F.D.N.Y.

PROBATIONARY FIREFIGHTERS MANUAL

VOLUME II

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FIREFIGHTING PROCEDURES (VOLUME 1)
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GLOSSARY

Air shaft	A space between buildings or between rooms within a building, provided for the purpose of admitting air and light to rooms.
Auto exposure	The extension of fire via the exterior of a building from a fire originating in the same building.
Beam	A horizontal supporting member in building construction.
Bearing wall	A wall of a building which carries any load other than its own weight.
Bulkhead	A structure on the roof of a building which is built over, or encloses, a stairway, elevator, dumbwaiter or other building facility.
Casement window	A metal framed window which opens outward.
Class "A" Multiple Dwelling	A building housing three or more families in which residency is permanent in nature.
Class "B" Multiple Dwelling	A multiple dwelling which is occupied transiently.
Coaming	A raised frame around a floor or roof opening or scuttle to keep water from running in.
Cockloft	A space between the roof and the top floor ceiling.
Column	A vertical structural member in building construction.
Compactor	A device for crushing garbage and trash into a small space prior to removal from the premises.
Drop ladder	A vertical ladder normally held in the "up" position at the second floor balcony of the fire escape by a hook. When this ladder is to be used, the hook is released and the drop ladder is lowered or dropped to the ground. Care must be exercised to make certain that no one is struck by this ladder when it is lowered or dropped to the ground.
Dumbwaiter	A device for collecting garbage from apartments by means of a wooden car which is raised and lowered in a vertical shaft by means of a rope and a pulley. In most buildings having these dumbwaiters they are no longer used.

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Exposure 1, 2, 3, 4 A system of designating the areas or buildings which are adjacent to the fire building. When facing the main entrance to the fire building, exposure 1 is in front of the building, 2 is on the left, 3 is to the rear of the fire building and 4 is on the right.

Fire escape An emergency means of egress from a building consisting of metal balconies on the outside of a building connected by ladders to each other and to the ground. Some fire escapes have a ladder from the top floor balcony to the roof.

Fire partition A partition provided for the purpose of protecting life by furnishing an area of exit, or refuge, and having a fire resistive rating of at least three hours as per the 1938 Building Code.

Fireproof construction A building in which the walls, floors, structural members and stairway enclosures are made of non-combustible materials with fire resistive ratings as required by the Building Code.

Fire stopping The closing of all concealed draft openings to form a barrier against the spread of fire with non-combustible materials.

Fire wall A fire-rated, smoke tight wall having protected openings designed to restrict the spread of fire from one structure to another, or from one area of a structure to another. It extends continuously from the foundation to, or through, the roof with sufficient structural stability to withstand the collapse of construction on either side of it. Fire Wall ratings for 1968 BC are rated at 4 hours; 2008 BC are rated at 2 or 3 hours depending on occupancy.

Gooseneck ladder A vertical ladder, the side rails of which are curved at the top. This type of ladder is sometimes used between the top floor balcony of a fire escape and the roof.

Raised roof A roof which is raised above the roof beams and supported by 2 x 4"s. The extent to which it is raised varies, so as to provide proper drainage on the roof. The result is a large open cockloft where fire can spread easily. Also called an inverted, reversed or rain roof.

Return The interior surface of a scuttle or skylight between the roof and the top floor ceiling.

Scissor Stairs Two enclosed stairs separated by rated walls contained in a single stair shaft. Scissor stairs may be installed in multiple dwellings rather than requiring stairs to be remote, and are counted as two separate exits. Scissor stair exit doors are placed no less than 15’ apart in the public hallway.

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Scuttle	An opening in the roof or a floor fitted with a lid.
Single room occupancy	A multiple dwelling in which the apartments, which were formerly rented to families, are now rented as single rooms to unrelated people. These occupants use the kitchen and bathroom facilities in common.
Unprotected steel	Steel structural components of a building which do not have any fire resistive covering such as concrete, brick, asbestos, etc.
Window gate	A folding gate placed at a window to prevent intruders from entering. The type that is approved by the Board of Standards & Appeals does not have any locks.

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MULTIPLE DWELLING FIRES
CHAPTER 1
March 24, 2022

NON-FIREPROOF MULTIPLE DWELLINGS

1. BUILDING DESCRIPTIONS

1.1 OLD LAW TENEMENTS BUILT BEFORE 4/12/1901 (Figure 1).

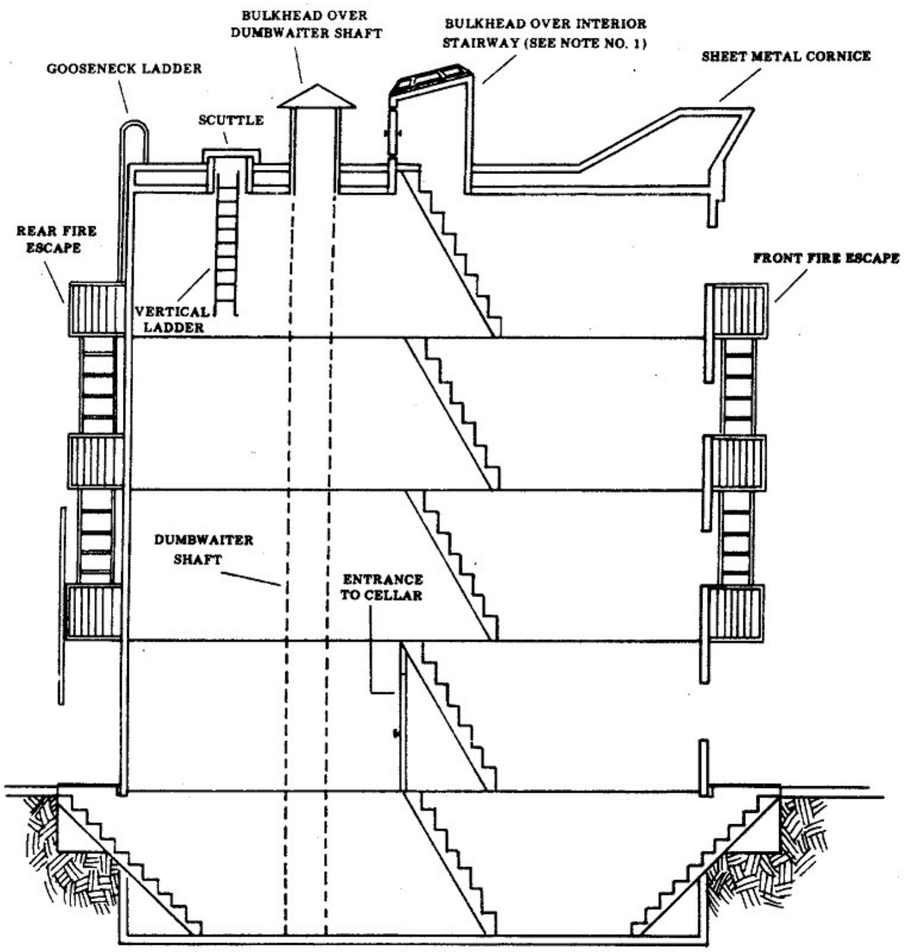

Figure 1

Note: OLT's usually have the interior stairway going up to the roof. Sometimes there is just a vertical iron ladder and scuttle opening, not both.

1.1.1 Three to seven stories in height.

1.1.2 20' or 25' wide.

1.1.3 50' to 85' deep.

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1.1.4 Class 3, non-fireproof construction (brick walls, wood floor beams and wood floors)

1.1.5 Two means of egress from each apartment, almost always consisting of an interior stairway and a fire escape.

1.1.6 Originally the stairs and stairway enclosures were wood with wood lath and plaster partitions. In 1934, most of these buildings were required to fire retard the stairway enclosure.

1.1.7 Stairway to the cellar is located inside the building, usually beneath the interior stairway.

1.1.8 To provide light and air to each room, shafts of different shapes and sizes are provided between adjoining buildings (Figure 2).

OLD LAW TENEMENT - TYPES OF SHAFTS AND FIRE ESCAPES

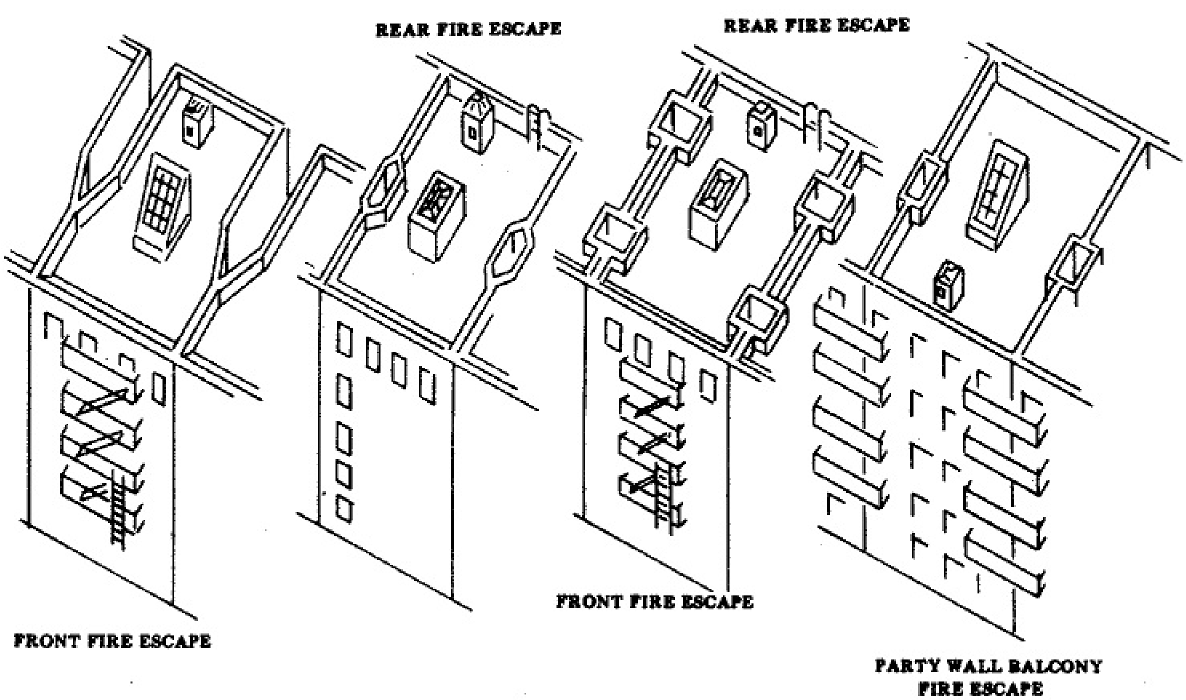

Figure 2

1.1.9 Two to four apartments on each floor.

1.1.10 When the building has four windows per floor and no front fire escape, it usually indicates two “railroad flats” with a rear fire escape (Figure 3). "Railroad flats" are those apartments which extend from the front of the building to the rear. There are usually two of these apartments on each floor. This does not necessarily apply to a corner building.

TYPICAL RAILROAD FLAT IN O.L.T.
2 OF THESE APARTMENTS ON EACH FLOOR

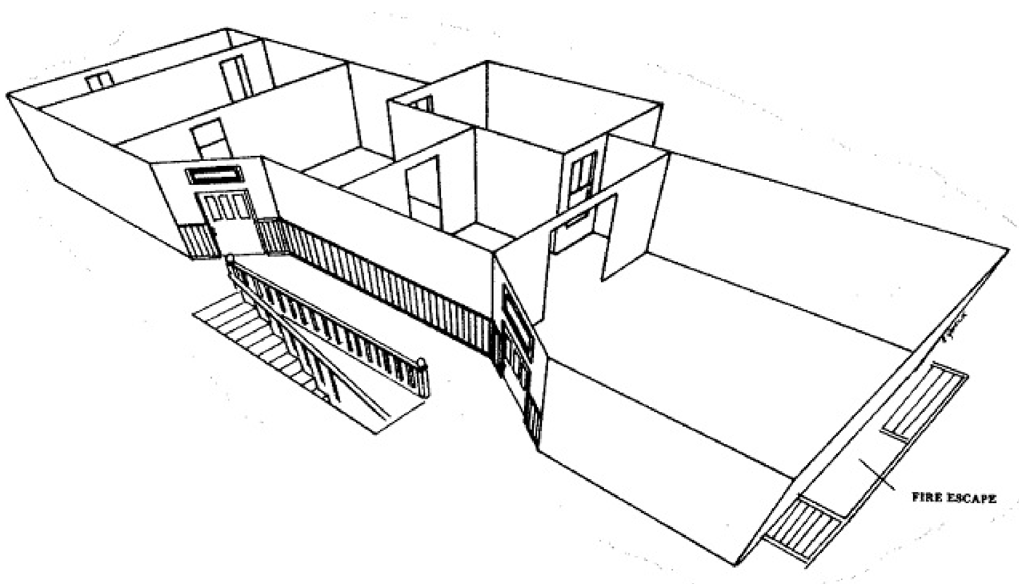

Figure 3

1.1.11 When the building has four windows per floor and a front fire escape, it usually indicates three or four apartments per floor with another fire escape in the rear.

1.1.12 The ever-dangerous exception to this is buildings with railroad flats whose secondary means of egress is a front fire escape. The absence of a rear fire escape is of major concern for the safety of the operating forces. This information should be relayed immediately to the IC.

1.2 NEW LAW TENEMENTS BUILT ON OR AFTER 4/12/1901 AND BEFORE 1916 (Figure 4).

TYPICAL NLT OF THE TYPE BUILT FROM 1901 TO 1916

SOME OUTSTANDING FEATURES

A. NO INSIDE ENTRANCE TO CELLAR
B. CONCRETE CELLAR CEILING

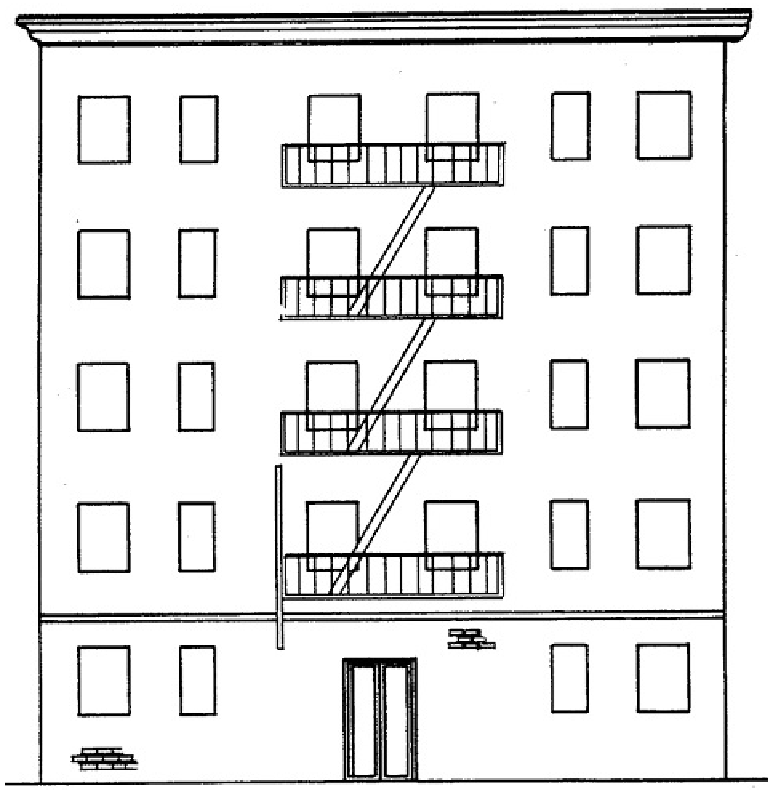

Figure 4

1.2.1 Generally six or seven stories high.

1.2.2 35' to 50' wide.

1.2.3 85' in depth.

1.2.4 Five to six apartments per floor.

1.2.5 The first floor (cellar ceiling) is of fireproof construction and unpierced.

1.2.6 The entrance to the cellar is by way of exterior stairs.

1.2.7 The interior stairs are fireproof and enclosed in partitions of fireproof construction. Apartment doors are constructed of fire-resistant materials.

1.2.8 The second means of egress is either another stairway or an exterior fire escape. The fire escape is more generally found in these buildings.

1.2.9 All interior walls and furred partitions are required to be fire stopped at each story.

1.2.10 Steel "I" beams were introduced to carry floor joists which couldn't span the enlarged floor areas. These steel beams generally were supported by masonry walls.

1.3 NEW LAW TENEMENTS BUILT BETWEEN 1916 AND 1929 (Figure 5).

TOP VIEW OF "H" TYPE BUILDING

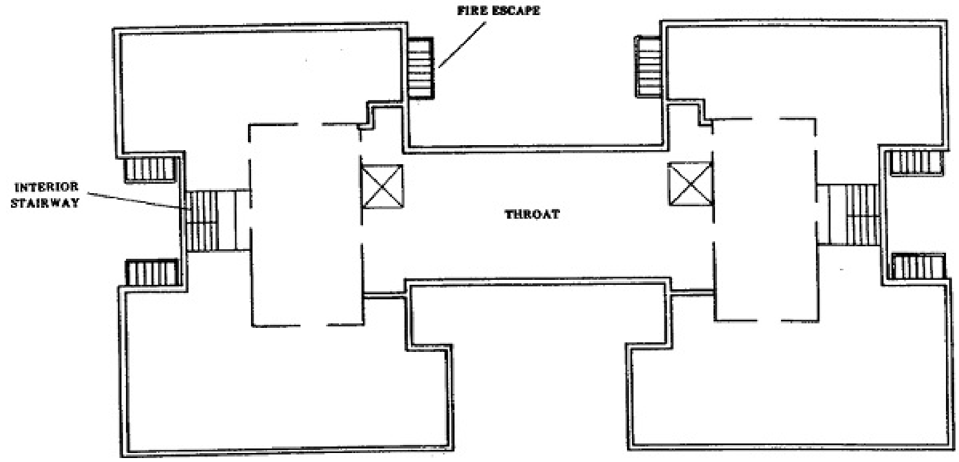

Figure 5

1.3.1 Much larger floor area, e.g. 150' x 200'.

1.3.2 To avoid being required to be built of fireproof construction, the floor areas were broken up into areas of 2,500 square feet or less. This means that between some apartments there are brick or fireproof partitions which effectively limit the horizontal spread of fire. However, these dividing walls only go as high as the ceiling of the top floor. This results in a very large undivided cockloft area. Fire can, and often does, spread throughout this large cockloft area.

1.3.3 Unprotected steel beams are used to support some of the wood floor joists. These steel beams are supported by vertical steel columns which run the height of the building.

1.3.4 Wooden floor joists (beams) run horizontally from brick wall to a steel girder or from a steel girder to a steel girder.

1.3.5 There are dumbwaiter shafts located in the apartments. In most cases, 2 apartments share 1 dumbwaiter. They terminate on the roof in a bulkhead with a skylight on top.

1.3.6 Elevators are provided in some buildings. They run from the cellar to the top floor with a bulkhead on the roof.

1.3.7 Entrance to the basement is by a side or rear door at that level, accessed via an exterior stair from the first floor, or through a passageway located in the front of the building.

Note: Because of the size and complexity of the larger type non-fireproof multiple dwellings, more complete descriptions are provided in Section 4.

1.4 NFP MULTIPLE DWELLINGS BUILT ON OR AFTER 4/18/1929 (Figure 6)

NEW TYPE CLASS "A" MULTIPLE DWELLING

**6 STORIES, 60' X 340', NON-FIREPROOF SUBDIVIDED ABOVE THE FIRST FLOOR INTO TWO AREAS 60' X 170', 2 STAIRS IN EACH SECTION.
22 APARTMENTS ON EACH FLOOR.
(ROOMS OF APARTMENTS NOT SHOWN)**

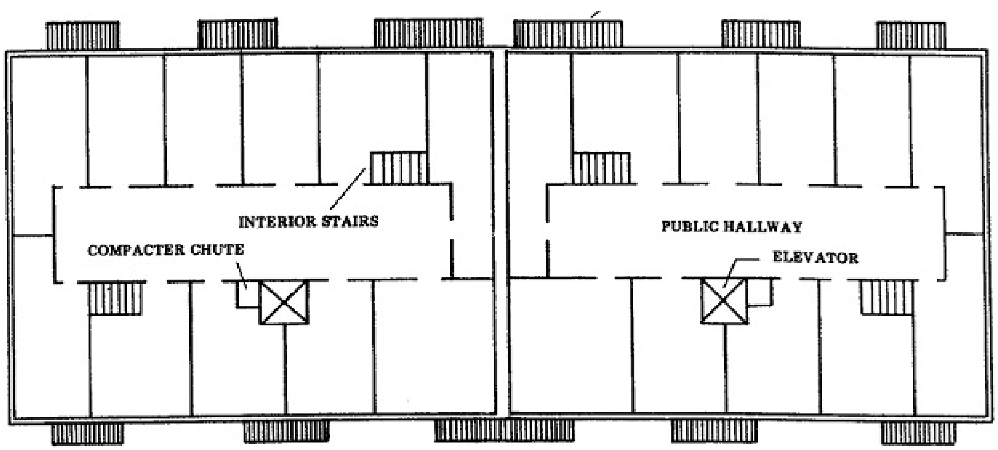

Figure 6

1.4.1 After 4/18/1929, multiple dwellings were no longer called "Tenements" and became known as "Apartment Houses."

1.4.2 It must be emphasized that no matter what protection a law provides, it cannot be depended upon entirely in these NFP buildings due to renovations, settling of the building, original shoddy workmanship or repair work.

1.4.3 Between 1930 and 1940, firewalls were required to be carried to the underside of the roof boards, and after 1940, to the top of the roof boards. These changes were designed to effectively reduce the size of the cockloft and limit fire spread.

1.4.4 The size of the area to be enclosed by fire walls is 3,000 square feet. This is larger than the area of an OLT, and it should be realized that there are several of these areas under one roof of later built multiple dwellings.

1.4.5 Buildings of extraordinary dimensions are now being built. They include various designs which, although they comply with the 3,000 sq. ft. rule, result in interior public hallways hundreds of feet long.

1.4.6 The limitation of height (six stories or 75 feet) for NFP residence buildings is bypassed for buildings that are built on grades. It is not unusual to find a NFP multiple dwelling seven, eight, or nine stories in height with no standpipe.

1.4.7 Fire escapes as a second means of egress are still very common. Some of the newer buildings may have 10 or more.

1.4.8 Some of the newer buildings have non storage garages below. A sprinkler system may be required, depending when the building was erected.

2. OPERATIONS

2.1 A great deal of information in this bulletin pertains to more than one type of building. To avoid repetition, the following material is applicable to Old Law Tenements and New Law Tenements:

2.2 *GENERAL OPERATIONS - ENGINE COMPANIES*

2.2.1 ***Redacted for PFS***

2.2.2 In most cases, the first line is stretched via the interior stairs to the location of the fire. The purpose of this line is to protect the primary means of egress for occupants evacuating the building and to confine and extinguish the fire. An exception to stretching the first line up the interior stairs may be made when fire is actively endangering civilians that are evacuating the building via windows or fire escapes and the immediate application of water from the exterior is needed to protect them. In this case the first line may be operated from the street to partially extinguish or knockdown fire and protect the fleeing civilians. ***Edited for PFS***

2.2.3 ***Redacted for PFS***

2.2.4 The second engine company to arrive will typically assist in stretching the first line.

2.2.5 Getting the first line in position and in operation is of vital importance.

2.2.6-2.2.10 ***Redacted for PFS***

2.2.11 Stretching of hoselines on the first alarm:

A. The first line stretched for a fire in a multiple dwelling should be stretched by way of the interior stairs. This positioning allows the first line to safeguard the stairway so that it can be used by the escaping occupants. The door to the fire apartment must not be opened while people are coming down the stairway from the floors above. When the safety of the stairway is assured, this first line may be advanced to extinguish the fire.

B. The second hoseline is also usually stretched by way of the interior stairs to the same floor as the first line. It is meant to augment the first line, if necessary. If not needed on the original fire floor, it is then advanced to the floor above.

C. The third line in the building should usually be stretched via the fire escape or rope stretch via a window. This is especially true in Old Law Tenements because the stairway is narrow and the stretching of a third line via the interior stairs would result in congestion and inability to move any of the hoselines.

D. ***Redacted for PFS***

2.3 GENERAL OPERATIONS - LADDER COMPANIES

2.3.1 ***Redacted for PFS***

2.3.2 Many times occupants of apartments in these buildings are reluctant to leave their apartments and afraid to answer the door. Every effort must be made to search all apartments that present a hazard to anyone therein.

2.3.3 All horizontal ventilation shall be coordinated and controlled by the Ladder Company Officer operating inside the area to be vented (fire floor, floor above, etc.). Discretion should be used in the breaking of windows in apartments not involved in fire. Efforts should be made to open these windows where possible and necessary. Windows should be opened 2/3's from the top and 1/3 from the bottom to allow heat and smoke to vent and cool air to enter the room. If there is a tolerable smoke condition and very little heat in the apartment and the windows cannot be opened, they should be left intact after a search has been made.

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2.3.4 Officers must not permit any material to be thrown out of windows unnecessarily. A member should always be posted in the yard or street below to prevent injuries to anyone from falling material. Examination of yard must be made before discarding any material into the yard to assure that no occupant has jumped into the yard prior to the arrival of Fire Department units. No material shall be thrown onto roofs of building setbacks or into narrow shafts.\

2.3.5 ***Redacted for PFS***

2.3.6 It is the responsibility of the first ladder company to arrive to determine the location of the fire, whether it is extending and, if so, where it is extending.

2.3.7 When serious fires occur on the top floor or in the cockloft, it may be necessary to cut openings in the roof to ventilate and stop the horizontal spread of the fire. Cutting holes in the roof must be done only when necessary. However, when the decision has been made to cut the roof, a sufficiently large hole should be made directly over the fire, using portable saws. If possible, the long side of the opening should be at right angles to the roof beams in order to provide venting of as many bays as possible.

2.3.8 When fire has extended into the cockloft, the Incident Commander should be notified immediately. The Incident Commander shall evaluate conditions and consider the use of the cockloft nozzle from either the top floor or the roof. An additional hoseline may also be needed to protect the cockloft nozzle operation.

2.3.9 Venting the windows on the top floor, in conjunction with the hole in the roof, will usually result in an indraft of fresh air into the top floor which will be carried out along with heat and smoke through the roof opening and permit advance of hoselines, search, rescue, and opening up operations.

2.3.10 When fire is on the top floor or in the cockloft, sufficient firefighters with hooks must be sent to the top floor to pull ceilings, especially for the larger non-fireproof multiple dwellings. It may be necessary to use engine companies for this purpose or to special call additional ladder companies.

2.4 ***Redacted for PFS***

2.5 MISCELLANEOUS PROBLEMS AND KEY POINTS

2.5.1 Members inside the building and not engaged in operations should remain in the hallways on the floors below the fire and not crowd the stairs and landings.

2.5.2 Arsonists possess knowledge of fire travel and the use of accelerants. The use of accelerants can create some unusual fire conditions with an explosive spread of fire after units have been operating for a period of time in the building.

2.5.3 In some instances, fire on a lower floor may not be discovered until operations have started on the upper floor fire. Then the lower floor will suddenly erupt with intense fire endangering the members above. One of the best defenses for this problem is the stretching of a back-up line as soon as possible. All members must be aware of any unusual condition or odor as they are operating, whether it is while stretching, opening up, searching, supervising, or resting. Wet or stained ceilings or floors, especially in areas where units were not operating, could be from fuel or diesel oil. Other tell-tale signs are plastic bottles, balloons, streamers, etc.

2.5.4 The first officer inside the fire building must make known to the IC and other members the manner in which the floors and apartments are designated, i.e., whether numerically or alphabetically. Apartment 2E could be on the second floor or on the fifth floor.

2.5.5 ***Redacted for PFS***

2.5.6 Doors to the apartments may be of the metal clad type, some with steel frames. The locks (as many as three on one door) are very sturdy and of various designs. Heavy chains with hardened padlocks, as well as bars, are placed across doors for further security while the apartment is occupied. In most cases, these doors are difficult to force open and it may be advantageous to seek other means of entrance, such as through walls from the adjoining apartment or from the fire escape. If many apartments are to be searched, it may speed up the process if an effort is made to find a person who may have keys to the apartments. These people may also be able to supply information about other occupants. Windows may be barred by protective gates. Many windows on fire escapes are so equipped. With sturdy locks and the construction of gates, they are difficult to force. Some of these windows may be barred and some may be covered with plywood. People are literally locking themselves in "steel cages" for security reasons and our task is to penetrate this defense.

2.5.7 Members must be aware that when operating near windows, the window sill may be low and debris may be piled high beneath it; and under conditions of poor visibility at a fire, there is a danger of falling out of the window.

2.5.8 Gas Meters:

A. Gas meters are usually in the cellar but they may also be found in apartments and in public hallways. ***Edited for PFS***

B. When gas meters are burning, they should be allowed to continue to burn until the gas supply is shut off.. Combustible material near the burning meter should be wet down while waiting for the gas supply to be shut off. ***Edited for PFS***

2.5.9 Exterior Streams

A. There are a number of situations in which it may be necessary for a hoseline to be charged and operated from the exterior of the fire building. While this is not a primary tactic in the FDNY, the proper application of water from an exterior stream can facilitate the rapid advance of interior attack hoselines in conditions that may have otherwise been untenable.

B. ***Redacted for PFS***

F. See Engine Company Operations, Chapter 4 for more information where exterior water application tactics are explained in detail.

3. OLD LAW TENEMENTS

3.1 GENERAL OPERATIONS

3.1.1 The severe life hazard in these buildings, because of the crowded living conditions and the ease with which fire can spread, requires prompt and efficient stretching of hoselines by engine companies.

3.1.2 At least the first length of hose should be brought up to the fire floor and the hose strap attached to prevent hose from slipping back down the well hole of the stairway.

3.1.3 If there is fire in two apartments on a floor or fire involves an apartment from front to rear, two lines may be needed on that floor.

3.1.4 The absence of a fire escape on the front of an OLT will usually indicate that the apartments are railroad flats. That is, apartments with the rooms arranged single file from front to rear, with a single fire escape in the rear and two entrance doors in the interior hall. Corner buildings may be exceptions to this general rule.

3.2 OPERATIONS AT CELLAR FIRES

3.2.1 - The first hoseline should be stretched through the front door, then to the cellar via the interior stairs to extinguish the fire. If the first hoseline is stretched to the interior and cannot be advanced down to the cellar due to the intensity of the fire, it shall be used to protect the public hall, interior stairs, and the first floor, allowing the occupants to leave the building.

3.2.2 Exception: When an exterior entrance exists, especially in the front of the building, that entrance should be utilized if it provides the quickest access to the cellar to extinguish the fire. The use of an exterior cellar entrance at an advanced cellar fire is frequently safer and more efficient to initially attack the fire.

3.2.3 All horizontal ventilation shall be coordinated and controlled by the Ladder Company Officer operating in the area to be vented (fire floor, floor above, etc.). Initial vertical ventilation shall be coordinated and controlled by the Ladder Company Officer operating in the fire area (fire floor). ***Edited for PFS.***

3.2.4 First Hoseline

A. When the first hoseline advances down the interior stairs, the second hoseline will be stretched to back-up the first hoseline and will be positioned at the top of the interior stairs. If the first hoseline does not advance down the interior stairs, the second hoseline will be stretched into the cellar via an exterior cellar entrance to extinguish the fire.

B. When the first hoseline is stretched to the cellar by way of an exterior entrance, then the second hoseline should be stretched to the first floor to protect the public hall, interior stairs, and the first floor, allowing the occupants to leave the building, and the ladder company to perform VES.

3.2.5 Fires in cellars may quickly spread to the upper parts of the building since OLTs do not have the advantage of a fireproof cellar ceiling, such as is found in buildings erected at a later date. ***Edited for PFS***

3.2.6 The possibility of living quarters in the cellar cannot be ruled out. This area must be promptly searched for occupants.

3.3 OPERATIONS AT STORE FIRES:

3.3.1 Store fires in OLTs may involve a large amount of combustible material. The first hose line should be stretched to the store and a second hose line stretched to the entrance hallway. Depending on the size of the fire area and the fire conditions encountered, the use of a 2 ½” hoseline may be considered. However, a 1 ¾” hoseline may be more appropriate for fires in smaller commercial occupancies common in OLT’s. When assured that the second line is not needed on the first floor, it may be advanced to the floor above the fire.

3.3.2 A charged hoseline must be ready before the store is ventilated. It is especially important that no plate glass windows be broken without a charged line being ready.

3.3.3 ***Redacted for PFS***

3.3.4 Fire issuing from stores may be directly under a fire escape and people attempting to use the fire escape may be in great danger. It is very important to position a hoseline to protect the people on the fire escape.

3.3.5 ***Redacted for PFS***

3.3.6 Stores in OLTs may have a door which opens into the public hallway on the first floor. The first floor public hallway should be examined immediately to determine whether the means of egress for the occupants of the building is in danger from the store fire. If so, a hoseline should be positioned to protect the interior stairs.

3.3.7 Store owners may use the rear of the store as their living quarters, so it is important to search the rear of stores as soon as possible. Access to the rear will be extremely difficult because of iron bars on windows and the interior hall rear door possibly nailed shut.

3.4 OPERATIONS AT APARTMENT FIRES:

3.4.1 It can be expected that fire will extend quickly to the floors above by way of pipe recesses, partitions, flooring, shafts, and various hidden voids. This is particularly important in Old Law Tenements due to many bathroom alterations.

3.4.2 Fire may also extend quickly to adjoining buildings by way of shafts between buildings. In some cases, there are two or three shafts between buildings and then the problem of stopping extension of fire to the exposures becomes very difficult. The roof firefighter, especially, should report, as soon as possible, the layout of shafts between buildings and whether there is any fire visible in these shafts.

3.5 OPERATIONS AT STAIRWAY FIRES:

3.5.1 ***Redacted for PFS***

3.5.2 The first hoseline should be stretched up the stairway, operated to extinguish fire, shut down and advanced further up the stairway. When possible, the line should be operated up the well hole to cool off the hall and stairs above. This procedure should be repeated until line is advanced to the top floor. A second line should follow to finish up extinguishing operations and to serve as protection for members advancing the first line. Apartments must be checked for possible extension of fire into them.

3.5.3-3.5.4 ***Redacted for PFS***

3.5.5 Portable ladders may be placed over weakened, damaged or burnt-out stairs in order to safely gain access to upper stories of a building. The preferred ladder for this is the extension ladder, rather than a straight ladder. The shorter nested length allows easier maneuverability and positioning, while the adjustable length should insure proper coverage of the entire stair span. The butts shall be supported by the floor at the base of the stair, while both upper beams at the tip of the ladder should rest on the upper floor landing for proper support.

3.6 OPERATIONS AT TOP FLOOR FIRES:

3.6.1 ***Redacted for PFS***

3.6.2 It may be necessary to cut a hole in the roof over the fire if the heat and smoke conditions are too severe or if the fire has extended into the cockloft.

3.6.3 ***Redacted for PFS***

3.6.4 The entire top floor must be thoroughly searched and examined because of the lack of fire stopping in these buildings.

3.7 OPERATIONS AT AIR AND LIGHT AND DUMBWATER SHAFT FIRES:

3.7.1 Windows opening on shafts may provide means for fire to extend into a building or into two buildings. This is especially true in warm weather, when windows may be open. ***Edited for PFS***

3.7.2 A hoseline should be stretched to the nearest point from which water can be directed onto fire in the shaft. Sufficient hose must be stretched to reach the upper floors of the building.

3.7.3 A second hoseline may be necessary if it appears that fire might have extended into the adjoining building.

3.7.4 In some cases, the base of the shaft may be the roof of a store or ceiling of a cellar and the fire may burn down into the store or cellar.

3.7.5 Shafts may be open or covered. It is important to ventilate those shafts which have skylights or any other covering.

3.7.6 For fires in rooms in the vicinity of a shaft, after the fire in the room has been knocked down, the line should be operated into the shaft in order to knock down the shaft fire before continuing through the apartment for knockdown and final extinguishment.

3.8 MISCELLANEOUS PROBLEMS AND KEY POINTS

3.8.1 Possibility of Collapse:

A. Because of the short span of floor beams (25'), and the fact that the floors are not heavily loaded, the collapse of floors in OLT's is usually not a problem.

B-D. ***Redacted for PFS***

3.8.2 Spread of Fire to Exposures:

A. At fires in OLT's, the danger of fire extending to exposed buildings is great. Exposures 2 and 4 are in greatest danger because they are usually closer to the fire building and, if they also are OLT's, then the layout of the shafts between the buildings makes it easy for fire to spread to the adjoining buildings.

B. Buildings in the rear are usually not as seriously exposed because they are anywhere from 10 to 25 feet or more away from the OLT. ***Edited for PFS***

3.8.3 OLT's Converted to Single Room Occupancies:

A. It is no longer permitted to convert OLT's to Single Room Occupancies, but thousands of such buildings have been converted and are still being used as Single Room Occupancies (SRO's).

B. In these SRO's, the individual rooms in each apartment are rented to occupants and the bathroom and kitchen facilities are used by all of the occupants of the apartment.

C. Each individual room is equipped with a lock; many with padlocks on the outside. Just because a door is found padlocked, do not assume that the room is empty. Someone may be locked in the room. Entry must be made and all rooms searched.

D. The layout of the rooms must be arranged so that each occupant has access to both means of egress (stairs and fire escape) without having to go through another person's room.

E. These buildings require sprinklers in each room and in the stairway. The sprinkler system has no roof tank; it is supplied from the water main in the street. The system cannot be supplied by the Fire Department.

F. These SRO's also require an interior alarm system to warn the occupants of fire. Exit lights and signs must be provided.

3.8.4 Rehabilitated OLT's:

A. ***Redacted for PFS***

B. In some areas, two or three adjacent OLT's have been extensively altered and interconnected to create one building with one street entrance. In many instances, a new brick front is placed on these interconnected buildings giving the appearance of a newly constructed multiple dwelling. In reality, the buildings still retain all of the original avenues for rapid fire spread common to an OLT, e.g., interior shafts, little or no fire stopping, dumbwaiter shafts, etc.

3.8.5 Severe Life Hazard in OLT's:

A. Because of the combustible nature of the building contents and components, and the many voids, fires in OLT's can spread rapidly, endangering the occupants of the building.

B. The interior stairway may be unusable because of fire, heat and smoke in the stairway.

C. Fire escapes may be unusable because fire is issuing from windows which open onto the fire escape.

D. There may be a delay in occupants becoming aware of a fire, especially at nighttime.

E. For these reasons it is very important to search and evacuate the building promptly. Particular attention must be directed to an initial search of the top floor apartments. Regardless of the fire location within the building, a substantial fire will tend to create a heavy smoke build-up in these top floor apartments.

3.8.6 Party Wall Balcony Fire Escapes in OLT's

A. Some fire escapes in OLT's do not have ladders connecting fire escape balconies. Instead, they are arranged so that the fire escape balconies connect two or more buildings. In the event of fire, the occupants would use the fire escape balcony to escape to an adjoining building.

B. Some problems may arise with this type of fire escape:

1. Firefighters cannot use the fire escape to go from one floor to another for ventilation and search purposes.

2. The fire escape cannot be used to gain access to the roof.

3. The fire escape cannot be used for stretching hoselines.

4-6. ***Redacted for PFS***

C. In the event of a serious shaft fire between buildings, and major extension into the adjoining building, many occupants could be found stranded on the party balconies. These people would be in a very dangerous situation and it may be extremely urgent to rescue them by ladders or life saving ropes. An even more serious situation is if the party balcony fire escapes are in the rear of the buildings, where it will be much more difficult to rescue occupants.

D. The roof firefighter must inform his/her officer and the Incident Commander of the presence of party wall balconies in the rear of the building. ***Edited for PFS***

3.8.7 Rear Tenements

A. Some very old OLT's are found in the rear of other buildings. Usually, it is necessary to go through the front building in order to get to the rear building.

B. These rear tenements are small in area, may be of frame or non-fireproof construction, and may range from two to five stories.

C. The distance between the front building and the rear building varies but is somewhere between 10 to 25 feet usually.

D. The rear buildings are frequently not visible from the street. This may result in a delay in discovery of fire in a rear tenement, especially at night.

E. Raising ladders at these rear tenements is a problem. Portable ladders may have to be carried through the hallway of the front building. We may find the ladder can not be maneuvered to a standing position in this instance. Portable ladders may be raised via utility rope up and over front building, lowered to yard in standing position and maneuvered to rear building for rescue work. Emergency measures may require bridging from front tenement to rear roof for ventilation purposes or rescue.

F. ***Redacted for PFS***

4. NEW LAW TENEMENTS

4.1 INTRODUCTION

4.1.1 This section includes all non-fireproof multiple dwellings built after 1901. Emphasis will be on the larger buildings, historically referred to as "H type" since they are our greatest problem (Figure 7). Although there are variations in the shapes of these buildings, such as "U", "O", "V", Double "E" and the newer, larger rectangular buildings, the problems and solutions are similar.

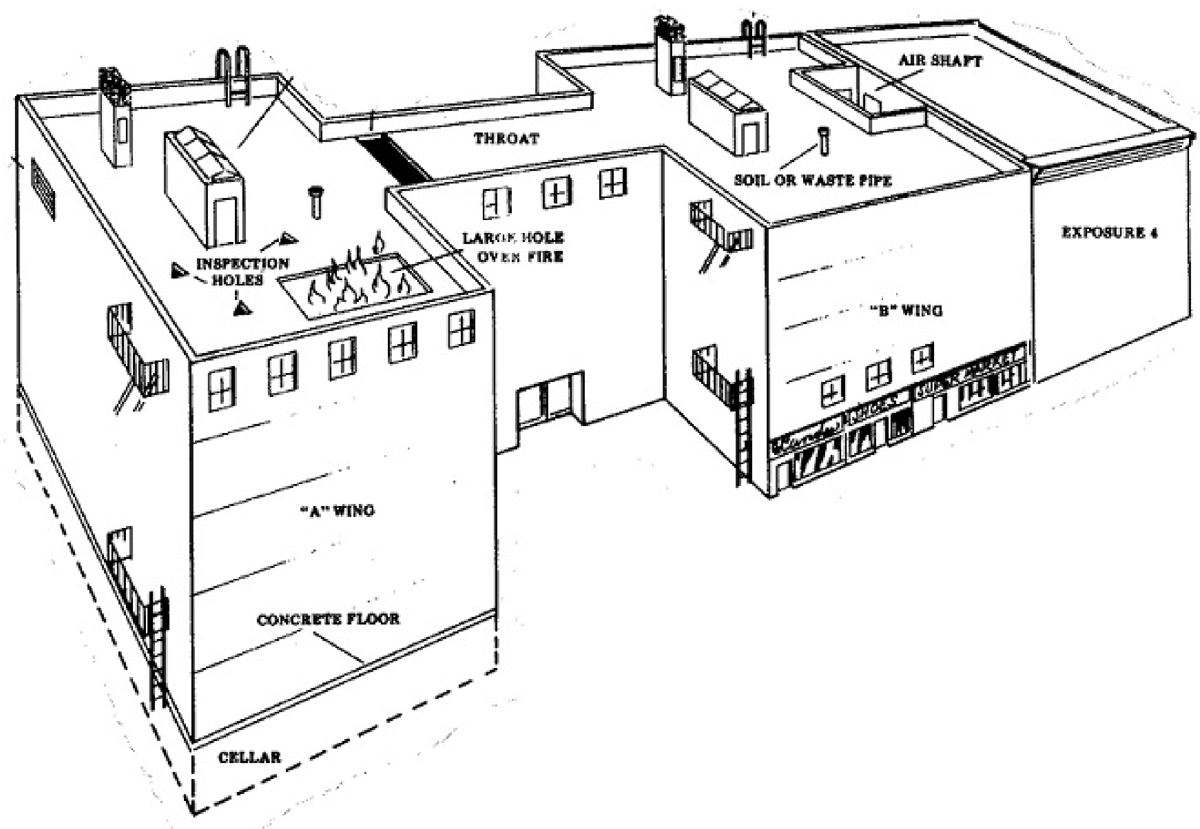


Figure 7

4.1.2 A fire in an apartment of an "H type" building is of much greater potential than a similar fire in an apartment of a smaller building. An apartment in an "H type" building is usually larger, irregularly shaped and has long private halls. Once a major fire develops, maintaining control of the fire floor becomes difficult because of the large number of apartments with their complex room layouts.

4.1.3 Generally, in the design of the "H" type, stairs and living units are located in the vertical lines of the letter "H". Elevators and a large entrance lobby will be found in the "throat" (that portion which connects the wings of the building). During its period of popularity in building, namely the 1920's and 1930's, the "H" type design was used to connect many sections of housing together to form large residential complexes of apartments which encircled inner courts or gardens. These large, non-fireproof multiple dwellings present tremendous fire potential due to the large areas that fire can spread to within the structure. New Law Tenements were constructed in the "H" type design beginning about 1916. In 1929, with the passage of the New York State Multiple Dwelling Law, the term "tenement" was no longer used for newly constructed buildings. The "H" type design was continued, and these buildings are now called apartment houses. ***Edited for PFS.***

4.2 CONSTRUCTION FEATURES:

4.2.1 Construction of "H" type buildings has remained basically the same for over 100 years. The exterior walls are masonry, and generally of brick. The floors, roof and interior framing are partly or wholly of wood. Columns and girders are unprotected steel. Vertical exits and shafts have various degrees of fire retarding protection.

4.2.2 The "H" type design of residence buildings differs from the older tenements and the newer high rise multiple dwellings in that there are three structural elements to support the structure: masonry bearing walls, wood beams that support the floors and roof, and structural steel columns, beams and girders that connect and support sections of the "H" type building.

4.2.3 In contrast, older tenements generally only have two: masonry and wood. The introduction of steel into the "H" type design had the following advantages: it allowed girders to support floors instead of a costly bearing wall of brick; the consistency of steel structural characteristics allowed a fairly exact moment of failure to be determined, thereby eliminating costly overbuilding required by the use of safety factors when using less predictable materials, such as masonry and wood.

4.2.4 The ability of steel to be connected permitted the coupling of several building sections to form the "H" type design of residential housing.

4.2.5 Structural steel concerns in "H" type structures:

A. Steel, when heated, expands and substantial elongation can occur at a fire. This elongation can cause a wall to bulge, move, or even collapse, if the steel is set within the wall.

B. Steel, when heated to higher temperatures during a fire, may fail. Floor beams supported by such failing steel will fall to the floor below.

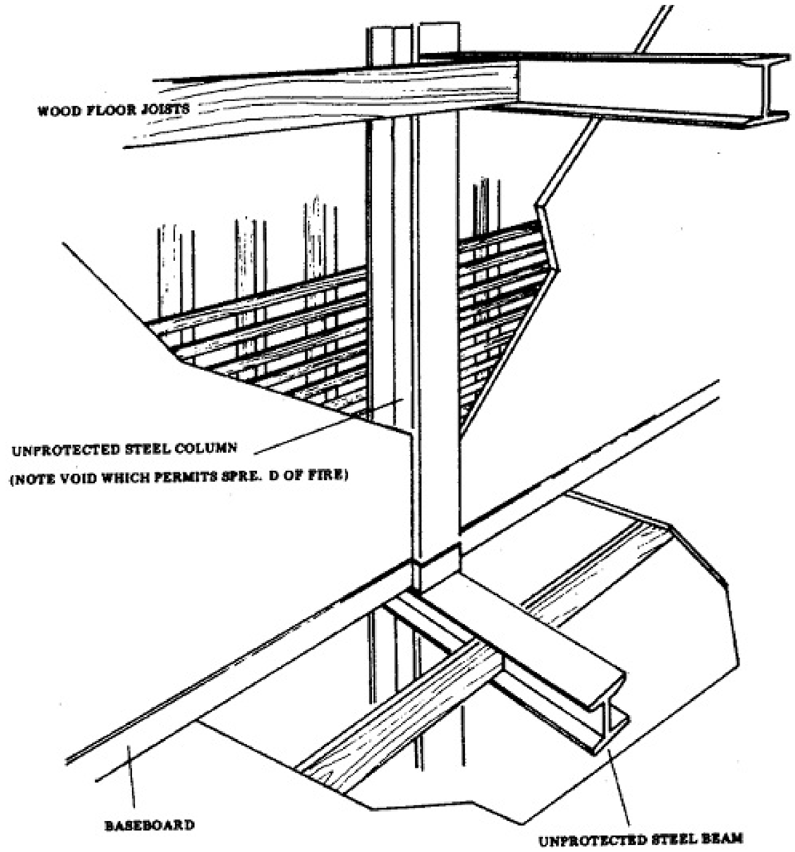
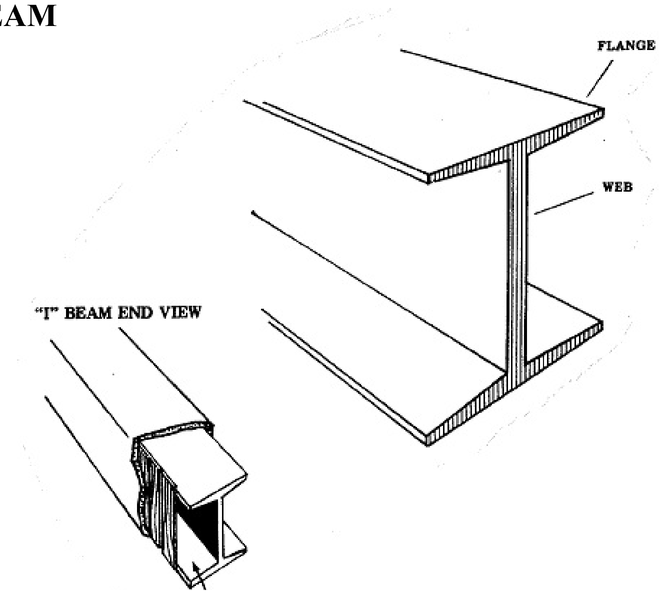


Figure 8

C. Steel columns are vertical structural members designed in an "H" shape; they are also known as channel rails. When located in the inner framework of a building, may extend from the first floor up into the roof space or cockloft area (Figure 8). The space between the enclosing wood framework and column leads up into the cockloft and many times spreads fire, heat or smoke to this roof space (Figure 9).

D. Steel girders are horizontal structural members designed in an "I" shape; they are also known as "I" beams. I" beams will transmit fire, heat or smoke horizontally into adjoining areas.

"I" BEAM



Enclosing material, usually wood lath and plaster.
Notice area in web open forming a flue

Figure 9

4.2.6 The Cockloft

A. The "cockloft" is a large, concealed void between the top floor ceiling and the underside of the roof boards. This space, not large enough to be called an attic, has no means of entry. Once a fire occurs within the cockloft, it may spread undetected for some time. When it finally does make itself apparent, by smoke drifting down to the top floor apartments or by burning through the roof, the entire roof space may be involved in fire. This area is required to be subdivided, in some cases by firestopping, to prevent the entire void from becoming engulfed in fire. However, this firestopping is sometimes defective and fails to restrict the fire.

B. The cockloft of an "H" type building if improperly firestopped, will become a very large, undivided area with the fire potential of a lumber yard. The fire loading of this area is considerable; roof beams, wood roof boards, wood framework of the ceiling below, wood lath backing for the plaster ceiling and wood bracing connecting it all. (Figure 10)

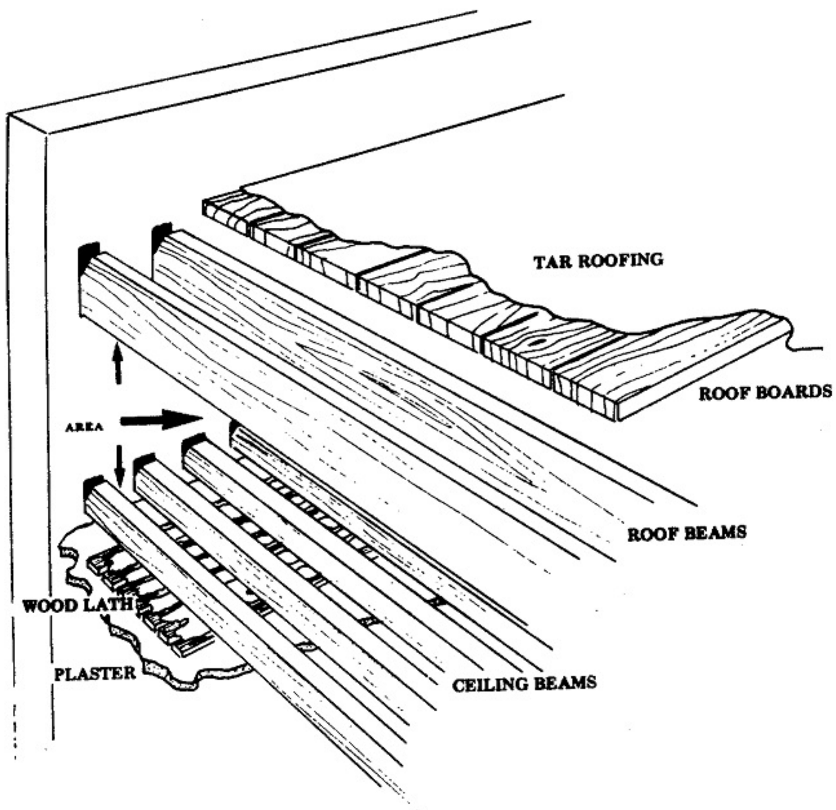


Figure 10

C. The most common roof has the top floor ceiling several feet below the main roof beams. The roof boards are fastened directly to the top of the roof beams. This provides for a sturdy roof. In the inverted, raised or reversed roof, the main roof beams are at the ceiling level and a framework is raised above these beams with the roof boards attached. This roof is normally springy, but it permits the roof to be pitched so that water will run off. (Figure 11)

D. When there is a heavy body of fire in the cockloft, expect at least a partial collapse of the inverted roof. Since the inverted roof is constructed of 2 x 4's, they will burn away faster than the main roof beams and the roof section will come to rest on these beams.

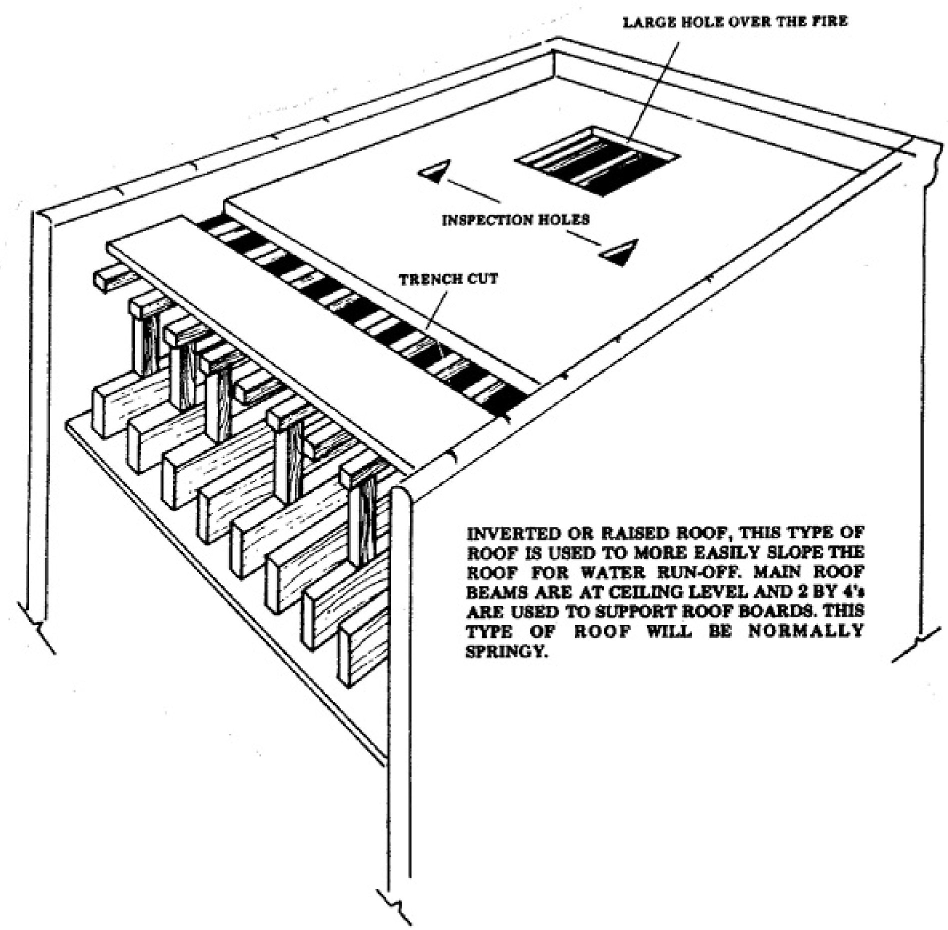
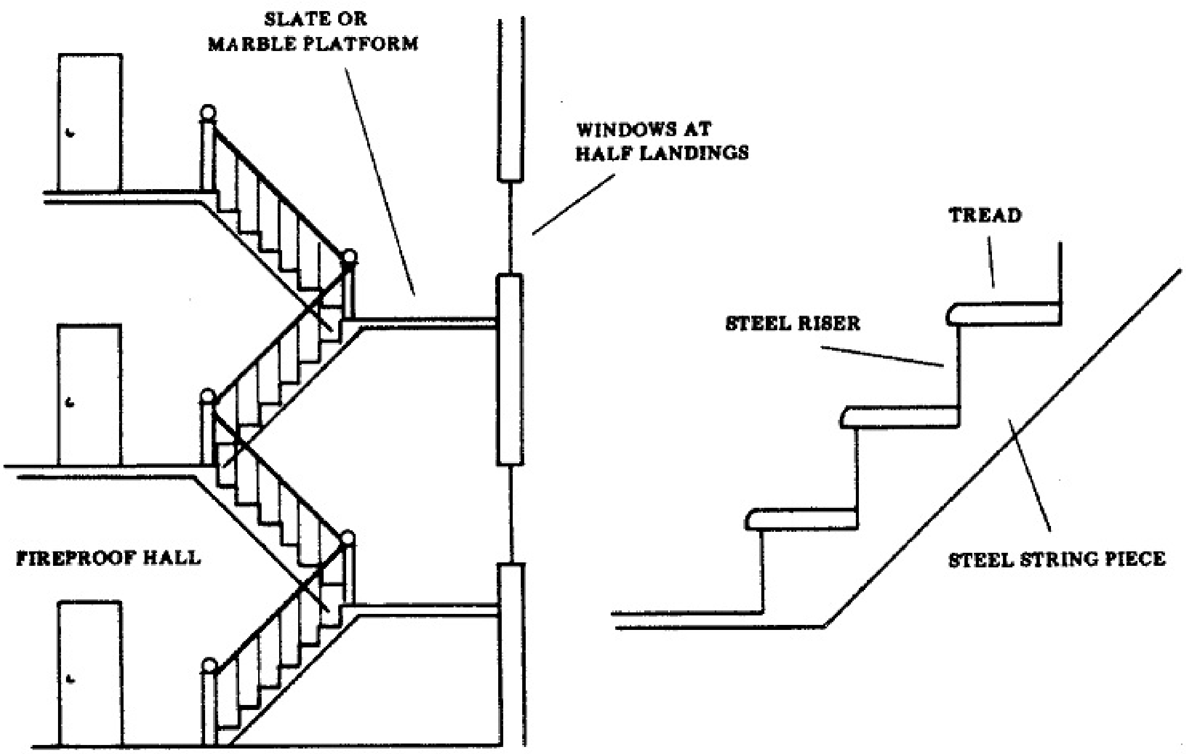


Figure 11

4.2.7 Stairways

A. The number and location of stairways do not adhere to a common pattern. Some stairways will be found near the front entrance; others will be some distance away. In some instances, there will be no access from one wing to another or from one part of the building to another. Generally, on the first floor, there is access between wings. Stairway construction (Figure 12) is usually of the return type, some with no wells, making hoseline stretches more difficult. Some stairways will have windows at the half landing facing the street, courtyard or front entrance courtyard. There are usually two to four independent stairs in "H" type buildings as follows: (Figure 12A)

Figure 12



STAIR CONSTRUCTION

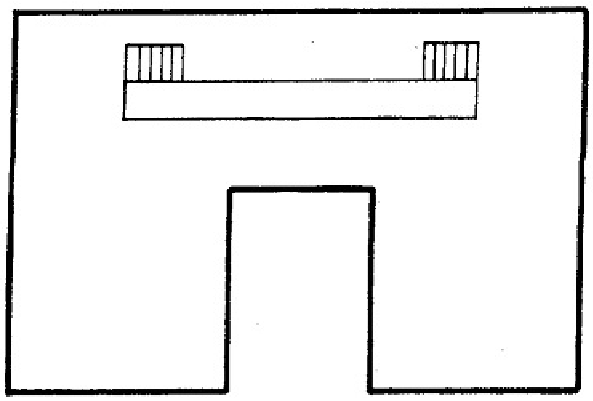
1. STEEL RISERS AND MARBLE OR SLATE TREADS.

2. THE FRAMEWORK OF THESE STAIRS IS STEEL WITH MARBLE OR SLATE TREADS AND PLATFORMS SUPPORTED ONLY AT THE EDGES

3. WHEN HEATED OR SUDDENLY COOLED BY WATER OR SUBJECTED TO A SINGLE MEMBER'S WEIGHT, THE PLATFORMS AT THE HALF LANDINGS CAN COLLAPSE WITHOUT WARNING.

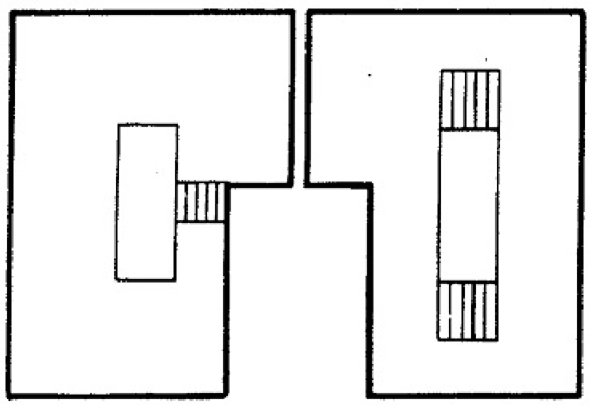
Figure 12A

LAYOUTS - STAIRWAYS AND PUBLIC HALLS



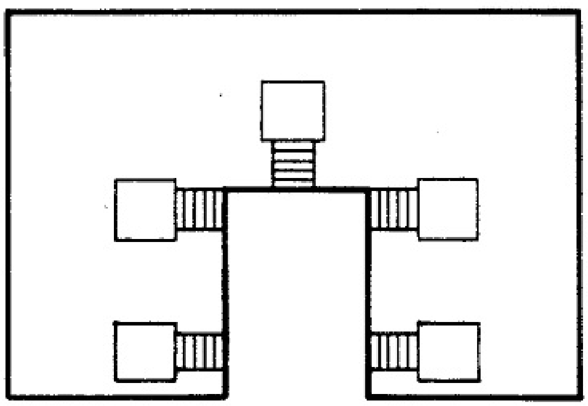
TRANSVERSE STAIRS

Located at points remote from each other but a person can go from one stairway to another via public hall on all floors of the building. An asset to fire operations



WING STAIRS

These stairs, one or two in a building, are located in each wing. There is no connection to the other wing. The diagram represents half a building showing each type.



ISOLATED STAIRS

Usually have individual entrance. Floor landings are limited. No connection to other.

1. *Transverse stairs*-these stairs are usually located at points remote from each other, but a person can go (transverse) from one stairway to another via the public hall on all floors of the building. Their layouts ease evacuation, assist in examination and permit lines to be stretched to any apartment, via any stairs. They are a tremendous asset in heavy fire operations on the top floor.

2. *Wing stairs*-these stairs, one or two, are located at the front and rear of each wing. The floor landing leads to the public hall that will join the other stairs in that wing only (if two stairs). The public hall does not transverse to the other wing of the "H".

3. *Isolated stairs*-these stairs are usually identified by their individual entrances. Floor landings are recognized by their limited space and absence of a public hall. Access is limited to the apartments served by the stairs, and there is no access to other wings and hoseline operations are confined to their limited area.

4. It is essential that once the stair layout is recognized, this information be relayed by handie-talkie. This is vital in the size-up picture.

4.2.8 Interior Shafts and Voids

A. *Channel Rails*-to provide stability to these large "H" shaped buildings, a steel framework is employed. Steel columns are erected vertically from the foundation to the cockloft. Their locations vary according to the architects design and are at times difficult to find. They are often located in voids behind closets. Our main concern is that they are not fire stopped. This provides a chimney effect for fire travel from the first floor to all apartments above and to the cockloft.

B. These vertical voids, about one foot square, may be larger when the void is built to include waste and water pipes. When the fire is knocked down and opening up begins, areas where the lath has been burned must be examined for the presence of these columns. If detected, locations above and below the fire must be checked immediately. (Figures 8 and 9)

C. *Pipe Recesses*-the danger of allowing vertical fire travel is well known and require little emphasis. A note of caution: repairs by local handymen may have been made around pipe recesses or light fixtures. These poorly repaired openings may facilitate fire entering walls or ceilings. Waste pipe recesses exist wherever a kitchen or bathroom exists. Their presence may be picked up first by the roof firefighter who notes the locations of exposed waste pipes atop roofs which line up with the fire below. If the pipe is hot to the touch, a top floor examination is required and notification made to officer and the IC.

D. *Closets*-Their construction atop one another sometimes provides a vertical artery. Workmanship may be shoddy in closets, creating openings for fire travel. Remember also that they are usually back to back with other closets. This may lead to horizontal, as well as vertical extension.

E. *Dumbwaiter Shafts*-These are sometimes used as voids for new electrical wiring or water pipes. The openings where these wires or pipes enter the apartment may not have been fire stopped and will allow a shaft fire to readily enter the apartment. (Figure 13)

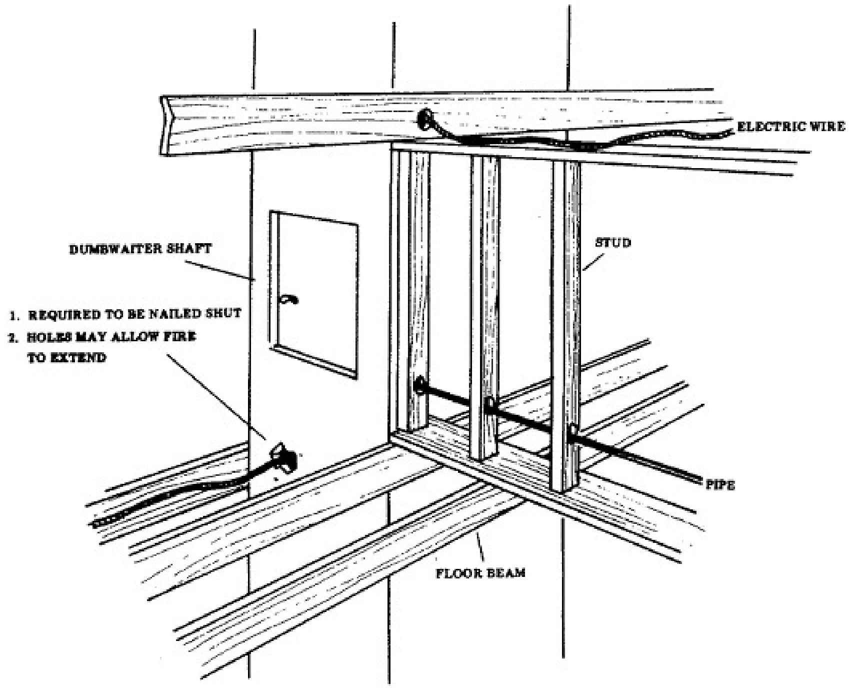


Figure 13

F. *Voids*-In unusual shaped buildings, voids may be created by squaring off rooms or hallways. These voids run the entire height of the building and will spread fire either up or down. (Figure 14)

4.2.9 Apartment Layouts

A. In the past, professional occupancies, such as doctors and dentists were found on the first floor of the "H" type buildings. It was common to find two apartments joined by inserting doorways in the common partition wall of the adjoining apartments. Today, this practice has become more common for a variety of reasons other than the original intent and can now be found on any floor. This type of alteration creates the possibility of heavy fire conditions throughout two apartments. Extreme caution must be exercised and units must be alert to the possibility of two apartments converted into one.

B. The number and layout of apartments in a wing vary greatly from building to building. Some apartments may have long, interior hallways. The rooms of one apartment may be behind another apartment, in "L" or "T" shaped form.

C. Except for the first floor, which contains the lobby, upper floor apartment layouts are generally identical in each vertical line.

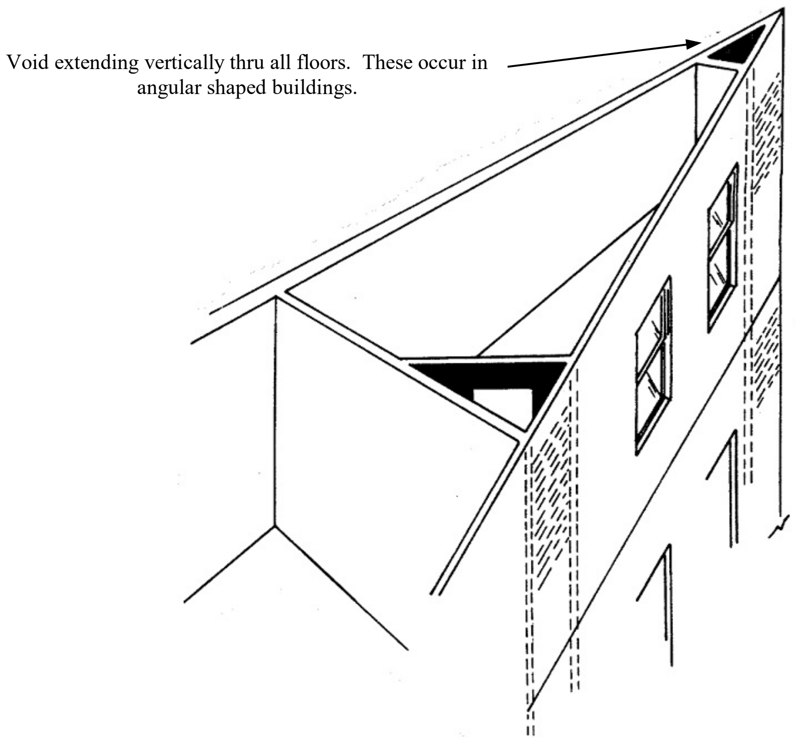


Figure 14

4.2.10 Floor and Apartment Designation:

A. The manner in which the floors and apartments are designated (numerically or alphabetically) has no set rule and can differ with each building. Some consider the floor one flight up as the first floor and are numbered accordingly. In the Fire Department, the ground floor is considered the first floor. As shown on the diagram below, apartment 2E could be on the second, third, fifth or sixth floor depending on the system used:

B. Apartment Designations

	"E" Line Apts.		"2" Line Apts.	
6th Floor	5E	6E	2F	2E
5th Floor	4E	5E	2E	2D
4th Floor	3E	4E	2D	2C
3rd Floor	2E	3E	2C	2B
2nd Floor	1E	2E	2B	2A
1st Floor	E	1E	2A	2

C. ***Redacted for PFS***

4.2.11 Entrance to rear yards may be gained through passageways from the street or through interior doors located on the first-floor public hallway to exterior stairs.

4.2.12 Fire escapes may be found on one, two, or all sides of the building. Some may have gooseneck ladders to the roof; others may not. Gooseneck ladders to the roof will not be found on fire escapes on the street side or on those in the street side courtyards.

4.2.13 The cellar ceiling is of fireproof construction. Openings below the first floor for pipes, conduits, ducts, dumbwaiter and elevator shafts, must be protected by fireproof doors and assemblies and such doors must be self-closing. Entrance to the cellar is by exterior stairs.

4.3 GENERAL OPERATIONS - ENGINE COMPANIES

4.3.1 It is of vital importance that, before a line is committed in an "H" type building, the exact location of the fire be determined. Care must be taken to avoid using a wrong stairway. Determine if the wings are connected above the first floor. Communication is essential. You must know where you are going before you start.

4.3.2 Many times just stretching a line to a fire apartment will prove difficult. It may require many lengths (five or more) just to reach the building entrance. There may be large courtyards, often with obstacles such as trees, benches, fences, shrubbery, etc. Every effort must be made to get the first line in operation before additional lines are stretched. All available engine companies should be used to stretch the first line.

4.3.3 Wrap-around Stairway

A. Some stairs wrap around elevator shafts, necessitating difficult stretches. When stretching up a wrap-around stairway, the technique used needs to be modified somewhat from the traditional stairway stretch. Due to the additional turns in the stairway and limited visibility, these stretches are more time consuming, demand greater coordination, and require additional hose. The keys to this stretch are adopting a methodical pace and keeping the lead lengths intact for deployment on the fire floor.

B. In this situation, a rope stretch can also be considered as an alternate to a wrap-around stretch. Instead of stretc hing around the elevator shaft, a rope is used to pull the hoseline up to the floor below the fire via the outside of the building, then up the interior stairs to the fire floor. The stairway windows, if available, can be used for this purpose. When this stretch is made, the location of the fire must be definitely known in order to be certain that the line will be brought into the building on the floor below the fire. See Engine Company Operations, Chapter 7 for more information about these hose stretches.

4.4 GENERAL OPERATIONS – LADDER COMPANIES

4.4.1 The operations of ladder companies in "H" type buildings are very similar to, but more extensive than, operations in smaller multiple dwellings. The rapid location of the fire and determination if and how it is extending is an important responsibility of the first ladder company to arrive. The provisions of Fire Tactics and Procedures - Ladder Companies 1, 2, 3 and 6, are appropriate to operations in "H" type buildings. There are, however, inherent problems which may not be found in the older tenements. For example: The inability to cross from one wing to another above the first floor in some buildings.

4.4.2 ***Redacted for PFS***

4.4.3 When conditions indicate roof operations (top floor fire, shaft fire, two floors involved, heavy fire condition, etc.) the aerial may initially be raised to the roof for rapid ascent of the roof and outside vent firefighter. The primary means of getting to the roof would be winged or isolated stairways in the same building or any stairway in an adjoining building, if feasible. The aerial may then be used to vent windows as necessary. Once the windows are vented, the aerial should be returned to the roof. It can be used as a means of escape for members operating on the roof.

4.5 ***Redacted for PFS***

4.6 COMMUNICATIONS

4.6.1 The need for immediate, clear, concise information is an essential part of the overall strategy. The Incident Commander must obtain the information necessary to evaluate the situation and then formulate the proper strategy to cope with it.

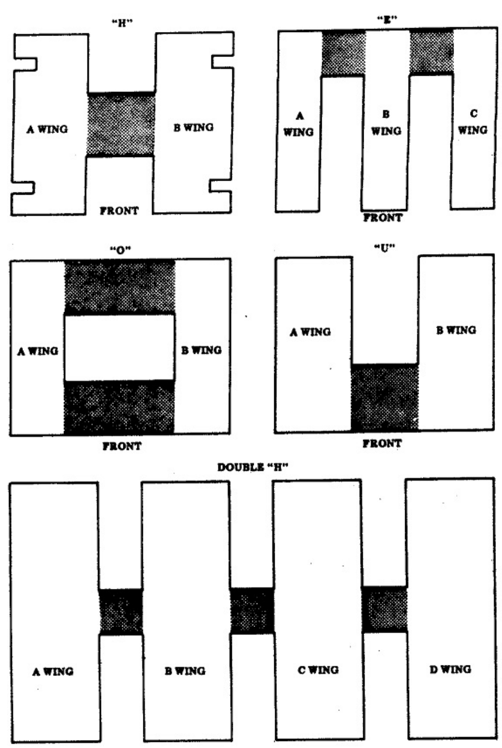
4.6.2 With the building of these large multiple dwellings, a system of identification of various sections became necessary. Many wings are already designated: A wing, B wing, East wing, West wing, etc.

4.6.3 ***Redacted for PFS***

4.6.4 Standing in front of and facing the fire building and beginning on your extreme left, wings shall be designated A, B, C, D etc. The entire wing from the front to the back of the building shall be A, B, etc. The wing shall be further subdivided by the term: front and rear or front, center and rear, if necessary. That part of the building connecting each wing shall be designated the throat and shall be referred to as the throat between A wing and B wing etc (Figure 15). At an escalating fire it may be necessary to establish subordinate levels of command in the wings of the building. The same description of building wings can be used to describe the assignment i.e., Sector A, B, C, D or when necessary, Branch A, B, C, D.

Figure 15

VARIOUS TYPES OF LARGE MULTIPLE DWELLINGS



A. ***Redacted for PFS***

B. The roof firefighter shall inform his/her officer or the Incident Commander of the following:

1. The configuration of the building, "H", "E", "U", etc.

2. Fire showing out windows (number and location) which are not visible from the street and whether any exposure is affected.

3. Color and volume of smoke coming from windows.

4. Persons trapped and their exact location.

5. Location of stairways and fire escapes.

6. If the building fronts on more than one street. Whether there is access for apparatus. Whether it is a street, alleyway, parking lot, vacant lot, etc.

7. Whether there is any difference in the height of the building from street to street, or from front or rear, or from side to side. (Figure 16)

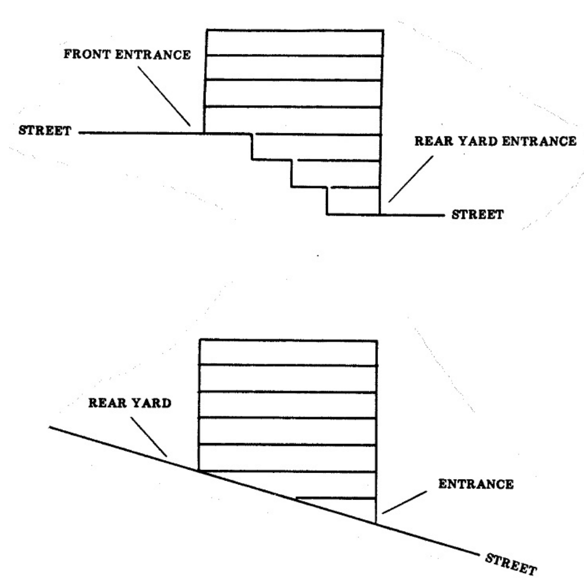
8. Evidence of unusual heat, smoke or fire in the cockloft, or if fire has burned through roof. Need for additional saws.

9. Location of parapet and dividing walls.

10. Any other information that will be relevant to aid operations.

Figure 16

DIFFERENCES IN HEIGHT OF VARIOUS SIDES OF SAME BUILDING



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4.7 STORE FIRE OPERATIONS

4.7.1 Construction Features

A. Many of these buildings contain one or more stores on the first floor.

B. Deep or wide stores may span two or more apartments above.

C. Floor above the store(s) is constructed of wood joists.

D. Possibility of unprotected steel columns extending all the way to the cockloft, lally columns, and horizontal I-beams.

E. Alterations may have created openings in ceilings and walls that can channel fire and smoke into column and pipe voids some distance from the original fire, horizontally as well as vertically.

F. Presence of pipe recesses to floors above and possibly straight through to the cockloft.

G. Tin ceilings that are difficult to pull and may not prevent fire extension.

4.7.2 Fire Tactics:

A. The first line is stretched to the store and extinguishes fire. Anticipate that the store may be deep and that water must be directed into any vertical and horizontal openings that are found or suspected.

B. The second line should be used to back up the first line. When it is obvious that the first line can control the store fire, the second line should be advanced to the floor above the fire. If two lines are needed in the store, the third line shall be stretched to the floor above.

C. First Ladder: force entry into the store, check rear of store for possible extension into public areas of building, quick opening of ceilings and voids.

D. Second Ladder: floor above for forcible entry and search for life and extension. Areas larger than the actual size of the store must be checked due to the possibility of horizontal travel of fire and smoke. These buildings have a peculiarity, in that many times a fire will bypass intermediate areas both vertically and horizontally and then, when an obstruction is met, will set fire to the surrounding material.

E. Fire can spread to adjoining stores by way of spaces between the ceiling joists or by openings in walls for pipes, ducts and wiring.

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F. Fire can extend upward in pipe recesses and vertical steel columns to the cockloft, possibly bypassing intermediate floors. The top floor and cockloft must be promptly checked and rechecked at a later time.

G. Rescue problem above stores may be severe if heavy fire or smoke condition exists. Deckpipes on engines may have to be used momentarily to drive fire back into the store or to protect people on fire escapes. A quick dash from this large caliber stream may make a tremendous difference in not only protecting life, but in quick extinguishment of the fire.

H. ***Redacted for PFS***

I. Heavy fire and smoke can make fire escapes untenable for occupants above the stores or in close proximity to the stores. A line must be stretched to protect this means of egress and an aggressive interior search must be made.

4.8 CELLAR FIRE OPERATIONS

4.8.1 Construction Features

A. Fireproof construction throughout cellar.

B. Cellar ceiling-concrete and rated at two-hour fire resistance.

C. Holes made for wiring or pipes to upper floors are usually sealed, but full reliance on this cannot be made. Ceilings in the cellar and flooring on the first floor must be checked.

D. Wood sleepers (strips of wood embedded in the top of the concrete) used to nail the first-floor floorboards to.

4.8.2 Fire Tactics:

A. The first line is stretched by way of the usually numerous, exterior approaches to the seat of fire and extinguish.

B. First Ladder provides forcible entry and search of cellar to locate fire and search for life. Consider likelihood of cellar apartments for superintendent or maintenance people.

C. First floor checked for extension and smoke condition.

D. Roof firefighter to roof for vent and examination. This firefighter also checks cockloft for possible extension of fire through vertical voids.

E. All horizontal ventilation tactics must be coordinated with interior operations and performed as directed by the Ladder Company Officer operating inside the fire area to be vented. Numerous ground level windows are usually available at the sides and rear, a considerable difference from Old Law Tenements. Due to this, they are more easily vented and also provide alternate points of attack if interior attack is very arduous for the engine company.

F. Water damage is usually not a problem.

G. Always be aware of the possible civilian life hazard in these cellar areas.

Note: ***Redacted for PFS***

4.9 TOP FLOOR, ROOF, AND COCKLOFT FIRE OPERATIONS

4.9.1 Top floor fires always present the possibility of fire extending into the cockloft. This can result in a complete loss of the top floor and roof. Fire can also drop down to the lower floors. ***Redacted for PFS*** When fire has extended into the cockloft, the Incident Commander shall be notified immediately. ***Redacted for PFS***

4.9.2 When it is necessary to cut holes in the roof, initially, approximately a 3' x 6' coffin cut is recommended. Two saws should be put into operation promptly to prevent lateral spread of fire in the cockloft.

4.9.3 Ventilation of the top floor must also be accomplished via the windows. This may be done from the interior or from the fire escape, ladders or roof. Ventilation via the windows, in conjunction with the hole made in the roof will make the top floor tenable for search, opening up and extinguishment.

4.9.4 At these cockloft fires it is very important to have the ceilings pulled to expose the fire. Sufficient firefighters with hooks must be assigned to pull these ceilings. At times, it may be necessary to assign engine companies or individual engine firefighters to pull ceilings. A charged line must be in readiness to extinguish exposed fire before the ceilings are pulled.

4.9.5 One of the most serious problems at these cockloft fires is determining the extent of the fire. To accomplish this, it will be necessary to get all apartments open on the top floor, make openings to find the extent of the fire, get ahead of the fire, and work back to the original fire area.

4.9.6 Fire stopping in the cockloft cannot be depended on. Cocklofts may be undivided, as in the case of when fire partitions only come up to the underside of the roof beams, or there may be openings in the fire stopping because of poor workmanship.

4.9.7 Attached buildings of the same height, especially if built at the same time, must be checked for possible extension of fire.

4.9.8 Cockloft fires in large area buildings such as these may spread rapidly. Because of the layout of the building sections and apartments, it usually requires many hoselines and many ladder company personnel to bring these fires under control. It is important, therefore, to transmit additional alarms in the early stages of the fire.

4.9.9 Trenching (Figure 17)

TRENCH CUTS

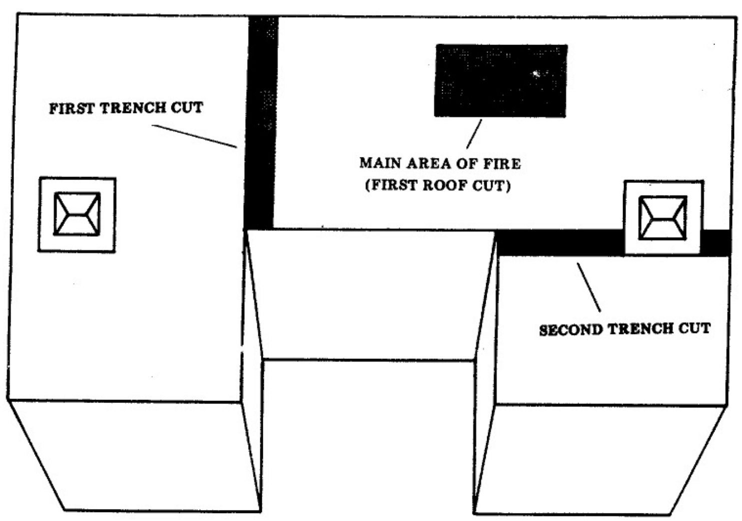

Figure 17

A. One of the techniques used to stop the spread of fire in a cockloft is to cut one or more trenches in the roof.

B. Trenching a roof is a defensive operation that is performed to limit the extension of fire in the cockloft. A trench may be cut, but should not be opened, until there is an adequate vent opening directly over the fire. Ideally, the trench should be precut, but not pulled. Two or more inspection holes may be cut on the fire side of the trench. When, and if, the fire reaches the inspection holes, the precut trench is pulled. This sequence lessens the possibility of the fire moving rapidly and prematurely towards what is, in effect, a second distant opening (the trench) cut in the roof.

C. To be effective, the trench must be properly located, at least 3' wide, and cut from wall to wall or other suitable fire stop, such as a stair or elevator bulkhead. Failure to complete a trench may allow a fire to pass to the other side of the trench.

D. ***Redacted for PFS***

E. The trench should be cut about 20 feet from the initial vent hole. It should be cut at the narrowest, available roof section, taking advantage of bulkhead structures, outside walls, skylights, etc. Do not depend on firewalls constructed within the structure. If the fire is heavy, and the first trench cut appears doubtful to stop the spread of fire, or if during the trenching operation there are indications of fire existing in the cockloft beneath you, then retreat and start a second trench a greater distance from your previous position, even if this means giving up the entire wing. If fire does not pass the trench, your mission was successful.

F. Personnel cutting a trench or a ventilation hole on a roof must be assured of a way of getting off the roof. Their means of escape must not be cut off by the trench cut or any other opening. Keep all personnel off the roof on the fire side of the trench. If fire vents out of and/or crosses the trench, they may be cut off. It is good practice, on larger buildings, to have two ladders raised to the roof at different ends of the building to provide egress. Members operating on the roof shall call for and direct the placement of ladders to assure their safe egress from the roof. It should be noted that not all fire escapes extend to the roof. In some buildings, none of the fire escapes extend to the roof.

G. ***Redacted for PFS***

H. A charged line should be in position on the roof to protect personnel and the trench opening. This line may be operated into the trench in a brief, sweeping, side to side motion to prevent fire from extending across the opening. Such operations should only be conducted after adequate precautions are taken to prevent injury to interior operating forces.

I. Remember, roofs of "H" type buildings are extensive in area and present challenging fire control problems because of potential horizontal fire travel. Understand that there is a mass of wood in the cockloft equal to a small lumber yard. Some cocklofts are as much as four feet deep. Wood components range from 2"x 8" to 1"x 2" braces, all dry and easy to ignite.

J-K. ***Redacted for PFS***

4.10 EXTENSION OF FIRE

4.10.1 Checking for fire extension: When a heavy fire is encountered in one apartment, all sides and above and below the fire area, must be examined. Nothing can be taken for granted. The most probable point for vertical fire extension will be the vertical steel channels (in buildings that have steel frame construction). These columns have no specific location and many are completely hidden. Any boxed-out area is there for a purpose and, if involved in fire, must be opened up and examined. Closets are another very probable point of vertical extension. At times the vertical steel columns are located in the walls of these closets. Fires in channel rails necessitate opening up above and at the top floor ceiling to check for extension into the cockloft.

4.10.2 Other vertical voids to examine would be pipe recesses and shafts of any type, such as elevator, dumbwaiter, vents etc. Any time fire enters a vertical void, the top and bottom must be checked for extension. Unused shafts may be sealed and covered over so that their location is not evident. These unused shafts are, at times, used for closets or to install new wiring with holes poked into the sides at ceiling level. These holes may not be properly sealed and fire can extend to a number of floors or to the cockloft by this means. These vertical voids may be found in the most unexpected places, such as the center of living and bedroom walls. The wall of a closet in one apartment could be the wall of a kitchen in the next, with pipes running up the wall between the closet and the kitchen. Always examine walls in the vicinity of the bathroom for the large void enclosing the waste pipe. In renovated and/or rehabilitated buildings, the boxed out interior shafts for plumbing, electrical, steam, etc., must be checked. They may be open from basement to cockloft. These large shafts are generally found behind kitchens and bathrooms and are discernible by unusually thick partition walls,

which are inconsistent with previous structures. They have been added to facilitate installation of additional services.

4.10.3 Horizontal spread may be through any of the following means: the ceiling and floor beams, horizontal channel irons which may be found along partition walls at the ceiling level, burning through partitions, holes in interior brick walls, around shafts, through windows, cockloft and cornice. Ceiling beams are not always laid in the conventional manner (across the width of the wings). Some may be laid lengthwise, depending on the iron framework. Wooden beams of one building may contact the beams of an adjoining section or building where they are laid on a common wall. Beams may be of unusual length, spanning large areas.

4.10.4 In irregularly shaped buildings (outer walls not squared off) hidden voids may be created because of the necessity of squaring off the interior walls.

4.10.5 The officer of the first ladder company to arrive, if the second ladder company is not on the scene, shall order members to the floor above, directly over the fire, to feel all the walls for hot spots, including the walls of closets. Any hot spots found must be reported to the officer or to the IC. At times, there may be no smoke in this apartment, but the fire could be spreading through the vertical voids. These firefighters must also feel the floors above the fire and of the adjoining rooms. Fire may have extended through the horizontal voids and not be evident on the fire floor. This fire will travel horizontally until it encounters a vertical channel and will then travel upward.

4.10.6 ***Redacted for PFS***

4.11 PROBLEMS, PRECAUTIONS, KEY POINTS

4.11.1 Know the floor, wing, section, side or exposure where you are operating. It is essential that all members at the scene use the same terminology.

4.11.2 ***Redacted for PFS***

4.11.3 A fire escape in the throat often spans the firewall and indicates two (2) separate apartments in the throat.

4.11.4 One apartment in the throat may span firewall with no fire escape and have two (2) interior exits, one to the stairway in one wing and the other to the adjacent wing. Usually, one door is nailed shut or obstructed by furniture so as not to be openable. A search of this apartment must be thorough.

4.11.5 Some buildings have been found to have a fire partition in the throat which does not extend completely to the rear wall. When a fire partition is found, it must be checked to be sure it is carried to the front and rear fire walls

4.11.6 The law requires the subdivision of these large NFP Multiple Dwellings into smaller areas. However, there is no way to determine the location of these subdividing walls from the outside of the building, except in these few cases where they are continued above the roof.

Addition for PFS
(As Per Ladders 3)

Basic Gear

Bunker Gear- 19.5 lbs. (Coat, pants, boots, gloves, and hood)
Helmet-3.5 lbs.
SCBA (self-contained breathing apparatus)-27.5 lbs. (45 min. cylinder)
PSS (personal safety system)-6 ¾ lbs. (includes harness)
Radio-1 ¼ lbs. (includes battery & harness)
Light- 3 lbs.
Pocket Tools-1 to 3 lbs. (knife, wrench, screw driver, chock, etc...)
***Total Weight- 62 ½ -65 ½ lbs.**
*(hose strap 1 lb.)

Inside Team *1st due*

Officer Complement of basic gear- 65 ½ to 68 ½ lbs.
Officers Tool- 3 to 5 lbs.
C.O. Detector-1/2 lb.
Thermal Imaging Camera -3lbs
***Total Weight-66-71 lbs.**

Can Complement of basic gear- 62 ½ to 65 ½ lbs.
6ft Hook-5 lbs.
Extinguisher-30 lbs.
***Total Weight-97 ½- 100 ½ lbs**.

Irons Complement of basic gear- 65 ½ to 68 ½ lbs.
Axe-7 lbs. or Maul 10 lbs.
Halligan-9 lbs.
Hydra Ram-12 lbs.
K-tool-3 lbs
***Total Weight-90 ½-93 ½ lbs.**

Outside Team *1st due*

Chauffeur Complement of basic gear- 62 ½ to 65 ½ lbs.
Tools-what he/she deems necessary to complete their assignment
***Total Weight-depending on tools chosen**

Outside Vent (OV)* Complement of basic gear- 62 ½ to 65 ½ lbs.
Halligan-9 lbs.
6ft Hook-5lbs.
***Total Weight-76 ½-79 ½ lbs.**

Roof Complement of basic gear- 62 ½ to 65 ½ lbs.
Halligan-9 lbs.
Halligan Hook-6 ½ lbs.
Life Saving Rope-17 ¼ lbs. (includes atlas life belt)
***Total Weight-95 ¼- 98 ¼ lbs.**

*Top floor fires in some occupancies the OV will go to the roof with the saw (25 lbs.) & halligan (9 lbs.), also in other situations the OV may choose to take the maul (10 lbs.) in place of the 6' hook (5 lbs.).

Addition for PFS
(As Per Ladders 3)

<u>Inside Team 2nd *due*</u>
All tools remain the same

<u>Outside Team 2nd *due*</u>
The OV Firefighter tools remain the same.
The Roof Firefighter will take a halligan (9 lbs.) and a 6 ft. halligan hook (6 ½ lbs.).
***For top floor fires:** a saw (25 lbs.) and a halligan hook (6 ½ lbs.) shall be taken to the roof.

- The Thermal Imaging Camera has become a very common tool in initial operations, which can be utilized by any member, (2.8 lbs.) also the Rad. 50 (1 lb.) is used more frequently.

- There are times when an Engine company may be utilized as a Truck company, or an Engine member may be detailed to a Truck for the tour, so it is important that all members are aware of the weight imposed upon them when assigned certain positions with the associated tools that accompany that position. Engine Company members performing their normal duties should be aware of the weight placed upon them also. Aside from the weight of the basic gear & pocket tools which will include a hose strap
(1 lb., 63 ½ to 66 ½ lbs., total weight of basic gear), members will be under an additional weight strain as in standpipe operations where they will carry a 2 ½ roll up (35 lbs., 37 lbs. with a nozzle attached & a standpipe kit (control bag) 25 to 35 lbs.).

- A length of 1 ¾ hose weighs 22 lbs., once charged the weight increases to approximately 52 lbs., as stated above a length of 2 ½ hose weighs 35 lbs. once charged the weight increases to approximately 135 lbs........Factor in several lengths (of either size hose) and the friction of stretching (dragging) along the ground, floor, or around obstacles you will note that this can be an arduous task.

- The weight of the basic gear may vary depending on the height & weight (size) of the member wearing the PPE (personal protective equipment). Weight of tools and equipment may vary depending on the manufacturer of such.

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HIGH RISE FIREPROOF MULTIPLE DWELLINGS

1. BUILDING DESCRIPTIONS

1.1 75' or more in height.

1.2 Irregularly shaped clusters of buildings: Double H, Star, rectangular, semi-circular, that may have elevators, incinerators or compactors, standpipes and limited sprinklers. All newly constructed High Rise Fireproof Multiple Dwellings built under the 2008 Building Code are fully sprinklered throughout the structure.

1.3 Well constructed and maintained.

1.4 Rarely exposure problems.

1.5 Life Hazard: The potential exists for rapid fire development and extensive smoke on the fire floor and all the floors above, especially the top floor. Smoke will travel via vertical shafts, most notably the stairwells and elevator shafts.

1.6 Usually poured concrete floors, cinder block or gypsum block walls. Newer buildings use gypsum board (sheetrock) in the interior construction.

1.7 Apartments may be served by two remote, fireproof stairways, generally leading to a public hallway, or sometimes opening directly into the apartments. Scissor stairs may be installed in multiple dwellings rather than requiring stairs to be remote and are counted as two separate exits.

1.8 First floor may contain:

1.8.1 Large stores, supermarkets, day care centers, clinics, offices, the size of which may cover several apartments on the second floor.

1.9 Cellars and basements may contain:

1.9.1 Parking garages, laundry rooms, meeting rooms, stock areas for the first-floor stores, tenant storage, incinerator or compactor rooms, or loading docks.

2. GENERAL OPERATIONS

2.1 The following sections will cover the initial considerations at fires in high rise fireproof multiple dwellings (HRFPMDs) including buildings referred to in the past as projects and in newer HRFPMDs. Fires in these buildings can be extensive, extremely hot and, depending on wind conditions and building air flow patterns, very difficult to extinguish. These fires require a coordinated effort from the designated attack stairway. The IC shall notify the borough dispatcher, as well as all members operating on scene, of the letter designation of the stairwell being used for attack operations.

2.2 When the fire apartment door is left open; it will allow smoke and/or fire to vent out into the public hallway. If a window in the fire apartment fails, and wind is blowing into the fire apartment, an extreme condition may be created on that floor. This may negate the standard attack strategy, which is a direct frontal attack with a hoseline from a stairwell, down the public hall and through the apartment door. If size-up indicates wind is, or may become, a factor that negatively impacts fire conditions, the IC must be notified, and alternate strategies implemented as described in Chapter 5.

2.3 Life Hazard: The potential exists for rapid fire development and extensive smoke on the fire floor and all the floors above, especially the top floor. Smoke will travel via vertical shafts, most notably the stairwells and elevator shafts. This smoke travel may require the need for stairwell pressurization by positive pressure ventilation fans. Sufficient units will be needed for search of stairwells in the taller, more extensive, high-rise buildings.

2.4 Stairways: The types of stairs encountered can range from enclosed, return type stairs, enclosed, scissor type stairs, open stairs, to, in rare cases, fire towers. Whenever enclosed stairwells are encountered, doors to any and all evacuation stairs must be maintained closed on the fire floor.

2.5 Prior to advancing to the reported fire floor, members must gather information from the floor below, or two floors below if scissor stairs are present.

2.5.1 Determine the location, letter designation and number of stairways serving the fire floor. Stairways can provide members with alternate egress points from the public hallway if conditions should unexpectedly deteriorate due to fire conditions. They may also provide alternate access points if civilians or members become trapped in the hallway due to a sudden, unexpected change in conditions.

2.5.2 Prior to the designation of the attack stairway, all members must access the fire floor from the same stairway. If the door to the fire apartment has been left open and size-up indicates that wind may impact fire conditions, the air flow paths must be controlled on the fire floor. Uncoordinated opening of apartment and stairway doors may cause fire conditions to dramatically increase with little or no warning.

2.5.3 Identify the stairways that have a standpipe.

Back to Main TOC

2.5.4 Determine the layout, shape and size of the public hallway including dead-end hallways, before you enter the fire floor public hallway. Also note apartment designations and the location of fire/smoke doors.

2.6 Operational considerations when using scissors stairs: When scissor stairs are present, it should be communicated via handie-talkie to all units. At fire operations, early efforts should be made to ensure stairways are correctly labeled. Mislabeled scissor stairs will cause confusion during fire operations. The attack stair door should be the only stair door that is left open on the fire floor. The strategy is to reduce smoke contamination to the upper floors via stairways. When scissor stairs are mislabeled, this becomes very difficult to accomplish. If mislabeled scissor stairs are discovered, this information should be relayed to the IC immediately.

Note: A priority when performing building inspection in a HRFPMD should be to verify that stairways are correctly labeled.

3. AIR AND SMOKE/HEAT MOVEMENT

3.1 Premature ventilation in HRFPMDs can cause negative consequences for our operating forces. Horizontal ventilation of the fire apartment should be limited and controlled by the ladder company officer operating in the fire apartment. All other ventilation must be strictly limited and controlled by the IC.

3.2 The most prominent variables that affect smoke movement are:

3.2.1 Pressure: Smoke and hot fire gases increase the air pressure inside the fire area or fire apartment. This higher air pressure will always travel toward areas of lower air pressure, creating a flow path for the fire to travel. These lower air pressure areas are the public hallways, vertical shafts, stairwells and elevators. Lower air pressure areas also include other open apartment doors and open windows, especially on the opposite side of the public hallway from the fire apartment. Vertical ventilation will only be performed at the direction of the IC. This must be coordinated through direct communication with the engine and ladder company officers operating in the fire sector or the Fire Sector Supervisor.

3.2.2 Stack Effect: Natural, thermal air movement, either positive (up) or negative (down) within a structure, most often in the direction of vertical shafts. ***Edited for PFS.***

3.2.3 Wind: A major factor for smoke movement within a structure. Wind pressures external to the building create pressures within the structure on both the windward side (high pressure) and leeward side (low pressure) because of leakage through windows, walls or other openings, however small. The degree of increased internal pressure depends upon the extent of leakage. Wind blowing into a fire apartment before extinguishment will accelerate the fire into blow torch proportions, pushing fire and heat to lower pressure areas throughout the fire floor and building. Wind blowing into an apartment after a fire is controlled will push smoke to lower pressure areas throughout the building. Wind blowing across the roof level is also a factor to consider. If it is blowing into an open, roof bulkhead door, it will cause heat and smoke to flow downward, causing the lower floors and/or lobbies to be contaminated with smoke during fire operations. Generally, wind moving across a roof level will cause a lower pressure to be created, which can increase positive stack effect inside the stairwell, regardless of which side of the building the wind is impacting or the position of the bulkhead on the roof. The Department has always been aware of the dangers and problems associated with wind impacted fires on any floor of a fireproof multiple dwelling. When the fire apartment door has been left in the open position and the windows fail, the public hall becomes an extension of the fire area. We must always consider the effects of wind at every fire encountered. Improper ventilation, even when the fire is on a lower floor, or appears to be minor, can have disastrous results.

3.2.4 HVAC: These systems and their components of duct work and shafts can contribute to smoke infiltration in other areas of the building. An IC should confirm that all HVAC systems are shut down prior to commencing any fire operations. They are installed most commonly in hotels and the hallways of upscale high-rise apartment buildings.

4. VENTILATION PROCEDURES

4.1 ***Edited for PFS.*** Like high rise office building procedures, ventilation of the fire apartment in HRFPMDs should take place after the main body of fire has been controlled. The IC shall control all ventilation other than the fire apartment.

4.2 Horizontal ventilation of the fire apartment is limited and controlled by the ladder officer operating inside the apartment. All other ventilation must be strictly limited and controlled by the IC.

4.3 ***Redacted for PFS.***

4.4 Stairways other than the evacuation stairs may be used for venting the fire floor. All members operating will be advised by the IC of the letter designation of the stairwell being used for ventilation and smoke removal operations.

4.5 Roof ventilation operations can dramatically affect the airflows (from high pressure areas to low pressure areas) inside the building. These changes in building pressures and air flows can cause changes in the fire's behavior that could have adverse effects on operating forces. Vertical ventilation shall only be performed at the direction of the IC.

5. ELEVATORS

5.1 ***Redacted for PFS***

5.2 Stairs shall be used when the fire is on the seventh floor or below. The first arriving ladder company shall recall the elevators, whether or not they will be used. The second to arrive ladder company shall ensure that all elevators are recalled and searched. Regardless of the fire floor, the IC must ensure that all elevators are recalled, searched and controlled early in the operation, preventing civilians from placing themselves in danger by entering the elevator cars during the incident.

5.3-5.5 ***Redacted for PFS***

5.6 When both the engine and ladder companies arrive together and only one elevator is available (non fire service), the ladder officer with the forcible entry team and the engine officer with two firefighters (nozzle & control) with all rolled up lengths and standpipe kit shall go up first. If the elevator has Fire Service, and no outside operations are indicated, the OV will be operating the elevator. This will necessitate reducing the elevator load by one of the engine firefighters. Remaining members in the lobby are to make up a second team for the next elevator or consider using the stairs. This approach will allow these members to begin setting up equipment for the appropriate attack strategy and size-up information to be conveyed to the IC and all other operating units.

5.6.1 The first to arrive OV firefighter shall first complete an outside survey of the fire building. If no outside operations are indicated and the building has Fire service elevators, the OV firefighter will:

A. Report to the lobby

B. Place an elevator car in Fire Service Phase II

5.6.2 ***Redacted for PFS***

5.7 ***Redacted for PFS***

5.8 ***Redacted for PFS***

5.9 After all units are in position, and two elevators are available and serviceable, maintain one elevator on standby in the lobby and one two floors below the fire. This would allow the transport of members required for relief and/or transport of injured members or civilians down to the lobby.

6. FORCIBLE ENTRY

6.1 Fire Floor

6.1.1 It is not usually necessary to force apartment doors on the fire floor other than the fire apartment door. A heavy smoke condition in the hallway indicates that the door to the fire apartment most likely has been left open. When the main body of fire has been controlled, adjoining apartments can be forced for reasons such as high carbon monoxide readings or severe smoke conditions in the public hallway. Ladder companies shall report in with their carbon monoxide meters to reported fires in HRFPMDs. The ventilation effects of forcing doors other than the fire apartment on the fire floor cannot be accurately predicted. Air movement (high pressure to low pressure flow paths) may work against our firefighting and search efforts. Operations should not cause unnecessary damage to the building or endanger occupants of the other apartments who are sheltering in place.

6.1.2 If confronted with wind impacted fire conditions, notify the IC and follow procedures outlined in Chapter 5:

6.1.3 If it is decided that an apartment door is going to be forced to provide an area of refuge, the door selected must be to an apartment that is entirely on the same side of the building as the fire apartment. This will prevent fire from being drawn across the hall if the fire apartment windows fail, putting members in the flow path.

6.2 Floors Above:

6.2.1 Generally, the only apartment requiring access on the floor above is the apartment directly above the fire apartment. No other doors should be forced without sufficient reasons, e.g., high carbon monoxide readings at the end of a hall, specific reports of persons needing assistance, concentrated smoke conditions due to stack effect on a particular floor.

7. *Redacted for PFS*

8. ENGINE COMPANY OPERATIONS

8.1 1ST ENGINE COMPANY TO ARRIVE

8.1.1 Due to the complexity of supplying and stretching from standpipe systems, the first and second arriving engines companies will **always** operate together in order to ensure prompt and efficient placement of the first hoseline. Initial hoselines stretched from a standpipe shall be from an outlet on a floor below the fire.

8.1.2 Equipment:

A. One length of hose per firefighter (some floors may require more than three lengths).

B. Standpipe kit

Note: Officers and firefighters shall use every opportunity during outside activities to identify buildings where a three length stretch from a standpipe would not be sufficient. The identity of these buildings should be made known to all first alarm units and should be entered into the CIDS program.

8.1.3-8.1.4 ***Redacted for PFS***

8.1.5 Duties:

A. Take elevators to at least two floors below the reported fire floor using precautions normally taken with elevators. Examine this floor for the following:

1. Hallway layout;
2. Scissor stairs correctly labeled;
3. Location of the reported fire apartment;
4. The best stairs from which to attack the fire;
5. Length of stretch from the attack stairs to the fire apartment;
6. The number of apartment doors from the attack stairs to the fire apartment door;

7. All turns the hose stretch will need to make in order to reach the fire apartment.

B. Once the attack stairway is selected, all hoselines will be stretched and operated from this stairway. ***Edited for PFS.***

C. Charging the hoseline:

1. When the ladder company has control of the fire apartment entrance door:

   a. The hoseline can be advanced to that location and charged.

   b. The engine officer will assist with keeping the fire apartment door closed until there is water at the nozzle and the hoseline is ready to advance into the apartment.

   c. In most cases, the hoseline shall not enter the apartment until the ladder company locates the fire and provides direction for the advancing engine company.

2. When the apartment door has been left open, the public hallway is now considered an extension of the fire area, (fire apartment and public hallway):

   a. The hoseline should be charged before exiting the attack stairway.

   b. In most cases, the hoseline shall not enter the public hallway until the ladder company locates the fire apartment and provides direction for the advancing engine company.

3. Engine companies shall not enter the IDLH without a charged hoseline.

4. ***Redacted for PFS***

5. At severe fires in these buildings many times it takes one engine company to place the hoseline into position and a relieving company is used for final extinguishment due to punishing conditions and diminishing air supplies.

6. The control firefighter of the 1st to arrive engine company will complete the connection to the standpipe outlet, charge the line when ordered, provide proper water pressure, and remain at the standpipe outlet throughout the operation to provide orderly and accurate communications and continuity.

D. Line Advance:

1. There is the ever-present danger that heat and fire conditions can change drastically. Factors that can affect changing fire and heat conditions are:

   a. The adverse change in air flow through the fire apartment caused by window failure due to the fire or premature venting.

   b. The necessary opening of the fire apartment and attack stairway doors by members.

   c. A tenant opening an apartment door on the fire floor on the opposite side of the public hallway from the fire apartment.

   d. Increased stack effect caused by the opening of the attack stairway lobby and bulkhead doors. The bulkhead door shall be vented upon the direction of the Incident Commander after the main body of fire has been controlled.

2. When any of these conditions exist and the line cannot be advanced out of the attack stairwell, the unit operating the first hoseline should maintain their position in the attack stairwell with the stairwell door closed. The IC must be notified and alternate strategies implemented as described in Chapter 5.

E. Use of the fog tip for ventilation of the fire apartment:

1. After the fire has been extinguished, if the positive pressure fans used for stairwell pressurization and smoke removal are ineffective in venting the fire apartment, the engine company officer should call for the fog tip to be brought up to the fire floor. The fog stream can be directed out an open window to assist in venting smoke from the fire apartment.

8.2 2^ND ENGINE COMPANY TO ARRIVE

8.2.1 The 2nd engine company to arrive will operate with the 1st engine company on the scene to stretch and place the first hoseline into operation. The 1st and 2nd engine officers must communicate and ensure that there are sufficient members properly positioned on the 1st hoseline, to rapidly advance and extinguish the fire. The 2nd engine officer must recognize, and request additional assistance from the IC, when long and complicated stretches are encountered.

8.2.2 Equipment:

A. One length of hose per firefighter

B. Standpipe kit

C. ***Redacted for PFS***

8.2.3 Duties:

A. Upon arrival, ensure the Fire Department Connection (FDC) is supplied and provide assistance where necessary (e.g., extremely long stretch to the FDC, broken FDC, frozen hydrant, etc.)

B. ***Redacted for PFS***

C. Take elevators to at least two floors below the reported fire floor, using precautions normally taken with elevators. Upon exiting the elevator, survey the hallway to determine:

1. Hallway layout;

2. Location of the reported fire apartment;

3. Length of stretch from the attack stairs to the fire apartment;

4. The number of apartment doors from the attack stairs to the fire apartment door;

5. All turns the hose stretch will need to make in order to reach the fire apartment;

6. The number of turns in the stairwell.
7. Has the line been charged or will it be charged before leaving the stairway?

D. Support the 1st engine company operation by assisting in the stretch, ensure sufficient lengths of hose available for advance into fire apartment, facilitate smooth advance onto the fire floor and into the apartment, and ensure proper water pressure. ***Redacted for PFS***

8.3 3RD ENGINE COMPANY TO ARRIVE

8.3.1 The 3rd engine company to arrive is responsible to start the stretch of a second hoseline when required. They will be assisted by the 4th engine company. If a second hoseline is not required, the IC shall be notified.

8.3.2 ***Redacted for PFS.***

8.3.3 Duties:

A. The second hoseline is usually stretched from two floors below the fire. The second line will be stretched via the attack stairway and this will be the factor in determining which standpipe outlet to use. Additional lengths of hose will probably be needed from the 2nd or 4th engine companies. The additional lengths should be added between the last length of the second hoseline and the standpipe outlet. The control firefighter will complete the connection to the standpipe outlet, charge the line when ordered, provide proper water pressure, and remain at the standpipe outlet throughout the operation to provide orderly and accurate communications and continuity.

B. ***Redacted for PFS***

C. Line Advance:

1. The second line may be used to:

    a. Back up the first line

    b. Advance with the first line

    c. Operate the Hi-Rise Nozzle

    d. Operate into a breach in the adjoining apartment wall while the first line is protecting the public hallway

    e. Go to the floor above due to auto exposure via windows or air conditioner sleeves

    f. Operate on the floor above due to extension via utility voids or steam pipe risers

8.4 4TH ENGINE COMPANY TO ARRIVE

8.4.1 The 4th engine company to arrive is responsible to support and assist the 3rd engine company's operation.

8.4.2 Equipment:

A One length of hose per firefighter

B. Standpipe kit

8.4.2 ***Redacted for PFS***

8.5 HIGH RISE NOZZLE ENGINE COMPANY

8.5.1 The 5th assigned engine company is responsible for placing the High-Rise Nozzle (HRN) into operation, if this alternate strategy is needed.

8.5.2 When the 5th assigned engine company is not equipped with a HRN, the officer shall contact the dispatcher for the identity of the unit carrying the HRN that has already been assigned to the 10-77.

Note: Every 10-77 will have at least one HRN equipped engine company assigned to the incident.

8.5.3 Equipment:

A. One length of hose per firefighter

B. Standpipe kit

C. High Rise Nozzle

8.5.4 Duties:

A. Upon arrival, the 5th Engine Officer will have his/her unit bring the HRN, one length of hose per Firefighter and the standpipe kit, and report into the IC at ICP. Upon the IC's orders, bring all their equipment to the floor below the fire. They should be prepared to support the following:

1. When the HRN is to be used, the 5th assigned engine will put it into operation. They will either use the hose already in place for the second hoseline, or stretch their own line. Notify the IC or Fire Sector Supervisor for assistance if needed with the hose stretch or forcible entry.

8.6 CFR ENGINE COMPANY

8.6.1 This unit will report to the Incident Commander and stand by with the FAST Unit.

8.6.2 Equipment:

A. CFR equipment

B. Forcible Entry Tools

8.6.3 Duties:

A. Announce designation as CFR Engine and ascertain identity of FAST Unit.

B. Monitor handie-talkie transmissions while standing fast.

C. Note the designation of attack, evacuation stairways and apartment numbering system, etc.

8.7 LOWER FLOOR FIRE

8.7.1 Similar to other standpipe equipped buildings, when a hoseline is hand stretched from the apparatus into a fireproof multiple dwelling, the use of 2 ½" hose is not mandated. The size of the hoseline stretched (1 ¾ or 2 ½) will be based on occupancy/conditions outlined in FFP Engine Company Operations, Chapter 4. This is true for high rise and low rise fireproof multiple dwellings alike.

8.7.2 The flowrate provided by 1 ¾" hose is sufficient to extinguish the majority of fires in fireproof multiple dwellings. Due to the fireproof construction, these fires will involve the contents only. Considering the compartmented layout common in multiple dwellings, the speed and mobility of 1 ¾" hose may be most effective in these buildings when hand stretched from the apparatus. In the event of wind-impacted conditions, in which fire or high heat is driven down the hallway, even the increased flow of a 2 ½" line has proven ineffective. Consequently, alternative fire attack procedures will be implemented (e.g., exterior handline, deckpipe, KO curtain, high-rise nozzle, etc.). The practice of combating wind-impacted conditions with one or more hoselines operating down a hallway is not a primary tactic, regardless of the size of the hoseline.

9. LADDER COMPANY OPERATIONS

9.1 1ST LADDER COMPANY TO ARRIVE

9.1.1 This unit is responsible for:

A. Elevator recall to gain control of the elevators and to prevent occupant use.

B. Control of the attack and evacuation stairway doors on the fire floor.

C. Control of the fire apartment door.

D. Search and ventilation of the fire apartment.

Note: ***Redacted for PFS***

9.1.2 Officer and Forcible Entry Team

A. Tools: Extinguisher, hook, axe, Halligan, Hydra Ram, search rope, SCBAs, carbon monoxide meter, and the Thermal Imaging Camera (TIC)

B. Duties:

1. Take an elevator in Fire Service, if available, to at least two floors below the reported fire floor, using precautions normally taken with elevators. Examine this floor to determine fire apartment location, stairway locations and type, correct labeling of scissor stairs, etc. This slight delay will enhance your operation on the fire floor should you encounter a heavy smoke condition in the public hallway.

2. Notify the IC or Engine Officer (if the IC is not on the scene):

   a. The stairwell closest to the fire apartment;

   b. The type of stairs (open/enclosed, scissor/return, etc.)

   c. If scissor stairs, whether they are or are not correctly labeled.

3. When there are two stairways, communicate with the Engine Officer to assist in determining the attack stairway. Once this designation has been made, all operations are to proceed from this stairway.

4. Upon arriving at the fire floor in a FPMD, members must evaluate conditions. If a smoke and/or heat condition exists in the public hallway, notify the IC and operate as follows:

a. Prior to entering the public hallway, the Ladder Officer shall get a report on exterior conditions from members operating outside the building and the Roof firefighter operating on the floor above. If it is determined the smoke and/or heat condition in the public hallway is due to a wind impacted fire, members shall remain in the stairwell and follow procedures outlined in Chapter 5.

b. When unable to determine if this is a wind impacted fire, the Ladder Company Officer and one member of the forcible entry team shall enter the public hallway to locate the fire apartment and control the fire apartment door. The other member of the interior team will remain at the attack stairwell door on the hallway side of the door to ensure the stairwell door remains closed limiting the flow path and to act as a beacon in case members need to evacuate the hallway. The Engine Company Officer shall be responsible for control and coordination on the stairwell side of the door.

c. If while operating in the public hall, it is determined to be a wind impacted fire, the Ladder Company Officer shall ensure members exit the public hallway immediately and follow procedures outlined in Chapter 5.

5. Once the Ladder Company Officer gains control of the fire apartment door, notify the IC and have the Engine Company advance the hoseline to the fire apartment door. The Ladder company member who remained at the stairwell door shall also advance to the fire apartment door.

Note: While at the apartment door, reports are received from members operating on the floor above or the exterior that wind is impacting the fire, follow procedures outlined in Chapter 5, Wind Impacted Fires.

6. If wind is not impacting the fire and conditions allow, enter the fire apartment to search. Search team must be prepared to exit quickly and control the fire apartment door under all circumstances. Do not chock the door open until a charged hoseline is moving into the fire apartment.

7. Control of the fire apartment door can be accomplished by positioning a member inside the door with door closed, but not locked. The door can be ajar with the dead bolt extended, preventing the door from completely closing. The intent is:

a. To deny the fire air, which will inhibit fire growth.

b. To deny the fire (high air pressure area) a path of travel to any low air pressure areas via the public hallway.

c. Provide verbal direction for the search team to get back to the fire apartment door if heat conditions necessitate withdrawal.

8. Once inside the fire apartment, locate the fire area/room and:

a. Control the fire by using the extinguisher or closing an interior door;

b. Inform the engine officer the location of the fire area;

d. Clear a path for the advance of the hoseline;

e. Report results of the primary search to the IC;

f. Begin overhaul as needed, trying not to hamper efforts of the thorough secondary search, which will subsequently be conducted by another company.

9. The 1st ladder company officer must continually monitor conditions on the fire floor along with reports received from the floor above and the exterior.

9.1.3 Outside Vent Firefighter

A. Tools: Halligan, hook or axe

B. Duties:

1. Conduct an outside survey with chauffeur.

2. When VEIS can be made with ladders, the outside team must communicate with the ladder officer in the fire apartment to request permission before commencing VEIS of the fire apartment.

3. When no outside operations are indicated, then:

a. If the fire building has fire service elevators, proceed into lobby and take control of an elevator car using the fire service feature (1620 key). This position shall then be maintained until relief is provided by IC.

b. If the fire building does not have fire service elevators, then proceed to the fire floor, team up with your officer and assist in the search of the fire apartment.

Note: It has become common for NYC Housing Authority to have apartment letters stenciled on the exterior of the building; either on or below the first floor window sill. These markings provide a valuable reference point and should be included in the OV size-up. Be aware that in some instances, the actual apartment lettering can change from floor to floor and not all apartments will line up in the same vertical row. This condition is usually found between the first and second floors, but may vary between upper floors as well, especially in buildings with duplex and sandwich apartments. It is crucial that only correct apartment information be conveyed to units operating within the building. Therefore, when giving a report from the exterior of the building, the OV should include the letter markings as a guide; e.g., "L26 OV to L26, on the exposure 3 side I see light smoke seeping from an 8th floor window. That should be the "B" apartment according to the exterior markings." Units with NYC Housing complexes in their administrative district that do not have the markings, or where markings have faded, can contact the local management office and request they be provided or updated.

9.1.4 Roof Firefighter

A. Tools: Halligan, Hydra Ram, and KO Curtain

B. Duties:

1. Proceed to the apartment directly above the fire via the attack stairway if possible, and gain entry. If the attack stairway is an IDLH area, team up with another member prior to proceeding to the floor above.

    a. The Roof FF shall notify the IC of the conditions in the public hall (smoke, civilians evacuating etc.) on the floor above the fire.

2. Notify your ladder officer of conditions found, such as:

    a. The apartment layout.

    b. The fire location on fire floor – Visible fire or smoke coming from the fire apartment.

    c. Report on wind conditions – determine what windows serve the fire room. By keeping the apartment door open and opening a window in the room over the fire room, the roof firefighter will be able to simulate how the wind will flow through the fire apartment. Size up this location on preparation to deploy a WCD, if warranted.

d. Persons trapped at windows.

i. Notify your officer and the IC, try to calm the person, and call for the life saving rope.

ii. The IC should contact this member and question the feasibility of a successful life saving rope rescue. If the windows below are protected with child guard gates, or are of the awning or casement type windows, a rope rescue may not be possible. If these conditions exist, all efforts to extinguish the fire and attempt a rescue from the interior shall take priority.

iii. When a lifesaving rope rescue is appropriate, the IC will ensure the LSR is being brought to the apartment above and will simultaneously reinforce this floor above position with the second ladder, rescue, squad or an engine company. If a life saving rope operation is conducted, units will be needed at the point of rescue in the apartment below the fire, to prepare the window for the member's entrance.

e. KO Curtain deployment may be needed. Fire pulsating from a window indicates gusting wind conditions or over pressurization of the fire room by the wind and may at first allow fire to vent out of the window, only to push the fire back into the window without warning. Do not break the window glass. Open window; deploy WCD when ordered by the IC, then close window onto the WCD ropes. Auto exposure is possible. Call for an extinguisher or hoseline if needed.

9.1.5 Chauffeur

A. Tools: The chauffeur shall select the tools deemed necessary to complete the assignment.

B. Duties:

1. Conduct outside survey with OV as per section 9.1.3. Deliver the LSR to the floor above if Roof Firefighter has called for it, unless you can reach the victim from the exterior by aerial, TL, or portable ladder. If you are delivering the LSR to the floor above, notify your officer if you are assisting or continuing to the roof.

2– 6 ***Redacted for PFS***

9.2 2ND LADDER COMPANY TO ARRIVE

9.2.1 This unit is responsible for:

A. Ensure that all elevators are recalled and searched.

B Control ventilation in areas other than the fire apartment as directed by the IC.

C. Search of the public hallway and ensure all evacuation stair doors are closed on the fire floor.

D. Search of the attack stairwell for five floors above the fire floor.

E. Coordinate WCD deployment, if ordered deployed by the IC.

9.2.2 Officer and Forcible Entry Team

A. Tools: Extinguisher, hook, axe, Halligan, Hydra Ram, search rope, SCBAs, carbon monoxide meter and TIC.

B. Duties:

1. Recall all elevators, regardless of the fire floor location and whether or not FD members will use them, to gain control of the elevators, prevent occupant use, and to ensure they are searched.

2. Take elevator to at least two floors below the reported fire floor, using precautions normally taken with elevators.

3. Examine this floor and try to determine the fire apartment location, stairway, etc, to enhance your operation in the fire floor hallway in case a heavy smoke condition exists.

4. Proceed to the fire floor via the attack stairway and communicate with the engine and ladder company officers on the fire floor to confirm the attack and evacuation stairways.

5. Maintain the evacuation stairway door/s closed and initiate search of public hallway on the fire floor. If persons are found in the stairway notify the IC and direct them below the fire sector. If persons are found in the hallway, notify the IC and remove them to an evacuation stairway. Be aware that the building occupants opening their apartment doors to evacuate should be advised to stay in their apartment, if it is tenable. They will not know which stairway is being used for evacuation. Extinguishment of the fire will ensure control of the public hallway, which will allow occupants to be safely evacuated as conditions permit. The integrity of the evacuation stairway(s) on the fire floor must be maintained. This is a critical task to help prevent smoke migration to the upper levels of the stairway while also maintaining a viable escape route for trapped occupants above the fire floor. There may be more than one evacuation stairway in a building. Any stairway not designated as the attack stairway is considered an evacuation stairway.

6. Communicate with the ladder company officer in the fire apartment to see if any help is required. In most cases, the members of the first ladder company are sufficient to operate in the fire apartment unless multiple removals are necessary.

7. While searching the public hallway, use sound judgment when deciding to force entry into adjacent apartments. Severe heat and smoke conditions or high carbon monoxide readings are two possible indications of the need to force adjacent apartments. If possible, this should be done after the main body of fire has been knocked down.

8. After searching the hallway on the fire floor, initiate search of the attack stairway for five floors above the fire to search for any building occupants that may have tried to evacuate using these stairs. Communicate results of searches to the IC, or Fire Sector if established.

9. When a WCD deployment is initiated, the 2nd ladder company officer must coordinate this evolution. Points to address:

    a. Is assistance needed on the floor above?

    b. Is an extinguisher/hoseline needed in the apartment above in case of auto exposure?

    c. Are there members in the apartment below the fire apartment to secure the lower WCD ropes?

    d. Is a spotter in place on the exterior of the building for guidance?

e. Notify IC of any needed assistance, progress, or lack of progress.

9.2.3 Outside Vent Firefighter

A. Tools: Halligan, hook or axe.

B. Duties:

1. Contact 1st OV/chauffeur via handie-talkie.

2. If outside operations are in progress, team up with your 2nd ladder chauffeur and assist with same.

3. If no outside operations are indicated and the building is equipped with fire service elevators, operate in conjunction with the OV from the 1st ladder company and secure another elevator.

4. If the building does not have fire service elevators, proceed to the fire floor, team up with your officer and operate as ordered.

5. If the building has a "service" freight elevator that is remote from the fire area and can be safely used, notify the IC and operate the service elevator, when directed, with building personnel.

9.2.4 Roof Firefighter

A. Tools: Halligan, Maul, Life Saving Rope and Life Belt.

B. Duties:

1. Proceed to the apartment directly above the fire via the attack stairway. If attack stairway is an IDLH area, team up with 1st roof firefighter before proceeding above. Operate as per section 9.1.4.

9.2.5 ***Redacted for PFS***

9.3 3RD LADDER COMPANY TO ARRIVE

9.3.1 This unit shall report into the lobby with all personnel and be directed by the Incident Commander. The progress of the fire operation will determine their assignment.

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9.3.2 The 3rd ladder company officer shall confirm the evacuation stairway door(s) have been closed on the fire floor and are maintained in a closed position. This may be accomplished by positioning members on the stairwell side of the evacuation stairway door(s) until the Fire Sector Supervisor and/or the IC deems that the situation no longer presents a hazard in that particular stairwell. There may be more than one evacuation stairway in a building. Any stairway not designated as the attack stairway is considered an evacuation stairway.

9.3.3 ***Redacted for PFS***

9.3.4 The Roof Firefighter shall proceed to the apartment directly above the fire with a KO Curtain, in addition to his/her normal complement of tools, to assist members operating on that floor.

9.3.5 When a WCD is being deployed, they may be assigned to the apartment below the fire apartment to secure the WCD lower ropes.

9.3.6 When a LSR rescue is in progress, they may be assigned to the floor below to receive the rescued victim and member being lowered on the rope.

9.3.7 Generally, they should be used to conduct searches of stairways and hallways when reports indicate severe smoke above the fire sector. They should be assigned specific stairs and floors and advised of the identity of the Search and Evacuation (SAE) Group Supervisor responsible for all searches on the upper floors. A carbon monoxide meter and TIC shall be included in their tools

9.4 4TH LADDER COMPANY TO ARRIVE

9.4.1 Depending on the progress of the fire operation, this unit will usually assist or initiate searches on upper floors and stairs as determined by the IC. Specific stair and floor assignments shall be given along with the identity of the SAE Group Supervisor responsible for searches on upper floors. A carbon monoxide meter and TIC shall be included in their tools.

9.5 FAST UNIT

9.5.1 This unit will report to the Incident Commander and stand by with the CFR Engine Company.

A. Tools:

1. FAST equipment as per Department policy

B. Duties:

1. Announce designation as FAST Unit,

2. Ascertain identity of the CFR Engine Company and determine the location of EMS personnel on the scene.

3. Note the designation of attack and evacuation stairways, apartment numbering system, and prepare for activation according to the guidelines listed in Firefighting Procedures, Volume 4, Book 1, Chapter 2 titled Firefighter Assist and Search Team – FAST UNIT.

9.6 ***Redacted for PFS***

10-11. *Redacted for PFS*

12. LIFE RESCUE OPERATIONS

12.1 Problems:

12.1.1 Some windows in these buildings have fixed panes for the first pane above sill.

12.1.2 Windows of casement or awning type may have fixed sections that limit accessibility and the ability to affect a LSR rescue.

12.1.3 Sills are usually narrow.

12.1.4 Persons may be trapped hanging out the window or standing on the sill. Sitting or straddling the window may not be possible if lower window section is fixed. Victim may be inaccessible due to height or ground area that could limit apparatus positioning.

12.1.5 Heat or smoke from fire or hoseline can cause victim to lose position.

12.1.6 Lack of communication between inside and outside team may cause delay in removal.

12.2 Solution:

12.2.1 Removal by interior team.

12.2.2 Removal by aerial, tower, or portable ladder.

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12.2.3 Rescue from floor above with life saving rope and lowering to floor below fire or to the ground. Members will have to be positioned on the floor below the fire to assist.

12.2.4 Bridging from an adjacent balcony or window.

12.2.5 Breaching walls from adjacent apartment.

12.2.6 Deploy a WCD enabling the inside team to advance on the fire and effect the rescue.

12.3 Key points:

12.3.1 When it is not necessary to remove occupants, generally, they should be instructed to remain in place with the door to the room they are in closed and the window open.

12.3.2 It must be emphasized that the inside approach to removal is always preferable for both the victim and the firefighter.

12.3.3 Be aware that rescue/removal can be made from any side, above, or below.

12.3.4 If the doorman or superintendent is present, inquire as to the size of the apartment (e.g., number of rooms, duplex, triplex, etc.), and if keys are available.

12.3.5 If the occupant of the fire apartment is in the lobby, if possible, ascertain if the door to the fire apartment is open, closed, locked, and if keys are available.

13. STANDPIPE AND SPRINKLERS

13.1 Engine companies shall operate as per the procedures in Engine Company Operations, Chapter 8, when supplying standpipe systems in HRFPMD's.

14. BUILDING FEATURES THAT AFFECT OPERATIONS

14.1 Duplex and Triplex Apartments

14.1.1 Simply stated, duplex apartments are those apartments with living spaces on two distinct floor levels of a building, with an internal private stairway inside the apartment. Triplex apartments are those with living spaces on three levels, interconnected internally by stairs. This does not mean that there must be two or three stories in height as some are built on staggered floor levels on the style of a split-level house. The window arrangement from floor to floor may be different, which would indicate duplex or triplex apartments. This information must be entered in the CIDS program.

14.1.2 The varieties of design in duplex and triplex apartments make it very difficult to formulate a standard operating procedure for all types. Inspections by units on BISP or special drills are the best way to be prepared for fire and emergency operations in these types of apartments.

14.1.3 Most of these apartments have only one entrance from a public hall or open air walkway and may have an interconnecting balcony to a similar apartment. Others may have two means of egress.

14.1.4 There are several floor configurations that may be found.

A. The simplest type of duplex apartment is one that has all doors on the public hall entering apartments with identical floor layouts. Inside the apartment, a private stair leads up to bedroom areas. Therefore, if fire conditions are so severe that entry is impossible, consideration can be given to breaching walls from the adjoining apartment, if it can be determined which fire apartment room this breaching will lead. The room designs of apartments are that two apartments that adjoin may share the same utility chase ways. Two adjoining apartments may be a mirror image of each other. You will be able to determine the room layout in reverse. In that respect, the kitchen areas of two adjoining apartments will be on the other side of the wall of each other. Bedroom areas will be on the other side of an adjoining apartment wall. A size-up of the adjoining apartments on each side of the fire apartment will help determine which apartment to breach if the fire is in a room along the adjoining wall.

B. A second type of duplex apartment has doors leading from the public hall into the main level and the second level is down. This presents the same problems as a cellar fire, with the added problem of bedrooms on this lower level with possible trapped occupants.

C. A third design type, while not strictly duplex or triplex apartments, but with similar problems for firefighters, is one where apartment entrance doors are in groups of threes in a public hall and there is only one public hall every three floors. This is called the "sandwich" type apartment arrangement. When the apartment doors are in groups of three, you will find one apartment entrance door opens to an interior stair leading down one flight to an apartment on the floor below. The next apartment door on the public hall leads directly into the apartment on that same level. The third door opens to an interior stairway leading up one flight to an apartment on the floor level above. The rooms in each apartment are on only one level, but as can be seen, if the fire is in the lower-level apartment, the firefighting techniques will have to be the same as for cellar fires.

14.1.5 Engine operations will be the same as outlined for apartments in fireproof buildings except that when a 2nd line is needed:

A. The 3rd and 4th engines have to be readily available to stretch through an adjoining apartment and into the fire apartment by way of a breached wall.

B. This line may require more than three lengths since it may have to use a standpipe outlet two or more floors away, or possibly from a different stairway or standpipe riser.

C. It will usually require extra firefighters for a quick stretch.

D. The hoseline should still be brought into the attack stairway from below and advanced up to the fire floor.

E. Positioning the HRN may be difficult since the window below the fire window may only be accessible from the fire floor public hallway. Wall breaching may be necessary to access the window from which the HRN will operate.

F. Water must be applied to the room where the main body of fire is located to be most effective. Wall breaching to apply water into the fire room from an adjoining apartment will be difficult since the adjoining room/apartment most likely will have an entrance door on a floor other than the fire floor.

14.1.6 Ladder operations: The ladder company first to arrive operates as in a fireproof building. When it becomes known that the fire is in a duplex or triplex apartment and conventional firefighting techniques are not working, consideration must be given to gaining access to the fire area by other approaches.

14.1.7 Many of the newer apartments have outside balconies that serve two apartments. Entry into the apartment adjacent to the fire apartment will provide an alternate means of entry to the fire apartment via this balcony. On lower floors a firefighter may reach the balcony by way of the aerial ladder.

14.1.8 Rescue operations may have to be performed by breaching walls and following the charged hoseline in so as to reach trapped occupants who are in the bedrooms with the doors closed.

14.1.9 Many of the newer buildings have double ⅝" sheet rock walls between apartments mounted on metal studs. Breaking directly through them is a fast way of entry into the fire apartment.

14.1.10 Fire, smoke, and high levels of CO may infiltrate areas of newer type buildings due to inadequate sealing of floor and ceiling openings around pipe, electrical and duct work. This is particularly important in kitchens and bathrooms.

14.1.11 Horizontal ventilation or deployment of a WCD from the apartment above may be difficult to impossible, since this may place the firefighter two floors above his/her objective. Many of the newer buildings are designed with large plate glass windows that are extremely difficult to break.

14.1.12 Doors on some floors have no letter or number designations on them, indicating that they are a second exit from an apartment. It is extremely difficult to tell which apartment they serve.

14.1.13 Local planning and drills on the type of duplex or triplex apartments found in a unit's response area will help to ensure an effective operation.

14.2 Balconies and Terraces

14.2.1 Many privately owned HRFPMDs and newer city housing buildings are built with balconies and terraces providing us additional access to the apartments.

14.2.2 The balcony or terrace may serve only one apartment or be connected to two apartments with a partition between them. Access can be provided to both sides of the balcony by way of adjoining apartment or ladder. Members can breach or break through the partition to get to the outside door of the fire apartment. These doors generally have glass in them, either as a full panel or smaller panels, which can be broken if necessary, and opened from the inside. Always try the handle, as they may not be locked.

14.2.3 Members shall request permission from the ladder officer operating within the fire apartment prior to ventilation or entry. Members operating on balconies must be aware that the fire may vent through the balcony door by itself or it may be pushed there by the advancing hoseline.

14.2.4 The deployment of a HRN and/or a WCD may prove difficult or not be possible if the fire window faces onto a balcony or terrace.

A. The balcony floor outside the fire apartment may block the HRN stream deployed from the window directly below. Directing the HRN stream from the adjoining window from the floor below may prove effective. If the apartment below the fire has a balcony, the HRN could be operating from the balcony railing, deflecting the stream off of the underside of the balcony directly above the fire apartment. This may provide limited success.

B. Deployment of the WCD will not be possible from a floor above if that apartment itself has a balcony and the fire window is below this balcony, preventing the WCD from deploying against the building's exterior wall.

14.3 ***Redacted for PFS***

15. STORE FIRES

15.1 Large stores may be found on the first floor extending beneath several apartments on the second floor. These apartments should be checked and monitored for life hazard and fire extension. Venting of this ground floor may be difficult. Consider the use of PPV fans for smoke control/removal.

15.2 Day Care Centers, Clinics and offices may also be found.

15.3 In older buildings, fireproof, self-closing doors are connected to the public halls from within these commercial occupancies. Ladder companies should check for them and call for a hoseline to protect the public hallway when necessary.

16. CELLAR FIRES

16.1 Cellars contain compactor rooms, storage areas, meeting rooms, sprinkler protected motor vehicle garages, laundry rooms and utility meter rooms. These areas may also contain HVAC equipment with its associated duct work. The entire run of ducts should be checked to their termination points. The duct work venting dryers from laundry rooms should be checked to their termination point as well.

16.2 Access to below grade areas may be via the interior, enclosed, fireproof stairways or outside ramps and driveways.

16.3 Motor vehicle fires in these cellars can create an extremely heavy smoke condition, which can delay locating the vehicle, even though the sprinkler system may be discharging water. A search line should be used in these situations and a limited number of personnel should be used. The noise from the discharging sprinkler heads and the use of thermal imaging cameras will help locate the fire. PPV fans should be positioned to control smoke infiltration into other building areas, in addition to relieving the smoke condition in the garage.

16.4 As stated previously in this document, consider a hand stretch into below grade areas. When the fire is controlled by the sprinkler system and connecting to a standpipe outlet would not expose our members to an IDLH, an Engine officer can, with sound judgment, use the standpipe and notify the IC.

MULTIPLE DWELLING FIRES
CHAPTER 5
March 24, 2022

WIND IMPACTED FIRES IN FIREPROOF MULTIPLE DWELLINGS

1. INTRODUCTION

1.1 A wind impacted fire may be one of the most dangerous operations members of the FDNY will encounter. The term "wind impacted" fire shall be used to describe a fire in which the wind has the potential to, or is already causing, a dramatic, sudden and unexpected increase in fire, heat and smoke conditions. Experienced, respected members of this Department who have survived wind impacted fires have all described the following:

1.1.1 Upon arrival, conditions appeared to be routine.

1.1.2 Within seconds, fire, heat and smoke conditions changed without warning "from routine to life threatening."

1.1.3 An operating 2½" hoseline had little or no effect on the incredible heat being produced.

1.1.4 Directly attacking these fires with one or two - 2½" hoselines proved ineffective and ultimately led to members incurring serious injuries.

1.2 Members of this Department and many civilians have lost their lives or suffered serious injuries when wind has impacted fire conditions causing the conditions to dramatically increase without any warning indications.

1.3 When responding to a reported fire in a Fireproof Multiple Dwelling (FPMD), an overriding consideration concerning size-up must be wind conditions and its potential effect on the fire. The following sections concerning operations in FPMDs are written to provide members with tactical guidance when wind is or may be a factor.

Note: The tactical guidance outlined within this chapter may be applicable to other than FPMDs, upon direction of the IC.

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1.4 The FDNY and the National Institute of Standards and Technology (NIST) fire research group, conducted extensive research to determine the causes and effects of wind impacted fires in FPMDs. Live burns recreating wind impacted fires were conducted in vacant apartments on Governor's Island. Based on data gathered from these burns, and from interviews conducted with officers and firefighters who have operated as the first to arrive units at wind impacted fires, alternate firefighting strategies and tactics were developed, tested and evaluated for effectiveness. This testing has resulted in a revision to firefighting tactics and procedures. In addition, new tools and equipment have been developed for the purpose of extinguishing wind impacted fires.

2. RECOGNIZING WIND IMPACTED FIRE CONDITIONS

2.1 The key to successfully operating at wind impacted fires in FPMDs depends on recognizing the wind impacted fire conditions that may change a seemingly routine fire into a blowtorching fire. Blowtorching is the appropriate description of what will occur when fire conditions are impacted by wind conditions.

2.2 **When wind impacted fire conditions exist in a FPMD, the IC shall notify the Borough dispatcher so this information can be relayed to all responding units.** Once the contributing factors are identified, steps can be taken to minimize the hazards to operating members.

2.3 The following five conditions must be present for a wind impacted fire to occur:

2.3.1 Wind.

2.3.2 Fire in an apartment.

2.3.3 Failed or opened window in the fire room.

2.3.4 Fire apartment door leading to the public hall left open or not fully closed.

2.3.5 An area of low pressure such as an opened stairwell door, or an opened apartment door on the opposite side of the public hallway from the fire apartment. This characteristic of air movement is known as the Flow Path.

Note 1: The term Flow Path describes the movement of fire, heat and smoke from an area of high pressure (the fire area) to an area of low pressure (all areas other than the fire area).

Note 2: The impact of the wind will be affected by the size of the window opening, the fuel load and the stage of the fire when the window failed.

2.4 When these five conditions are present, a wind impacted fire condition may occur. The combination of wind feeding the fire and the natural airflow that results from the construction characteristics of all buildings, especially FPMDs, may cause fire to blowtorch from the fire area. In FPMDs, the flow path for these conditions will be towards the public hallway if the fire apartment door is open. The fire is drawn to an area of low air pressure such as an open door on the opposite side of the public hallway or open stairway door. Eliminating this flow path, by keeping these doors closed, is key to preventing a fire in a FPMD from becoming wind impacted. The one factor that cannot be controlled is an occupant in another apartment opening their apartment door, especially on the opposite side of the fire apartment.

2.5 Members must be aware and understand that the recognition of any of these factors is the critical first step in evaluating the potential for a wind impacted fire. The IC and company officer must be notified immediately when any of these conditions are observed. **The communication of this critical information to the IC and company officers operating inside the building must be acknowledged.**

3. SIZE-UP

3.1 Size-up begins by observing the wind and weather conditions before the tour starts and knowing forecasted weather changes that will involve wind conditions. This information must be discussed at each roll call. Members must maintain constant situational awareness and accurately size-up conditions when responding to any reported fire in a FPMD. In addition to normal size-up of life, fire and exposures, particular attention must be paid to the following:

3.2 Size-Up: Building Exterior

3.2.1 When responding to a reported fire in a FPMD, an overriding consideration concerning size-up must be wind conditions and its effect on the fire.

A. The direction and speed at the street level is not a reliable indicator of wind conditions above the street level.

B. Wind behavior is not consistent or predictable. Wind impacted fires have occurred on upper and lower floors. Building height, size, shape and location of adjoining or adjacent buildings add to the unpredictability of the effects of wind on fire conditions.

C. It does not take high winds to dramatically increase fire conditions inside the building. When the wind subsides or shifts, pressure will equalize allowing the fire and smoke to vent out the window. This condition has also been described as fire and/or smoke pulsing in and out of a failed or opened window. Members operating in the fire area must be aware that when the fire and smoke pulse outward from the window, the condition in the interior will temporarily subside, **giving a false sense that the interior conditions improved.** When the wind gusts back into the window the interior conditions will dramatically deteriorate.

3.2.2 Fire or smoke visible inside the fire apartment that is not venting out of an open or failed window is a potentially dangerous, life-threatening condition. This is the classic ventilation profile of a wind impacted fire.

A. This indicates the wind is pressurizing the fire area, keeping the fire, heat and smoke from venting out of the window.

B. The firefighter performing the outside survey may be the first member to observe this wind impacted fire condition.

C. Their observations and size-up are critical to fire operations. These conditions must be immediately transmitted to the company officer and IC. The IC must immediately relay this information to all members on the scene.

Note: The IC must communicate with the officers on the fire floor to determine the interior conditions. The IC must determine if an alternate strategy for extinguishing the fire should be implemented. If so, the IC must communicate this to all officers and receive acknowledgement of the change to the regular SOP's for FPMDs.

3.3 Size-Up: Building Interior

3.3.1 Prior to advancing to the reported fire floor, member must gather information by surveying the floor below or two floors below if scissor stairs are present.

A. Determine the location, the number of and letter designation of stairways serving the fire floor. This information is critical if confronted with heavy smoke conditions when arriving on the fire floor or if conditions unexpectedly deteriorate due to fire conditions.

B. All members must access the fire floor from the same stairway until the attack stairway has been determined.

C. The flow path of any fire will be towards the stairwell, the control of the stairwell door is critical. This door should be maintained closed as much as possible.

3.3.2 When conducting the survey of the floor(s) below, determine the layout, shape and size of the public hallway, especially if there are dead-end hallways. Heightened awareness is required when operating in any hallway that is unusually long, odd shaped, or has dead-ends.

3.3.3 Take note of the location and presence of any fire/smoke stop doors in the public hallway.

3.3.4 Take note of the apartment designations in sandwich type apartments; take note of the apartment layout designation.

3.3.5 The roof firefighter in the apartment above the fire may be able to provide the following information:

A. Size and layout of the fire apartment.

B. Visible fire or smoke coming from the fire apartment.

C. By keeping the apartment door open and opening a window, the roof firefighter will be able to simulate how the wind will flow through the apartment.

4. ALTERNATE STRATEGIES FOR WIND IMPACTED FIRES

4.1 The utilization of alternate strategies to combat wind impacted fires will provide the following benefits:

4.1.1 Ability to enter the public hallway to close the door to the fire apartment, thereby gaining control of the public hallway and decreasing the flow of smoke and heat from the fire apartment into other areas of the building.

4.1.2 Rapid deployment of units to search apartment(s), public hallway(s), and stairways.

4.1.3 Rapid knock down of the fire to quickly improve conditions on the fire floor.

4.1.4 Reduction of serious injuries to members and civilians.

4.2 Wind Control Devices (WCD) and Exterior Streams

4.2.1 Live fire testing and fireground deployments have shown that the deployment of WCDs (KO Curtains and Fire Blankets) will have the following effects:

A. Will cause an immediate reduction in heat and intensity of the fire.

B. Possible reduction of visibility in the fire area due to an increase in smoke production.

C. Fire may periodically vent around the sides and top of the deployed WCD with the potential for auto-exposure to the floor(s) above. The deployment window must be closed after deployment of the device.

D. Advancing a hoseline into the fire apartment after a WCD is deployed, may increase steam and/or heat production. This is due to:

1. WCD allowing members to move closer to the main body of fire.

2. WCD preventing any ventilation of the fire area.

3. Firefighters must have all PPE in place and use the full reach of the stream to maximize cooling of the area ahead of the advancing hoseline.

Note: Refer to TB Tools 2, 3 and Evolutions 33, 33A, and 34 for additional information on this equipment.

4.2.2 In FPMDs, water applied to the main body of fire from a high-rise nozzle (HRN), exterior stream, or flanking strategy can provide an offensive tactic designed to rapidly knock down the fire. An exterior stream may be a hoseline operated from street level, a setback, an outside terrace, another wing of the building or advanced up an aerial ladder. A tower ladder stream or ladder pipe may also be effective. Any exterior stream must be directed at the ceiling of the main fire area.

4.2.3 ***Redacted for PFS***

Note: Tests done by the Department concluded that the deployment of the HRN to combat a wind impacted fire greatly improves conditions in the public hallway and inside the apartment when the apartment door has been left open. If members are trapped and a wind impacted fire is preventing their removal, the use of a HRN or an exterior stream may protect members and allow for their safe removal. Refer to Engine Company Operations, Chapter 8, Addendum 3.

4.2.4 WCDs and HRNs may be difficult or impossible to deploy in windows of buildings with the following construction features:

A. Balconies that extend beyond the building face and are in front of a vented fire window.

B. Luxury high-rise FPMDs having non-operating windows, limited opening type windows or window walls. In these instances, glass removal will be a time-consuming operation requiring specialized equipment. In addition, falling glass will present a hazard.

C. Any type of façade or ledge that extends beyond the face of the building may prevent WCDs from being effectively deployed if they are above or below the fire window.

Note: Members must be aware of the obstacles that buildings in their area present. Drills shall be conducted to determine which alternate strategies may be used based on the building characteristics.

4.2.5 A Flanking strategy is the application of water from inside the fire building to control the main body of fire via a non-frontal attack. A small opening is made in the adjoining wall to the fire room as close to the exterior wall as possible, so as not to create a flow path. The hoseline is operated into the opening to extinguish the fire. Initially, the hole in the wall should be only large enough for the mainstream tip of the nozzle to be placed into the opening allowing the stream to be directed at the ceiling of the fire room.

A. Flanking attack when the door to the fire apartment has been left **open**:

1. This option is available based on the location of the fire apartment, the location of a stairway closer to the selected apartment, and the interior hallway conditions.

2. Enter an adjoining apartment to apply the hose stream to the fire room or fire apartment via a breached wall adjacent to the fire area, if this adjoining area can be accessed and occupied safely.

3. Once access is obtained to the adjoining apartment, the door to that apartment must remain closed and the hoseline stretched to this adjoining apartment from the apartment below via an exterior window or balcony using a utility rope.

B. Flanking attack when the door to the fire apartment is **closed**:

1. Enter an adjoining apartment to apply the hose stream to the fire room or fire apartment via a breached wall adjacent to the fire area, if this adjoining area can be accessed and occupied safely.

2. Once access is obtained to the adjoining apartment the hoseline will be stretched via the fire floor public hallway into the adjoining apartment to operate into the fire apartment.

4.3 ***Redacted for PFS***

5. OPERATIONS

5.1 When it is determined that the smoke and heat condition in the hallway is due to a wind impacted fire with the fire apartment door left **open**, operate as follows:

5.1.1 The Ladder Officer shall ensure members exit the public hallway immediately AND notify the IC and Engine officer of conditions. Units on scene shall be notified that a wind impacted fire condition exists.

5.1.2 The IC shall implement the appropriate alternate strategy to gain control of the fire area to allow the forcible entry team to reach and close the fire apartment door. Control of the fire apartment door is critical.

5.1.3 A hoseline shall be stretched and charged in the attack stairwell. This charged hoseline will remain in the stairwell so as not to create a flow path drawing the heat and smoke into the stairwell.

5.1.4 The door to the stairwell must remain closed until the alternate strategy has been implemented, and the IC receives confirmation of the following:

A. A KO Curtain or Window Blanket has been deployed over the target window(s) and is secured in place.

and/or

B. The stream of a High-Rise Nozzle, Exterior Stream, or Flanking Strategy has controlled the fire.

Note: In most circumstances, the KO Curtain would normally be the first tactic used due to its availability and time it takes to deploy.

5.1.5 Once confirmation is received that the alternative strategy has been successfully implemented, the following actions may be taken:

A. Approval to enter the public hallway must be given by the IC, Operations Section Chief or Fire Sector Supervisor.

B. Only the Ladder Officer and one member of the forcible entry team shall enter the public hallway to locate and gain control of the fire apartment door. The Ladder Officer shall utilize the TIC to assist in locating the fire apartment.

C. The other member of the interior team will remain at the attack stairwell door on the hallway side of the door to ensure the stairwell door remains closed limiting the flow path and to act as a beacon in case members need to evacuate the hallway. The Engine officer shall be responsible for control and coordination on the stairwell side of the door.

D. Once the Ladder Officer gains control of the fire apartment door, have the Engine Company advance the charged hoseline to the fire apartment door. The Ladder company member who remained at the stairwell door shall also advance to the fire apartment door.

E. The Ladder Company Officer shall evaluate and communicate to the IC and/or Fire Sector Supervisor of the conditions found. The IC and/or Fire Sector Supervisor shall determine if additional alternate strategies are required or whether to enter the fire apartment.

F. Once the decision has been made by the IC and/or Fire Sector Supervisor to enter the fire apartment, the Engine Company **must** enter the apartment first followed by the Ladder Company. This is for the protection of operating members due to the extreme conditions and the need to cool the fire apartment immediately. Opening the handline and using the reach and penetration of the stream ahead of the advancing firefighters will cool the fire gases and will help extinguish the fire ahead of the line.

G. Prior to entering the fire apartment, to assist the engine company in locating and extinguishing the main body of fire, the Engine Officer shall contact the roof firefighter, or other member operating in the apartment above the fire apartment, and request the following information:

   1. Description of fire apartment (e.g., L-shape, 3-bedroom apartment)

   2. Location of the main body of fire (e.g., kitchen, bedroom, living room)

   3. Most direct route to the fire area (e.g., When you enter the apartment, go in straight 6 feet and make a right down the hallway, the fire room will be the second door on the left approximately 12 feet down.

H. Once the hoseline advances towards the interior fire area as directed by the Engine Officer, the fire apartment door shall be chocked open.

5.2 When the door to the fire apartment is found **closed** on arrival, window failure **has** occurred, and reports are received from members operating on the floor above and the exterior that the wind **is** impacting the fire, operate as follows:

5.2.1 The door to the fire apartment must remain closed.

5.2.2 The IC shall implement the appropriate alternate strategy to gain control of the fire area.

5.2.3 The hoseline can be advanced to that location and charged.

5.2.4 The door to the fire apartment must remain closed until the alternate strategy has been implemented, and the IC receives confirmation of the following:

A. A KO Curtain or Window Blanket has been deployed over the target window(s) and is secured in place.

and/or

B. The stream of a High-Rise Nozzle, Exterior Stream, or Flanking Strategy has controlled the fire.

Note: In most circumstances, the KO Curtain would normally be the first tactic used due to its availability and time it takes to deploy.

5.2.5 The Ladder Company Officer shall evaluate and communicate to the IC and/or Fire Sector Supervisor of the conditions found. The IC and/or Fire Sector Supervisor shall determine if additional alternate strategies are required or whether to enter the fire apartment.

5.2.6 Once the decision has been made by the IC and/or Fire Sector Supervisor to enter the fire apartment, the Engine Company **must** enter the apartment first followed by the Ladder Company. This is for the protection of operating members due to the extreme conditions and the need to cool the fire apartment immediately. Opening the handline and using the reach and penetration of the stream ahead of the advancing firefighters will cool the fire gases and will help extinguish the fire ahead of the line.

5.2.7 Prior to entering the fire apartment, to assist the engine company in locating and extinguishing the main body of fire, the Engine Officer shall contact the roof firefighter, or other member operating in the apartment above the fire apartment, and request the following information:

A. Description of fire apartment (e.g., L-shape, 3-bedroom apartment)

B. Location of the main body of fire (e.g., kitchen, bedroom, living room)

C. Most direct route to the fire area (e.g., When you enter the apartment, go in straight 6 feet and make a right down the hallway, the fire room will be the second door on the left approximately 12 feet down.

5.2.8 Once the hoseline advances towards the interior fire area as directed by the Engine Officer, the fire apartment door shall be chocked open.

5.3 When the door to the fire apartment is found **closed** on arrival, window failure has **not** occurred but size-up indicates there is a wind condition; Officers must **still** evaluate the potential for the wind to adversely affect fire conditions. Prior to entry into the fire apartment, the following actions shall be implemented:

5.3.1 The hoseline can be advanced to that location and charged.

5.3.2 Wind Control Device in position above the fire apartment ready for immediate deployment. As a precautionary tactic, the IC may decide to deploy a Wind Control Device over an intact window of the fire room/area.

Note: Where you are unable to determine the target window from the exterior, the TIC may be of assistance. The IC shall assign a member with a TIC to scan the windows of the fire apartment from street level. Scanning of the fire apartment windows with the TIC can assist in identifying the target window for deploying of the WCD. The TIC does not see-through clear glass or plastic, but a heated window or window frame may be detected from below.

5.3.3 High Rise Nozzle ordered to point of operation upon arrival.

5.3.4 Prior to opening the door of the fire apartment, the Ladder Officer shall get a report on exterior conditions from members operating outside the building and the Roof firefighter operating on the floor above.

5.3.5 The Ladder Officer and one member of the forcible entry team shall enter the fire apartment to perform a search for the interior fire area location while the other member stays at the fire apartment door inside the apartment making sure the door remains controlled in the closed position, thereby limiting the flow path.

5.3.6 The door to the fire apartment must remain controlled in the closed position until the Ladder Officer requests the charged hoseline be advanced into the fire apartment or requires other assistance. Generally, the charged hoseline should not be advanced into the fire apartment until the main fire area/room has been located and if possible confined by closing a door. Keeping the fire apartment door controlled in the closed position until the fire room/area is confined will significantly reduce the flowpath. Taking steps to reduce the flowpath is a key tactic for member's safety when wind has the potential to adversely affect fire conditions.

5.3.7 Once the hoseline advances towards the interior fire area as directed by the Ladder Officer, the door shall be chocked open.

Note: The goal of the tactics outlined in this situation is to provide a margin of safety to members if window failure should occur. The immediate deployment of these resources will enable members to rapidly exit the fire apartment and control the fire apartment door.

5.4 KNOWN LIFE HAZARD

5.4.1 When faced with a known life hazard in either the public hallway or the fire apartment, the following actions shall be taken:

A. Notify the IC and all units of the location of the known life hazard.

B. Officers must maintain situational awareness and assess conditions while evaluating the risk vs reward. If a decision is made to attempt a rescue, it may be performed while alternate strategies are being implemented. The IC must be notified prior to any rescue attempt. In addition, the IC shall also be notified of the stairway from which operations will take place.

C. If the open fire apartment door is found in close proximity to the known life hazard in a public hallway, attempt to close the door. Control of the fire apartment door is critical. Notify the IC if the fire apartment door has been controlled.

D. Members operating in the stairwell shall keep the landing clear to allow for victim removal and/or emergency egress.

E. Notify the IC when the victim is removed.

BY ORDER OF THE FIRE COMMISSIONER AND CHIEF OF DEPARTMENT

FIREFIGHTING PROCEDURES
VOLUME 1, BOOK 2
June 1, 2013

BROWNSTONE AND ROWFRAME BUILDING FIRES

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1. GENERAL

1.1 INTRODUCTION

1.1.1 This bulletin describes the initial operations, assignments and use of tools at fires in Brownstone and Row Frame buildings.

1.1.2 This bulletin will be considered as the operating procedure for both types of buildings. While all situations cannot be covered in this bulletin, the areas of responsibility listed with the specific assignments of members should be followed as closely as the situation permits.

1.1.3 ***Redacted for PFS***

2. BROWNSTONES

2.1 GENERAL DESCRIPTION

2.1.1 Brownstone buildings were built in the late 1800's as private dwellings. They are three to five stories in height with a cellar. In brownstones, the basement is the first floor (See Figure 1). The interior is of combustible construction, while the exterior shell is made of non-combustible material. Their width is 20 to 25 feet, and their depth varies to about 60 feet.

Note: The word basement shall **not** be used in fireground communications. Members referring to the first story of the building during fireground communications shall only use the terminology, First Floor. Example "Engine 214 to Command, fire is located on the first floor."

2.1.2 The original layout of the interior rooms is as follows:

A. The first floor (basement) was composed of a kitchen in the rear with a dining room in the front, and an interior stairway to the second floor (parlor) and cellar. There is also a large closet. This is the only floor with two means of egress to the outside.

B. The second floor (parlor) contained the front and rear parlor rooms, a hall, bedroom in the rear and the main entrance to the building.

C. The third and fourth floors contained two bedrooms each, with hall rooms in the front and the rear, off the stairway. These may have been bedrooms or bathrooms.

Note: When searching the upper floors, do not overlook the possibility of small bedrooms having their only entrance from the hall. These rooms can be found in the front or the rear. The single means of egress to the interior hall may cause occupants to be trapped when fire has possession of the open interior stairs. Because of this, these rooms have been referred to as the "deadman's" room.

2.1.3 The entrance to the second floor (parlor) is usually by way of exterior stair or stoop. Entrance to the first floor (basement) is through a doorway located under the exterior stoop. Interior wooden stairs connect the cellar and first floor (basement), and first floor (basement) and second floor (parlor). An open interior stair connects the second floor (parlor) and upper floors. An iron ladder gives access from the top floor to the roof through a scuttle.

2.2 OTHER FEATURES ENCOUNTERED

2.2.1 Brownstones are often found to occupy entire blocks or section of them. When built at the same time, and by the same contractor, they are normally of the same height.

2.2.2 Originally bars were often encountered on both front and rear first floor (basement) windows and iron gates beneath the front stoop, negating access and egress. Additional bars and gates may be found on upper floors (See Figure 2).

2.2.3 There is normally a rear entrance from the yard to the first floor (basement) (See Figure 3).

2.2.4 The need for 10-foot hooks, to pull ceilings on the second floor (parlor floor), may exist in some Brownstone buildings.

2.2.5 Ceilings on the second floor (parlor floor) have much ornamental plasterwork. It is often in the center and around the perimeter of the room. Use caution when pulling ceilings. The weight of this plaster can cause serious injury to members operating in the area.

2.2.6 In some instances these buildings have been renovated by removal of the front stoop converting the former first floor (basement) entrance to the main access for the building.

2.2.7 In many buildings, when they were converted to Multiple Dwellings, fire escapes were added or sprinklers were installed in the interior halls in lieu of secondary means of egress. Sprinkler lines were further extended into individual rooms when buildings were converted to Rooming Houses. The presence of these sprinklers may indicate the absence of a fire escape. Most brownstones, however, do not have fire escapes.

2.2.8 In many instances these buildings are being utilized as "illegal" Multiple Dwellings with single room occupancies or entire families found on all floors, without the required fire escape or sprinklers.

2.2.9 Due to the poor integrity of individual rooms and areas, the single open interior stair often becomes involved in fire and/or heavily charged with smoke. Buildup of heat and smoke on the top floor is extremely rapid, and since the buildings were originally constructed without secondary means of egress, occupants are often trapped above the fire. Immediate ventilation, entry, Isolation and search (VEIS) of the top floor is mandatory, and is considered to be one of the most important operations at these fires. This important operational tactic must be controlled, communicated and coordinated between the inside and outside teams.

2.2.10 Doors at top of cellar and first floor (basement) stairs normally prevent the immediate extension of cellar fires up the main interior stairs. However, there will be a rapid build-up of smoke and heat on upper floors and initial operations will remain the same.

2.2.11 ***Redacted for PFS***

2.2.12 Rear extensions also have been added on the first floor. In some cases these extensions may be two or three stories in height, and 10 to 20 feet in depth (See Figure 3). They will have their own cockloft.

2.2.13 Duplex Apartments: In certain areas of the city, it has become popular to convert to duplex apartments. Each conversion will present its own unique problems. The following is a list of construction features that may be found:

A. Access to the apartments:

1. It is common to have one apartment on the first (basement) and second (parlor) floors and the other apartment on the third and fourth floors, with each apartment having its own separate entrance.
2. In Brownstone conversions of this type, where the high stoop remains in place, access to the lower apartment will usually be the entrance under the stoop. Ascending the stoop will provide entrance to the apartment on the upper floors.

B. Partial areas of the floors may be cut out to create two story-high ceilings and balconies.

C. Open, unprotected stairs between floors within each apartment.

Note: In some cases, ventilation of the roof will only provide ventilation for the apartments on the upper floors.

2.2.14 Other popular conversions may include a penthouse. These structures are constructed on the roof. They are usually accessed via the apartment on the top floor, creating a duplex apartment.

Note: This is only a partial list. Companies with conversions in their response areas must be aware of the problems presented in each conversion, and adjust their operations to meet these problems. For example, routes for engine companies stretching lines may differ from standard Brownstone operations. Ladder company operations may differ in access to, and VEIS of, the floor above the fire.

2.2.15 Roof construction is also varied:

A. The majority are flat construction with no parapet in rear (see Figure 4).

B. Some have a center peak which slopes toward the front and the rear (See Figure 3).

C. A third type has more floors in the rear than in front. There may be five stories in the rear with full windows. The roof slopes to the front where there are small front windows making access to and removal of trapped persons from these areas difficult. This creates a communication problem when making a size up (See Figure 5).

2.2.16 Access to the roof is via the iron ladder leading up to the scuttle opening (See Figure 4). The ladder is usually in a closet.

2.2.17 Figures 6 and 7 illustrate other roof and attic construction features found in Brownstone buildings that may affect fire operations.

2.2.18 In flat roof buildings, the cockloft space between the top floor ceiling and the roof is approximately 2' to 3' in height and the roof is pitched toward the rear of the building.

2.3 EXTENSION AND SPREAD OF FIRE

2.3.1 The Brownstone is similar to the tenement in interior construction in that it is basically non-fireproof (NFP).

2.3.2 The fire is generally confined to the original fire building, although there may be some spread in cellars due to beams of adjoining buildings butting up against one another, and in the cockloft due to the deterioration and faulty construction in division walls. Fire can also extend to adjoining buildings via the cornice and/or the "Yankee gutter" (See Figure 8).

2.3.3 When a cornice has been exposed to fire or involved in fire, the cornice or parts of it may suddenly fall. In these situations, it may be necessary to keep members away from all areas in the front of the building, especially when the cornice has been involved by heavy fire for a considerable time.

2.3.4 In addition to typical problem areas associated with NFP buildings, particular points of examination inside the Brownstone should include dumbwaiter shafts, hot air ducts and registers running throughout the building and pockets in the walls on the second floor (parlor floor) constructed to facilitate the operation of sliding doors (pocket doors).

2.3.5 Some Brownstone buildings may have open stairs in the rear of the building. They usually go from the first (basement) to second (parlor) floors. This is separate from the main staircase. Their original use was for servants. Fire may extend via these stairs.

2.3.6 The large open stairway with wood paneling provides a continuous combustible flue from the second floor (parlor floor) to the roof. This will allow fire to spread rapidly and cut off escape of the occupants.

2.3.7 Transom windows, which may be found over the interior doors, can fail under fire conditions and allow heat and smoke into the hall areas. This also will allow fire to spread more easily.

2.4 GENERAL AREAS OF RESPONSIBILITY

2.4.1 First Ladder Company to Arrive

A. Ladder company operations on fire floor.

B. Determine life hazard and rescue as required.

C. Roof ventilation and a visual check of rear and sides from this level.

D. Ladder as needed.

E. All horizontal and initial vertical ventilation tactics must be controlled, communicated and coordinated by the Ladder Company Officer inside the fire area to be vented.

F. Rear of building:

1. Visual examination *
2. Ventilation

* *The basement has a rear door which opens into the yard. This is a fast way to check the rear for trapped occupants. This action must be communicated to and coordinated by the Ladder Company Officer.*

G. When second ladder company will not arrive within a reasonable time, make interior search and removal of endangered occupants above the fire.

2.4.2 **Second Ladder Company to Arrive**

A. All floors above the fire floor for VEIS and to check for fire extension.
B. Confirm roof ventilation (assist first unit).
C. Check rear and sides of buildings.
D. Reinforce laddering and removal operations when necessary.
E. Examine exposures as conditions require.

Note: Due to narrow stairs and landings, do not crowd or impede the operation and movement of the first attack line.

2.5 ASSUMPTIONS

There is a light-to-medium fire situation within the building with one or more rooms involved and both ladder companies and required engine companies will arrive at the scene.

Light Fire Situation. Indicates a fire which can be extinguished with the operation of one hand line and/or hand extinguishers or those that can be readily extinguished without resorting to extinguishing agents.

Medium Fire Situation. Indicates a fire which may be extinguished with the operation of two handlines.

2.5.1 Ladder Companies will institute a two-team offense that will cover their area of assigned responsibility.

INSIDE TEAM:
A. Officer
B. Forcible Entry Firefighter
C. Extinguisher Firefighter

OUTSIDE TEAM:
D. Chauffeur
E. Outside Vent Firefighter (OV)
F. Roof Firefighter

2.5.2 For the purposes of this bulletin we are assuming the fire building to be a four-story structure, cellar, first floor (basement), second floor (parlor), plus two additional floors.

2.5.3 Variations of this operational procedure, based on structural changes from this assumed structure, will be the responsibility of the company officer.

2.6 FIRST LADDER COMPANY TO ARRIVE

INSIDE TEAM

A. OFFICER *(First Arriving Ladder - Brownstone Building)*

TOOLS: Handie Talkie (HT)
Flashlight
Officer's tool

POSITION: Door to the fire floor or fire area.

B. FORCIBLE ENTRY FIREFIGHTER *(First Arriving Ladder - Brownstone Building)*

TOOLS: Axe/Halligan(Maul/Halligan)
Hydra Ram
Flashlight
HT

POSITION: Door to the fire floor or fire area.

DUTIES:

1. Forcible entry.
2. Immediate search and removal of victims.
3. Locate the fire.
4. Ventilate as ordered by the Officer.

C. EXTINGUISHER FIREFIGHTER *(First Arriving Ladder - Brownstone Building)*

TOOLS: 6’ Hook
Pressurized water extinguisher
Flashlight
HT

POSITION: Door to the fire floor or fire area.

DUTIES:

1. Assist in forcible entry.
2. Search and removal of victims.
3. Locate the fire.
4. Use the extinguisher where it can be of any possible help.
5. Ventilate as ordered by the Officer.

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OUTSIDE TEAM

Note: All exterior horizontal ventilation tactics and initial vertical ventilation tactics must be controlled, communicated and coordinated with the Ladder Company Officer inside the fire area to be vented.

D. CHAUFFEUR *(First Arriving Ladder – Brownstone Building)*

The chauffeur must have a working knowledge of the duties and responsibilities of all members of first alarm ladder companies and how they are likely to execute their assignments under different fire situations. Monitoring the HT will be of assistance in making decisions. The chauffeur should have the ability to evaluate a problem and then make a sound decision to cope with it.

TOOLS: HT
Flashlight
The chauffeur shall select the tools that he/she deems necessary to complete assignment.

POSITION: The front of the fire building.

The chauffeur of an aerial ladder shall not operate in a manner that will in any way impede s/hehis/her return to the pedestal and cause a delay in positioning or repositioning the aerial for rescue or removal operations.

The chauffeur must notify their company officer of intended destination when leaving this primary position.

DUTIES:

1. Position and prepare apparatus for complete coverage. When unable to complete this assignment, the IC must be notified.

2. Raise aerial to roof.

3. Wait for completion of roof size-up.
   - A. When roof firefighter indicates need for a Life Saving Rope (LSR) rescue, the chauffeur shall proceed to roof to assist.
   - B. When roof firefighter indicates no need for rescue, chauffeur will place ladder to top floor for VEIS as necessary. He/she shall team up with the 2nd chauffeur (or another available member).
   - C. When a fire denies the use of the interior stair to the occupants and there is no rear fire escape, top floor VEIS is mandatory if we are going to reach persons who are in a hazardous position, or who have already been overcome.

D. Generally, the window over the main entrance opens into one small room (on all upper floors). The other two windows open into a large room which originally, and in many cases still is, connected railroad fashion to other rooms deeper in the building. It is best to select one of these windows for VEIS, instead of the window over the main entrance.

E. In fire involving interior stairs, egress from the small room above the main entrance (on each floor) may be cut off. A similar type room may be found in the rear. Early attention must be given to search of these rooms.

4. The only variation from this procedure shall be when there is a known life hazard at another location requiring action, e.g.

A. Aerial ladder/Portable ladder rescue on the front of the building

B. LSR rescue

Note: This involves the principle of taking care of known life hazard before moving toward an area of possible life hazard.

5. When there is fire on the 3rd floor of a four-story brownstone it can readily be seen that entry into the top floor via aerial may be negated until the fire has been darkened down. The chauffeur will wait until the possibility of lapping fire has been eliminated, then vent all windows on top floor. Entry into the top floor via aerial may then be attempted, when teamed up with another available member, if the second arriving ladder company has not already "made" the top floor via the interior.

6. For a Top Floor Fire:

A. Raise and position aerial to roof of exposure for use by roof firefighter and OV (who will be going to roof).

B. Commence venting top floor windows as coordinated with the Ladder Company Officer inside the fire area to be vented.

C. The top floor fire often permits search of all but the immediate fire area by members of the Inside Team. One of these members may make their way to a front window to inform the chauffeur that they are "in", relieving him/her of the necessity of performing VEIS from the aerial.

When the chauffer is not contacted by a member of the Inside Team, the chauffeur must assume that they have been unable to get past the fire, or are otherwise heavily engaged. In such instances and where fire conditions permit, the chauffeur should attempt entry and search.

Prior to venting the top floor, the chauffeur shall communicate and coordinate with the Ladder Company Officer inside the fire area to be vented. Prior to entering an IDLH environment, the chauffeur shall team up with the 2nd chauffeur (or another available member).

D. Once assured that laddering is not needed, or after VEIS has been completed, the chauffeur will report to their officer with whatever tools necessary, keeping in mind that maximum utilization of 6' hooks is expected at top floor fires.

E. OUTSIDE VENT (OV) POSITION *(First Arriving Ladder – Brownstone Building)*

TOOLS:
6' hook
Halligan tool
Flashlight
HT

Note: For top floor fires, the saw is taken in place of the hook.

POSITION:

1. Assist the chauffeur in front of the fire building when aerial or portable ladders are needed for rescue or removal.
2. Check the rear of building for trapped occupants.
3. **Top Floor Fire:** Take the saw to the roof.

DUTIES:

1. Assist Chauffeur in any ladder rescue that may be required on the front of the building.
2. NO FRONT LADDER RESCUE REQUIRED
   When ladder rescue is not required at the front of the building, the OV shall immediately make their way to the rear, to check for the life hazard and to perform outside vent of floors within reach.
   A. When necessary to vent the second floor, the option of utilizing a 10-foot hook will assure venting of both upper and lower panes of 2nd floor level while placing the member out of range of falling glass.
   B. The 10-foot scissor ladder is also a useful tool for the OV. It can be used to accomplish the following:
      - In closed position it can be used for venting.
      - Access to 2nd floor for VEIS. Prior to VEIS, he/she shall be teamed up with another available member.
      - Access to roof of 1 story setback.

- Access to the 3rd floor from the roof of setback for ventilation. Prior to entry and search, he/she shall be teamed up with another available member.
- Provide means of climbing fences.

3. REAR RESCUE NEEDED

When on arrival at the rear a person is seen trapped on an upper floor, the OV should do the following:

A. Notify the company officer and the IC of the floor and the exact location of the victim.

B. When there is a rear fire escape, ascend same and assist victim.

C. When there is no rear fire escape, reassure victim and determine if a portable laddering operation is practical.

D. When the OV determines that a laddering operation is **practical,** they may initiate such an attempt. Generally, there is less effort and staffing involved than a LSR rescue. It is usually a safer operation for the members involved. In this case the OV should:

   1. Notify the IC.

   2. Determine what size ladder is needed.

   3. Determine the most accessible route to rear.

E. When the OV determines that it is impractical to get a portable ladder to the rear due to room layout, hallways, remodeling, fences between yards, etc., the OV will have to make a decision whether to stay in the rear reassuring the victim that help is on the way or proceed to the roof and assist with a LSR rescue.

   This decision should be based on:

   - The emotional state of the victim.
   - The fire/smoke condition in the immediate vicinity of the victim.
   - The location and severity of the fire, e.g. 2nd floor (parlor floor) of fire building or adjoining building.

4. NO REAR RESCUE NEEDED

When no rear rescue is needed and the OV is able to enter and search, they shall be teamed up with another available member. When unable to team up with another member or if unable to enter for search, the OV shall return to the front of the building to team up with the chauffeur for top floor VEIS.

5. BUILDINGS WITH FIRE ESCAPES

A. Due to conversions to multiple dwellings, some of these buildings may have fire escapes. If such is the case, the OV will operate as outlined in Ladders 3. They shall team up with the roof firefighter (or another available member) to VEIS the fire floor and, if not needed for search on that floor, proceed to VEIS the floors above.

B. It is extremely important for the OV to notify their officer and the IC of the presence of a rear fire escape via the HT.

6. TOP FLOOR FIRE

For a fire on the top floor, the OV will proceed to the roof with the saw and halligan tool. When possible, descend the fire escape and perform ventilation of the top floor when coordinated with the Ladder Company Officer inside the fire area to be vented. Prior to VEIS, he/she shall team up with the 2nd OV (or another available member).

When unable to descend the fire escape, attempt to vent the fire apartment from roof level, when coordinated with the Ladder Company Officer inside the fire area to be vented, and then assist with roof ventilation.

F. ROOF POSITION *(First Arriving Ladder – Brownstone Building)*

TOOLS:
Halligan Tool
6' Halligan Hook
Flashlight

HT
Life Saving Rope (LSR)

POSITION: **THE ROOF OF FIRE BUILDING**

ACCESS TO THE ROOF: *(Order of Preference)*

1. AERIAL LADDER OR TOWER LADDER

A. Access through adjoining building is often difficult and undependable.

B. Eliminates possibly time consuming forcible entry and needless structural damage to other than the fire building.

C. Scuttle ladders, the usual means of access to the roof, are often loose, broken, or missing.

D. Scuttle covers are often locked, chained, nailed and/or completely tarred over.

E. Area in vicinity of scuttle ladder is frequently used for storage of excess household furniture, bicycles, boxes of clothing, etc.

F. Size of scuttle opening is narrow, making it difficult to get through, especially with a mask, tools and LSR.

G. As will be noted in a subsequent section, the aerial normally will be raised at these operations to facilitate VEIS of top floor.

H. With the roof firefighter ascending via aerial, there is visual assurance that member is in position.

I. The aerial will be in position for rapid ascent by the chauffeur and additional personnel, in the event immediate LSR rescue in the rear is required.

Note: When using aerial for access to roof, have the roof firefighter assist the chauffeur in setting up the apparatus for the operation.

2. 2ND ARRIVING AERIAL LADDER (when available)

3. ACCESS VIA ADJOINING BUILDINGS

A. Aerial ladder rescue must be performed.

B. Apparatus will be blocked out of the street or otherwise delayed.

C. Street conditions, e.g. overhead wires, trees, etc., will negate the use of the aerial.

D. The roof firefighter should use the building offering easiest access to its interior as indicated by persons on the stoop, lights in either basement or parlor windows, etc. obviating the need for forcible entry or the possibility of encountering prolonged delay.

DUTIES:

The duties of the roof firefighter demand an experienced, observant and determined firefighter capable of decisive action. Nothing shall deter the member assigned the roof position from carrying out s/hehis/her assigned duties. The responsibility of this position covers three broad areas:

- Life
- Communication
- Ventilation

1. Survey the rear, courts and shafts of the building for trapped occupants and/or persons who may have jumped. Check for the presence of any fire escapes. Notify the Officer of any life hazard, location of fire escapes, and the ventilation profile of the rear and sides of the building.

2. When trapped occupants are noted:

   A. Assure the victim that help is on the way. This is to deter the victim from jumping, keeping the victim at the window until they can be reached via the interior or exterior.

   B. Contact the Ladder Company Officer via HT, informing them of the exact location of the trapped occupant so a concentrated inside rescue attempt may be made. An acknowledgement of the above message must be received.

   C. When a LSR rescue is required, contact the chauffeur via HT for assistance on the roof. When the aerial ladder is to be used as a substantial object to tie off the LSR, notify the chauffeur to reposition if necessary.

3. When no trapped occupants are noted, notify the chauffeur that rescue operations are not needed.

4. Notify the Officer that you are in position to perform ventilation tactics and proceed as directed:

   Note: Initial vertical ventilation tactics must be performed as directed by the ladder company officer. Initial vertical ventilation tactics include the venting of bulkheads, skylights and scuttles over stairways and hallways.

   A) Ventilate skylights. Take out the glass skylight over the stairs. Units below shall be warned via HT prior to breaking glass. Break out a small pane of glass as a warning to the members moving up the stairs below before breaking the remaining larger sections of glass. Members moving up the stairs shall stay close to the wall, keeping their hands off the stair rail until the glass has been dropped. Remove additional skylights as needed.

   B) Open up the roof scuttle covers. Persons attempting to escape via the roof may have been trapped and/or overcome under the scuttle enclosure. There may be a door on the closet leading to the scuttle. Fire or excessive heat may be immediately behind the door. Do not descend the scuttle ladder to open the door.

   C) Vent windows to the upper floors as directed by the ladder company officer responsible for the top floor (be careful of creating an auto-exposure). This operation is based on the members carrying utility cords.

5. When the building has a rear fire escape, after completing roof ventilation duties, the roof firefighter will operate as per Ladders 3. They shall team up with the OV (or another available member) to VEIS the fire floor and if not needed for search on that floor, proceed to VEIS the floors above. Members will notify their Officer via HT that they are leaving their primary area of responsibility and initiating such search. The scuttle ladder shall never be used to descend to the lower floors unless the fire is under control.

6. When there is no fire escape, after completing their roof responsibilities, the roof firefighter will descend the aerial ladder, if it is still in position at the roof, and team up with the chauffeur for VEIS of the top floor. When the aerial ladder is not in position, the roof firefighter shall contact their company officer and be guided by their direction.

7. For top floor fires, pending the arrival of the saw to the roof, the roof firefighter shall open up the returns. Ventilate the top floor windows from the roof level as directed by the Ladder Company Officer operating on the top floor. The roof firefighter is also responsible for utilization of the saw to vent the cockloft and top floor as needed after completing their initial duties.

   Note: Roof firefighters should be aware that they are the eyes of the Incident Commander as far as roof level size-up is concerned. Report initial size-up and any important additional information as it develops, such as penthouse structures, or the inability to ventilate the interior stairs due to either there being no skylight or tarred over roof skylights. (In these cases, a saw must be called for.)

2.7 SECOND LADDER COMPANY TO ARRIVE

OPERATIONS

Units responding to any fire should monitor both the department radio and HT transmissions. This will provide members with vital information about conditions at the scene and make them aware of problems encountered by first arriving units, such as water supply problems, people trapped, location and severity of fire, heavy smoke conditions, apparatus blocked out of street, etc.

Along with augmenting the operations of the first ladder company as it pertains to immediate rescue and ventilation, the 2nd ladder is responsible for:

A. Conducting VEIS on all floors above the fire.

B. Examining floors above for fire extension.

C. Examining rear of building for possible victims.

D. Examining exposures for extension as ordered by the IC

Note: Common interior shafts may be encountered and must be given serious consideration as they pertain to fire extension. These shafts are often covered at roof level.

When first arriving ladder is a Tower Ladder (TL), the OV position in the rear will be covered by the 2nd to arrive OV.

INSIDE TEAM

(Second Arriving Ladder - Brownstone Building)

TOOLS:
Remain the same.

POSITION:
For other than top floor fires:
To the floors above via the interior for all floors.

When the 2nd Ladder Company Officer finds their access to the floor above blocked by fire on the interior stair, they may order a portable ladder raised to the selected floor to attempt access via the exterior or fire escape, when available.

For a top floor fire:
Go into the fire building, checking the floors below to insure fire did not start on lower floor. Be available to assist or relieve the first ladder on the top floor.

Units should remain on the floor below until needed. They shall not block the stair or hallway leading to upper floors.

DUTIES:

Other than augmenting the operations of the 1st ladder company as it pertains to immediate rescue and ventilation, the 2nd ladder company has two GENERAL areas of responsibility:

1. Saving life on floors above the fire and in attached exposures.
2. Controlling extension of fire to floors above and below via heat registers and dumbwaiters and controlling spread to attached exposures.

OUTSIDE TEAM

CHAUFFEUR *(Second Arriving Ladder – Brownstone Building)*

TOOLS:
HT
Flashlight
The chauffeur shall select the tools that he/she deems necessary to complete assignment.

Note: Maximum use of 6' hooks is expected for top floor fires.

POSITION:

Reports to the turntable area of the 1st ladder Company to assist, or if necessary, team up with the chauffeur of the 1st ladder for top floor VEIS.

DUTIES:

1. Position apparatus and place in Power Take Off (PTO) for use by the roof firefighter.

2. Team up with 1st chauffeur for top floor VEIS.

3. When no longer needed at the aerial or for other laddering operations on the front of the building, goes to work where their company officer directs.

   Note: All members of the Outside Team should be aware when a LSR rescue may be under way. The Outside Team shall be prepared to assist the first arriving ladder as needed.

OUTSIDE VENT (OV) POSITION *(Second Arriving Ladder – Brownstone Building)*

TOOLS:
6' hook
Halligan tool
Flashlight
HT

POSITION:

Except for assisting the chauffeur in front of the building when aerial or portable ladders are needed for rescue or removal, check rear for trapped occupants and insure that ventilation has been completed.

DUTIES:

1. Check rear for trapped occupants and to assure ventilation has been completed. This is especially important when the first to arrive ladder is a TL, as the first to arrive OV will be operating in the bucket in front of the building.

2. Be available to assist in rear laddering when necessary.

3. Return to the front of the building in case there is a need to get to the floors above via portable ladder or aerial ladder when teamed up with another member.

4. When not needed for ladder operations, report in to their officer above the fire.

5. For a top floor fire, after checking the rear, report to the roof to assist in ventilation and opening up of the roof, or go into an exposure as directed by their officer.

6. When a fire escape is present, operate as per Ladders 3. The 2nd OV and 2nd roof firefighter (or another available member) shall team up and VEIS the apartment directly over the fire from the fire escape when coordinated with the Ladder Company Officer inside the area to be vented.

ROOF POSITION *(Second Arriving Ladder – Brownstone Building)*

Since the aerial of the 1st arriving ladder company may be involved in top floor VEIS by the time the 2nd ladder company arrives, the roof firefighter of the 2nd ladder company may raise and use their aerial as a means of access to the roof.

TOOLS: Halligan tool
6' Halligan Hook
Flashlight
HT

Note: For top floor fires, the saw is taken to the roof with the 6' Halligan hook.

POSITION:
Roof of the fire building to insure the roof has been opened and to assist the first arriving ladder in ventilation and opening up of the roof.

DUTIES:

1. When the 2nd arriving aerial can be raised to the fire building or an exposure, the member assigned to the roof, should attempt access this way.

2. Confirms roof ventilation and/or assists the 1st arriving ladder with ventilation of the floors above the fire to assist their own company's operation within the building.

3. Check for rear fire escape. When present, team up with the 2nd OV (or another available member) to VEIS all floors above the fire. Pay particular attention to top floor apartments, including the public hall.

4. Where conditions warrant, commence initial ventilation of adjoining building roofs.

5. When there is no apparent need for their presence on the roof, reports to officer, via HT, for further duties.

6. **For a top floor fire**, go to the roof with the saw and Halligan hook to assist in ventilation and opening up.

7. **For fire below the top floor**, be alert to first arriving roof firefighter's request for a saw because of the inability to ventilate the interior stairs due to no roof level skylight (tarred over skylights), dumbwaiters and penthouse structures.

2.8 FIRST LADDER COMPANY TO ARRIVE - TOWER LADDER

Tower Ladders and Aerial Ladders shall operate the same except:

INSIDE TEAM

(First Arriving Ladder Company is a Tower Ladder)

TOOLS, POSITION AND DUTIES:
Remain the same.

OUTSIDE TEAM

Tools, position, and duties remain the same with the following exceptions:

CHAUFFEUR:

POSITION:
Remain at pedestal for overall safety, control, and coordination.

OUTSIDE VENT FIREFIGHTER:

POSITION
Operates as basket firefighter for ventilation.

DUTIES

1. When the basket is used for roof access the saw and life saving rope will be brought to the roof. The OV will wait for completion of roof size-up before repositioning the basket to the fire floor for ventilation as coordinated with the Ladder Company Officer inside the fire area to be vented.

2. After venting the fire floor, reposition the basket to the top floor for VEIS.

3. Prior to VEIS of the top floor the OV shall team up with the roof firefighter (or another available member).

ROOF FIREFIGHTER:

POSITION:
Roof of fire building.

DUTIES

1. Proceed to the roof via:(Order of Preference)
   - the basket
   - the 2nd arriving aerial ladder
   - the adjoining building

   Note: A visible life hazard will negate the initial use of the TL basket for roof access.

2. After completing initial roof duties they shall team up with the OV for top floor VEIS.

2.9 SECOND LADDER COMPANY TO ARRIVE *(When First Arriving Ladder is a Tower Ladder)*

TOOLS, POSITIONS AND DUTIES:
All remain the same **except** for chauffeur as noted below.

Note: When the first to arrive ladder company is a TL, the chauffeur will remain on the pedestal. Therefore the chauffeur of the 2nd to arrive ladder company does not have to report to the pedestal and may be assigned other duties by their company officer: e.g.

- Examination of exposures.
- Assist with roof operations.
- Be available to team up with another available member, if needed.

3. ENGINE OPERATIONS

Fires discussed are to be considered of such magnitude as to require the use of one or two hoselines for extinguishment. All interior hoselines stretched will be considered 1 ¾". Reason for use: Speed, mobility, and close quarters.

Note: The Engine Company officer shall announce via the handi-talkie when the initial hoseline attack is to commence. Conditions in areas behind, adjoining or above the operating hoseline must be monitored for sudden possible deterioration due to the effects of hoseline advancement on the fire. All members must be alert to fireground communications concerning hoseline placement and the commencement of hoseline operations so that they may seek refuge if necessary.

3.1 Cellar Fires

A. First Line
First hoseline stretched through the front door on the first floor, then down to the cellar via the interior cellar stairs to extinguish the fire.

B. Second Line
Second hoseline stretched through the front door on the first floor to back up the first hoseline. If the first line was used to secure first floor, second line will be stretched to cellar via interior cellar stair to extinguish the fire.

C. Third Line
If a third hoseline is necessary, it will be stretched as ordered by the Incident Commander.

3.2 First Floor Fires

A. First Line
First hoseline stretched through the front door on the first floor to extinguish the fire.

B. Second Line
Second hoseline, if not needed to back up the first hoseline, shall be stretched through the front door on the second (parlor) floor to maintain the integrity of the interior stairs.

C. Third Line
If a third hoseline is necessary, it will be stretched as ordered by the Incident Commander.

Note: Interior wooden stairs connect the first floor (basement) and second floor (parlor). If interior stair doors are present at the top and/or bottom of these stairs, they shall be closed to control the flow path.

3.3 Fire on an Upper Floor

A. First Line
The first hoseline is taken through the front door on the second (parlor) floor to the fire floor to extinguish the fire.

B. Second Line
Second hoseline stretched through the front door on the second (parlor) floor to back up the first hoseline.

C. Third Line
If a third hoseline is necessary, it will be stretched as ordered by the Incident Commander.

3.4 ***Redacted for PFS***

4. ***Redacted for PFS***

5. ROW FRAMES

Redacted for PFS

5.1 GENERAL DESCRIPTION

5.1.1 These buildings, as the name implies, are built in rows containing as many as twenty or more buildings. They vary in height from two to five stories, are twenty to thirty feet in width, with depths ranging from forty to sixty feet. When constructed, each builder may have used varying designs, i.e., with stoop similar to brownstones but all wood; with or without cornices. They were constructed over a period of many years in the 1800's and early 1900's. Many are found throughout the city.

5.1.2 The room arrangement will vary with design of building.

A. One type is similar to the Brownstone layout of rooms. They generally have three front windows per floor with one apartment going front to rear and no rear fire escape (See Figures 11 & 11A).

Note: The word basement shall **not** be used in fireground communications. Members referring to the first story of the building during fireground communications shall only use the terminology, First Floor. Example "Engine 214 to Command, fire is located on the first floor."

B. Another type is the railroad flat with two apartments per floor. They generally have four windows across the front, with a rear fire escape (see Figures 12 & 12A). The depth of the building will determine the size and number of rooms.

1. There may be a dumbwaiter shaft present.

2. The presence of light shafts is also a possibility (See Figure 12A).

5.1.3 These buildings can be either balloon frame or braced frame construction. (See Figures 9 & 10)

5.2 OTHER FEATURES ENCOUNTERED

5.2.1 These buildings can be considered large rectangular boxes of dry lumber, capable of generating large amounts of heat when burning. There is danger of fire spreading in all directions.

A. Interior construction is similar to tenements and Brownstones, usually wood lathe and plaster, wood studs; caps, and plates forming the outline for walls, door frames, etc.

B. All exterior is wood, or a veneer over outer wood sheathing. Fire can travel unseen in the air space formed when vertical wood furring strips are used between a veneer and outer sheathing.

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5.2.2 The salient feature common to all, regardless of variations in design, is the common cockloft spreading over all the buildings in the row. This cockloft may vary in height from one foot to a height tall enough for a member to stand in.

5.2.3 The division walls between buildings are quite frequently no more than the equivalent of a partition wall with nogging present (see Figure 10). Because of age, this nogging presents limited hindrance to fire. The mortar has disintegrated with age leaving many spaces through which the fire can penetrate.

5.2.4 Common cornices may be present, but even in buildings in the same row there may be variations. Owners of some of the row buildings may have altered the original construction. The impression that can result is that the cocklofts were constructed at different times, and are not connected to those burning. It is important to determine the extent of the common cockloft which is involved in fire.

5.2.5 Common or poorly fire stopped cockloft and cornice permits rapid fire spread into exposures. The term Row Frame is, of course, derived from the fact that these are constructed in rows, often running the length of the entire block.

5.2.6 There are many variations in the construction of these buildings. Light and airshafts are found in some, while not in others. Usually the buildings of longer length will have the shafts. Air and light shafts are of wood, and fire in shafts rapidly assumes blowtorch proportions.

5.2.7 To gain entrance to the roof from the interior of the building, there is a scuttle on the roof which is reached by an iron ladder from the top floor. The scuttle is usually near the skylight over the stairs.

5.2.8 Many of these buildings have a retail store on the first floor. This may include anything from a grocery to a repair shop.

5.2.9 Lack of fire stopping at cellar ceilings may permit fire travel from one building to another. Sometimes the cellar runs under more than one building with no separation. Fires in these cellars endanger two or more buildings.

5.2.10 Common partition walls between buildings readily permit horizontal fire spread to exposures through adjacent walls.

5.3 EXTENSION AND SPREAD OF FIRE

5.3.1 The life hazard is great due to the large number of occupants and the rapidity with which the fire may spread. Loss of life may occur within the building, or as a result of the occupants jumping from windows.

5.3.2 The major defects or faults in the construction are the lack of the fire stopping and the vast quantity of combustible material used in the construction. Fire can spread in the following manner:

A. Vertically

1. Via pipe recesses.

2. Via light and air shafts.

3. Auto exposure via front and rear windows, and via siding,

4. Via interior walls and partitions.

5. Via false fronts, bay windows, spaces between sheathing and building.

B. Horizontally

1. Via the common cockloft from one building to another. As the heat from the fire on a lower floor increases in intensity, the temperature rises rapidly. Smoke and heat will then spread laterally throughout the entire cockloft area. An extremely intense fire will develop in short order. Identifying those buildings already involved will be made more difficult, since we will already have heavy smoke throughout the cockloft.

2. Fire will spread via the common cornice.

3. Thin and flimsy walls between buildings will present no stop to fire spread.

4. In those with cellars common to more than one building, fire will involve both when the fire is of any consequence.

5. Presence of a store, and the type of business, may add to the fire. Tin ceilings make opening up more difficult.

6. Wood cellar beams in adjoining buildings, resting on a common wall, may spread fire where they butt

7. Fire may also spread from the roof of the fire building to the roof of an adjoining building by ignition of the roof covering.

8. Via windows and siding to adjoining buildings.

5.4 **The Danger of Collapse with Fires in This Type of Structure is a Factor Deserving Consideration.**

A. A heavy fire in the cockloft will burn roof supports and cause the collapse of the roof into the top floor.

B. Rear walls can pull away from the building and collapse in one section into the yard. Personnel will have to be alert to the possibility.

C. Collapse of sidewalls is also a danger. This is especially true where buildings within the row have been demolished and removed. Even when walls bordering this gap are braced, the danger is still present.

D. Indiscriminate removal of structural members during overhauling can cause partial or complete collapse of the building

E. The weight of a fire escape can cause a complete collapse of an exterior wall.

F. Brick veneer and stucco facing can collapse in sections or as a complete unit.

G. Steel plating attached on interior and exterior walls for security purposes adds additional weight increasing collapse potential.

H. When a serious fire burns out the entire first floor, there is danger of collapse, especially in corner buildings and buildings standing alone.

I. When a cornice has been exposed to fire or involved in fire, the cornice or parts of it may suddenly fall. In these situations, it may be necessary to keep members away from all areas in the front of the building, especially when the cornice has been involved by heavy fire for a considerable time.

5.5 GENERAL AREAS OF RESPONSIBILITY

5.5.1 First Ladder Company to Arrive

A. Ladder company operations on fire floor.

B. Determine life hazard and rescue as required.

C. Roof ventilation and a visual check of rear and sides from this level.

D. Ladder as needed.

E. All horizontal and initial vertical ventilation. These tactics must be controlled, communicated and coordinated by the ladder company officer in the fire area to be vented.

F. Check rear of building.

G. When the second ladder company will not arrive within a reasonable time, make interior search and removal of endangered occupants above the fire.

5.5.2 Second Ladder Company to Arrive

A. All floors above the fire floor for VEIS and to check for fire extension.

B. Confirm roof ventilation (assist first unit).

C. Check rear and sides of buildings for extension and victims.

D. Reinforce laddering and removal operations when necessary.

E. For fires on top floor, check exposures for extension.

Note: Due to narrow stairs and landings, do not crowd or impede the operation and movement of the first attack line.

5.6 ASSUMPTIONS

There is a light-to-medium fire situation within the building with one or more rooms involved and both ladder companies and required engine companies will arrive at the scene.

Light Fire Situation. Indicates a fire which can be extinguished with the operation of one hand line and/or hand extinguishers or those that can be readily extinguished without resorting to extinguishing agents.

Medium Fire Situation. Indicates a fire which may be extinguished with the operation of two handlines.

5.6.1 Ladder Companies will institute a two-team offense that will cover their area of responsibility.

INSIDE TEAM:
A Officer
B. Forcible Entry Firefighter
C. Extinguisher Firefighter

OUTSIDE TEAM:
D. Chauffeur
E. Outside Vent Firefighter(OV)
F. Roof Firefighter

5.6.2 For the purposes of this bulletin we are assuming the fire building to be a four-story structure.

5.6.3 Operational procedures will be based on the layout of the building, e.g. Brownstone type layout or Old Law Tenement layout, are the types most commonly found, but there are exceptions.

5.6.4 At top floor fires in the Brownstone type layout, the inside team of the first to arrive ladder company will be responsible for VEIS of the top floor, including examination of the cockloft.

The second ladder company to arrive will split the company and examine exposures 2 and 4 for extension.

5.6.5 At top floor fires in the Old Law Tenement (OLT) type layout, the inside team of the first to arrive ladder company will be responsible for VEIS of the fire apartment, including examination of the cockloft.

The second to arrive ladder company inside team will be responsible for VEIS of the adjoining apartment including examination of the cockloft.

5.7 FIRST LADDER COMPANY TO ARRIVE

INSIDE TEAM

A. OFFICER *(First Arriving Ladder - RowFrame Building)*

TOOLS: Handie Talkie(HT)
Flashlight
Officer's tool

POSITION: The door to the fire floor or fire area.

B. FORCIBLE ENTRY FIREFIGHTER *(First Arriving Ladder - Row Frame Building)*

TOOLS: Axe/Halligan (Maul/Halligan)
Hydra Ram
Flashlight
HT

POSITION: Door to the fire floor or fire area

DUTIES:

1. Forcible entry.
2. Immediate search and removal of victims.
3. Locate the fire.
4. Ventilate as ordered by the Officer.

C. EXTINGUISHER FIREFIGHTER *(First Arriving Ladder - Row Frame Building)*

TOOLS: 6' Hook
Pressurized water extinguisher
Flashlight
HT

POSITION: Door to the fire floor or fire area.

DUTIES:

1. Assist in forcible entry.

2. Search and removal of victims.

3. Locate the fire.

4. Use the extinguisher where it can be of any possible help.

5. Ventilate as ordered by the Officer.

OUTSIDE TEAM

Note: All exterior horizontal ventilation tactics must be controlled, communicated and coordinated with interior operations. All horizontal ventilation and the initial vertical ventilation tactics must be controlled and coordinated as directed by the Ladder Company Officer.

D. CHAUFFEUR *(First Arriving Ladder - RowFrame Building)*

The chauffeur must have a working knowledge of the duties and responsibilities of all members of first alarm ladder companies and how they are likely to execute their assignments under different fire situations. Monitoring the HT will be of assistance in making decisions. The chauffeur should have the ability to evaluate a problem and then make a sound decision to cope with it.

TOOLS: HT
Flashlight
The chauffeur shall select the tools that he/she deems necessary to complete assignment.

POSITION: The front of the fire building.

The chauffeur of an aerial ladder shall not operate in a manner that will in any way impede their return to the pedestal and cause a delay in positioning or repositioning the aerial for rescue or removal operations.

The chauffeur must notify their company officer of intended destination when leaving this primary position.

DUTIES: **Brownstone layout (three window front)**

1. Position and prepare apparatus for complete coverage. When unable to complete this assignment, the IC must be notified.

2. Raise aerial to roof.

3. Wait for completion of roof size-up.

   A. When roof firefighter indicates need for LSR rescue, the chauffeur shall proceed to roof to assist.

B. When roof firefighter indicates no need for rescue, chauffeur will place ladder to top floor for VEIS. He/she shall team up with the 2nd chauffeur (or another available member).

4. When a fire denies the use of the interior stair to the occupants and there is no rear fire escape, top floor VEIS is mandatory when we are going to reach persons who are in a hazardous position, or who have already been overcome. This important operational tactic must be controlled, communicated and coordinated between the inside and outside teams.

5. Generally, the window over the main entrance opens into one small room (on all upper floors). The other two windows open into a large room which originally, and in many cases still is, connected railroad fashion to other rooms deeper in the building. It is best to select one of these windows for VEIS, instead of the window over the main entrance.

6. In a fire involving interior stairs, egress from the small room above the main entrance (on each floor) may be cut off. A similar type room may be found in the rear. Early attention must be given to search of these rooms.

7. The only variation from this procedure shall be when there is a known life hazard at another location requiring action, e.g.

   A. Aerial ladder / portable ladder rescue on the front of the building.

   B. LSR rescue.

   Note: This involves the principle of taking care of a known life hazard before moving toward an area of possible life hazard.

8. When fire is lapping out of a lower floor opening, and entry into the top floor via aerial may be delayed until fire has been knocked down, the chauffeur will wait until lapping fire has been eliminated, then vent all windows on top floor. Entry into the top floor via aerial may then be attempted when the second to arrive ladder company has not already "made" the top floor via the interior.

DUTIES: **Old Law Tenement layout (4 window front)**

1. Position and prepare apparatus for complete coverage. When unable to complete this assignment, the IC must be notified.

2. Raise and use aerial and/or portable ladders for rescue purposes.

3. Raise aerial for roof access by roof firefighter.

4. After roof firefighter has reached the roof, reposition aerial for VEIS of the fire apartment if fire is on the 3rd floor or above when teamed up with the 2nd chauffeur (or another available member)

5. When fire is on the 1st or 2nd floor, VEIS the fire apartment from the exterior using portable ladders when teamed up with the 2nd chauffeur (or another available member).

6. After VEIS of the fire apartment is complete, the aerial may be used for VEIS of adjoining apartment and/or floors above.

Note: Partitions that separate apartments are not fire stopped between the ceiling of one floor and the underside of the floor above. This may permit lateral extension across the building and could result in an unusually heavy smoke condition in the apartment which is not directly over the fire apartment.

E. OUTSIDE VENT FIREFIGHTER *(First Arriving Ladder-RowFrame Building)*

TOOLS:
- 6' hook
- Halligan tool
- Flashlight
- HT

Note: For top floor fires, the saw is taken in place of the hook.

POSITION:
Except for assisting the chauffeur in front of the fire building when aerial or portable ladders are needed for rescue or removal, assignment is to ventilate the fire area from the exterior providing horizontal ventilation, as coordinated with and when ordered by the Ladder Company Officer inside the fire area to be vented.

Top Floor Fire:
Proceed to roof with saw and Halligan tool. When possible, descend fire escape and provide VEIS. When unable to descend the fire escape, notify company officer. When directed by the Ladder Company Officer operating on the top floor, attempt to vent fire apartment from roof level and then assist roof firefighter with roof vent.

DUTIES:

1. Assist chauffeur in any ladder rescue that may be required on the front of the building.

2. NO FRONT LADDER RESCUE REQUIRED
When ladder rescue is not required at the front of the building, the OV shall immediately make their way to the rear, to perform outside vent of floors within reach.

   Note: At "Brownstone type" RowFrames, the 10' hook or the 10' scissor ladder can be taken to the rear to assist in venting and/or gaining access as outlined in Brownstone Operations.

3. REAR RESCUE NEEDED
When on arrival at the rear, a person is seen trapped on an upper floor, the OV should do the following:

A. Notify company officer and the IC of the floor and the exact location of the victim.

B. When there is a rear fire escape, ascend same and assist victim.

C. When there is no rear fire escape, reassure victim and determine if a portable laddering operation is practical.

D. When the OV determines that a laddering operation **is practical**, they may initiate such an attempt. Generally, there is less effort and staffing involved than a LSR rescue. It is usually a safer operation for the members involved. In this case the OV should:

   1. Notify the IC.

   2. Determine what size ladder is needed.

   3. Determine the most accessible route to the rear.

E. When the OV determines that it **is impractical** to get a portable ladder to the rear due to room layout, hallways, remodeling, fences between yards, etc. the OV will have to make a decision whether to stay in the rear reassuring the victim that help is on the way or proceed to the roof and assist with a LSR rescue.
This decision should be based on:

   - ♦ The emotional state of the victim
   - ♦ The fire/smoke condition in the immediate vicinity of the victim.
   - ♦ The location and severity of the fire.

4. NO REAR RESCUE NEEDED

When no rear rescue is needed and the OV is able to enter and search, he/she shall be teamed up with another available member. When unable to team up with another member or if unable to enter for search, he/she shall return to the front of the building to team up with the chauffeur for top floor VEIS.

5. BUILDINGS WITH FIRE ESCAPES

A. When building has a fire escape, the OV will operate as outlined in Ladders 3. He/she shall team up with the roof firefighter (or another available member) to VEIS the fire floor and, when not needed for search on that floor, proceed to VEIS the floors above.

B. It is **extremely important** for the OV to notify s/hehis/her officer and the IC of the presence of rear fire escape via the HT.

F. ROOF FIREFIGHTER *(First Arriving Ladder - RowFrame Building)*

TOOLS:
Halligan tool
6' Halligan Hook
Flashlight
HT
Life Saving Rope (LSR)

POSITION: **THE ROOF OF FIRE BUILDING.**

ACCESS TO THE ROOF: *(Order of Preference)*

1. **AERIAL LADDER OR TOWER LADDER**
   - A. Access through adjoining building is often difficult and undependable.
   - B. Eliminates possibly time consuming forcible entry and needless structural damage to other than the fire building.
   - C. Scuttle ladders, the usual means of access to the roof, are often loose, broken, or missing.
   - D. Scuttle covers are often locked, chained, nailed and/or completely tarred over.
   - E. Area in vicinity of scuttle ladder is frequently used for storage of excess household furniture, bicycles, boxes of clothing, etc.
   - F. Size of scuttle opening is narrow, making it difficult to get through, especially with a mask, tools and LSR.
   - G. As will be noted in a subsequent section, the aerial normally will be raised at these operations to facilitate VEIS of top floor.
   - H. With the roof firefighter ascending via aerial, there is visual assurance that member is in position.
   - I. The aerial will be in position for rapid ascent by the chauffeur and additional personnel, in the event immediate LSR rescue in the rear is required.

2. **2ND ARRIVING AERIAL LADDER (WHEN AVAILABLE)**

3. **ACCESS VIA ADJOINING BUILDINGS**
   - A. Aerial ladder rescue must be performed
   - B. Apparatus will be blocked out of the street or otherwise delayed.

C. Street conditions, e.g. overhead wires, trees, etc., will negate the use of the aerial.

D. The immediate adjoining building **should not be used** for access to the roof due to the possibility of cockloft involvement.

DUTIES:
The duties of the roof firefighter demand an experienced, observant and determined firefighter capable of decisive action. Nothing shall deter the member assigned the roof position from carrying out s/hehis/her assigned duties.

The responsibility of this position covers three broad areas:

- Life
- Communication
- Ventilation

1. Survey the rear, courts and shafts of the building for trapped occupants and/or persons who may have jumped. Check for the presence of any fire escapes. Notify the Officer of any life hazard, location of fire escapes, and the ventilation profile of the rear and sides of the building.

2. When trapped occupants are noted:
    A. Assure the victim that help is on the way. This is to deter the victim from jumping, keeping the victim at the window until they can be reached via the interior or exterior.

    B. Contact the Ladder Company Officer via H/T, informing them of the exact location of the trapped occupant, so a concentrated inside rescue attempt may be made. An acknowledgement of the above message must be received.

    C. When a LSR rescue is required, contact the chauffeur via H/T for assistance on the roof. When the aerial ladder is to be used as a substantial object to tie off the LSR, notify the chauffeur to reposition when necessary.

3. When no trapped occupants are noted, notify the chauffeur that rescue operations are not needed.

4. Notify the Officer that you are in position to perform ventilation tactics and proceed as directed.

    Note: Initial vertical ventilation tactics must be performed as directed by the ladder company officer. Initial vertical ventilation tactics include the venting of bulkheads, skylights and scuttles over stairways and hallways.

A. Ventilate skylights. Take out the glass skylight over the stairs, units below shall be warned via h/t prior to breaking glass. Break out a small pane of glass as a warning to the members moving up the stairs below before breaking the remaining larger sections of glass. Members moving up the stairs shall stay close to the wall, keeping their hands off the stair rail until the glass has been dropped. Remove additional skylights as needed.

B. Open up the roof scuttle covers. Persons attempting to escape via the roof may have been trapped and/or overcome under the scuttle enclosure. There may be a door on the closet leading to the scuttle. Fire or excessive heat may be immediately behind the door. Do not descend the scuttle ladder to open the door.

C. Vent windows to the upper floors as directed by the ladder company officer responsible for the top floor (be careful of creating an auto-exposure). This operation is based on the members carrying utility cords.

5. When the building has a rear fire escape, after completing roof ventilation duties, the roof firefighter will operate as per Ladders 3. They shall team up with the OV (or another available member) to VEIS the fire floor and when not needed for search on that floor, proceed to VEIS the floors above. Members will notify their Officer via H/T that they are leaving their primary area of responsibility and initiating such search. The scuttle ladder shall never be used to descend to the lower floors unless the fire is under control.

6. When there is no fire escape, after completing their roof responsibilities, the roof firefighter will descend the aerial ladder, when it is still in position at the roof, and team up with the chauffeur for VEIS of the top floor. When the aerial ladder is not in position the roof firefighter shall contact their company officer and be guided by their direction.

7. For top floor fires, pending the arrival of the saw to the roof, the roof firefighter shall open up the returns. Ventilate the top floor windows from the roof level as directed by the Ladder company officer operating on the top floor. The roof firefighter is also responsible for utilization of the saw to vent the cockloft and top floor as needed after completing initial duties.

Note: Roof firefighters should be aware that they are the eyes of the Incident Commander as far as roof level size up is concerned. Report initial size up and any important additional information as it develops, such as penthouse structures, or the inability to ventilate the interior stairs due to either there being no skylight or tarred over roof skylights. (A saw must be called for in these instances)

5.8 SECOND LADDER COMPANY TO ARRIVE

OPERATIONS

Units responding to any fire should monitor both the department radio and HT transmissions. This will provide members with vital information about conditions at the scene and make them aware of problems encountered by first arriving units, such as water supply problems, people trapped, location and severity of fire, heavy smoke conditions, apparatus blocked out of street, etc.

Along with augmenting the operations of the first ladder company as it pertains to immediate rescue and ventilation the 2nd ladder is responsible for:

A. **All floors above the fire floor** for VEIS and to check for fire extension.

B. Confirm roof ventilation (assist first unit).

C. Check rear and sides of buildings for extension and victims.

D. Reinforce laddering and removal operations when necessary.

E. For all fires other than top floor fires, the Inside Team and Outside Team will operate on the floors above the fire floor.

Note: The window configuration and apartment layout are based on those most commonly found, but there are exceptions.

F. For fires on top floor:

1. In Brownstone type, split the company and examine exposures for extension in the cockloft. The inside team should operate in the most severely threatened exposure.

2. In OLT type, the inside team will proceed to the top floor of the fire building and be responsible for VEIS of the adjoining apartment, including examination of the cockloft.
In both situations described above, the Ladder Company Officer can assign the chauffeur to an exposure, when they are no longer needed at the aerial or for other laddering operations on the front of the building.

Note: Common interior shafts may be encountered and must be given serious consideration as they pertain to fire extension. These shafts are often covered at roof level.

5.8.1 TOP FLOOR FIRE: **Brownstone Type (3 window front)**

INSIDE TEAM

(Second Arriving Ladder - RowFrame Building - Brownstone Type)

TOOLS: Remain the same.

Consideration should be given to the extinguisher firefighter taking two 6' hooks in lieu of the pressurized water extinguisher. The forcible entry firefighter can assist with the pulling of ceilings, once finished with other duties.

POSITION:

Initially, the top floor of the most severely threatened exposure.

DUTIES:

1. VEIS top floor of exposure.
2. Examine the cockloft. Make inspection holes in the ceiling of each room to check for fire extension. Don't pull the entire ceiling until a charged line is in position.
3. When fire is discovered in the cockloft, the IC must be notified immediately.
4. When it is determined that a stop of the fire can be made in this building, a hand line must be called for.
5. When a stop cannot be made in this building, they must move to additional exposures to determine boundaries of the fire spread. This might entail skipping a building at a fast spreading fire.

OUTSIDE TEAM

(Second Arriving Ladder - RowFrame Building - Brownstone Type)

CHAUFFEUR

TOOLS: Remain the same.

POSITION: Front of building.

DUTIES:

1. Position apparatus for laddering operations on the front of the fire building for rescue purposes and / or roof access.
   The need for rescuing trapped occupants shall take preference when positioning apparatus
2. When no longer needed at the aerial, goes into an exposure as directed by their officer. VEIS the top floor and examine the cockloft as per Inside Team duties.

   Note: When exposed building is an IDLH area then members shall team up before entering exposures.

OUTSIDE VENT (OV) FIREFIGHTER *(Second Arriving Ladder - Top Floor Fire)*

TOOLS: 6' Hook
Halligan Tool
HT
Flashlight

POSITION:
Except for assisting the chauffeur in front of the building when aerial or portable ladders are needed for rescue or removal, check rear for trapped occupants and insure ventilation has been completed.

DUTIES:
When building has a rear fire escape operate as per Ladders 3, performing VEIS of top floor when teamed up with 1st OV (or another available member). When there is no rear fire escape, they shall team up with the chauffeur for exposure examination or they shall proceed to the roof.

ROOF FIREFIGHTER *(Second Arriving Ladder - Top Floor Fire)*

TOOLS: Saw
6’ halligan hook

POSITION: Roof of fire building

DUTIES:

1. Assist in ventilation of fire building and necessary exposures. When the fire is on the top floor and in the cockloft, both roof firefighters work together to vent roof with the saw.

2. When possible, cut so at least two rooms will be vented. After initial holes are cut and opened, start enlarging this hole to provide additional ventilation. This may retard the lateral spread of the fire in the cockloft.

3. Make examination holes in the returns of the exposures. Use caution in opening returns as the fire may suddenly vent and cause face burns to the members operating. Check for extension, and report the results to company officer and IC.

4. Caution should be exercised when choosing returns to be opened. Returns remote from the fire should be avoided, as this action could spread the fire in the cockloft.

5.8.2 TOP FLOOR FIRE: **Old Law Tenement Type RowFrame Building (4-window front)**

INSIDE TEAM
(Second Arriving Ladder - Top Floor Fire)

TOOLS: Remain the same.

POSITION: Top floor fire building, adjacent apartment for VEIS as per Ladders 3.

DUTIES:
VEIS adjoining apartment top floor including examination of the cockloft for extension.

OUTSIDE TEAM
(Second Arriving Ladder - Top Floor Fire)

CHAUFFEUR

TOOLS: Remain the same.

POSITION: Front of building.

DUTIES:
1. Position and prepare apparatus for laddering operations on the front of the building for rescue purposes and/or roof access. The need for rescuing trapped occupants shall take preference when positioning apparatus.

2. When no longer needed at the aerial, or for other laddering operations on the front of the building, goes into an exposure as directed by s/hehis/her officer

   Note: When exposed building is an IDLH area then members shall team up before entering exposures.

OUTSIDE VENT (OV) FIREFIGHTER *(Second Arriving Ladder - Top Floor Fire)*

TOOLS: Remain the same.

POSITION: Fire Escape

DUTIES
Operate from the fire escape as per Ladders 3 performing VEIS of the top floor when teamed up with 1st OV (or another available member).

ROOF FIREFIGHTER *(Second Arriving Ladder - Top Floor Fire)*

TOOLS: Saw
6' Halligan Hook

POSITION: Roof of fire building

DUTIES:

1. Assist in ventilation of roof of fire building and necessary exposures. When the fire is on the top floor and in the cockloft, both roof firefighters work together to vent roof with the saw.

2. When possible, cut so at least two rooms will be vented. After the initial hole is cut and opened, start enlarging this hole to provide additional ventilation. This may retard the lateral spread of the fire in the cockloft.

3. Make examination holes in the returns of the exposures. Use caution in opening returns as the fire may suddenly vent and cause face burns to the members operating. Check for extension, and report the results to company officer and IC.

5. Caution should be exercised when choosing returns to be opened. Returns remote from the fire should be avoided, as this action could spread the fire in the cockloft.

5.9 FIRST LADDER COMPANY TO ARRIVE - TOWER LADDER

TOWER LADDERS AND AERIAL LADDERS SHALL OPERATE THE SAME EXCEPT:

INSIDE TEAM
(First Arriving Ladder Company is a Tower Ladder)

TOOLS, POSITION AND DUTIES:
Remain the same.

OUTSIDE TEAM
Tools, position, and duties remain the same with the following exceptions:

CHAUFFEUR: *(First Arriving Ladder Company is a Tower Ladder)*

POSITION Remain at pedestal for overall safety, control, and coordination.

OUTSIDE VENT FIREFIGHTER: *(First Arriving Ladder Company is a Tower Ladder)*

POSITION Operates as basket firefighter for ventilation.

DUTIES

A. When the basket is used for roof access the saw and life saving rope will be brought to the roof.

B. BROWNSTONE TYPE:
The OV will wait for completion of roof size up before repositioning the basket to the fire floor for ventilation as coordinated with and ordered by the Ladder Company Officer inside the fire area to be vented. After venting the fire floor, reposition the basket to the top floor for VEIS. Prior to VEIS of the top floor the OV shall team up with the roof firefighter (or another available member).

C. OLD LAW TENEMENT TYPE:
The OV will wait for completion of roof size up before repositioning the basket to the fire floor for ventilation.

ROOF FIREFIGHTER: *(First Arriving Ladder Company is a Tower Ladder)*

POSITION Roof of fire building.

Proceed to the roof via: (Order of Preference)

- ♦ the basket
- ♦ the 1st arriving aerial ladder
- ♦ an adjoining building, the immediate adjoining building should not be used for access to the roof due to the possibility of cockloft involvement.

Note: A visible life hazard will negate the initial use of the TL basket for roof access.

DUTIES

A. BROWNSTONE TYPE:
After completing initial roof duties they shall team up with the OV for top floor VEIS.

B. OLD LAW TENEMENT TYPE:
Roof operations remain the same as in SEC. 5.7.F.
When necessary, the officer may request the Roof firefighter to perform outside ventilation of the fire apartment from the fire escape after completion of initial roof ventilation (bulkhead, scuttle, skylight). He/she shall proceed via the fire escape to the fire floor to perform ventilation. When VEIS is to be made, he/she shall be teamed up with the 2nd Roof firefighter or another available member

5.10 **SECOND LADDER COMPANY TO ARRIVE** *(Tower Ladder On Scene As First Arriving Ladder Company)*

TOOLS, POSITIONS AND DUTIES:
All remain the same except for chauffeur as noted below.

Note: When the first to arrive ladder company is a TL, the chauffeur will remain on the pedestal. Therefore the chauffeur of the second to arrive ladder company does not have to report to the pedestal and may be assigned other duties by their company officer, e.g.:

A. Examination of exposures.

B. Assist with roof operations.

C. Be available to team up with another member, when needed.

6 ENGINE OPERATIONS

6.1 GENERAL

Fire conditions discussed are to be considered of such magnitude as to require the use of two or more hoselines for extinguishment. Fires in row frame houses are particularly vulnerable to the quick spread of fire due to their basic design and use of combustible construction material. Speed, operating in close quarters, and mobility of operation are of prime importance, therefore all interior hoselines stretched will be considered 1 ¾".

A. Officers of all engines arriving at fires will take positions at serviceable hydrants. They shall be alert to initiate in-line pumping when it would increase the speed of the operation, and make hoselines available in front of the fire building.

B. The officer should realize that the use of booster tank water, while the ECC is hooking up to hydrant, will make for a speedier operation. The officer must be informed when the pumper is receiving water from the hydrant.

C. An engine company, ordered to stretch a hoseline to the top floor of an exposure for purposes of extinguishing the fire in the cockloft, should take a six-foot hook to pull ceilings.

6.2 Cellar Fire

A. First hoseline

1. First hoseline through the front door, then to the cellar via the interior stairs to extinguish the fire.

2. If this hoseline cannot be advanced down to the cellar due to the intensity of the fire, it shall be used to protect the public hall, interior stairs, and the first floor, allowing the occupants to leave the building, and the ladder company to perform VES.

3. The first hoseline can be advanced to the top floor to cover any extension to that area or the cockloft after the cellar fire has been controlled by the second hoseline. Intervening floors shall be checked for fire on the way to the top floor. A member must be stationed on the landing to warn of any fire that may break out below them.

B. Second hoseline

1. Second hoseline shall back up the first hoseline.
2. If the first hoseline has advanced into the cellar, and a back up line is not needed, the second hoseline shall extinguish any fire on the first floor then proceed to the top floor as in A3 above.
3. If the first hoseline is used to cover the first floor public hall, and a back up line is not needed, the second hoseline will be stretched into the cellar via the outside cellar entrance to extinguish the fire.

C. Third hoseline

If a third hoseline is necessary, it will be stretched as ordered by the Incident Commander.

6.3 Fire on First Floor

A. First hoseline
The first hoseline should be stretched to the location of the fire.

B. Second hoseline
The second hoseline, if not needed to back up the first hoseline, should be stretched to the floor above the fire.

Note: In a Brownstone type Row Frame, the first hoseline shall be stretched through the front door on the first floor to extinguish the fire. The second hoseline, if not needed to back up the first hoseline, shall be stretched through the front door on the second (parlor) floor to maintain the integrity of the interior stairs.

Interior wooden stairs connect the first floor (basement) and second floor (parlor). If interior stair doors are present at the top and/or bottom of these stairs, they shall be closed to control the flow path.

C. Third hoseline

If necessary the Incident Commander should order a third hoseline stretched as needed:

1. To the fire building.
2. To an exposure.
3. To supply a tower ladder.
4. Through an exposure to the rear yard.

Back to Main TOC

6.4 Fire on Upper Floor

A. First hoseline

The first hoseline should be stretched to the location of the fire via the interior stairs. This hoseline will need to have sufficient length to cover the entire building.

B. Second hoseline

The second hoseline, if not needed to back up the first hoseline, should be stretched to the top floor or to the floor above. If a fire is reported in the exposure, the second hoseline may be more effective being stretched to the exposure, with the third or fourth hoseline stretched to back up hoseline #l. This hoseline will need to have sufficient length to cover the entire building

C. Third hoseline

If necessary the Incident Commander should order a third hoseline stretched as needed:

1. To the fire building.
2. To an exposure.
3. To supply a tower ladder.
4. Through an exposure to the rear yard.

6.5 ***Redacted for PFS***

6.6 Second Alarm or Extra Engines

It is expected that any hoseline stretched after line #1 and line #2 will be under the direction of a chief, and that these hoselines will be strategically placed to confine and extinguish the fire. Secondary to the life hazard in row frames, the biggest problem is fire extending to exposures via the cockloft, shafts, and narrow separations between buildings. Hoselines should be placed between the fire and the exposure. The most severe exposure should be given priority. Any difficulty with the advancement of a hoseline should be relayed via HT to the Incident Commander.

6.7 Vacant Buildings

These buildings are generally vacant due to previous fires. It can be anticipated that they have sustained heavy structural damage.

A. ***Redacted for PFS***

1. The first to arrive engine company should drop two hoselines: one a 3 ½" line to supply a TL, and a hoseline to enter the most severe exposure.

2-7. ***Redacted for PFS***

B. Vacant Building(s) in a Row

1. The first to arrive engine company stretches a 3 ½" hoseline to supply a tower ladder, and stretches a hoseline for use on the exterior of the building. (paragraph) ***Edited for PFS***

2.-4. ***Redacted for PFS***

7. BATTALION CHIEF RESPONSIBILITIES

7.1-7.3 ***Redacted for PFS***

7.4 Fire escapes in the rear may be in good condition at the start, but as the fire progresses their stability must be checked. The weakening of fire escape supports, due to the fire, may jeopardize the members operating on the fire escape or using the gooseneck ladder. ***Edited for PFS***

7.5-7.13 ***Redacted for PFS***

BY ORDER OF THE FIRE COMMISSIONER AND CHIEF OF DEPARTMENT

BROWNSTONE AND ROWFRAME BUILDINGS
REFERENCE FIGURES

Figure 1

TYPICAL BROWNSTONE FRONT

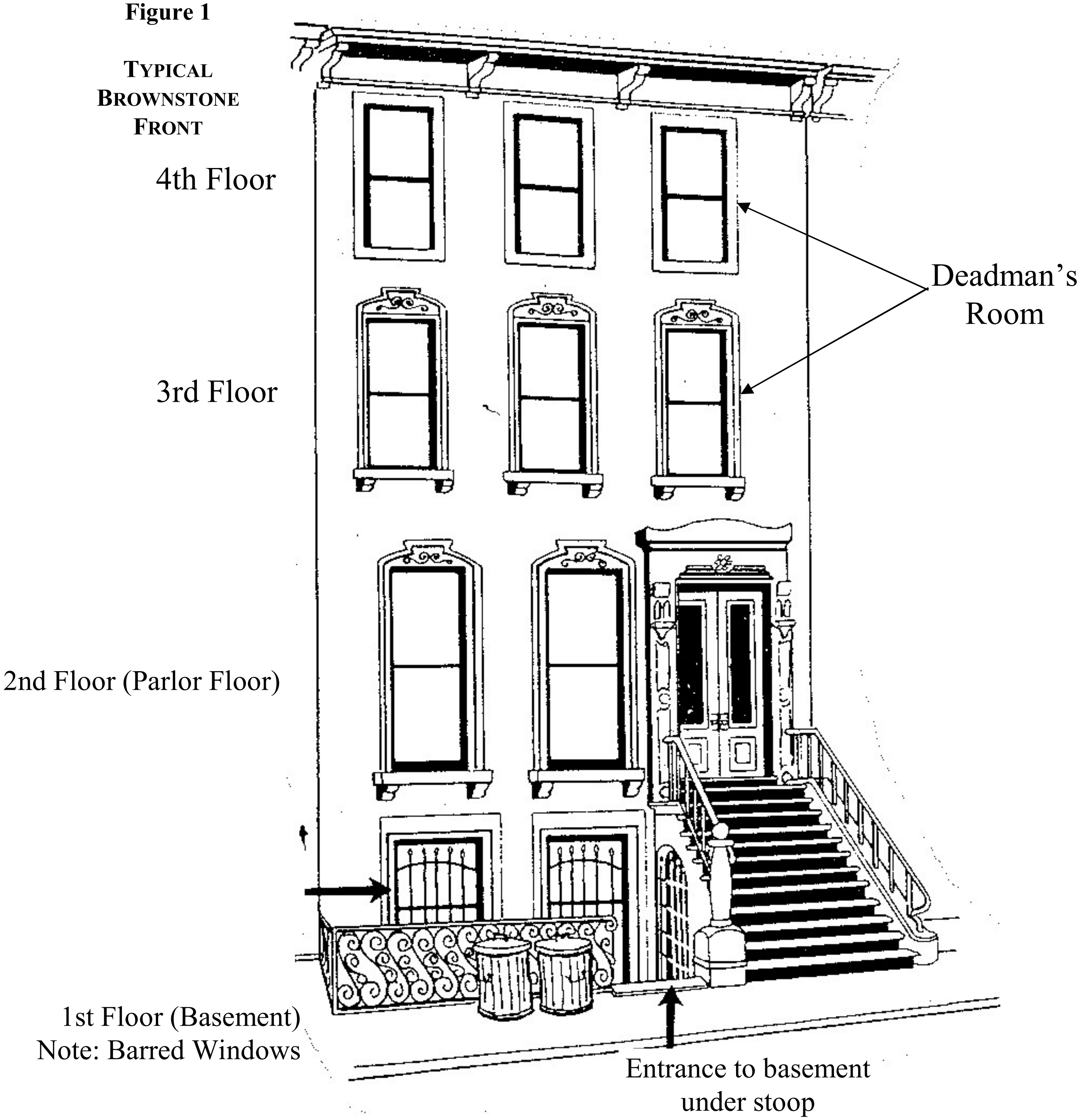

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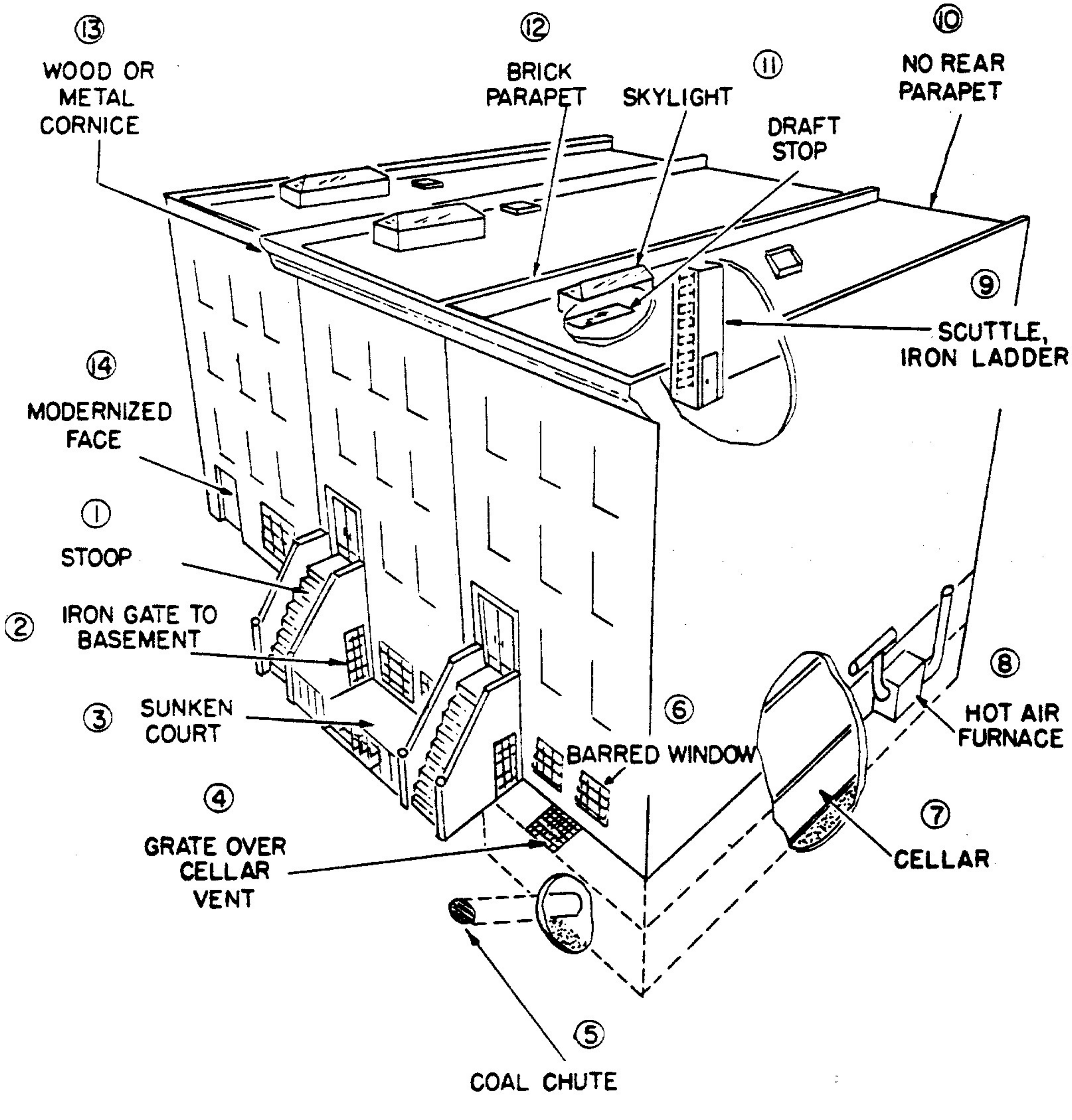
Figure 2

BROWNSTONE
(FRONT)



BROWNSTONE (FRONT)

1. **Stoop** - May be present. Some stoops have been removed to modernize the front. Provides access to 2nd floor and better control of basement fires. Interferes with laddering of 3rd floor.

2. **Iron Gate** - Difficult to force: Steel exit cover from cellar often found just inside gate; this 2nd exit required for class "B" Converted Dwellings.

3. **Sunken Court** - Makes laddering difficult, i.e. handling problems, falling ladders.

4. **Grate Over Vent Hole** - Often has wooden cover, which can be removed for ventilation.

5. **Coal Chute** - Metal cover often found in street or sunken court. Provides ventilation for cellar fires.

6. **Barred Windows** - Bars usually recessed into brick or stone, sometimes attached to frame with wood screws. Bars attached to wood frame are much easier to remove.

7. **Cellar** - Low ceiling; storage area; difficult access; ceiling is open beam construction (unless converted to M. D.).

8. **Heating Plant** - Older systems coal fired, hot air. Many ducts leading to hot air registers throughout building. Even if a newer type system present (steam or hot water) suspect presence of ducts, for often they were left in place when newer system was installed.

9. **Scuttle** - (Bulkheads not found in Brownstones). Iron ladder leads from top floor to roof. Where ladder goes through cockloft, area enclosed by "returns". A quick examination of "cockloft" can be made by removing lightly constructed "returns".

10. Generally no parapet on back wall of roof.

11. **Skylight over stairwell** -. Often has glass panel (draft stop) at ceiling level of top floor. For proper venting this panel must be opened or removed.

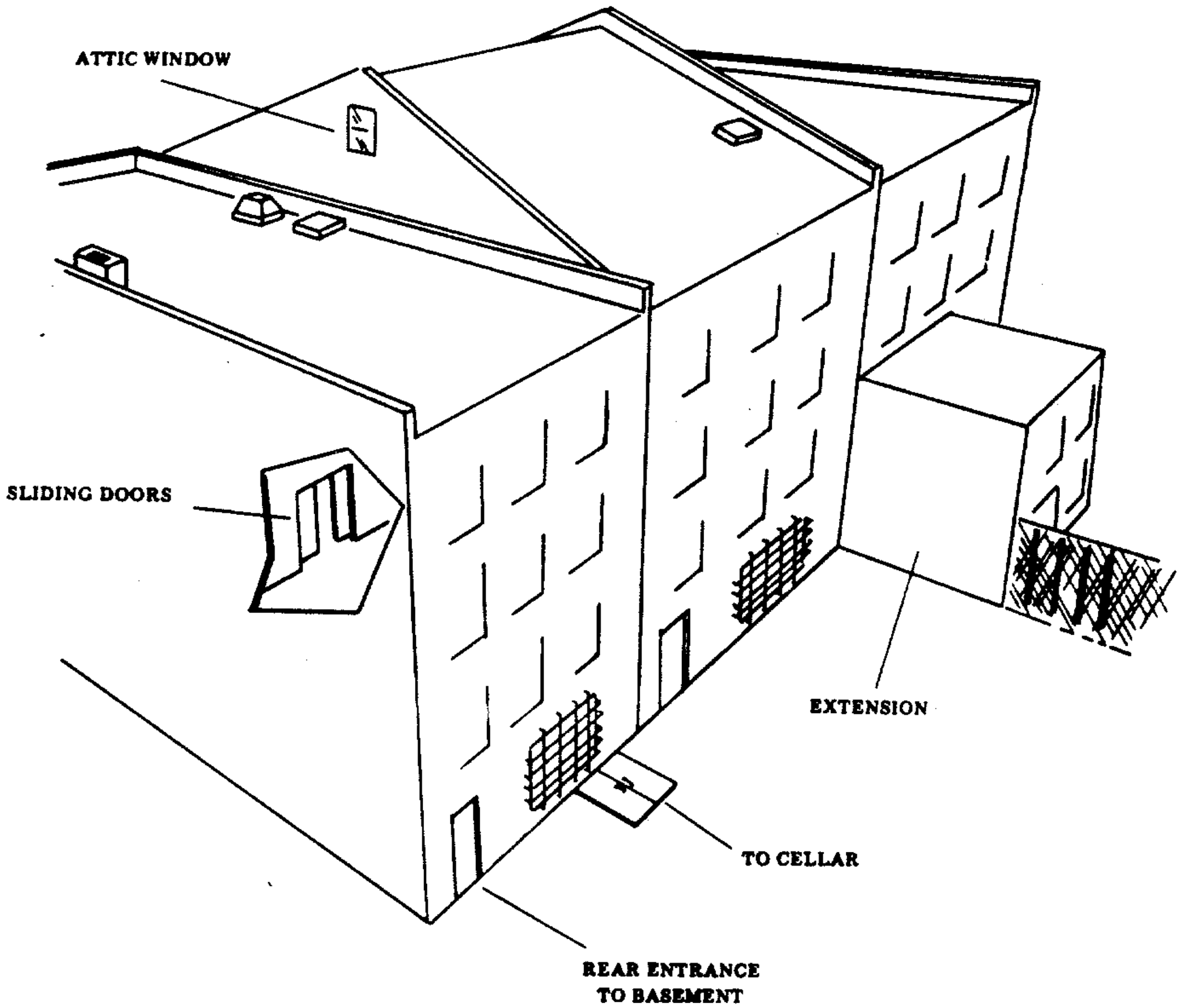
12. **Brick Parapet** - Carried above roof 8" or higher (as a rule).

13. **Cornice** - May be removed on renovated buildings.

14. **Modernized Face** - removal of stoop eliminates means of egress from front of building on parlor floor. Occupants encounter difficulty exiting the building during cellar fires.

Figure 3

BROWNSTONE
(REAR)



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BROWNSTONE (REAR)

1. Some of the older Brownstones have peaked roofs. Dangerous to work on , particularly in wet or icy weather.

2. Window in peak allows access and limited ventilation of top level.
   Note: Brownstones generally have a low ceiling on top floor, in which heat banks down rapidly.
   This makes entrance to the top floor very difficult under fire conditions.

3. Sliding doors are common in Brownstones. The doors recess into hollow partitions on each side of the opening. Voids are created in the partition which allows fire to extend; voids are larger when doors are in closed position.

4. Rear Entrance - 1st level (basement). Only level with 2 exits (unless fire escape is present).

5. Iron Bars - Difficult to remove, unless installed with screws into wood frame. Where bars are attached with screws to the frame, the frame is often rotted permitting rapid removal with a prying tool.

6. Roof of Extension has cockloft which must be examined when extension area is involved with fire.

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Figure 4

BROWNSTONE
(SIDE VIEW

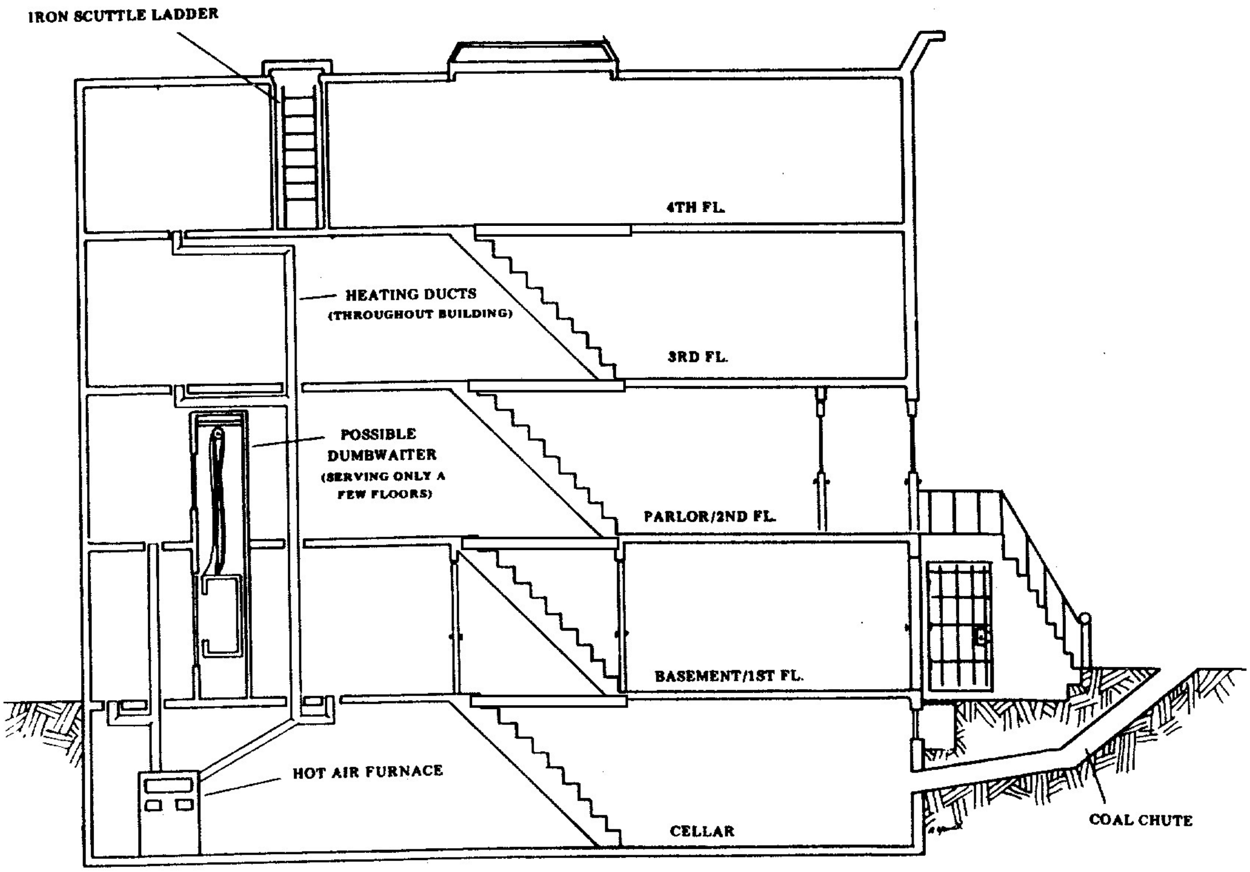

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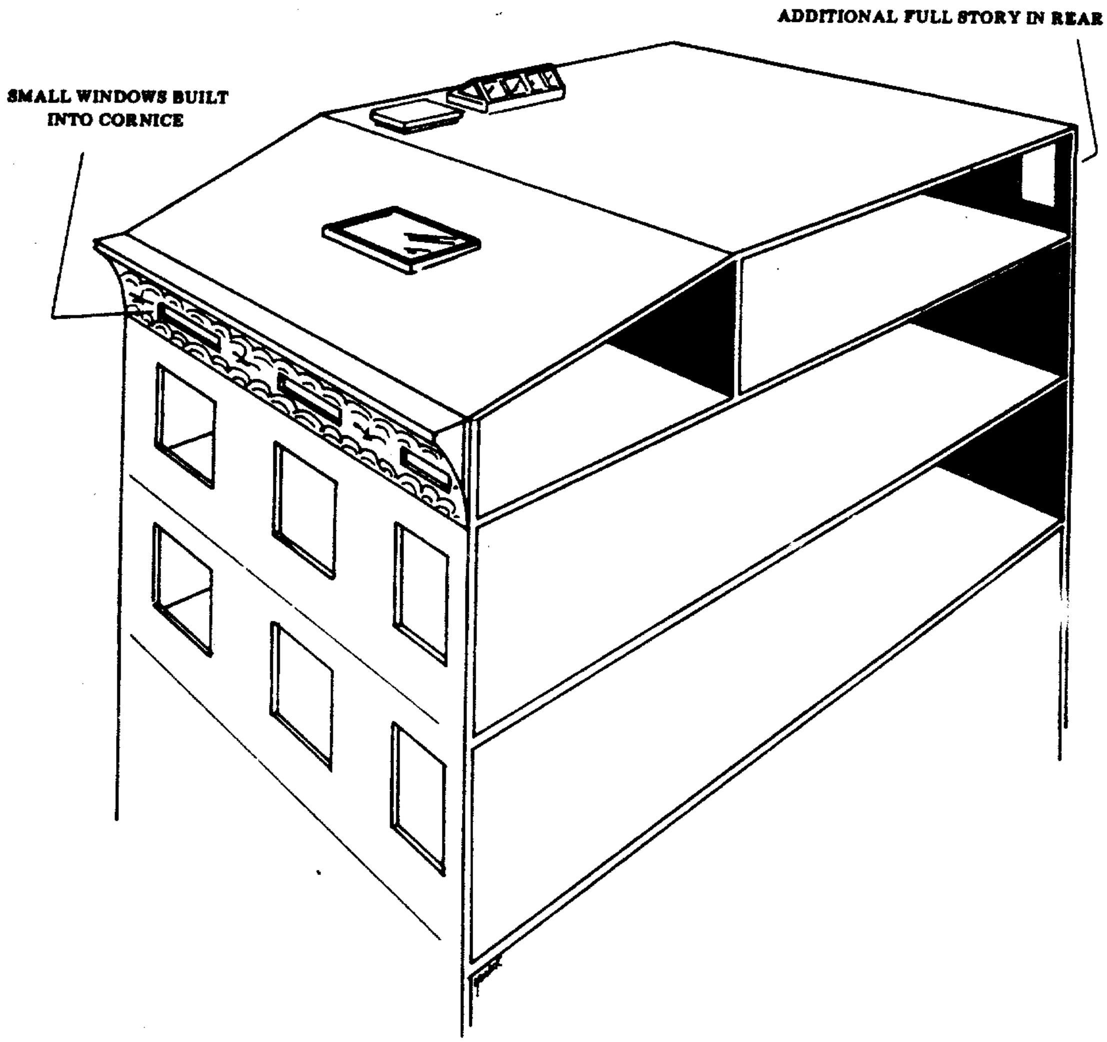
Figure 5

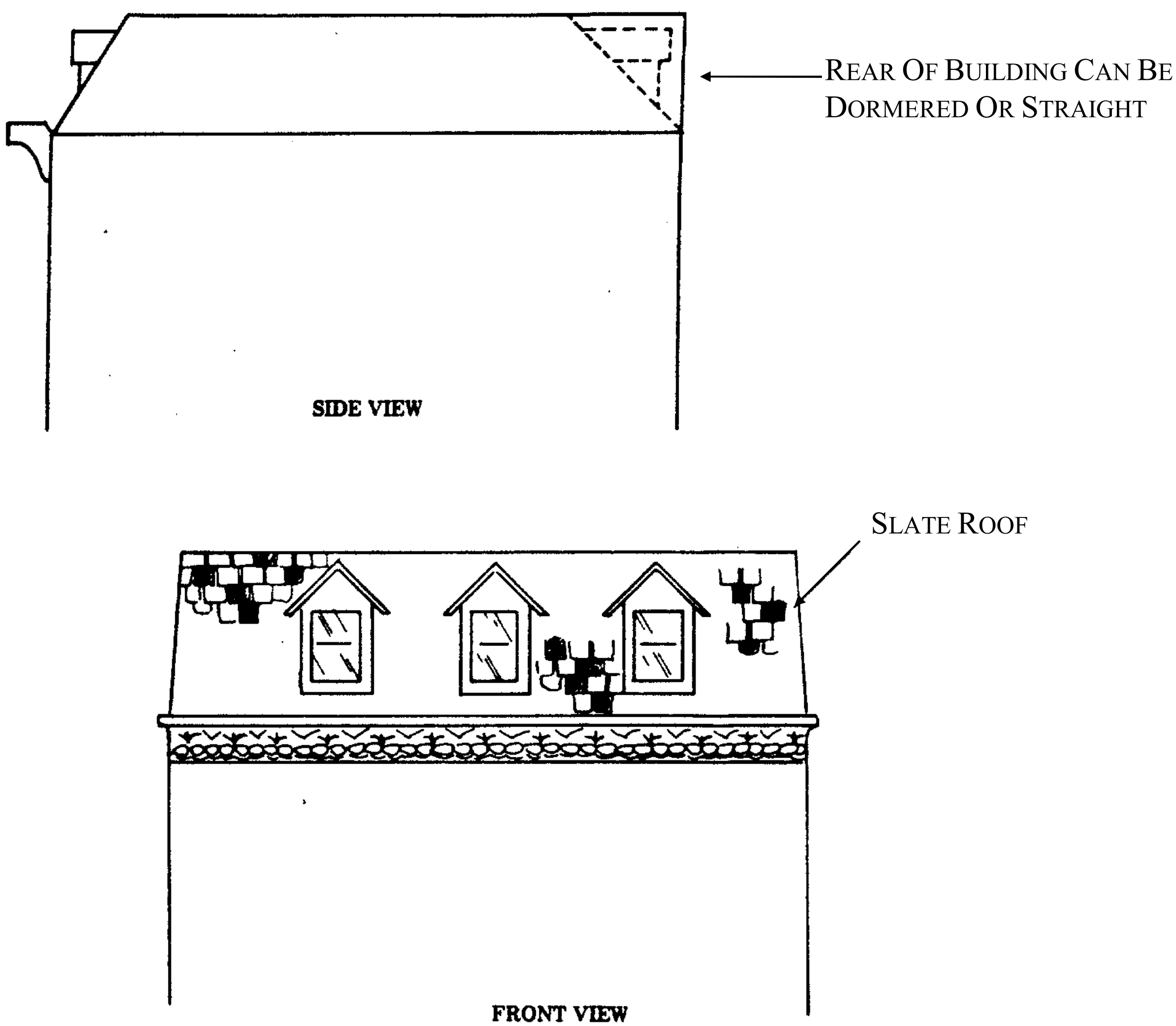
BROWNSTONE
(CORNICE AND ATTIC DETAIL)



THIS TYPE BROWNSTONE CAN BE BUILT WITHOUT WINDOWS IN CORNICE. IF SO BUILT THEN A GLAZED SCUTTLE, SKYLIGHT, OR SMALL DORMERED WINDOW WOULD USUALLY BE FOUND ON PITCHED SECTION OF THE ROOF.

Figure 6

BROWNSTONE
(ROOF DETAIL)



FULLY DORMERED BROWNSTONE
USUALLY 4 OR 5 STORIES IN HEIGHT

Figure 7

5-STORY BROWNSTONE
(WITH A FULLY DORMERED ATTIC APARTMENT)

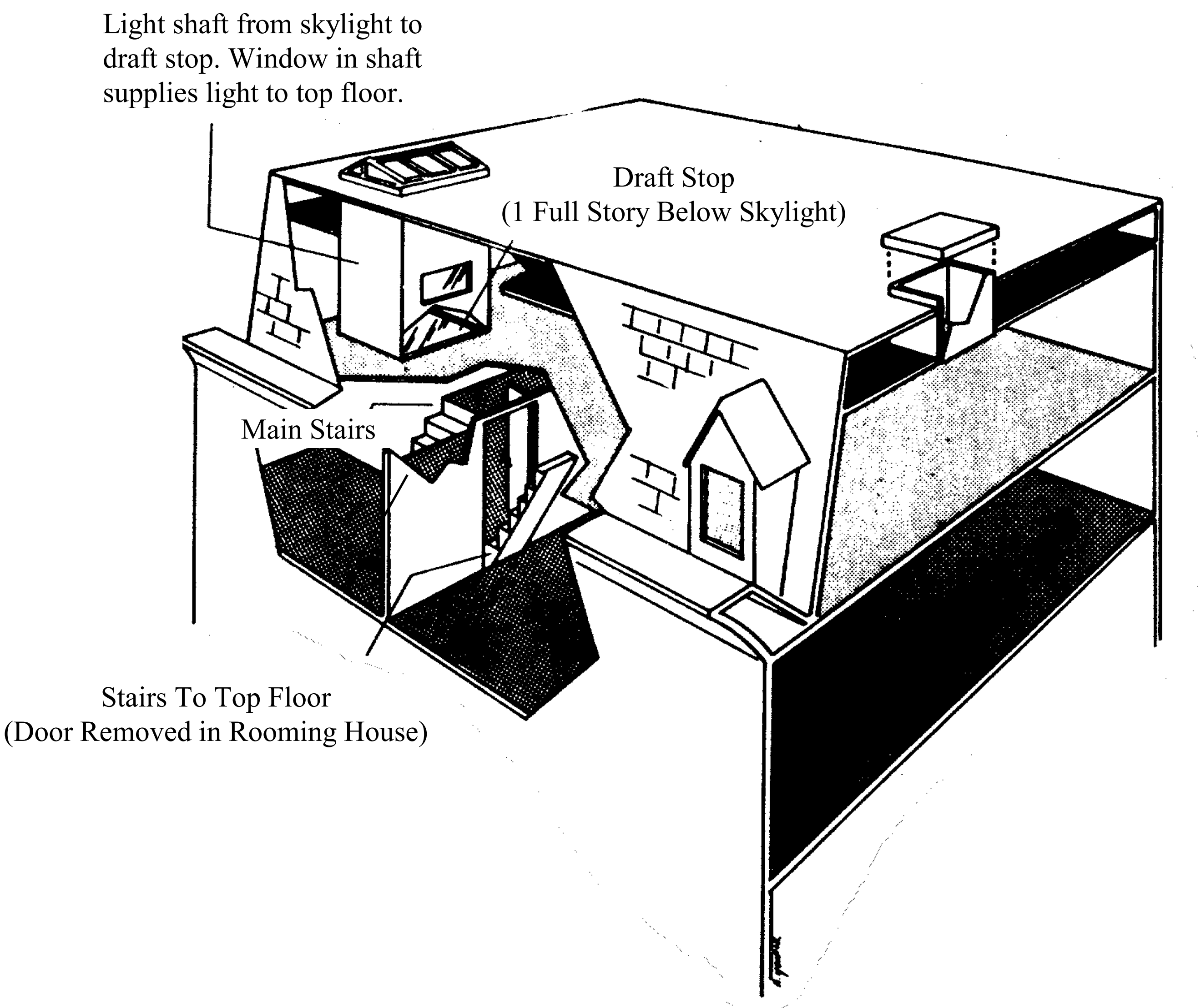


Figure 8

REAR OF BUILDING
(DETAIL OF YANKEE GUTTER)

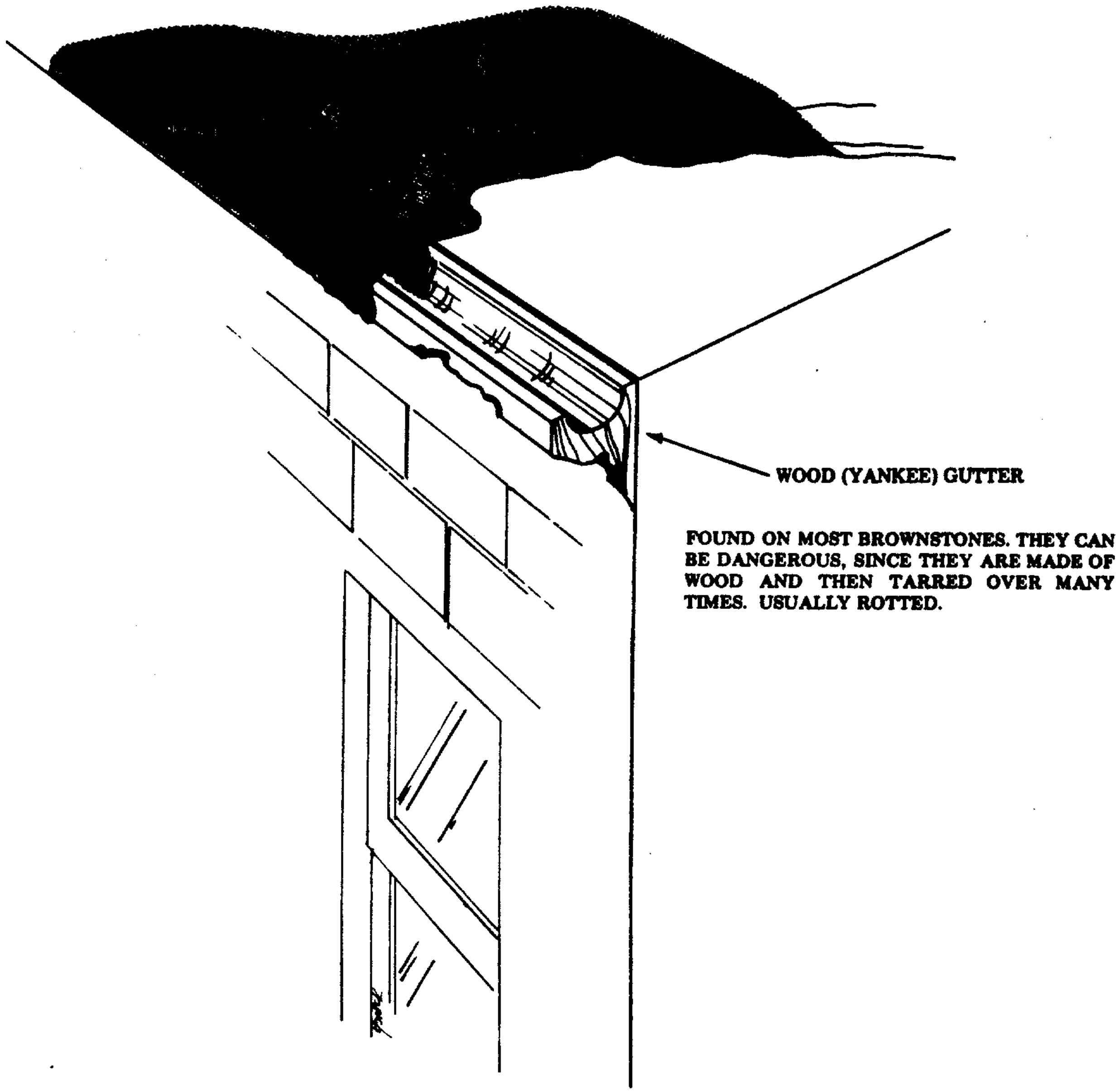
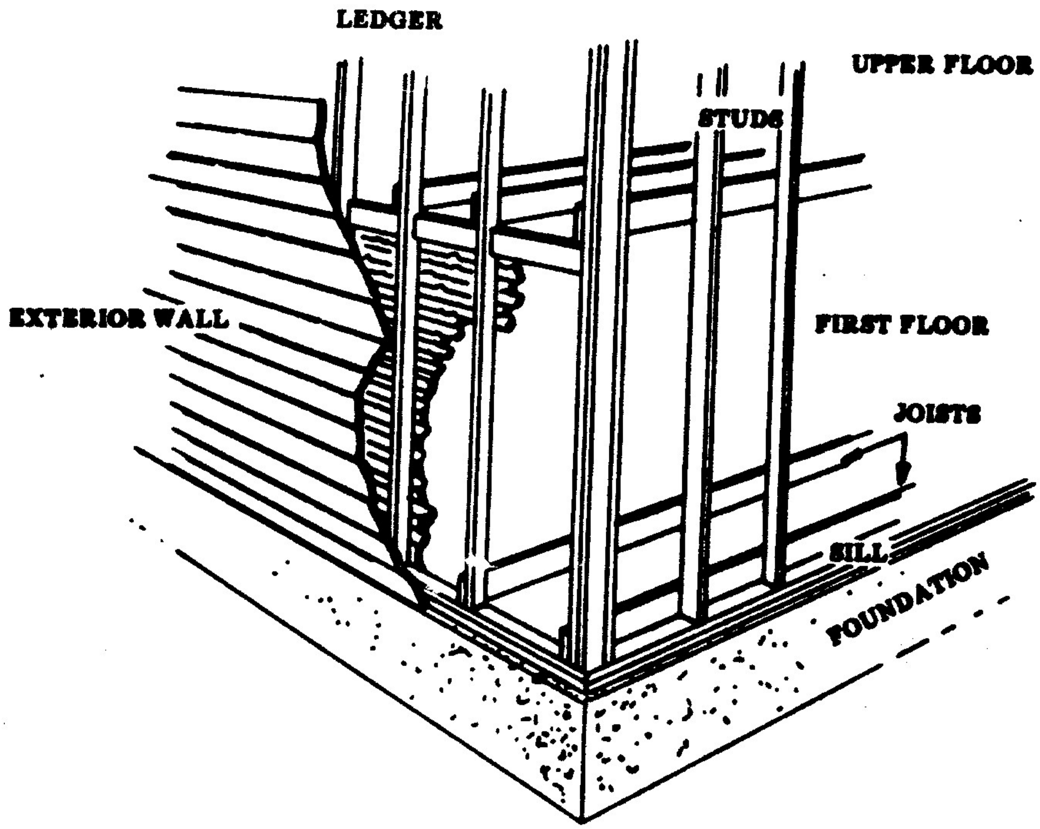


Figure 9

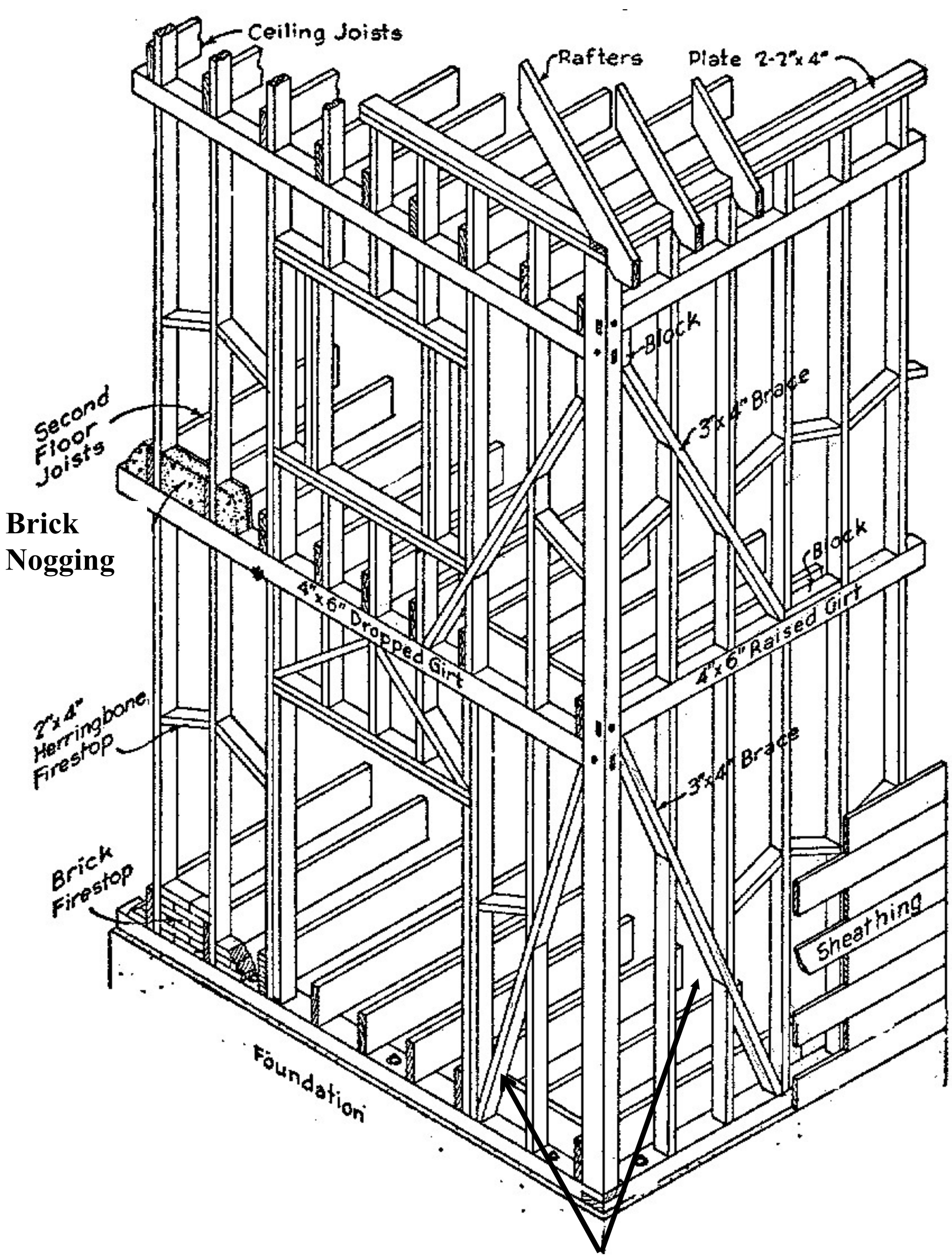
BALLOON FRAMING



IN BALLOON FRAMING CONSTRUCTION, FIRE CAN EASILY EXTEND VERTICALLY. STUDS AND CORNER POSTS ARE CONTINUOUS FROM THE SILL TO THE TOP PLATE. THE SIDE WALL STUDS ARE NOTCHED OUT AND A 1 X 4 IS FITTED AND NAILED INTO THE STUDS. THIS IS KNOWN AS THE LEDGER BOARD. THE LEDGER BOARD SUPPORTS THE FLOOR JOISTS OF THE UPPER FLOOR.

Figure 10

BRACED FRAME CONSTRUCTION



BRACED FRAMING STOPS VERTICAL EXTENSION OF FIRE BY USE OF A GIRT. WHEN A BUILDING IS BRACE FRAMED, THE UPPER FLOOR STUDS AND FLOOR JOISTS ARE SUPPORTED BY THIS GIRT. THE GIRT IS A HORIZONTAL 2X4 PLACED ON TOP OF THE STUDS ON EACH FLOOR. HOWEVER, OTHER FEATURES CONTRIBUTE TO THE SPREAD OF FIRE HORIZONTALLY.

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Figure 11

BROWNSTONE TYPE ROW FRAME (3-WINDOW FRONT)
(Refer to Text Section 5.1.2 A)

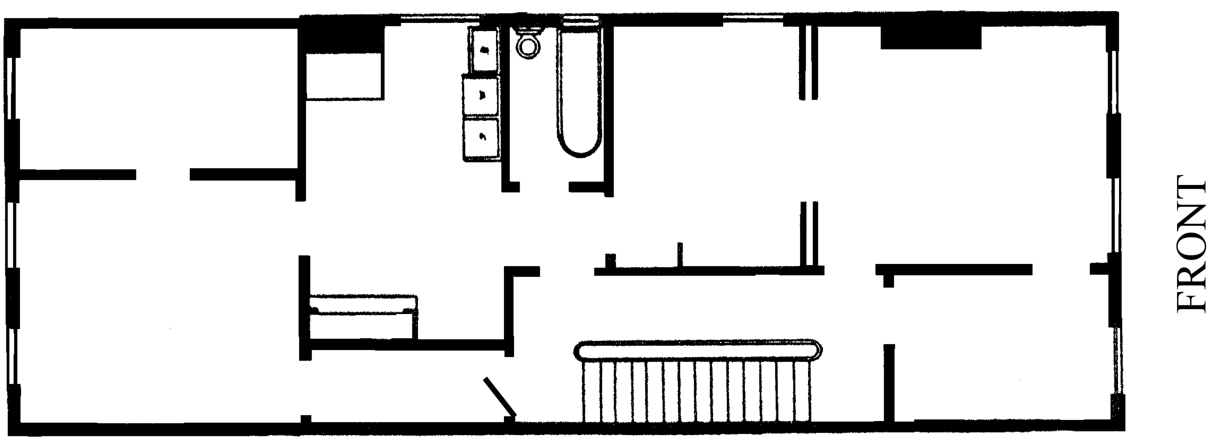


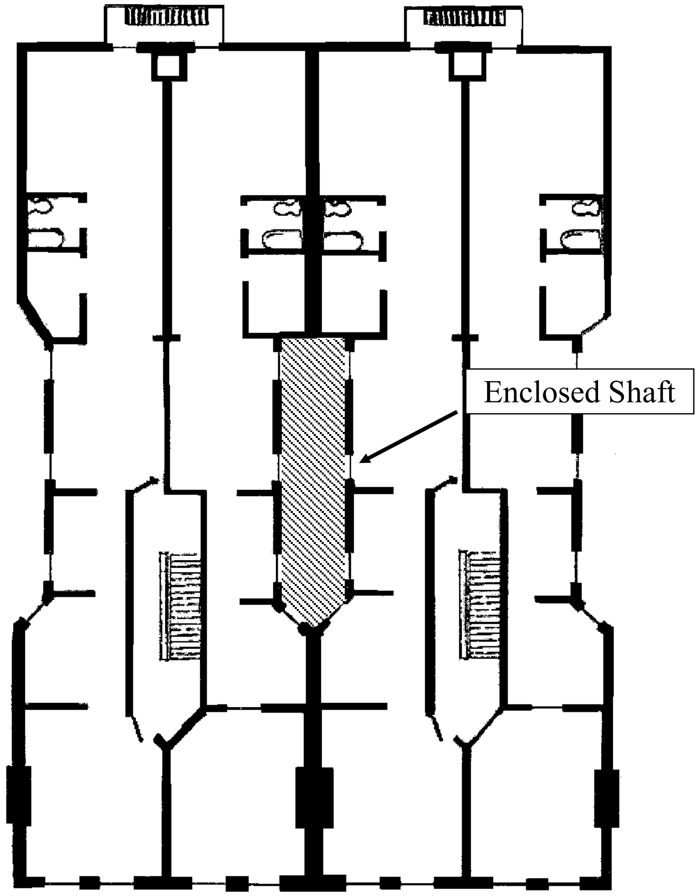
Figure 11A

FLOOR PLAN - BROWNSTONE TYPE FRAME
(Refer to Text Section 5.1.2 A)

Figure 12

OLD LAW TENEMENT TYPE ROW FRAME BUILDINGS WITH A FOUR-WINDOW FRONT
(Refer to Text Section 5.1.2 B)

Figure 12A



Front of Buildings

FLOOR PLAN
TWO ATTACHED ROW FRAME BUILDINGS
(Refer to Text Section 5.1.2 B)

FIREFIGHTING PROCEDURES
VOLUME 1, BOOK 3
January 8, 2020

VACANT BUILDING FIRES

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1. INTRODUCTION

1.1 As compared to occupied buildings, fire operations in vacant buildings pose an increased level of risk to firefighters. While the FDNY has saved countless civilian lives in occupied buildings using an aggressive, interior attack strategy, a building's status as "vacant" changes the risk-reward calculation. Members must consider that vacant structures may be weakened and unstable because of age, neglect, vandalism, and exposure to weather, and that there is an extremely low probability of life hazard associated with such buildings. Further, the likelihood of arson and other special hazards make fire operations more dangerous. This combination of factors must alter members' tolerance for risk, requiring a slower, more cautious fire attack that emphasizes a defensive exterior attack strategy. *Firefighting Procedures* - *Vacant Building Fires* will identify the special hazards and size-up variables associated with vacant buildings and outline the appropriate modifications to the Department's risk-assessment guidelines. Understanding these principles will minimize operational risk and promote safer, more effective outcomes at vacant building fires.

2. DEFINITION OF VACANT BUILDINGS

2.1 For the purpose of this bulletin, a **vacant building** is defined as a structure that is <u>completely unoccupied</u>, where the owner has <u>abandoned all efforts to maintain the building.</u> These buildings are typically open, unguarded, lack operating utilities and are not maintained in a safe condition.

A building's status may also fall into other categories:

- A **partially occupied building** may have occupants remaining in certain portions of the building, while other sections have been abandoned - this should be considered an occupied building.

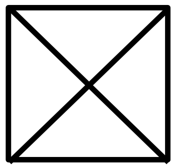
- A **temporarily unoccupied building** may be well-maintained while unrented, for sale or under renovation. Many private dwellings and commercial occupancies (e.g., retail stores) fall into this category.

In order to distinguish between building categories during size-up and define a building as "vacant," members must attempt to determine whether a building is occupied and assess the building's <u>current condition and degree of maintenance.</u>

Some of the hazards discussed in this bulletin may exist in buildings that are not identified with vacant building markings. Units should consider taking precautions consistent with *Firefighting Procedures - Vacant Building Fires* whenever a size-up and risk-assessment indicate an excessive level of risk.

3. VACANT BUILDING MARKINGS

3.1 All vacant buildings shall be marked using the following symbol:



Vacant building markings shall be made using the following format:

- Markings shall be spray painted using fluorescent paint.
- The size of the square shall be approximately 18" x 18".
- Marking lines shall be 2" wide.
- Primary markings shall be made alongside the front entrance of the building at a height that is in line with the area directly over the front entrance. Markings should be high enough to ensure visibility. To achieve this height, a ladder may be required.
- If the building has multiple entrances or other likely means of access, additional markings shall be made at other places (e.g., rear or side entrance, fire escape, roof bulkhead, etc.)
- Do not mark sealed doors or windows. The structure should be marked at locations that are likely to remain undisturbed.
- The letters "RO" (roof open) shall be made directly over the vacant building markings in cases when a roof is opened to the degree that there is little need for future vertical ventilation (e.g., the roof has been previously cut or burned away).
- The letters "FO" (floor openings) shall be made directly underneath vacant building markings in cases when members determine that floors within the building have holes or openings that may endanger members.
- ***Redacted for PFS***

4. SIZE-UP

When initiating fire operations at any incident, every member at the scene must perform an individual, ongoing size-up and understand the factors that affect members' safety and the outcome of the operation. Members should avoid "tunnel vision" by first considering the general considerations that affect the initial decision-making process, and then focus on the specific considerations that assist in adjusting strategy and tactics throughout the fire.

4.1 GENERAL CONSIDERATIONS

While performing a size-up, it is important to remember that the challenges and hazards at vacant building fires are substantially different as compared to occupied buildings. As such, members should initially consider four broad size-up concerns:

1. **Protection of Life**
2. **Member Safety**
3. **Structural Stability**
4. **Extension to Exposures**

4.2 SPECIFIC CONSIDERATIONS

After addressing general considerations, members must narrow the scope of their size-up to include the specific features and hazards associated with vacant buildings. As such, the traditional FDNY thirteen-point size-up should be tailored to assess vacant buildings in a standardized, systematic way that emphasizes the following variables:

1. CONSTRUCTION: The construction characteristics of a vacant building must be assessed in order to evaluate the current condition and stability of the structure. This assessment should include:

   - The construction classification: (e.g., ordinary brick and joist, wood frame, heavy timber, lightweight construction, etc.).
   - The degree of maintenance: (e.g., signs of abandonment, a lack of maintenance, deterioration due to age and weather, etc.). The degree of instability is affected by the length of time that the building has been vacant.
   - The condition of visible building features and structural members: (e.g., floors that are sagging - indicated by doors or window frames that are out of line, plaster walls with diagonal cracks, cracks between walls and ceiling plaster, evidence of beams pulling away from bearing walls, ceilings that are bowed, exterior walls that are cracked or out of line - indicated by bowing or bulging walls, window frames that are out of line, lintels that are cracked, bricks that are loose or missing, etc.).
   - Signs of previous fires: (e.g., charred or blackened structural members, conical soot stains above windows, overhaul debris, sections of floors, roofs, partitions, interior walls, and stairs that are burned away or missing, etc.)
   - The building's status as "sealed" or "unsealed." Unsealed buildings are more likely to be structurally unstable than sealed buildings for a variety of reasons, such as exposure to weather, access by vandals, etc. They also present a higher probability of fire extension to exposures. On the other hand, sealed buildings restrict egress for firefighters, making search operations extremely risky. Therefore, both scenarios constitute an increased level of risk as compared to occupied buildings, which is a size-up factor that should significantly affect members' risk-reward calculation.

2. OCCUPANCY: It is important to determine the previous occupancy as this factor may affect the level of risk associated with the building (e.g., residential, commercial, factory). For example, in general, abandoned warehouses or factories present greater dangers than residential buildings. In addition to large, wide-open spaces and maze-like conditions, members may encounter shafts, abandoned machinery, industrial materials or stock, flammable or combustible liquids, and other hazardous materials. Vacant commercial and industrial buildings also typically have large accumulations of rubbish in the building, which may increase the fire load and contribute to the spread of fire.

   Note: When operating at commercial buildings, members should be wary of stock or porous materials that have absorbed water from previous fires or have been exposed to rain or snow. The added water weight may create an excessive floor load or cause materials to expand, applying lateral forces to load-bearing walls or columns - either condition may cause collapse.

3. AREA: Fires in large-area vacant buildings, such as warehouses and factories, carry an increased level of risk in regard to search procedures. In addition, depending on the square footage of the fire area, it may be difficult or impossible to extinguish fires in large, open areas with interior hose lines because there may not be enough water flow to cool the superheated temperatures.

4. LIFE: The probability of encountering a life hazard in vacant buildings is extremely low as compared to occupied buildings, according to nationwide NFIRS data collected by the U.S. Fire Administration. Still, members should consider the possibility of transient occupants being trapped inside vacant buildings such as homeless people, vandals, workers or children. In addition, it is possible for people to be living in buildings that appear vacant. The following features may indicate the presence of occupants "squatting" in apparently vacant buildings:

   - Lights in the windows of some apartments.
   - Curtains, window shades, plants, window gates.
   - Electric extension wires strung from a utility pole to a window, running from the window of an occupied adjoining building, or running through the backyard of an occupied rear building.
   - Open doors or windows, or signs of forced entry in a sealed building.

5. WATER: While water supply is always critical, members should be especially cognizant of water delivery problems because of the tendency of vacant building fires to expand rapidly and endanger exposures - especially during the early stages of the fire. In addition, large water flows may be necessary in order to supply large caliber exterior streams. This may require water relay or augmentation procedures.

6. APPARATUS: Units should consider the types of apparatus assigned on the response ticket when positioning their apparatus. For example, a Tower Ladder should be placed in front of the fire building because of the increased likelihood of an exterior attack. Also, it may be desirable to place an Engine Company in close proximity to the building, outside of the collapse zone, in order to operate the deckpipe for an exterior attack.

7. STREET CONDITIONS: Street conditions may create access problems because of their width, parked cars, local topography, downed electrical wires, etc. In addition, hydrant location may complicate water supply operations. Consider the possibility of access to the building from other streets, courtyards, and alleys.

8. WEATHER: Members must consider that prolonged exposure to the elements can exact a heavy toll on the stability of vacant buildings, creating a collapse hazard. Wooden structural members may be rotted from water damage, while the expansion and contraction in masonry caused by the freeze-thaw cycle can cause walls or parapets to become unstable. During firefighting operations, wind may present a serious hazard, as unsealed vacant buildings may have numerous openings.

9. EXPOSURES: Exposed, occupied buildings or occupancies may be the primary concern at vacant building fires. This is based on whether or not life is endangered in exposures, or in the absence of a life hazard, on the amount of property exposed. It is also important to remember that fire extension to exposures is more likely to occur at vacant buildings than at occupied buildings.

10. AUXILARY APPLIANCES: Fire protection systems, such as sprinklers and standpipes, are more likely to be unserviceable at vacant buildings that are not maintained. This may result from damage or illegal removal of sprinkler or standpipe system components. Also, fire systems may be out-of-service because the water supply has been shut down.

11. LOCATION OF THE FIRE: The ability to access fires safely is a critical factor at vacant building fires. Fires that are located in hard-to-reach areas, such as cellars or windowless interior rooms, may significantly delay operations. In addition, fires in these areas may be inaccessible to outside master steams, as many vacant buildings have been sealed with HUD windows or concrete blocks.

12. TIME: Vacant residential fires tend to occur most frequently during the late-night to early-morning hours. Conditions upon arrival may be advanced and could present immediate exposure problems, particularly when vacant buildings are open and unsealed. ***Edited for PFS***

13. HEIGHT OF THE BUILDING: A building's height adds logistical complexities because of the challenges associated with moving members, equipment and water to the upper floors. In addition, building height can also increase the potential for collapse in wood-frame buildings (e.g., a 3-story wood-frame building may be more collapse prone than a similar 2-story wood-frame building because of the increased dead load imposed on first-floor structural supports by the weight of the upper floors).

4.3 ARSON IN VACANT BUILDINGS

Many vacant building fires are suspicious or incendiary in nature. Arsonists set fires in abandoned buildings for a variety of reasons including vandalism, profit, revenge, crime concealment or excitement. Vacant building fires account for a large percentage of all intentionally set structure fires. Considering that such a large proportion of these fires are purposely set by arsonists, members should pay special attention to the following arson-related dangers:

- Accelerants may be spread over several floors and ignited on a lower floor. This could create a heavy volume of fire on multiple floors within a short period of time.

- Diesel fuel may be used as an accelerant. These fires begin slowly but progress rapidly as vapor production intensifies. For this reason, arsonists may spread diesel fuel on all floors of the building in order to produce a fire of greater magnitude. A small initial fire may spread rapidly throughout a vacant building and trap members who are unable to safely exit the building. When encountering diesel fires, high heat will be present for a longer duration than similar fires involving gasoline (which ignites rapidly and is consumed more quickly). While both types of accelerants will produce intense conditions, diesel fires will ignite more of the combustible materials in the fire area and increase the severity of the fire.

- Separate fires may be intentionally set within a building - one on a lower floor and another on the top floor. In this situation, a top-floor fire may be evident on arrival and attract an initial interior attack. While members are advancing to the top floor, however, an undetected fire may flare up suddenly on a lower floor endangering members above. In some cases, such fires have been initiated using delayed-ignition devices.

- ***Redacted for PFS***
- ***Redacted for PFS***
- ***Redacted for PFS***
- Heavy furniture may be used to block the entrance of a building or an apartment and delay access to the fire area. Members must use extreme caution, as blocked access and egress points could entrap members who have gained access through other doors or windows.

4.4 SPECIAL HAZARDS IN VACANT BUILDINGS

While the following hazards may be present in any building, members should be particularly alert to the following dangers and operational issues in vacant buildings because of the lack of maintenance and site security:

- Fires in vacant buildings often spread rapidly via interior and exterior openings (e.g., unsealed windows, and holes in floors, roofs and walls). Openings allow a free flow of oxygen to reach the fire area, supplying incipient fires with the critical airflow that tightly sealed buildings sometimes lack. This characteristic threatens exposures during the early stages of an operation and may make conditions unsafe for interior operations, particularly on the floors above the fire

- Stairways with treads and half landings constructed of marble present a serious collapse hazard to members. The marble slabs associated with these stairways, typically found in New Law tenements, including H-types, may be cracked or broken after years of neglect. Also, stairway platforms may fail during fires as a result of heat and flame impingement. The collapse potential of treads and landings is exacerbated by their support system. Marble slabs may be held in place by only a thin strip of 3/4" angle iron at the perimeter of the landing, and the angle-iron framework may have deteriorated with age. These factors can cause steps or landings to collapse under a member's weight, allowing the member to fall through a landing to the floor below. Such a fall could trigger a progressive collapse resulting in multiple landing failures; FDNY members have been severely injured in this way.

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- ***Redacted for PFS***
- It is relatively common to find holes of varying sizes in the floors or roofs of vacant buildings. These holes may be open, or they may be covered over with thin materials, such as sheets of wood, linoleum or cardboard. Such coverings may obscure the presence of the opening and may collapse under a member's weight, leading to severe injuries. Another hazard regarding floor openings at vacant buildings consists of large holes or shafts that extend vertically from the first floor to the top floor. These shafts are cut in floors by contractors for demolition purposes, or by vandals who strip buildings and steal building materials. Such shafts are created by cutting the floor deck and removing the floor beams. This allows debris, such as bathtubs, toilet bowls, sinks, furniture, etc. to be dropped down to the first floor for removal. Members operating within vacant buildings must anticipate the possibility of these shafts, and be cognizant of falling hazards and the potential for rapid fire spread throughout the building. In addition, the practice of cutting floor beams dangerously weakens the load-bearing capacity of floors, creating a serious collapse hazard.
- ***Redacted for PFS***.

5. STRATEGY FOR VACANT BUILDING FIRES

5.1 RISK ASSESSMENT FOR DETERMINING THE INITIAL ATTACK STRATEGY (INTERIOR VS. EXTERIOR)

Before any interior operation is initiated, three points must be stressed:

1. In vacant buildings, the life hazard is typically limited to firefighters. A slower, more cautious operation should be initiated.
2. More time than usual must be devoted to the size-up of the situation.
3. The IC must minimize members’ interior operational time and maximize their level of supervision.

5.2 LARGE OR ADVANCED FIRES

At large or advanced fires, the primary attack strategy should consist of a **defensive exterior attack** and should focus on the protection of exposures.

When possible, units should take a position that not only protects exposures, but also enables the stream to be used on the main body of fire. In cases when it is impossible to confine the fire in this manner, the stream should be alternated from the fire to the exposure.

5.3 SEARCH OPERATIONS

The process of searching vacant buildings must differ substantially from search operations at occupied buildings, as vacant buildings pose a much greater threat to members' safety. Consequently, firefighters searching vacant buildings must reduce the speed and aggressiveness of their search to compensate for the increased level of risk. While all vacant buildings must be searched for life hazards within the limits of safety, primary searches should generally be conducted **after all visible fire has been knocked down** and **the IC has completed a size-up and risk assessment.** Members may vary from this guideline when confronted with a known life hazard.

5.4 – 5.5 ***Redacted for PFS***

6. TACTICS FOR VACANT BUILDING FIRES

(First paragraph) ***Redacted for PFS***

6.1 ENGINE COMPANY TACTICS

Initial tactics at vacant building fires usually emphasize Engine Company operations because of an adapted slower, more cautious operation and a decreased emphasis on ventilation, entry, isolation, and search. Engine Companies should apply the following general tactics, techniques and options:

A. Members should stretch hose lines consistent with Department policies for each building type (e.g., stretch a 1 ¾" hose line for a fire in a vacant rowframe building).

B. Engine Companies shall be alert to the need for a 3 ½" hose line to supply a Tower Ladder when consistent with operational needs. Whenever possible, a separate Engine shall be dedicated to the sole task of supplying water to a Tower Ladder in order to ensure proper water delivery.

C. Because vacant building fires are more likely to extend to the floors above and to exposures, there may be a need to quickly apply water to the fire area. This does not necessarily require an interior attack; a defensive exterior attack with a hoseline may be the best tactical approach. This tactic may limit extension and quickly control a rapidly expanding fire while minimizing risk to members. When using an exterior hose line from a purely defensive position (i.e., when a unit does not expect to advance a hose line within the structure), members should stretch a 2 ½" hoseline.

D. Engine Companies may consider using defensive tactics by operating a large caliber stream from a deck pipe. This tactic may be appropriate at vacant buildings for large or advanced fires, or when companies are having difficulty gaining access to fires.

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E-F. ***Redacted for PFS***

6.2 LADDER COMPANY TACTICS

Ladder Company operations are generally devoted to facilitating Engine Companies' efforts in getting water on the fire. This may be limited to forcible entry and ventilation tactics in order to gain access to the fire area for hose streams or exterior operations.

A. If interior operations are absolutely necessary (based on the IC's risk assessment) members shall operate using extreme caution, while making adjustments as outlined within this bulletin (i.e., search operations, floor-above operations, roof operations, etc.).

B. Ladder Company members should be aware of the emphasis on exterior operations and be prepared to position their apparatus to operate elevated master streams. The main objective when placing exterior streams is to balance optimal building coverage with the necessity for members' safety. Avoiding the collapse zone may require members to place the apparatus in a corner-safe flanking position and account for the specific collapse characteristics of the building or wall (e.g., a free-standing masonry wall may suffer a ninety-degree collapse that is equal to the height of the wall; bricks and lintels may bounce and roll further). Collapse zones must be conservative, ensuring that members, apparatus and equipment are not affected by collapsing building debris.

C. Members should form a habit of climbing stairs by placing the middle of their foot above the step riser and stepping as close to a supporting wall as possible. Placing downward pressure on risers and climbing close to supporting stringers is the safest way to climb stairs because these areas are the most structurally stable areas of the staircase. Such tactics will increase members' safety by reducing the chances of step or landing failure.

   - When the stability of a stairway is in doubt, members should place an extension ladder over the stairway, ensuring that it is properly supported at both the top and bottom of the stairs. It is imperative that the header beams at the top of the staircase support the ladder. If the ladder is not supported at its tip, it will fall with a collapsing stairway causing severe injuries to members. The bottom of the ladder must also be secure on the floor below so that the base of the ladder does not slip out when members' weight is applied.

   - Another method, often used for climbing "U"-return stairs with cracked or broken marble landings, is to hug the newel post while stepping around the marble landing to the stair riser on the floor above. When using this tactic, members should step up from the riser on the lower staircase to the riser on the upper staircase without placing any weight on the landing itself.

D. Members encountering piles of furniture or building debris on the first floor should determine whether such materials have been dropped from an upper floor through a shaft or floor opening. Also, members should be alert to piles of combustible materials that may have been coated with an accelerant by an arsonist.

E. Generally there is no need to VEIS from fire escapes, portable ladders or aerial ladders, since we are not aggressively searching for trapped occupants.

F. To the extent possible, the use of fire escapes should be avoided. When it is absolutely necessary to use fire escapes at vacant buildings, members should consider the following guidelines:

   - Use a Fire Department ladder to access the balcony in preference to drop ladders.

- If it is absolutely necessary to use a drop ladder, either for a civilian life hazard or for fire operations, members lowering the drop ladder should stand beneath the fire escape balcony in order to reduce the risk of being injured if the drop ladder falls free from its supporting guides.
- When operating on a fire escape, members should pay particular attention to areas of the metal structure that appear rusted or loose, and climb ladders with their feet as close to supporting stringers as possible to minimize step deflection.
- Members should avoid gooseneck ladders associated with vacant buildings whenever possible.

G. When an IC's risk assessment mandates an interior operation at a large-area vacant building (e.g., factory or warehouse), members shall deploy the search rope in accordance with Department policies in order to increase members' safety.

7. SAFETY

7.1 Members' safety is the highest priority while conducting fire operations at vacant buildings. The following general actions may be taken to mitigate some of the inherent risks:

- Members should be reminded that a **slower, more cautious risk assessment** shall be performed when sizing-up vacant buildings.
- When operating at vacant building fires, members should establish a collapse zone during the early stages of fire operations and the IC shall ensure that the ICP is outside of the collapse zone. Members must also understand the collapse characteristics of the various types of buildings and building features, especially walls, to determine the appropriate collapse zone distances. For example, wood-frame buildings often experience inward-outward or ninety-degree wall collapse, especially corner buildings and isolated (stand-alone) frame buildings. Members must establish a collapse zone with these characteristics in mind.
- A **defensive exterior attack** is the cornerstone of a safe operation at vacant building fires. This strategy is the most effective way of ensuring members' safety.
- ***Redacted for PFS***
- ***Redacted for PFS***

8. CONCLUSION

8.1 ***Edited for PFS*** Members' lives shall not be risked needlessly. The strategy for operating safely at vacant building fires emphasizes a **defensive exterior attack**.

BY ORDER OF THE FIRE COMMISSIONER AND CHIEF OF DEPARTMENT

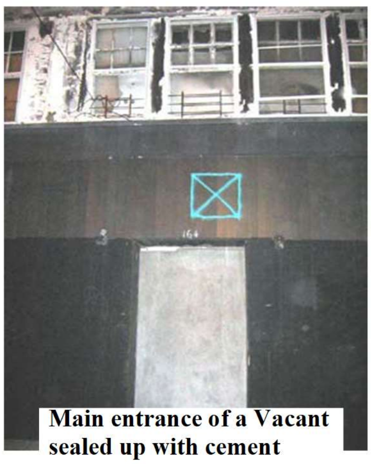
Addition for PFS

VACANTS

Addition for PFS

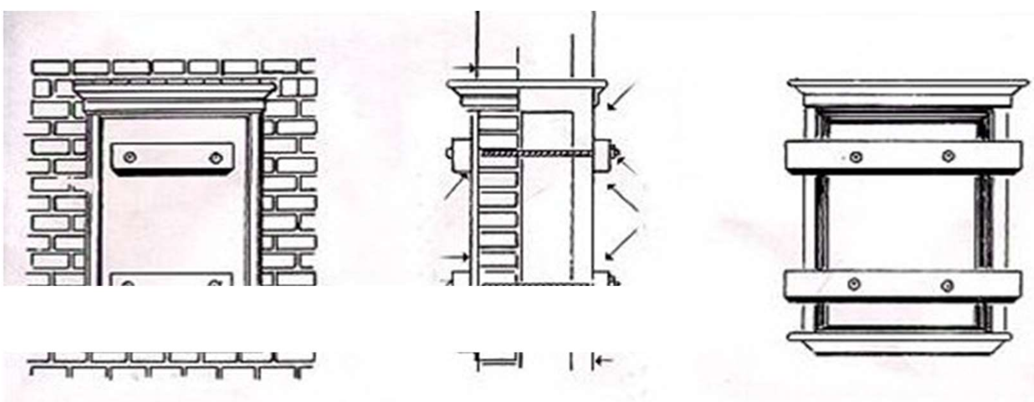
ACCESS & EGRESS

- Exterior openings may be sealed with cement blocks or covered with tin. Windows may be boarded up. A fire can burn for a considerable amount of time before being detected. Access and ventilation will be very difficult.
- All members responding to vacant building fires, (especially roof and outside vent firefighters) are cautioned to note the method used to seal these buildings in their size-up. Access may be gained via the roof or upper floors only to find no means of escape from the lower floors.
- Members must psychologically adjust to a "no rush" approach. In these buildings, the life hazard is to the firefighter. A slower, more cautious operation is definitely indicated.



Main entrance of a Vacant sealed up with cement

Boarded up window by braced



Sealed up windows; commonly referred to as "HUD" windows.

FIREFIGHTING PROCEDURES
VOLUME 1, BOOK 4
March 24, 2022

TAXPAYER FIRES

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Taxpayers

Axial load is a force perpendicular to the supporting member. An axial load is straight and true and is evenly applied to the bearing structure.

Built up roof is the roofing material applied in sealed water-proof layers on the structural members of the roof.

Canopy a supported, rooflike covering which projects from a wall as an ornamental feature.

Cantilever a horizontal structural member supported on one end only.

Corbelling is a course of brick built out from the face of a wall, as steps in reverse.

Eccentric load is a force whose resultant is perpendicular to the supporting member but does not pass through the center of the mass. The load is not evenly applied to the supporting or bearing member.

Fire retarding any material or substance that is used to hold back the spread of fire for a rated period of time.

Gypsum plank consists of steel reinforced gypsum units with tongue and grooved galvanized steel edges. Standard planks are two inches thick, two feet wide and eight feet long. They are supported at four foot intervals under normal roof loads. A heavier gauge steel edged plate may be used for spans up to seven feet.

Impact load are loads delivered, in a short time, on structural members and produce stresses on structural members that may not have been provided for in design and may cause collapse.

Lateral load are loads that are exerted outwardly on a horizontal plane. These forces may take place during a collapse or an explosion. Walls are not usually designed to withstand severe lateral loads.

Marquee a permanent hood which projects over an entrance to a building and is not supported by posts or columns.

Parapet is that portion of a wall continued above the roof line.

Spall the process by which masonry surfaces lose successive layers of their mass when exposed to excessive heat.

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Taxpayers

1. INTRODUCTION

1.1 BACKGROUND

1.1.1 Fires in taxpayer type structures are difficult and fast spreading. They have resulted in heavy, and at times complete, loss of structure and contents.

1.1.2 The collapse of roofs, floors and walls have caused the deaths of several firefighters and exacted a high toll of injuries to members.

1.1.3 Fire operations in these structures often demand a heavy commitment of resources and time.

1.1.4 ***Redacted for PFS***

2. DESCRIPTION

2.1 The term "Taxpayer" is not defined or recognized in the building code. The term originally referred to the practice of real estate investors who, while holding land for speculation, resorted to minimal investment in construction to produce income to offset the cost of taxes. These structures were usually of cheap and flimsy construction with little or no fire retarding features.

2.1.1 Supermarkets and one-story shopping centers of more recent construction do not fit the above description but contain many of the inherent hazards associated with taxpayers. For the purpose of this book, they shall be considered "taxpayers."

2.2 A taxpayer building is commonly taken to mean a business structure one or two stories in height of Class 3 construction (exterior firewalls with wooden interior structural members).

2.2.1 Their areas vary from 20' x 50' to areas of whole city blocks, the most common size being approximately 100' x 100'. They can be built on one or more lots with adjoining structures of greater heights on three sides.

2.2.2 These buildings are usually single structures commonly sheltering from one to as many as 15 different businesses with weak non-fire resistive partitions and no fire stops in the cocklofts.

Figure Added for PFS

2.3 THERE ARE THREE BROAD CATEGORIES OF TAXPAYERS:

2.3.1 The older type built from the turn of the century until the 1920's. This type is usually one story in height but there are some that have two stories. Some of the older structures have partitions, girders, beams, and columns of wood and may be considered wood frame buildings although most have masonry exteriors. This makes them susceptible to rapid fire involvement. . Decorative metal cornices, through which fire can spread, may be found on the front of some buildings. When there is a heavy fire in the front of the building, the supports of these cornices can be weakened and the cornice can fall to the ground unexpectedly. They can be removed to provide access to the cockloft area.

2.3.2 The most prevalent type built from the 1920's into the 1960's. They are usually larger in area than the older types and many are one-tenant occupancies, such as supermarkets, bowling alleys, restaurants, factories, etc. If the area is large, fire walls may have been installed for subdivision of the building. The integrity of these may be questionable because of alterations and openings made in them. The upper termination points of these walls vary. Some end just above or below the ceilings, others at the underside of the roof boards and still others may extend over the roof forming parapet walls. Many are two stories in height with various stores on the first floor. The second floor may house large meeting halls, dancehalls, restaurants, factories, etc., or the floor may be broken up into small offices and rooms. (See Figures. 1 and 2). Egress from the upper floor may be via one or more interior stairways or fire escapes. Cornices, of the facade type, and signs are often attached to the front of the building outside off the brick walls. Removing the cornice or sign in most cases will not provide access to the cockloft area.

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TYPICAL ONE-STORY TAXPAYER

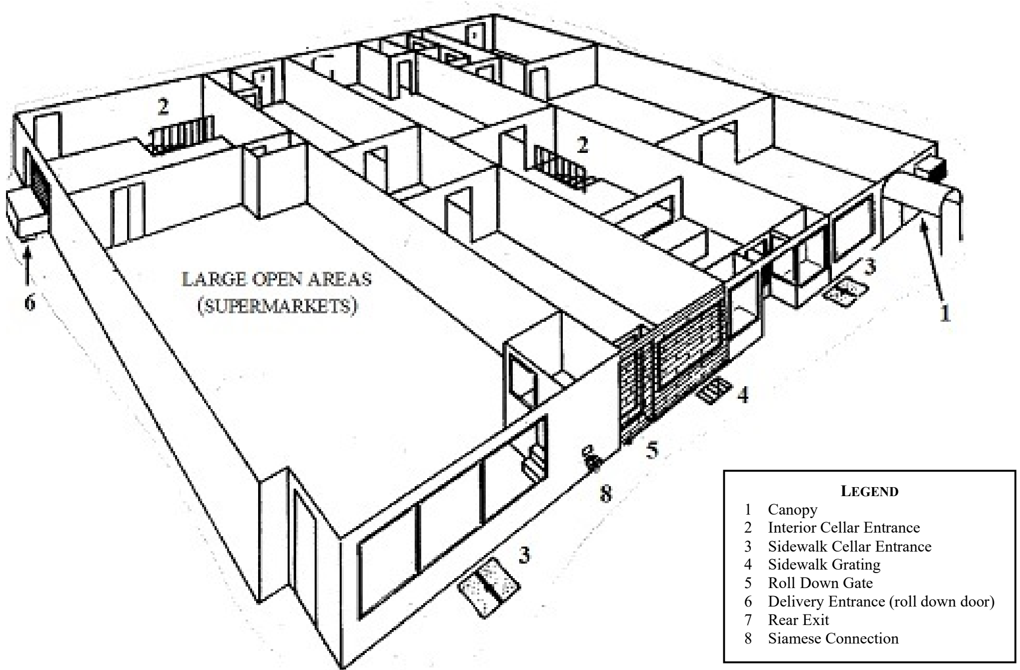


Figure 1

TYPICAL TWO-STORY TAXPAYER

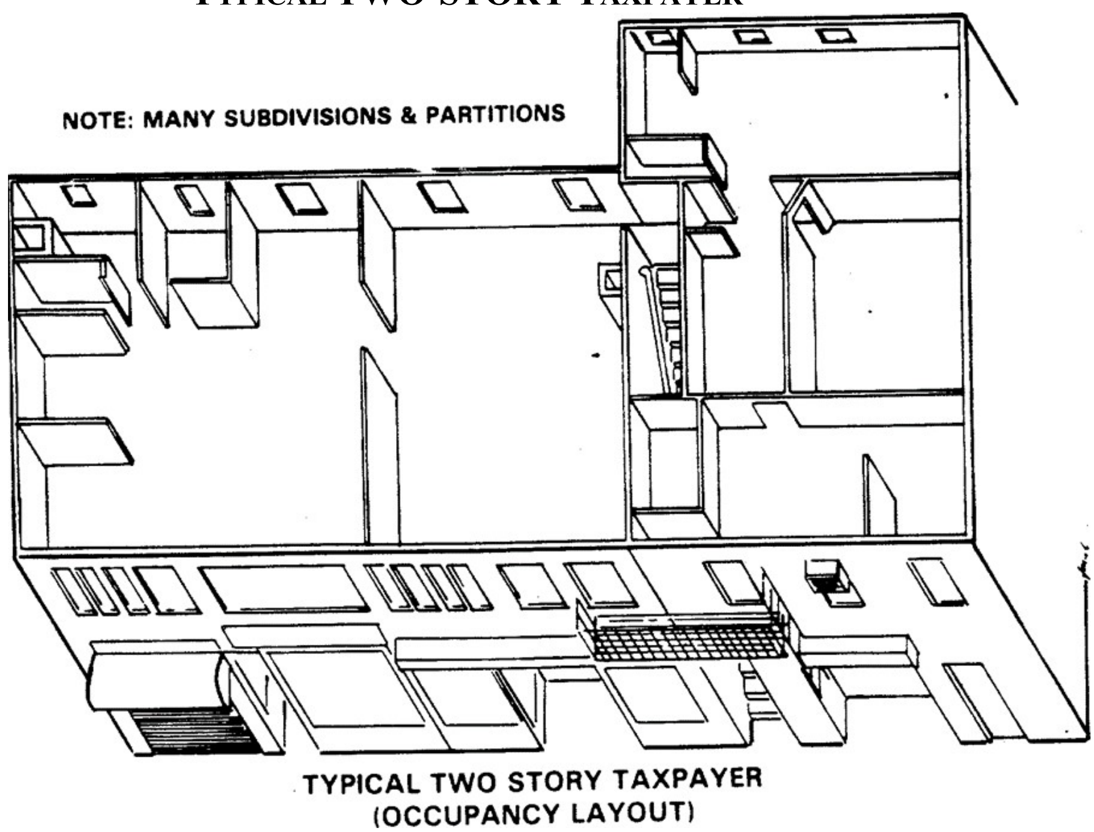


Figure 2

2.3.3 The newer type of construction built since the 1960's. These contain the same type of occupancies and the structural features will be similar to the previous types except that the use of combustible construction material has been reduced. In many of these buildings the difference will be the steel bar joists that are used to support the floors and roof in place of wood beams. These steel joists are being used more often because of their lower cost and lighter weight. (See Figure. 3) In the newest type of taxpayers, the floor and roof may be concrete poured on top of metal decking, which is supported by the metal joists. The roofs may also be concrete slabs between bar joists or fibrous material slabs supported in metal channels. All of these surfaces will have a poured pitch and gravel covering.

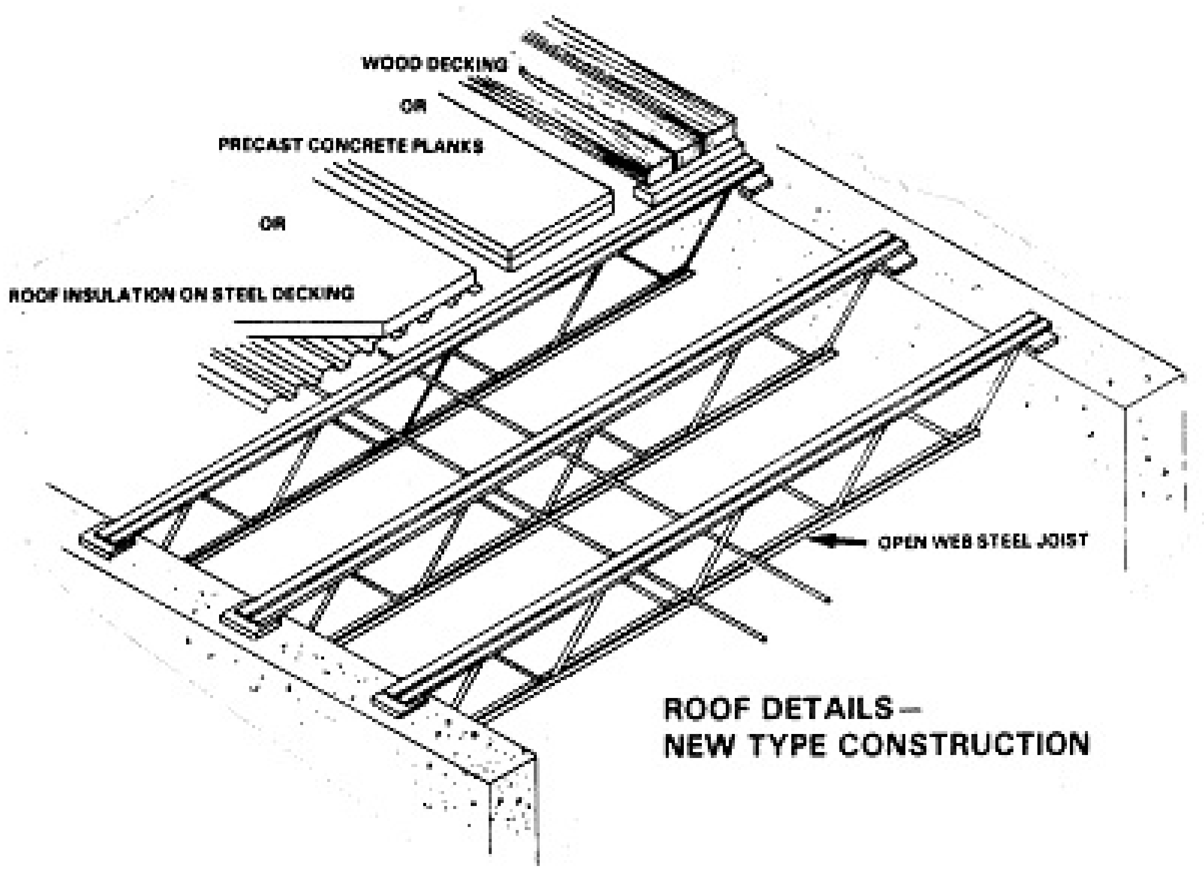


Figure 3

2.4 MEZZANINE AREA

2.4.1 Mezzanine areas will be found in some taxpayers. Their location, area and use will differ

2.4.2 Since these areas have probably been added to the premises after the original construction date, the load bearing components can be of light construction. These supports may be loaded beyond their safe load bearing capabilities.

2.4.3 The mezzanine area is in most cases used for storage of goods, but it can contain offices (predominant in supermarkets and factories) and sales areas to which the public will have access.

2.4.4 The height of the ceilings in the mezzanine and the area below will be below average.

2.4.5 Access to this area may be via small wooden stairs or just a ladder. Very seldom will there be another means of access.

2.4.6 In the majority of the mezzanines this area will not be enclosed and there will be a railing at the edge.

2.5-2.*6* ***Redacted for PFS***

2.5 *Edited for PFS* AUXILIARY FIRE PROTECTION SYSTEMS

Generally, the only auxiliary fire protection that may be found in these buildings will be automatic sprinkler systems where they are required by the Code. In some cases, due to variances, sprinklers may only be found in the cellar areas.

2.6 ***Redacted for PFS***

3. CONSTRUCTION

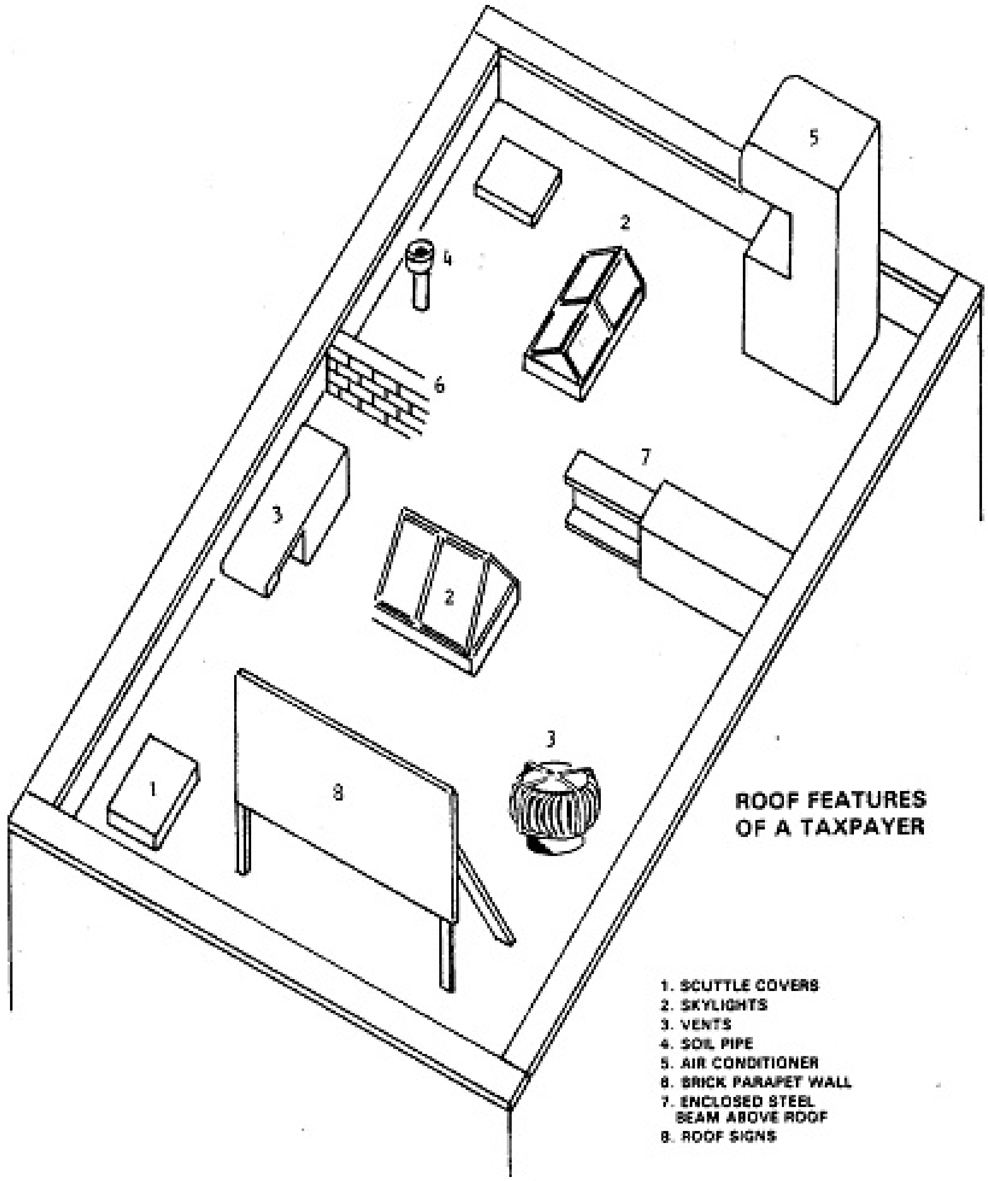
3.1 ***Redacted for PFS***

3.2 COCKLOFTS

3.2.1 The cockloft is the space above the finished ceiling and the underside of the roof sheathing. It usually is a common area extending over all the stores in the structure and can vary in height from four inches to more than six feet. A large amount of exposed wood, such as roof boards, bridging and wood lath is present. These factors of wide open area and heavy fire loading result in rapid fire spread. Fire may enter the cockloft through recesses, voids and ducts.

3.3 ROOFS

3.3.1 There are many types of roofs on taxpayers but the most common is constructed of wood joists covered with either tongue and groove boards or plywood. The roof is then covered with combustible waterproofing material commonly called "tarpaper" or "built up roofing" which may be several layers thick. Sometimes a layer of tin is found under the tarpaper in old taxpayers. The roof joists may be supported at approximately 20-foot intervals, by exterior brick bearing walls, interior load bearing studded partitions, wood or steel girders supported by steel lally columns or wood columns. The roof may have skylights and scuttle openings, signs, air conditioners and heating units. (See Figure 4)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ROOF FEATURES
OF A TAXPAYER
1. SCUTTLE COVERS
2. SKYLIGHTS
3. VENTS
4. SOIL PIPE
5. AIR CONDITIONER
6. BRICK PARAPET WALL
7. ENCLOSED STEEL BEAM ABOVE ROOF
8. ROOF SIGNS

Figure 4

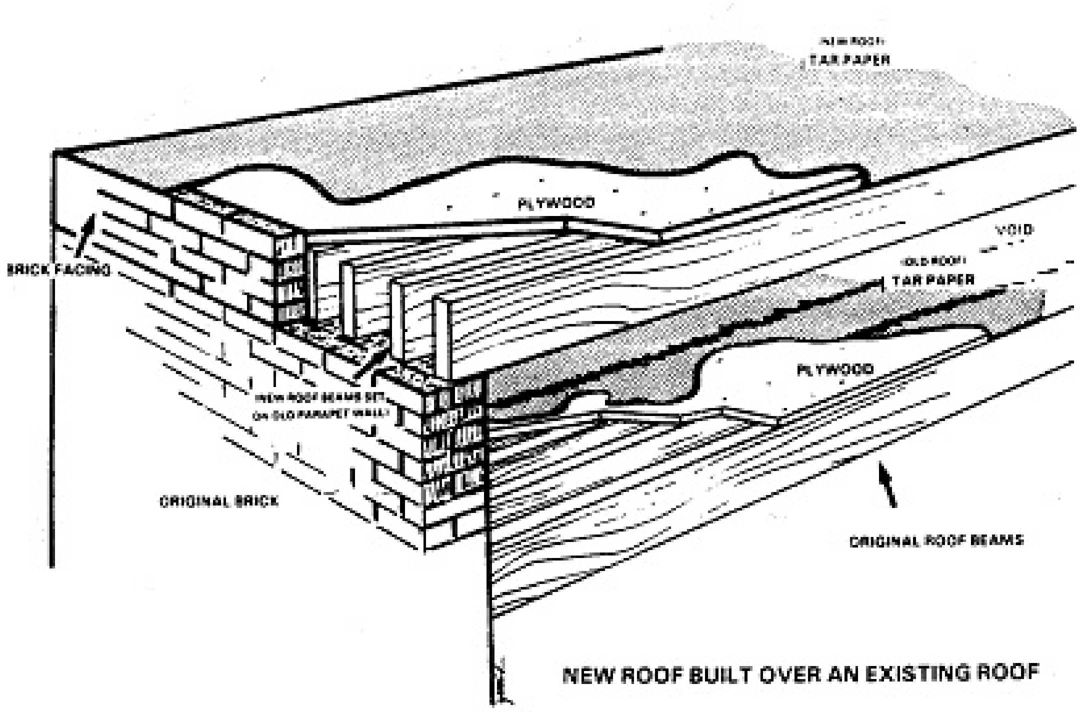

Figure 5

3.3.2 Inverted, raised or reversed roof construction is used to create a pitch to provide drainage. Sometimes an inverted roof is constructed over an existing roof and forms an additional cockloft. (See Figure 5)

3.3.3 Trusses:

Truss construction is used where large areas, free of roof support columns, are desired. As spans and loads increase, structural components must increase in size to absorb and transmit to bearing surfaces the stresses of tension and compression. The truss was developed to allow greater spans while minimizing the increase in the size of the spanning members. Basically, the truss is composed of two major members -the top one is called the TOP CHORD and the lower one called the BOTTOM CHORD. Shorter members, called WEBS, connect the top and bottom chords. The WEBS are placed vertically and diagonally, forming triangular configurations with the CHORD members. There are many variations, but all are essentially the same; a combination of interdependent components used to span large distances through the use of smaller pieces fastened together. Trusses can be either wood or steel (See Figure 6). The open web joist or steel bar joist (See Figure 7) prevalent in modern taxpayer construction is a lightweight parallel chord truss. The type of truss and the material used varies with the needs of the particular application.

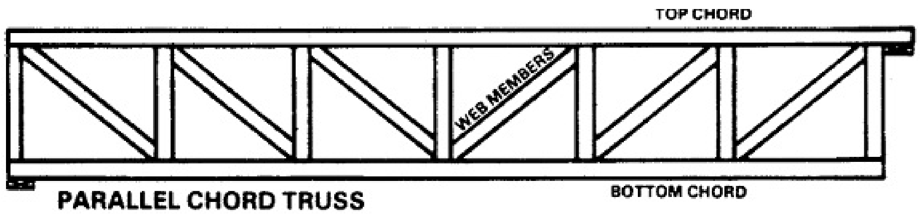

Figure 6

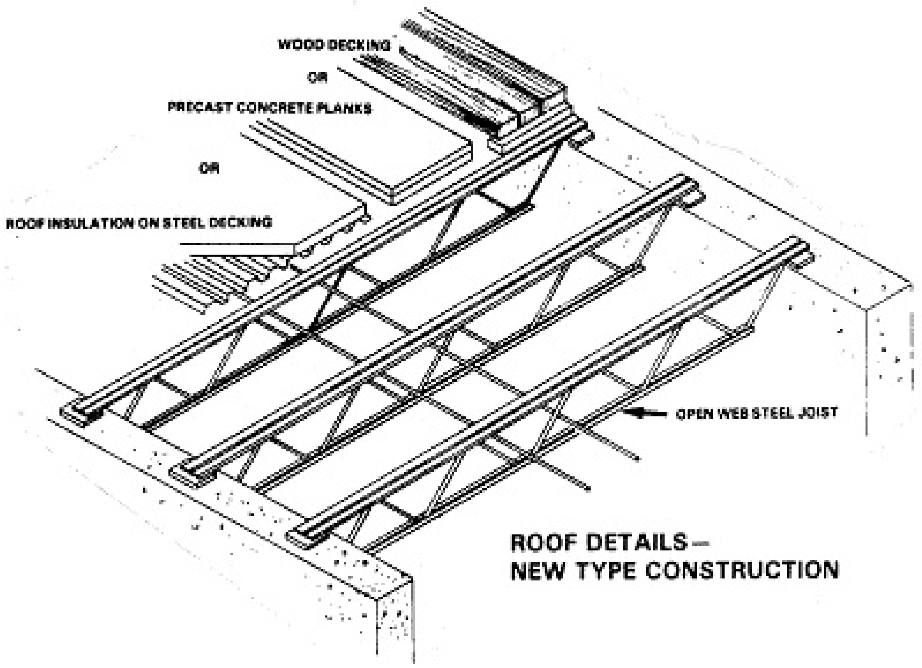

Figure 7

A. Wooden Bowstring Truss

Note: Buildings with bowstring truss roofs must be entered into the eCIDS program, with the abbreviation BWSTRG as the FD Designation.

1. The wooden bowstring truss is found in older commercial structures in New York City. It is common in supermarkets, bowling alleys, lumberyards, auto storage garages, and in buildings that originally housed such occupancies. These structures have a characteristic hump-like roof profile where the roof appears to rise up from below the parapet wall to tower above it. The longer the span, the higher the bow. This easily recognized silhouette, if not obscured by signs, built up parapets or smoke conditions, gives notice of truss construction. Other types of truss construction are not as easily discerned from the exterior of the building.

2. When the bowstring truss was originally designed, engineers used certain assumptions pertaining to tensile strength of wood. But using updated testing methods those assumptions have proven to be incorrect. The bottom chords of many bowstring trusses have inadequate tensile strength to support code-prescribed loads. Updated calculations have revealed that bowstring truss roofs may only support 40% of the load they were originally designed to hold.

3. Another common bowstring truss design flaw involves snow loads. ***Edited for PFS***

4. ***Redacted for PFS***

5. In the older bowstring truss roof buildings, there is a possibility of rotting at the ends of the trusses where they rest on the walls, due to water leaking through the roof covering.

6. The added live load of firefighters and their equipment on a roof of this type can precipitate a collapse.

7. Truss failure has occurred due to the above causes **without** fire impingement.

8. Failure of one truss element can cause a failure of the entire truss. ***Edited for PFS***

9. In older type truss roof buildings, the trusses may be spaced 10 or 20 feet apart with roof beams installed between the trusses to support the roof coverings.

10. Wood truss roofs appear to fail without warning. The roof does not sag or get "spongy." Steel trusses tend to "stretch" when losing their strength because of elevated temperatures, but wood tends to "snap".

11. Trusses are composed of smaller and lighter weight members and they span greater distances than the conventional roof beam construction. Fire will affect them more rapidly.

Note: See section 5.5.25 for operational procedures in structures with bowstring truss roofs

B. Open Web Steel Joists

1. Open web steel joists, found in modern taxpayer construction, have no fire resistance rating. Fire rating depends upon the ceiling finish and finish roofing.

2. Open web steel joists come in standardized lengths, depths and carrying capacities. They are used to span long distances up to 60 feet.

3. Open web steel joists may be covered with various roof decks: solid wood; steel deck; cementitious roof plank (wood fibers chemically processed and pressure bonded with portland cement); precast concrete or gypsum plank; gypsum concrete (factory-controlled mixture of gypsum and wood chips) poured over form boards and steel wire mesh; usually 2" minimum thickness.

Note: End joints of planks are staggered and may not end on roof supports. (See Figure 8)

4. Unprotected open web steel joists are particularly vulnerable to elevated temperatures of a fire and may collapse after only 5 or 10 minutes.

Note: See section 5.5.26 for operational procedures in structures with open web steel joist roof support systems.

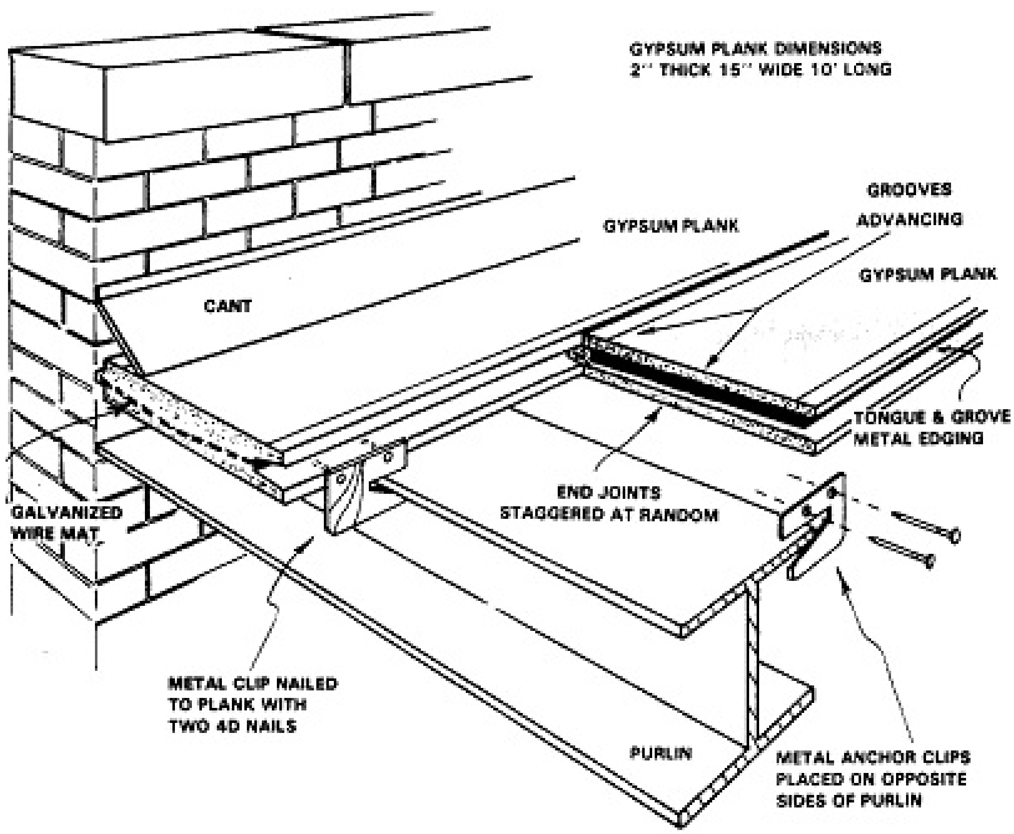

Figure 8

3.3.4 Additional roof features: (See Figure 4)

A. "I" beams protruding above the roof surface or roofs built in step fashion with one store roof slightly higher than another sometimes give the false impression of fire division walls. The side walls of such protrusions are made of wood sheathing and are easily detected by striking them with a tool to differentiate them from a masonry wall. They can be opened for inspection or stream operation. A good working knowledge of these features will allow members on roofs to determine the size and shape of the fire building for the information of operating forces on the first floor.

B. Skylights:

1. On some roofs the skylights, scuttles and other openings have additional security materials placed at the ceiling levels of these openings, such as, heavy metal grates, heavy steel plates and electrically charged grids.

2. If any of these appurtenances are removed and the area covered over, the supports for these coverings may be of very light weight (sometimes wooden 2 x 4's covered with thin sheets of plywood). In a fire situation these supports will fail much more rapidly than the regular beams. Therefore, caution must be exercised in placing any added weight on these sections

3. In some cases, heavy steel plates are being used to cover these openings.

C. Scuttles:

1. Small scuttle covers, possibly with iron ladders to the interior, may also be opened to vent rooms below.

D. Ventilators or Exhaust Ducts:

1. Ventilators or exhaust ducts which may vent store areas or the cockloft are sometimes found on the roof.

E. Signs:

1. Large display signs on rods or front walls can present a collapse hazard in a well involved structure. Smaller signs attached to the front wall over stores sometimes cover openings into the cockloft and can be removed for early stream operation into the cockloft.

3.4 WALLS

3.4.1 Exterior bearing walls are constructed of brick, stone, concrete block and mortar. In some cases, brick walls are only two courses wide in taxpayers. Differential thermal expansion may cause a wall to bulge. (As mentioned in Section 3.6.1, expanding "I" beams can easily upset masonry or stone walls which inherently have little lateral strength. A close watch should be kept on such walls). Stone or block may spall due to heat or subsequent stream application, thus reducing the effective load bearing area of the wall.

3.4.2 The stability of masonry walls is very much dependent on the integrity of the roof. The roof acts as a monolithic brace which ties the walls together. In effect the roof is holding up the walls by providing lateral support. A collapse or disintegration of the roof removes this support and may impart a lateral load, either pushing out, or pulling in, on the wall as stresses are formed. Concrete block walls sometimes hinge at ground level and an entire side or rear wall may remain intact and fall out flat. Brick walls usually crumble or break as they fall, but large sections can be projected a good distance due to the impact as the wall hits the ground.

3.4.3 ***Redacted for PFS***

3.4.4 Interior partition walls between stores are usually of wood stud construction, with plaster or sheetrock covering, and are usually firestopped at the floor and the ceiling by wood sills and plates. The plaster or sheetrock provides longitudinal rigidity for these partition walls between the front and rear walls and roof. Removal of large sections of plaster will weaken this bracing.

3.5 CANOPIES OR MARQUEES

3.5.1 A canopy or marquee which is cantilevered over the sidewalk can act as a lever on the parapet wall pulling down a long section of it. These extensions are generally supported by cables, steel tie rods or steel beams, which go through the wall and are attached inside the building, probably to combustible members in the cockloft. A fire in the cockloft can weaken these attachments or supports, causing sudden collapse of the canopy or marquee and a long section of the parapet wall, without any warning. Six firefighters lost their lives in the collapse of a such a marquee and parapet wall at a furniture store fire in 1956. Marquees are hollow boxes which can fill up with run-off water at a fire operation due to use of heavy streams. A 12' x 24' marquee, 4' deep, when filled would contain approximately 35 tons of water. In effect, a hanging swimming pool. Marquees are required by the building code to have drainage facilities. Many have been found to have roof type gutters and down spouts blocked with debris, rubbish and rubber balls.

3.6 "I" BEAMS

3.6.1 Exposed steel "I" beams are commonly used in taxpayer construction to support roof and floor joists. "I" beams will absorb heat from the fire at a rate dependent on many factors, such as, the temperature of the fire, the extent of the fire, and the mass (weight and size) of the beam. A large, heavy "I" beam will be able to absorb more heat and its temperature will rise more slowly than a lightweight beam. Because of the conductivity of the steel, this temperature will diffuse into the beam causing its expansion. An average 50 foot long steel beam, heated uniformly over its length to 970 F will extend in length approximately four inches. A longer "I" beam will expand a proportionately greater distance, and as the temperature increases, the rate of expansion increases. At 1000 F a 100-foot long beam will have extended in length nine-and-a-half inches. It is this process of expansion in length that causes exterior walls to be pushed out so quickly at a taxpayer operation.

3.6.2 These "I" beams are often built into side or rear masonry walls, or butt the front parapet wall, where they are supported by masonry piers or iron columns at the storefronts. A close watch must be kept for walls out of plumb or bowed, or cracks appearing in mortar joints due to "I" beams forcing bearing or parapet walls outward (See section 3.4.3). If the "I" beams are restrained from expanding (an unlikely occurrence at roof level in taxpayers), they will buckle. Sometimes an "I" beam will push out a small section of bricks and allow fire to extend to exposures.

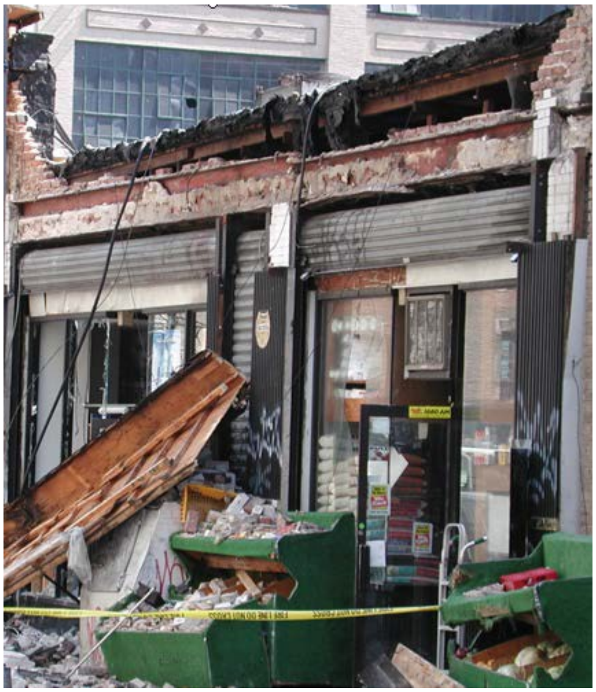

Figure Added for PFS

3.6.3 Redacted for PFS

3.6.4 There is a false impression that hot steel beams or columns cooled by hose streams will crack or fail. Tests have shown that cooling a steel member will cause it to regain its strength and load carrying ability, and under normal circumstances, there should be no hesitation in cooling these members. If the beam has already sagged under the weight of floors or roof, firefighters should not be allowed in the possible collapse zone, whether these beams are cooled or not. The steel will contract to its original length as it is cooled and if the beam has sagged, this shortening may pull the end of the beams off their supports or twist the beam allowing the joists to drop.

3.7 COLUMNS

3.7.1 Columns in taxpayers can be made from wood, cast iron, lally columns (steel or cast iron) or masonry piers which support the beams. Cast iron columns are unpredictable and fail, on the average, in about thirty (30) minutes in fire endurance tests. Some columns fail sooner than cast iron columns. The failure of a column is generally more serious than the failure of a girder or beam. The failure of a column in the cellar can cause the subsequent collapse of the floors and roof.

3.8 SUSPENDED CEILINGS

3.8.1 As many as two or three dropped ceilings may be found in a particular store. (See Figure 10). These suspended ceilings offer their own collapse potential when loaded with water or weakened by fire and are sometimes blown down by a backdraft in the cockloft. Special care must be exercised when these ceilings are constructed of heavy wire lath and plaster or tin, as these ceilings often fail and fall in one piece over the entire area of a store. Besides inflicting injury, these ceilings can trap members beneath, if they fall intact.

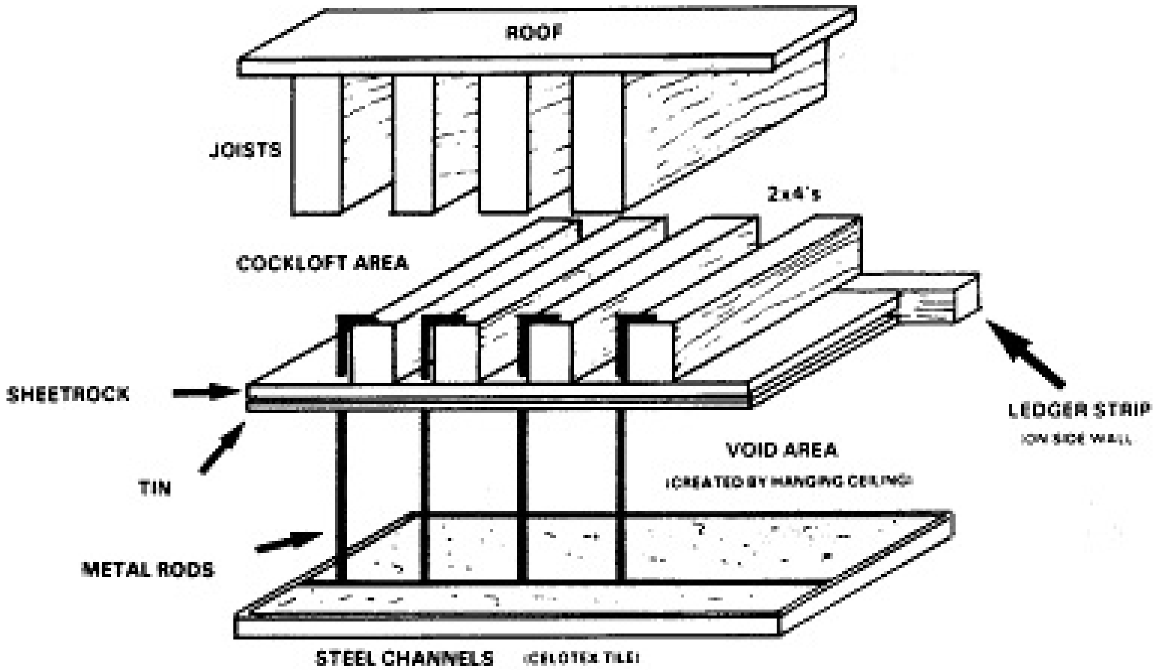

Figure 10

3.8.2 These ceilings should be "punched" with a hook for water detection, to check construction and fire conditions. Multiple layers of tin, sheetrock or tiles may have been affixed together on supports which were not intended to carry such weight. (See Fig. 11) A slight amount of water or fire can cause failure and the weight of such a ceiling increases chance of entrapment and injury. When initially pulling suspended ceilings, members should be in a safe area in case of total failure.

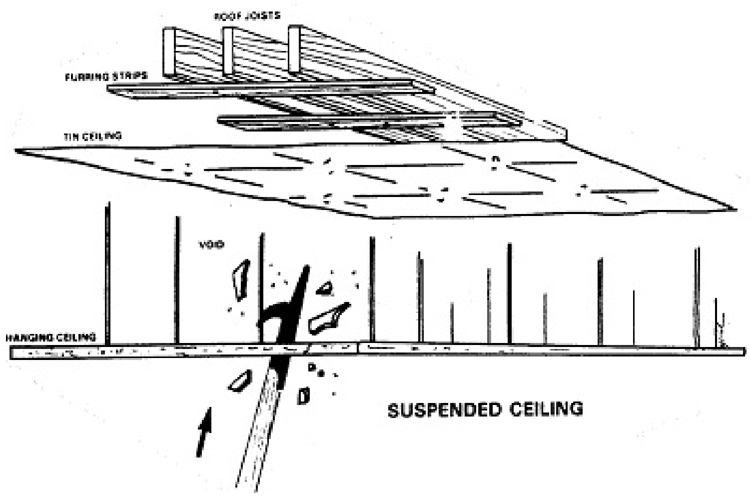

Figure 11

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3.8.3 When pulling sheetrock ceilings, large pieces often "hinge" at one side as they swing down and can inflict injury if they come down edge first.

3.8.4 Long ceiling ducts often have a minimum of supporting ties and chain reaction can pull the entire duct down. They may be sandwiched between hanging ceilings or suspended beneath them.

3.8.5 ***Redacted for PFS***

3.9 FLOORS

3.9.1 Flooring can vary in taxpayers. The most common type floors are tongue and groove boards or plywood, supported by wood floor joists.

3.9.2 Heavy terrazzo or concrete is sometimes placed over wood joist floor construction, an exceptionally hazardous condition. A fire in the cellar may weaken floor supports with little evidence of heat conditions on the first floor. These floors are difficult to ventilate to allow early advance of cellar lines or use of cellar pipes and distributors. Sudden failure due to weight on the floor is possible.

3.9.3 Paneling under display windows at street fronts can sometimes be removed to offer ventilation and stream operation points for cellar fires. The flooring under the raised display platform is sometimes omitted behind these panels.

3.9.4 In newer type taxpayer slab construction, concrete floors are prevalent on ground level with no basements or cellars in the buildings.

3.10 CELLAR AREAS

3.10.1 Cellar areas are often divided into a maze of storage spaces. The layout often does not necessarily conform to the store layout. One occupancy may use a large section of the cellar with openings through partitions, while other occupancies may use smaller areas or none at all.

3.10.2 Cellar ceilings are required to be fire retarded, but the plaster covering may be deficient. Partition walls between cellars are usually of combustible or flimsy construction and joist channels at cellar ceilings are often not firestopped allowing fire, combustible gas and smoke extension from cellar to cellar.

3.10.3 Access to cellar areas:

A. Outside sidewalk trap doors in front of the stores give access to wooden, iron or masonry stairs, straight iron ladders and chutes or conveyors for stock delivery. The chutes, when not in use, may be folded against the wall alongside the cellar stairs. After units have been committed to cellar operations down such stairs, these chutes can fall, covering the stairs. This will make it difficult to evacuate the cellar in an emergency.

B. Outside cellar stairs are usually found in the rear of taxpayers. When there are several stores in the building, these stairs may lead to a passageway along the rear cellar wall from which access can be gained to the various storage areas.

C. Outside sidewalk or interior elevators.

D. Interior open stairs, stairs covered with trapdoors or enclosed in light walls.

E. Interior openings for chutes and conveyors.

F. Windows to cellars and basement in taxpayers are usually below grade in depressed areas that are covered with gratings.

G. In the older type taxpayers, the flooring of the first floor may not be extended under the raised front window display area. By removing the paneling under these windows an opening for ventilation and water application can be gained.

3.10.4 Cellar contents.

A. Stock for the various stores, which may include flammable, fast burning or poisonous materials, and pressurized containers, all of which are hazardous. Large amounts of stockpiled to the ceiling with very little aisle space.

B. Refrigeration machinery and piping.

C. Walk-in refrigerated areas.

D. Heating furnace rooms and oil storage tanks.

E. Electrical supply entrance points with panel boxes and large amounts of wiring.

F. Gas supply with gas meters and piping.

3.11 SECURITY DOORS

3.11.1 As a result of increased burglary and vandalism incidents in the past years, store owners now provide greater security for their premises. Typical of these installations are the familiar metal overhead rolling doors which cover the entire store or building front. ***Edited for PFS***

3.11.2 Store fronts covered by overhead doors have presented the following problems:

A. Delayed discovery of the fire

1-3. ***Redacted for PFS***

B. Delay in operations due to the following:

1. Difficulty in determining the exact location of the fire.
2. Time consumed in gaining entry.
3. Water application and ventilating operation delays.
4. Examination for fire extension and stopping fire spread.
5. Need for special tools to gain entry, power saws, torches, etc.
6. The bottom bar of some overhead doors, when they are closed, may rest on the sidewalk entrance doors to the cellar.
7. Where a store covers a large area or there are a number of stores in a building all with overhead doors, it may be difficult to determine the exact location of the entrance door or doors to the stores. Overhead signs might give a clue.
8. These doors may cover the exterior entrances to the upper floors and also flush type fire department sprinkler connections.
9. Extensive and punishing operations requiring additional units.

3.11.3 Doors in the rear will be equipped with many strong security devices, such as the same type overhead doors as are found in the front. Conventional doors will have two or three strong door locks, plus strong metal bars across the inside of the door with strong anchor supports, which are securely attached to the walls, and the doors.

3.11.4 Problems with overhead type doors that depend on spring tension to counterbalance their weight will be encountered in structures as well as trucks. At fires in warehouses, garages etc., heat can cause springs to loose tension. If these doors start down without the counterbalance of fully tensioned springs they will come down with tremendous force. ***Edited for PFS***

A. When the spring tension is gone, motor or hoist devices usually will not prevent the door from coming down hard once it starts down. In addition, at more advanced fires the steel track on either side can warp pulling, out the rollers and allowing the door to drop flat.

B. When dealing with doors that may have been affected by fire the following is suggested:

1. Avoid standing in door path.

2. Secure door from rolling by clamping vise grip pliers in track under roller or place a ladder as a stop.

3. Check the integrity of overhead track as soon as conditions permit.

4. Attempting to force large overhead doors that have lost spring tension will require lifting dead weight and normally may be futile. When the door can be opened electrically it should be serviced immediately.

5. Treat every open overhead door for what it is - a heavy overhead hazard like air conditioners, machinery trucks, etc.

3.12 EXIT FACILITIES

3.12.1 In both the older and newer taxpayer, exit facilities are poor.

A. In the smaller type store establishments there is usually only one means of entrance and exit; that is the main store opening.

B. In the larger type occupancy (supermarkets, etc.), there are two means of egress. The customers, however, are aware of the main entrance only, since the secondary exit is usually remote or obscure. The entrance may consist of only two doors to as many as six doors. Some of the newer types are automatic in operation, opening inward and outward for the customers use.

C. Depending on access, use and location, there may be a second means of egress in the rear of the store from a storage, utility or delivery area. This exit is not readily available or accessible for public use.

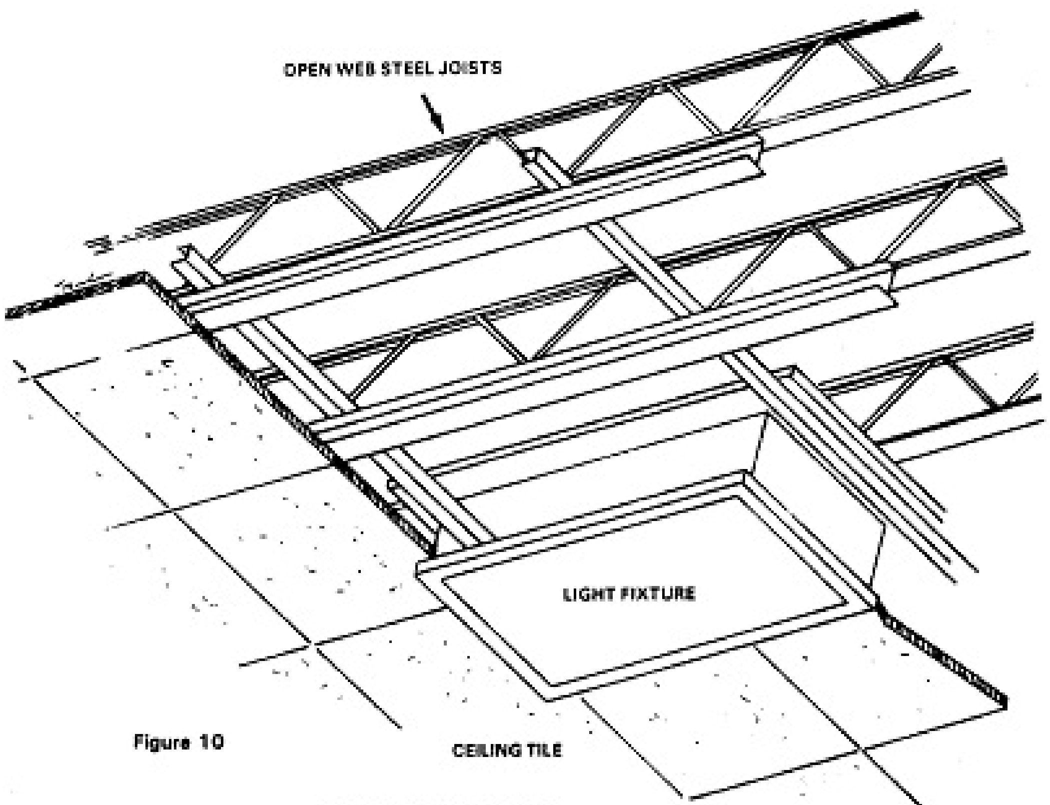
D. In supermarket and discount type store occupancies the obstruction of exit accessibility can be anticipated due to the presence of checkout counters, stock displays and shopping carts.

3.13 NEW TYPE CONSTRUCTION TAXPAYERS

3.13.1 The new type of construction (supermarkets, etc.) is much better than the traditional or older type from a fire protection view point.

3.13.2 Many of the newer type taxpayers are built on a concrete slab foundation, which removes a major problem of cellar and basement fires. The partition walls are usually better constructed due to the use of the steel and aluminum stud system which employs gypsum blocks and sheathing as a bearing or nonbearing wall system.

3.13.3 The roof system will remain a major firefighting factor because, for the most part, the roofs are constructed of "Bar Joists," light weight steel or flat wood trusses. These features, and how they behave under fire conditions, have been covered under "Truss Roofs," Section 3.3.3. (See Figures. 7 & 12).



TYPICAL CEILING –
OPEN WEB JOIST CONSTRUCTION

Figure 12

4. HAZARDS

4.1 LIFE HAZARDS

4.1.1 "Taxpayers" cover such a broad spectrum it is impossible to evaluate the life hazard in a general statement.

4.1.2 Occupants:

A. Life hazard will vary with the type of occupancies found in individual buildings.

B. The life hazard in a one-story taxpayer may present a problem during the day since occupants could be trapped in the rear areas and cellars of these stores. During night hours these premises, for the most part, are unoccupied but the possibility of some workers being in the premises must not be overlooked.

C. Life hazard in two story taxpayers can be a serious problem on the second floor. Occupancies such as restaurants, private clubs, dance halls, etc., open to large numbers of people may be found on the upper floor.

D. ***Redacted for PFS***

4.2 COLLAPSE

4.2.1 In assessing the possibility of a structural collapse, consideration must be given to the type of construction involved in the fire, the intensity of the fire and the time that the structural members have been burning or subjected to the heat of the fire.

4.2.2 -4.2.3 ***Redacted for PFS***

4.2.4 The following may be causes of collapse during fire operations in taxpayers:

A. Backdrafts blowing out walls or floor.

B. Weakened and burned out structural members.

C. Heating of unprotected structural members resulting in:

1. Expansion: walls pushed out; columns out of plumb.

2. Loss of strength and failure to support: Girders, beams and columns being twisted out of shape due to excessive heat and in turn causing floor joists to lose their bearing support and fall free.

D. Accumulation of a large volume of water on a floor or in a ceiling.

E. Presence of water absorbent materials such as rags, paper, clothing, which increase floor loads when wet and which may push out walls by expansion from the absorbed water.

F. Impact load: An object such as a gas heater falling from the ceiling, or a firefighter jumping onto a roof or floor which has been weakened by fire may be enough to cause collapse. An impact load has a much greater effect than the same weight carried as a static (stationary) load.

G. Vibration or movement in or near a weakened building.

H. Water, ice or snow loads on the roof.

4.3 ***Redacted for PFS***

4.4 BACKDRAFTS and SMOKE EXPLOSIONS

4.4.1 Backdrafts and smoke explosions are dangerous fire events that do not occur often but tend to occur more frequently during taxpayer fires than in other types of occupancies.

A. Backdrafts occur when there is an introduction of oxygen to a compartment that has been pressurized by the smoke and fire gases of an oxygen-deficient fire in the Decay Stage.

B. Smoke Explosions occur when fuel-rich smoke mixes with additional air and falls within its flammable / explosive range. It can occur without warning and occurs without a sudden change in ventilation

4.4.2 ***Redacted for PFS***

4.4.3 BACKDRAFT TACTICS: When favorable conditions exist for a backdraft to occur, the tactics of vertical ventilation and / or a flanking attack should be considered. ***Edited for PFS***

4.4.4 SMOKE EXPLOSION TACTICS. When a heavy fire condition is producing large amounts of smoke which is travelling into voids and adjoining occupancies, the following tactics should be considered:

A. Early Shutdown of Utilities: Under normal circumstances, shut down of utilities (both electric and gas) normally are not considered as an initial tactic. However, in an attempt to remove ignition sources that may ignite flammable smoke remote from the fire area, early shut down of both electric and gas should be considered.

1-3. ***Redacted for PFS***

4.5 ***Redacted for PFS***

4.6 FIRE EXTENSION

4.6.1 Horizontal Spread

A. Via common cockloft.

B. Through flimsy partitions.

C. Between the beams in ceilings.

D. Via hanging ceilings.

E. Via ducts-air conditioning, heating, vent ducts.

F. Butted joists.

G. Common ceiling.

H. "I" beams.

I. Party walls.

4.6.2 Vertical Spread.

A. Via ducts.

B. Via pipe recesses.

C. Through ceilings.

D. Via concealed spaces between furred plaster and brick walls.

E. Via open stairs or trapdoors.

F. Via voids.

G. Convection -mushrooming at upper levels.

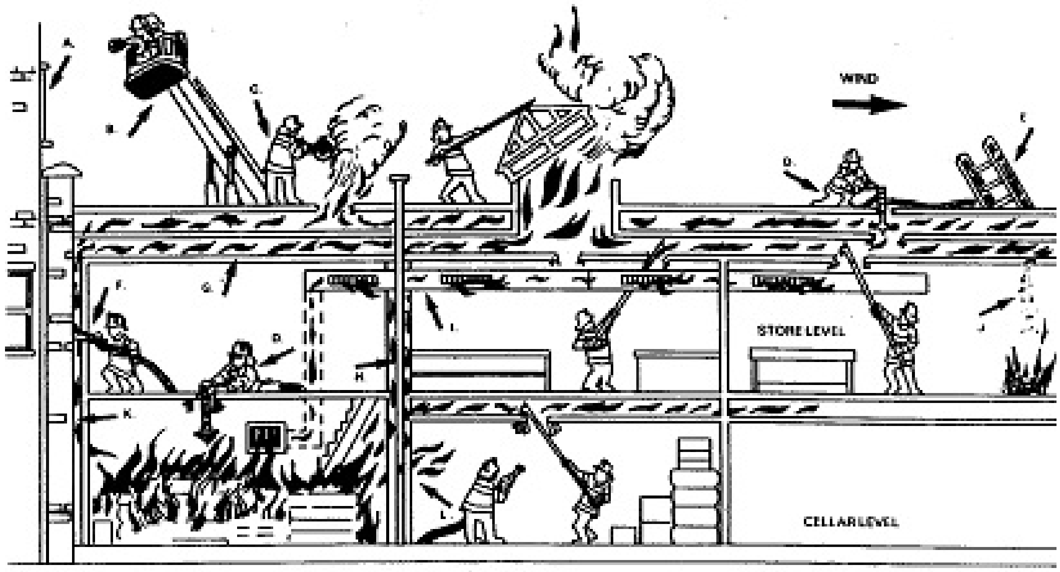
H. Shafts- light and ventilation shafts from interior bathrooms and offices.

I. Stock conveyor belts and chutes from cellars.

5. FIRE OPERATIONS

5.1-5.2 ***Redacted for PFS***

5.3 FIRE TRAVEL IN TAXPAYERS (See Figure 13)



LEGEND

A. Exposed building.
B. Tower Ladder to protect exposure. Turret pipe or hand line could also be used.
C. One large hole in roof better than several small ones.
D. Cellar pipes or distributors used with good effects on roofs.
E. Ladder for reconnaissance or retreat.
F. Bent nozzle in concealed spaces.
G. Hanging ceiling.
H. Open pipe recesses.
I. Ducts.
J. Fire dropping down.
K. Concealed space behind plaster of furred brick wall.
L. Fire burns through flimsy partitions.

Note: A charged line should be on hand to cover all openings made. Openings for cellar pipes, in particular, should be covered by separate hand line in event position becomes untenable.

Figure 13

5.3.1-5.3.3 ***Redacted for PFS***

5.3.4 In the inverted roof the situation is different. The roof beams create the original ceiling level. Roof supports of 2 inch x 4 inch short studs are connected to the roof beams and extended upward, where they connect to a roof grid to which the roof boards are nailed. This presents a miniature lumber yard. It also provides much fuel for a fire to feed on and a large open area for quick fire spread.

A. The inverted roof may be pitched from the front to the rear, front and rear to the center, or from the front, rear, and sides to the center. How the roof is pitched is usually determined by the configuration of the building and the position of the drainage facilities. In most cases the high portion of the cockloft is at the front of the building.

B. If fire enters the cockloft at the high point or front of the building, our fire problem is less severe than if it has entered into the cockloft at the rear. The reason is that fire does not burn quickly from a high point to a lower area.

C. Since most fires originate in the rear of the first floor where utilities, storage, and services are located, this is the area from which the fire usually extends to the cockloft. Generally, this is the lowest portion of the cockloft. The pitch of the roof (front to rear) allows the fire to spread rapidly to the higher cockloft area.

D. The standard (flat) roof may have little or no pitch. If it is pitched, it will be from the front to the rear.

5.4 VENTILATION

5.4.1-5.4.4 ***Redacted for PFS***

5.4.5 Generally, vertical openings are made at the roof level. Scuttles, skylights or covers of former skylights that are located over or near the main body of fire should be opened first. Openings that are made remote from the fire area may cause the fire to spread. These openings should not be made when such will jeopardize life or endanger any exposures, unless protective measures are taken.

5.4.6 The roof cut for vertical ventilation must be large enough to cause the bulk of the heat, smoke and gases being produced by the fire to vent in that direction and away from the advancing hose line. An insufficient vent opening will cause the heat, smoke and fire to “back up” and vent toward other available flow path openings, including the entrance opening used by the advancing hoseline. A hole eight feet by eight feet, where possible, is recommended. Methods for cutting and cuts are discussed under section 5.5.

5.4.7-5.4.17 ***Redacted for PFS***

5.5 CUTTING ROOFS AND FLOORS

5.5.1 At taxpayer fires, nothing affects the outcome of an operation as much as ventilation. The key is the cutting and pulling procedures used to provide the necessary escape for the fire, heat, smoke and gases. Trenching is also an important factor but in most cases not to the degree of the ventilation cuts.

5.5.2-5.5.8 ***Redacted for PFS***

5.5.9 Roof cuts should be made in one operation. They should be lifted off in one piece if possible. If this is not possible, then the roof covering should be removed first, followed by removal of the roof boards. All obstructions below the cut should be removed or opened by pushing down from the roof through such openings.

5.5.10 Generally, wood joists run the short side of a building or occupancy, particularly in the older taxpayers where the occupancies within a taxpayer have frontages not exceeding twenty feet.

5.5.11 Wood joist beams are usually spaced 16 inches on center. Wood flooring and roof boards when nailed directly to roof beams are nailed at right angles to these joists.

5.5.12 In the larger, or more prevalent taxpayers, floor and roof joists may run side to side, or front to rear within the building. How they run is usually dictated by how the "I" beam, girder and column supports were laid out during construction. They usually run the short span within this configuration.

5.5.13-5.5.14 ***Redacted for PFS***

5.5.15 When rear extensions were added to taxpayers, it was not unusual to utilize a larger girder to tie the older section in with the newer section. This at times made the rear portion of the added roof higher than the older portion. Depending on the span to the rear lot line and the distance to the supporting beams and columns, the joists would be laid on their supports either as those in the older portion or at right angles to them. In addition to creating a higher portion or raised roof in this area, it also creates a larger void in the ceiling below. This factor should be recognized and appreciated when considering fire travel and venting the roof area of taxpayers. (See Figure 13)

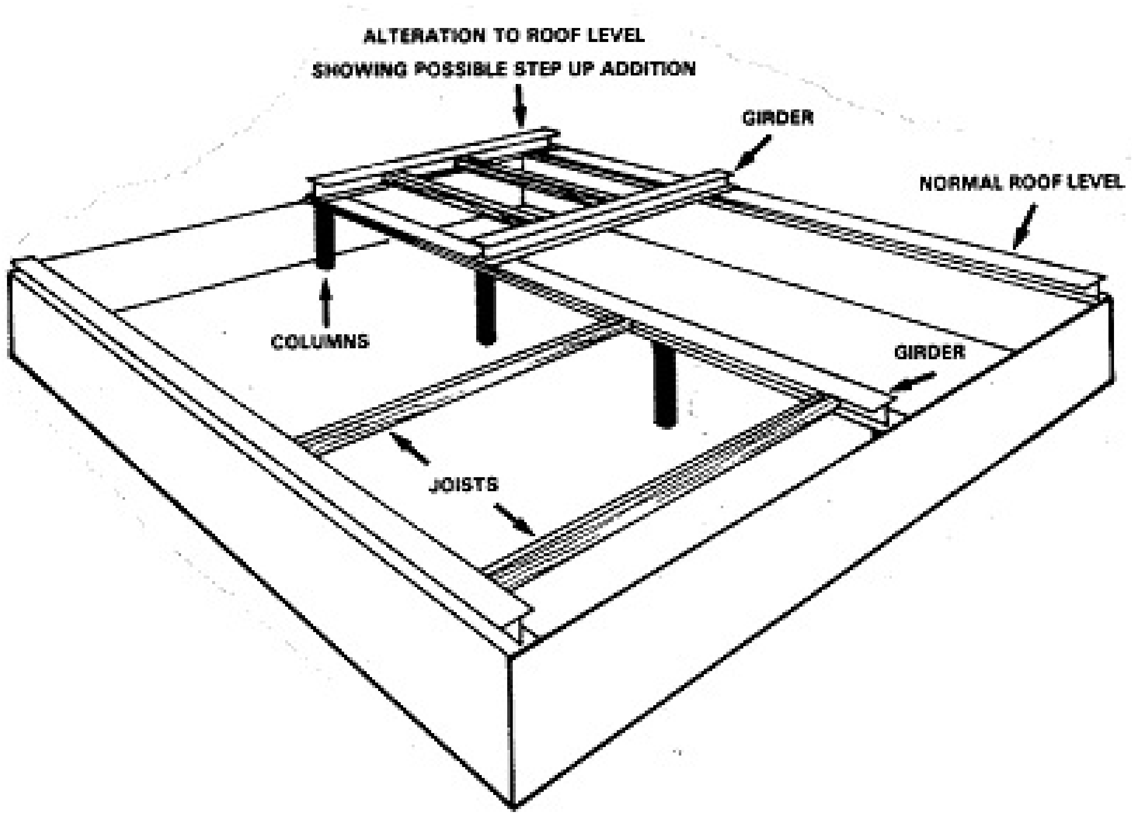


Figure 13

5.5.16 Cutting a hole eight feet by eight feet is recommended in providing ventilation at the roof. In a serious fire, instability, heat, or smoke conditions may make the cutting of this primary vent hole impossible, delaying overall effective ventilation.

5.5.17 When it is not possible to make an eight feet by eight feet cut in a serious cockloft fire or where a heavy heat and smoke condition exists in the cockloft, the largest opening possible shall be made.

5.5.18 ***Redacted for PFS***

5.5.19 Care shall be exercised in cutting scuttle covers. Often, for security reasons, skylights have been removed and the scuttle coverings for such openings consist of plywood or other light materials with little or no substantial framing supports. Members should avoid walking or placing their weight on these coverings.

5.5.20-5.5.21 ***Redacted for PFS***

5.5.22 At cellar fires, it is often necessary to cut the first floor to provide the necessary means of ventilation, so that the engine companies may advance their lines for extinguishment. The cut also may be used for getting water on the fire with bent tips, distributors or cellar pipes. The cut should be made as near to the windows as possible and away from doorways and aisles. When the run of the floor joists has been established, the cut should be extended at right angles to the joists. This provides additional cellar ventilation, maximum ventilation of the bays between joists and access points for streams. The size, location and number of cuts depend on the obstructions encountered, location and extent of the fire and the area of the occupancy. Additional cuts in adjacent stores should be made as required. All such cuts should be covered by hoselines.

5.5.23-5.5.24 ***Redacted for PFS***

5.5.25 ***Redacted for PFS***

A. ***Redacted for PFS***

Note: Under no circumstances shall any member operate on the roof of any building involved in a content or structural fire with a wooden, metal or combination bowstring truss design.

B-F. ***Redacted for PFS***

5.5.26 In newer taxpayers the roof supports are of lightweight open web steel joists.

A. They are spaced greater distances apart than the standard wood joists.

B. Redacted for PFS.

C. The most common decking is corrugated steel. With this type decking, the joists are spaced from four to six feet.

D. Redacted for PFS

E. Roofs of fire buildings with this type of roof support system must not be cut.

F. Vertical ventilation should be limited to removal of skylights and scuttle covers if present.

G. Emphasis should be placed on any and all horizontal ventilation points.

H. Gypsum concrete decking is of lightweight construction, spans wide spaces and is vulnerable to moisture. These characteristics are conducive to early collapse under fire conditions. Therefore, members shall not be committed to roof operations. Interior operations shall be conducted from areas of safety due to the weight of such decking materials (17.5 lbs. per sq. ft.). The presence of a gypsum roof deck will be indicated by a white powdery residue during saw operations. Upon this observation, members should immediately notify the Roof Sector Supervisor and IC and evacuate the roof.

5.5.27 In summary, at taxpayer fires where the roof supporting system is wood joist and the roof must be cut:

A. Members must realize, the larger the vertical opening, the more effective ventilation will be.

B. Never allow the smaller manageable four feet by four feet segment of an eight feet by eight feet ventilation hole segment to be pulled until the necessary additional leg cuts are placed in the cutting pattern. The early removal of the initial segment will often prevent the saw team from completing additional cuts.

5.6-5.7 ***Redacted for PFS***

6. ***Redacted for PFS***

7. ENGINE COMPANY TACTICS

7.1 General considerations for all taxpayer fires

7.1.1 Occupants may be trapped in cellars, the rear of stores or on the second floor of a two-story taxpayer.

7.1.2-7.1.5 ***Redacted for PFS***

7.1.6 However, there are situations in which the 2nd arriving engine company may stretch and operate a 2nd hoseline. This should only be done as follows:

A. The 1st arriving engine company must have secured a positive water source. The 2nd arriving engine officer can communicate with the 1st arriving chauffeur to confirm this.

B. The 1st arriving engine company does not require the help of the 2nd arriving engine to get the 1st line in operation. The 2nd arriving engine officer must communicate with the 1st arriving engine officer to confirm this.

C. The hose stretches are sufficiently short, so the 1st arriving company will not require immediate assistance in operating the line once it is charged.

D. There is an immediate need for a 2nd hoseline to address fire extension or a life hazard.

7.1.7-7.1.10 ***Redacted for PFS***

7.2 CELLAR FIRES

7.2.1 Line placement:

A. First Hoseline: Proper placement of the first hoseline requires a coordinated size-up and communication by the first Engine and Ladder Officer. After size-up, the first hoseline should be stretched to the entrance door that provides the quickest access to the cellar to extinguish the fire.

B. Second Hoseline: Initially positioned and charged outside the fire building as a back-up for the first hoseline. When not needed to back-up the first hoseline, the position of this hose line is on the first floor to extinguish any extending fire and to protect the members operating on the first floor.
Edited for PFS

C**. *Redacted for PFS***

7.2.2 Cellar Fire Considerations

A If a hoseline is operating in a cellar or similar area below grade, an additional charged hoseline must be positioned at the top of the interior cellar stairs to extinguish any extending fire and to protect members operating on the first floor. This position should normally be covered by the 2nd hoseline, but if the 2nd hoseline is stretched to another location, an additional hoseline must be stretched to this location

7.3 STORE AND COCKLOFT FIRES

7.3.1 Line placement

A. First Hoseline: Proper placement of the first hoseline requires a coordinated size-up and communication by the first Engine and Ladder Officer. After size-up, the first hoseline should be stretched through the entrance door that provides the quickest access to the fire.

B. Second Hoseline: Initially positioned and charged outside the fire building as a back-up for the first hoseline. When not needed to back-up the first hoseline, it can be used to extinguish any fire discovered in an adjoining store, in the cellar, or the upper floor of a 2-story taxpayer.

C. ***Redacted for PFS***

D. Advanced Fire Endangering Exposures: Depending on the life hazard and the location of the fire, when there is an advanced fire on arrival in a store or the cockloft that is endangering other nearby buildings, hose lines may need to be stretched and positioned to confine the fire, protect life or protect the exposures.

1. ***Redacted for PFS***

7.3.2 Store and Cockloft Fire Considerations

A. The first hoselines should be positioned between any people and the fire. A path of egress should be left unimpeded for evacuating people, if possible.

B-J. ***Redacted for PFS***

8. TACTICS, LADDER COMPANY

8.1 GENERAL

8.1.1-8.1.2 ***Redacted for PFS***

8.1.3 Egress from second stories is often limited and panic conditions are possible. These buildings must be well laddered to provide:

A. Roof access and egress.

B. Second floor rescues.

C. Escape routes for members searching the 2nd floor.

8.1.4 Many individual second floor occupancies do not have a secondary means of egress. Heavy smoke in the second floor public hall may have trapped people in these occupancies. A thorough search must be made and all doors must be opened. Refuge may have been sought in such windowless areas as lavatories, store rooms, or closets.

8.1.5-8.1.20 ***Redacted for PFS***

8.2 CELLAR FIRES

8.2.1 Tactics

A. ***Redacted for PFS***

B. Suspect a cellar fire if smoke shows in many stores and there is a high heat condition on the first floor with no visible flame in either case.

C-M. ***Redacted for PFS***

N. When sending members into cellars to shut down utilities, two mask equipped members shall be dispatched as a team.

8.2.2 Assignments

A. 1ST LADDER COMPANY TO ARRIVE

1. Officer and Forcible Entry Team

   a. To the store occupancy above the fire. Forcible entry as required at store entrance and cellar entrance.

   b. ***Redacted for PFS***

   c. After communicating and coordinating with 1st Ladder Company officer, ventilate the store as necessary. Take out the store windows if required. Ventilate rear from interior where possible.

   d-e. ***Redacted for PFS***

   f. Shut down utilities.

   g. ***Redacted for PFS***

2. Outside Vent Firefighter (OV)

   a. Check the rear and sides of the building for access.

   b. After communicating and coordinating with Ladder Company officer inside the area to be vented, provide ventilation at the rear for the cellar and store above the fire.

c. If access in the rear is available, attempt entry when teamed with the 2nd Ladder OV (or another available member). Notify the company officer and conduct searches with particular attention given to the first-floor rear.

3. Roof Firefighter

a. Place and raise portable ladder to the roof.

b. After communicating and coordinating with Ladder Company officer inside the fire area to be vented, provide necessary roof ventilation of scuttles, skylights, etc.

c. Monitor the roof, unless otherwise directed.

4. ***Redacted for PFS***

B. 2ND LADDER COMPANY TO ARRIVE

1. Officer and Forcible Entry Team

a. To adjacent stores and cellar entrances.

b. Search stores.

c. Communicate and coordinate ventilation with Ladder Company officer in area to be vented.

d. Check for fire extension. Open up floors, ceilings, and partitions.

e. Cut floors where necessary for operation of cellar pipes, distributors and bent tips.

2. Outside Vent Firefighter (OV)

a. Team up with 1st ladder OV and operate as per Section 8.2.2 A 3.

3. Roof Firefighter

a. Place a second portable ladder to the roof.

b. Bring saw to the roof if not required elsewhere and roof requires further opening.

c. If services are not required on roof, perform as directed.

4. ***Redacted for PFS***

C. ***Redact for PFS***

8.3 STORE AND COCKLOFT FIRES

8.3.1 Tactics (store fires)

A. Most taxpayer fires originate in the store occupancy at street level. The occupancy usually consists of a sales area, a storage area and a utility area. Fires in these premises generally originate in the storage or utility area, which in most occupancies are in the rearmost portion of the building. ***Edited for PFS***.

B-C. ***Redacted for PFS***

D. The probing of the ceiling area with a hook upon entering will give some indication of conditions in the cockloft area.

E. ***Redacted for PFS***

F. Ventilation and access from the rear is often limited and time consuming due to boarded or sealed windows and doors.

G-J. ***Redacted for PFS***

8.3.2 Tactics (cockloft fires)

A. Although the fire may have started in the cockloft from defective wiring, or a defective chimney, most fires extend to the cockloft through ceilings, vertical arteries or ducts from fires in stores or cellars.

B-F. ***Redacted for PFS***

8.3.3 Assignments

A. 1ST LADDER COMPANY TO ARRIVE

1. Officer and Forcible Entry Team

   a. Force entry.

   b. Locate the fire.

   c. Control the life hazard.

d. Search the store.

e. Communicate and coordinate ventilation of store at the front with Ladder Company officer in area to be vented. Remove the show windows when authorized by the Incident Commander, and only when a charged line is in position.

f. Open ceilings and partitions in the fire store for examination and extinguishment.

g. Check the cellar for fire.

h. Shut down gas and electric supply.

i. Work in with the engine company.

2. Outside Vent Firefighter (OV)

a. Check the rear for access.

b. After communicating and coordinating with Ladder officer in the area to be vented, provide ventilation at the rear.

c. When access in the rear is available, attempt entry when teamed with the 2nd Ladder OV (or another available member). Notify the company officer and conduct searches.

3. Roof Firefighter

a. Place a portable ladder to the roof.

b. Take the portable saw to the roof and, after communicating and coordinating with Ladder Company officer inside the fire area to be vented, provide ventilation.

c. Monitor the roof and report changing conditions to the Incident Commander of the fire.

4. ***Redacted for PFS***

B. 2ND LADDER COMPANY TO ARRIVE

1. Forcible Entry Team

a. Force entry into the adjacent stores.

b. Check for fire extension.

c. Perform necessary search.

d. Communicate and coordinate ventilation with Ladder Company officer in area to be vented.

e. Open up partitions and ceilings for engine companies to extinguish the fire.

2. Outside Vent Firefighter (OV)

a. Team up with the 1st ladder OV and operate as per section 8.3.3 A 3.

b. Proceed to the roof or other position as directed.

3. Roof Firefighter

a. Raise 2nd portable ladder to the roof. Take saw to roof and assist in ventilation.

4. ***Redacted for PFS***

C. Redacted for PFS

8.4 TOOL ASSIGNMENTS

8.4.1. ***Redacted for PFS***

8.4.2 ***Redacted for PFS***

8.4.3 Ladder company units shall consider the following for their standard operating procedures:

A. Forcible Entry Team

1. The extinguisher firefighter brings the can and hook to the fire door. The forcible entry firefighter carries an axe and a halligan tool. One member can be used to go for additional tools as needed.

2. The maul and duckbill lock-breaker may be required for some padlocks.

3. Redacted for PFS

4. The use of the saw must be considered to cut security doors with recessed locks. The proper blade, i.e., diamond blade oxide, shall be used for this purpose.

5. The metal slats of the security doors can be removed by using the power saw. Two cuts are made across the slats to form a triangle with the apex at the top. This makes it possible to remove the cut slats and push the remainder of the door up, or it provides an opening for hoseline operations after the windows are removed.

B. Member to the rear (Outside Vent Firefighter)

1. Remember what the objective is: access, force entry, search and ventilation.

2. Obstructions which may be encountered in the rear are doors sealed with wood or metal and bricked up windows. The tools taken must be commensurate with goals. The maul and halligan are required

C. Roof Firefighter

1. When the member going to the roof is carrying the saw, a hook must also be taken. Members going to the roof subsequently should bring an axe or halligan with the saw if available.

8.4.4 ***Edited for PFS*** Truck companies, other than first or second arriving on the initial alarm, should report in with their 10 and 12 foot hooks besides their normal tool complement. The hooks will be used by them or other personnel on the scene.

8.4.5-8.4.7 ***Redacted for PFS***

9. TACTICS, TWO-STORY TAXPAYER

9.1 When the fire is on the first floor, operations will be similar to those for one-story taxpayers, but with added emphasis on the following:

9.1.1 Life hazard may be great on the second floor with possible panic conditions.

9.1.2 Completely ladder the second floor. Utilize portable ladders.

9.1.3 Life hazard on the second floor may require extensive search procedures.

9.1.4 Use hose streams to protect occupants where necessary.

9.1.5 Preventing the spread of fire to the upper floor and cockloft will require the proper placement of many hoselines.

9.1.6 Retain command of the first floor to save the second floor.

9.1.7 A large hall on the second floor may mean roof girders and a deep cockloft.

9.1.8 Vigorous action is required to prevent fire from extending to the second floor and the cockloft.

9.1.9 Ventilation holes cut on upper floors can provide venting for areas below and facilitate other operations.

9.1.10 Fire extension in ducts and shafts may present serious problems.

9.1.11 Examine for fire extension in walls, shafts, ducts, etc. The possibility of a large open stairway must not be overlooked if the occupancy on the second floor is a dance hall, meeting hall, etc.

9.1.12 If the fire originated in the cellar it may require flooding of the first floor as a last resort.

9.2 A fire originating on the second floor of a two-story taxpayer may be treated as a fire originating on the first floor of a one-story taxpayer. Added emphasis must be given to the following:

9.2.1 The need for an aerial ladder to the roof for ventilation.

9.2.2 The forcible entry team should use the stairway to the second floor.

9.2.3 In a second floor occupancy with large unobstructed areas, such as a dance hall or meeting hall, the ceiling beams span greater distances, the cocklofts may be deeper and the ceilings may be higher. This will require using proper size hooks, ten foot or longer, more time and work and additional staffing to open these ceilings.

9.2.4 If the second floor is divided into multi-occupancy use, the penetration of heavy caliber streams will be limited due to partitions subdividing the floor area.

9.2.5 The probability of a fire extending into the cockloft is greater.

9.2.6 Remote stairs and rear fire escapes must be looked for.

9.2.7 The advancement of ladder company personnel should be coordinated with engine company personnel to expedite the locating, confining and extinguishment of the fire.

9.2.8 Areas below the fire must be examined for any fire dropping down.

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10. SAFETY

10.1-10.2 ***Redacted for PFS***

10.3 EXTERIOR OPERATIONS

10.3.1-10.3.2 ***Redacted for PFS***

10.3.3 Keep in mind your escape route from roof areas. As conditions and the area of operation change members should adjust their escape route.

10.3.4-10.3.7 ***Redacted for PFS***

10.4 ***Redacted for PFS***

11. Redacted for PFS

Addition for PFS

FIRST (1st) LADDER COMPANY TO ARRIVE

INSIDE TEAM

- POSITION:
    - The store occupancy involved with fire

- DUTIES:
    - Force Entry
    - Locate the Fire
        - Work in with the Engine to provide & maintain an unobstructed path through which the hose line can advance.
        - Open ceilings and partitions in the fire store for examination and extinguishment
        - Check the cellar for fire. Cellar fires might require the cutting of floors for ventilation & operation of cellar pipes, distributors, bent tips or high expansion FOAM
    - Search the store and control life hazard
    - Communicate and coordinate ventilation of store at the front with Ladder Company officer in area to be vented. Remove the show windows when authorized by the Incident Commander, and only when a charged line is in position.
    - Shut Down Gas and Electric supply

- TOOL ASSIGNMENTS:
    - CAN
        - 6 ft Hook
        - Pressurized water extinguisher

    - IRONS
        - Axe & Halligan or Maul & Halligan
        - Security doors may dictate specialized equipment i.e. Forcible Entry Saw (Diamond blade), duckbill, maul, etc.

OUTSIDE TEAM

OUTSIDE VENT (OV):

- POSITION & DUTIES:
    - Check the rear for access
    - After communicating and coordinating with Ladder officer in the area to be vented, provide ventilation at the rear.
    - When access in the rear is available, attempt entry when teamed with the 2nd Ladder OV (or another available member). Notify the company officer, and conduct searches.

- TOOL ASSIGNMENT:
    - Maul & Halligan

Addition for PFS

ROOF:

- POSITION:
  - Roof of Fire Building, via a portable ladder.

- DUTIES:
  - Take the portable saw to the roof and, after communicating and coordinating with Ladder Company officer inside the fire area to be vented, provide ventilation
  - Monitor the roof and report changing conditions to the Incident Commander of the fire.
  - Communicate conditions found, e.g. location or extension of fire or heavy equipment on roof

- TOOL ASSIGNMENT:
  - For store and cockloft fires: 6 ft. halligan hook and saw
  - For fires in the cellar: the halligan & 6 ft. halligan hook are taken.

CHAUFFEUR:

- POSITION & DUTIES:
  - If Tower Ladder, position it in front of the building to cut off the fire and drive it back to the point of origin.
  - If an Aerial Ladder, place it away from the immediate fire building/ occupancy in order to leave area accessible for a tower ladder
  - If the taxpayer faces on two streets and the front of the building is covered by tower ladder(s), then place the additional tower ladder(s) to cover the other street front
  - Join forcible entry team. If fire extends to the cockloft, proceed to the roof & assist the roof firefighter

SECOND (2nd) LADDER COMPANY TO ARRIVE

INSIDE TEAM

- POSITION:
  - Adjacent stores

- DUTIES:
  - Force entry and check for fire extension
  - Communicate and coordinate ventilation with Ladder
  - Company officer in area to be vented.
  - Open up partitions and ceilings for engine companies to extinguish the fire.

- TOOL ASSIGNMENTS:
  - Same as first (1st) to arrive inside team.

Addition for PFS

OUTSIDE TEAM

OUTSIDE VENT (OV):

- POSITION, DUTIES
    - Assist the first (1st) to arrive OV
    - If not needed, proceed to the roof or other position as directed

- TOOL ASSIGNMENT:
    - Same as first (1st) to arrive OV

ROOF:

- POSITION:
    - Roof of fire building, via a second portable ladder

- DUTIES:
    - Assist & confirm all duties of the 1st to arrive ROOF

- TOOL ASSIGNMENT:
    - For store and cockloft fires: Saw & either an ax or a Halligan (Iron)
    - For fires in the cellar: 6 ft. halligan hook and saw

CHAUFFEUR:

- POS ITION, DUTIES & TOOL ASSIGNMENT:
    - Same as the first (1st) to arrive ladder chauffeur

LADDER COMPANIES, OTHER THAN 1st OR 2nd TO ARRIVE

Should report in with their 10- and 12- foot hooks besides their normal tool complement. The hooks will be used by them or other personnel on the scene.

FIREFIGHTING PROCEDURES
VOLUME 1, BOOK 5
June 8, 2013

HIGH-RISE OFFICE BUILDINGS

CONTENTS

Back to Main TOC

Back to Main TOC

GLOSSARY

Access stairs — A stairway, usually open, serving a number of floors of a common tenant. Also known as convenience stairs.

Air diffusers — The air supply outlets of the heating, ventilation and air conditioning system (HVAC) into the conditioned space.

Attack stairway — A fire stair being used by the Fire Department to gain access to the fire area, where the door between the stairway and the fire area is being maintained in an open position.

Blind shaft elevators — Elevators serving the upper areas of a building in a shaft that is not equipped with hoistway doors on the lower floors.

Building Evacuation Supervisor — When the fire safety director is not present in a class "E" office building occupied by less than 100 people above or below the street floor or by less than 500 people in the entire building, an employee trained by the fire safety director will staff the fire command station and execute the fire safety plan.

Building Information Card (BIC) — The BIC can provide valuable information to the IC in the event of a fire as well as non-fire emergencies. It can be used in developing strategies and making tactical decisions.

Churning — A condition in a centrifugal pump in which the impeller is rotating but no water is being discharged.

Core type building — A building in which the elevators, stairway and building support systems are grouped together in one area of the building. This area could be in the center of the building as in a center core building or on one of the sides of the building as in a side core building.

Compartmentation — The subdividing of floor areas by fire resistive separations into smaller spaces or compartments.

Curtain wall — A non-bearing wall, built between piers or columns for the enclosure of the structure, but not supported at each story.

Damper — A device to seal off or to control airflow in a HVAC system.

Diffusers — See air diffusers.

ECC	Engine Company Chauffeur. A Fire Department member trained and qualified to operate Fire Department engines.
Elevator control panel	A visual display unit located in the lobby to indicate the status and location of all elevator cars and necessary controls for the operation of the cars.
Elevator door vane	The connection between the elevator car doors and the hoistway doors. It allows the elevator car doors to drive the hoistway doors.
Elevator machinery room	The area where the equipment is located that raises and lowers the elevator car. It can be at the top or bottom of the elevator shaft. In high-rise buildings it is usually found at the top of the shaft.
Evacuation stairway	Fire tower or a fire stairs that is remote from the fire area and used for the evacuation of the building occupants. A fire tower is the preferred evacuation stairs.
Fire dampers	A damper used to restrict the passage of heat.
Fire partition	A rated vertical unit or assembly of materials that separate one space from another within any story of a building.
Fire Safety Director	A designated employee holding a certificate of fitness from the Fire Department qualifying him/her to perform the duties as required.
Fire Sector or Branch	Defined as the fire floor and the floor above.
Fire shutter, (reversible)	A fire damper that can be controlled from a remote location.
Fire tower	An enclosed stairway connected at each story by an outside balcony or fireproof vestibule vented to the outside.
Fusible link	A device designed to be actuated by an abnormal rise in temperature.
Hard wire communications	A system of communications in which wiring physically connects both Incident Command Post and other areas within the building. Viz.: Points of transmission and reception.
Incident Command Post	Established in the lobby which will enable the Incident Commander to exert central control over the operations.

Key (1620) An official Fire Department alarm box key.

Key (2642) A standard key used by the elevator industry.

Locked door fail safe system A system where the lock mechanism is controlled electrically from a remote location.

Mechanical control center A location within a building where equipment is located for the monitoring of the building support systems. It has limited ability to control some of the building support systems. It may or may not be located on the same floor as the mechanical equipment rooms (MER).

Mixing dampers Dampers in the HVAC system which control the mixing of the return air and outside air.

Plenum An air compartment or chamber to which one or more ducts are connected and which form a part of an air distribution system. In high-rise buildings, the space between the suspended ceiling and the under side of the floor above is used as a plenum for the collection of the return air.

"Q" decking A type of composite floor construction in which corrugated steel is used to support the concrete floor. (Figure 1)

Reversible fire shutters See Fire Shutter (reversible).

Safety fire shutters See Fire Shutter (reversible).

Safety edge The leading edge of an elevator car door which causes the door to reverse its direction when it encounters an obstruction.

Set backs The area formed when the floor area of a building is reduced thus requiring the exterior wall of a building to be recessed.

Scissor stairs Two stairs constructed side by side in the core of a building in which their doors alternate the point of exit to opposite sides of the core.

Size-up An estimate of the conditions and problems of a fire or emergency situation by the Incident Commander.

Sky lobby	An elevator terminal point on an upper floor of a building where passengers can change from one bank of elevators to another.
Smoke ejector	A fan used by the Fire Department to move smoke or air.
Sound powered phone system	A portable hardwire telephone system powered by voice sound.
Forward Staging Area	An area established on a floor below the Fire Sector/Branch to provide logistical support to the Fire Sector/Branch.
Search and Evacuation Group or Branch	A position established above the Fire Sector/Branch to control and coordinate all search and evacuation operations in that area.
Standpipe kit	A collection of tools used by an engine company to effectively operate a hoseline from a standpipe system.
Thermostatic detector	A device to detect an increase in temperature.
Variation	Permission given by the Department of Buildings and/or Board of Standards and Appeals to construct a building in variation with the existing Building Code.

1. INTRODUCTION

1.1 *Redacted for PFS*

1.2 TYPES OF BUILDINGS

1.2.1 The types of buildings included in this book are:

A. High-Rise Class "E" office buildings built before 1945.

B. High-Rise Class "E" office buildings built between 1945 and 1968.

C. High-Rise Class "E" office buildings built after 1968.

Note: Many of these buildings are 200' x 400' in area with up to six stairways especially on the lower floors and with three or more stairways on the upper floors. However, others have only two stairways from lobby to roof with consequent reduction in our mobility and tactical flexibility.

Therefore, to permit an organized approach and deployment of our units this bulletin is based upon a serious fire on the upper floors of a two-stairway office tower.

1. Because of the variation in construction techniques and the complexity of High-rise class "E" office buildings, the procedures outlined in this bulletin must be general in character and must differ substantially from the "Ladders 3" approach used at multiple dwelling fires.

2. DESCRIPTION OF HIGH-RISE CLASS "E" OFFICE BUILDINGS

2.1 GENERAL DESCRIPTION

2.1.1 75 feet or more in height.

2.1.2 Vary in area from 2,000 square feet to over 300,000 square feet.

2.1.3 Fireproof/Non-Combustible.

2.1.4 Buildings shall be classified in the Class "E" occupancy group when they are primarily occupied for transacting business; for rendering professional services that may incidentally involve the storage of limited quantities of stocks of goods for office use or purposes. Buildings and spaces used for providing public and civic services shall also be classified in this group.

Examples are:

A. Office spaces

B. Showrooms

C. Banks

D. Telephone exchanges

E. Civic administration

F. Assembly occupancies such as restaurants, cafeterias, etc., also may be found in office buildings.

2.2 CLASS "E" HIGH-RISE OFFICE BUILDINGS BUILT BEFORE 1945

2.2.1 The construction techniques used in these buildings resulted in a "heavy-weight" building, usually weighing about 20 to 23 pounds per cubic foot.

2.2.3 Structural steel components were encased in concrete.

2.2.4 Exterior walls were of masonry construction.

2.2.5 Exterior walls were substantially tied to all floors.

2.2.6 Plenum type ceilings are generally not found in these buildings.

2.2.7 Normally steam heated.

2.2.8 Usually not centrally air conditioned.

2.2.9 Exterior windows were openable.

2.2.10 All buildings erected between 1938 and 1968 were required to have a fire tower. Some built prior to 1938 have fire towers.

2.2.11 Floors were constructed of reinforced concrete.

2.2.12 Core construction techniques were not used.

2.3 CLASS "E" HIGH-RISE BUILDINGS BUILT BETWEEN 1945 AND 1968

2.3.1 The construction techniques used resulted in a "medium-weight" building, usually weighing between 10 and 20 pounds per cubic foot.

2.3.2 Fire towers were required in all of these buildings.

2.3.3 The characteristics of these buildings are a mix of the pre 1945 buildings and the post 1968 buildings. These buildings were required to conform to the 1938 Building Code but because of the numerous variances granted, they used many of the construction techniques of the post 1968 buildings.

2.4 CLASS "E" HIGH-RISE OFFICE BUILDINGS BUILT AFTER 1968

2.4.1 The construction techniques used in these buildings resulted in a "lightweight" building, usually weighing about 8 to 10 pounds per cubic foot.

2.4.2 They were constructed with a lack of compartmentation.

2.4.3 The protection of the structural steel component is usually done by spraying on a fireproofing material.

2.4.4 Exterior walls are curtain walls constructed of a combination of glass and metal.

2.4.5 The method of securing exterior curtain walls leaves a space of 6 to 12 inches which requires additional fire stopping.

2.4.6 The ceiling plenums of these buildings are extensive and lack fire stopping. They are used to return the air to the air-conditioning system and for electrical, communications and other building support equipment.

2.4.7 They are usually heated by the heating, ventilating and air-conditioning system (HVAC).

Back to Main TOC

2.4.8 HVAC systems are usually multi-floor systems.

2.4.9 Exterior windows are usually not openable.

2.4.10 Fire towers are not required.

2.4.11 Floors are light in weight usually consisting of lightweight concrete, "Q decking," etc. (Figure 1)

2.4.12 Core construction techniques are used extensively.

3. HEATING, VENTILATION, AND AIR CONDITIONING SYSTEM (HVAC)

3.1 ***Redacted for PFS***

3.2 DESCRIPTION OF HVAC SYSTEMS

3.2.1 The HVAC systems found in high-rise office buildings fall into two general categories:

A. Central air conditioning systems, in which the processing equipment supplies air to more than one floor.

B. Non-central air conditioning systems that serve only the floor on which the processing equipment is located.

Note: Because central air conditioning systems are most commonly found in high-rise office buildings and create the most problems during a fire, the main emphasis of this section will be central air conditioning systems.

4-6. ***Redacted for PFS***

7. CLASS "E" COMMUNICATION SYSTEMS

7.1 INTRODUCTION

Because of the large number of people working in office buildings, the large floor areas and the number of floors involved, a system to alert and direct the occupants in the event of a fire and to transmit an alarm to the Fire Department is required. To meet this need, Local Law No. 5 of 1973 provides for the installation of a Class "E" communications system in Class "E" office buildings.

7.2 DESCRIPTION

7.2.1 Class "E" communications systems shall consist of:

A. The fire command station located in the lobby of the building near the elevator control panel.

B. Loudspeakers operated from the fire command station, which are located on all floors, in all elevators and in all stairway enclosures.

C. Floor warden stations on each floor which provide two-way communications with the fire command station.

D. Manual fire alarm sending stations on each floor.

E. Associated systems:
1. Smoke detection systems.
2. Sprinkler water flow alarms.
3. Thermostatic alarms.
4. Locked door fail safe system.

7.2.2-7.2.6 ***Redacted for PFS***

7.3 ***Redacted for PFS***

8. LADDER COMPANY OPERATIONS

8.1 ***Redacted for PFS***

8.2 LADDER COMPANY RESPONSIBILITIES

8.2.1 General goals of first alarm ladder companies.

A. Gain control of elevators.
B. Locate fire floor and determine the best access thereto.
C. Ascertain the general area and extent of the fire on the floor.
D. Provide the necessary search and evacuation of occupants on the fire floor.
E. Conduct a primary search and examination of the floor above the fire.
F. Initiate search and examination of the upper most floors of the building.
G. Reconnaissance of the exterior of the building.
H. Initiate search and examination of all stairways, especially the attack stairway. Care must be taken that doors to these stairways on the upper floors are not left open which would contaminate the upper floors and could *significantly* affect fire operations.

8.3 FIRST ARRIVING LADDER COMPANY

8.3.1 The first arriving ladder company shall:

A. Obtain as much information as possible from the fire safety director or his/her surrogate as to:
1. Location of the fire.
2. ***Redacted for PFS***
3. Status of elevators.
4. Access stairs serving the fire floor.

B. Prior to leaving the lobby:
1. Determine the elevator bank that provides the safest access to the fire area and place the elevator cars to be used on "Fire Service."
2-5. ***Redacted for PFS***

C. Conduct a preliminary inspection of the exterior of the building by the chauffeur for:

1. Persons in distress.
2. Smoke or fire showing through the skin of the building.
3. ***Redacted for PFS***

D. Proceed to a floor at least two floors below the fire floor using a "Fire Service" elevator. A firefighter equipped with a HT shall be assigned to remain with the elevator and to operate the elevator until relieved.

E. Upon arrival at the floor below the fire conduct the following operations and relay all information obtained to the ICP:

1. Determine if the reported fire floor is the correct location and return the elevator to the lobby to transport engine companies.
2. Determine the heat and smoke condition on the fire floor.
3. Determine the life hazard on the fire floor and initiate evacuation procedures where required.
4. Determine the location of the fire on the fire floor and communicate with the Engine Officer to assist in determining the best attack stairway. Once selected, the Engine Officer shall notify the IC of the identity of the attack stairway.
5. Conduct a primary search of the fire floor.
6. Provide support to the advancing engine company by:
   a. Removing obstructions.
   b. Forcing entry.
   c. Opening the ceiling to expose the plenum.

8.4 SECOND ARRIVING LADDER COMPANY

8.4.1 ***Redacted for PFS***

8.4.2 The second arriving ladder company shall:

A. Report to the ICP.

1-3. ***Redacted for PFS***

4. Coordinate the search operation of fire floor with first arriving ladder company.

8.5-8.6 ***Redacted for PFS***

9. ENGINE COMPANY OPERATIONS

9.1-9.1.2 ***Redacted for PFS***

NOTE: ***Redacted for PFS***

9.2 ENGINE COMPANY RESPONSIBILITIES

9.2.1 The general goals of the first alarm engine companies are:

A. To stretch sufficient hose to reach the fire and be able to operate effectively during the initial stages of operation.

B. Provide relief of the members operating the first hoselines.

C. Supply the standpipe and sprinkler systems.

9.3 FIRST ARRIVING ENGINE COMPANY

9.3.1 The first arriving engine company shall:

A. If first to arrive, obtain as much information as possible from the fire safety director or their surrogate with regard to:

1. Location of the fire.
2. Evacuation procedures that have been implemented.
3. Status of the elevators.
4. Access stairs serving the fire floor.

B. Remain at the ICP until the first ladder company has verified the fire location.

C. Proceed to the upper floor via the elevator staffed by the member of the first ladder company.

D. The first arriving Engine Officer will consult with the first arriving Ladder Officer regarding the location of the fire and available stairways to properly select the attack stairway. The Engine Officer will select a stairway that will provide the most efficient stretch and attack possible. Once selected, the Engine Officer shall notify the IC of the identity of the attack stairway.

E. The attack stairway does not need to be a stairway with a standpipe outlet. However, the attack stair should not be a fire tower.

F. With the assistance of the second arriving engine company, stretch a hoseline from the standpipe outlet on a floor below the fire floor via the attack stairway.

G. ***Redacted for PFS***

H. Due to the large, uncompartmented areas in these commercial buildings, all hoselines stretched and operated shall be 2 ½” hose.

9.4 SECOND ARRIVING ENGINE COMPANY

9.4.1 The second arriving engine company shall:

A. Report to the IC.

B. ***Redacted for PFS***

C. Proceed to the location of the first engine company via a staffed "Fire Service" elevator.

D. Assist the first arriving engine company in stretching sufficient hose to reach the fire.

E. ***Redacted for PFS***

F. Support the 1st engine company operation by assisting in the stretch, ensure sufficient lengths of hose are available for advance into the fire area, facilitate a smooth advance onto the fire floor and into the fire area, and ensure proper water pressure. The 2nd Engine Officer must advise the IC when members of this unit are assisting the 1st engine advance into the IDLH. The IC would then be aware of the resources required for relief. The Officer must also inform the IC when and where additional assistance is required on the first hoseline (e.g., in the stairway, on the floor below, on the fire floor hallway).

9.5 THIRD AND FOURTH ARRIVING ENGINE COMPANIES

9.5.1 The third and fourth arriving engine companies shall:

A. Report to the IC.

B. Operate in a manner similar to the first and second engine companies to stretch the second hoseline.

C. ***Redacted for PFS***

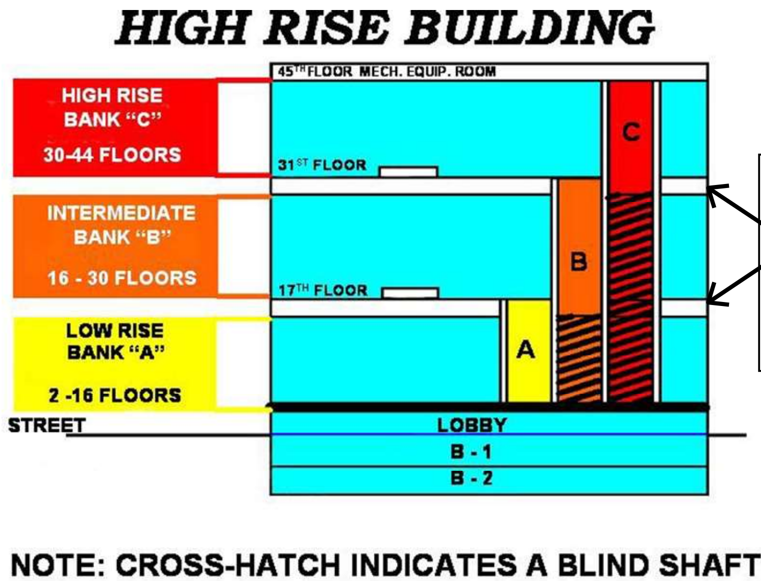
9.6 ***Redacted for PFS***

BY ORDER OF THE FIRE COMMISSIONER AND CHIEF OF DEPARTMENT

Addition for PFS

BLIND SHAFT ELEVATORS

Elevators that serve the upper areas of a building in a shaft that is not equipped with hoist way doors on the lower floors. These elevators bypass several floors, with no opening to those floors, and may possibly be utilized to go up past the fire floor.



Sky Lobbies: an elevator terminal point on an upper floor where passengers can change from one bank of elevators to another.

Addition for PFS

CLASS "E" COMMUNICATION SYSTEM

A system required for class "E" buildings, to alert and direct occupants in the event of a fire and to transmit an alarm to the FDNY. This system shall consist of[2]:

- A fire command station, located in the lobby near the elevator control panel, with a public address servicing all floors, elevators and stairways.
- Floor warden stations, on each floor, with two-way communications with the fire command station.
- Manual fire alarm sending stations on each floor.
- Associated systems:
    - Smoke detectors
    - Sprinkler water flow alarms
    - Thermostatic alarms
    - Locked door fail safe system (where lock mechanisms are controlled electrically from a remote location or activation of the class "E" system)

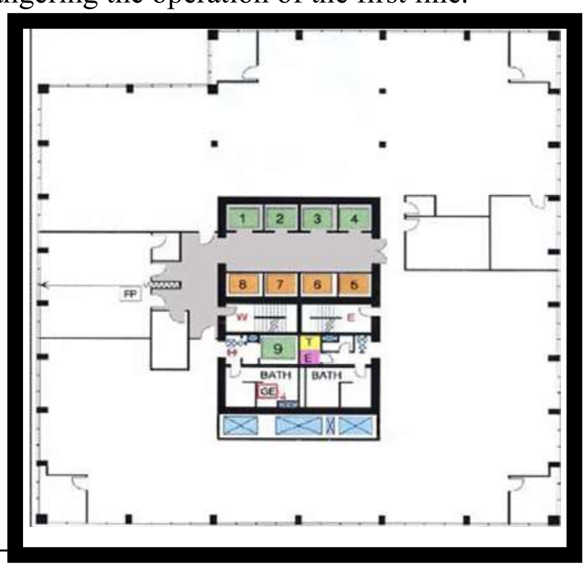
COMPARTMENTATION

The subdividing of floor areas by fire resistive separations into smaller spaces or compartments, such as numerous enclosed offices as compared to open space cubicles

CORE CONSTRUCTION

A building in which the elevators, stairway and building support systems are grouped together in one area of the building. This area could be in the center of the building as in a center core building or on one of the sides of the building as in a side core building.

In buildings of this design, the second hose line may be used to prevent fire from wrapping around the core, endangering the operation of the first line.



[2] This is not a complete list of what is required of a class "E" system.

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INTRODUCTION / DESCRIPTION

1. INTRODUCTION

1.1 Private dwelling fires challenge the expertise of firefighting forces and require a coordinated team operation. A significant number of all fire deaths occur in private dwellings.

1.2 For the purpose of this bulletin, we are assuming the fire building to be a 2½ story 20'x40' wood frame dwelling, with a cellar and attic.

1.3 Assumptions: There is a light to medium fire situation in a private dwelling with one or more rooms involved.

1.4 This bulletin will address operations in various types of private dwellings including peaked roof, flat roof, as well as those constructed using newer lightweight materials. The basic assignments of engine and ladder companies will be covered and should be considered a general guide for operations in private dwellings due to the many different styles of homes. Unit's officers must be prepared to adapt tactics as necessary dependent upon conditions encountered and communicate decisions to the Incident Commander.

1.5 Due to the size of these structures, crowding of stairs may become a major problem. Stairs must be kept clear. The number of firefighters inside the fire building should be kept to a minimum to safely carry out operations.

Back to Main TOC

2. GENERAL DESCRIPTION

2.1 Originally built for one or two family occupancy, these structures are usually one to three stories in height. It is not unusual to find more than two families living in these types of structures. They may be attached, semi-attached or detached. The interior of split level homes however, may have as many as five levels within a three-story building. An open and unenclosed stairway is the major weakness from a firefighting and fire protection standpoint.

2.2 Private Dwellings are generally rectangular in shape although alterations and extensions are common. They average approximately 20'x40'. These can be of Class 4 (Frame) construction with exterior walls of wood covered with brick veneer, stucco, asbestos shingles, vinyl or aluminum siding. They can also be of Class 3 (NFP) construction with brick exterior walls. Fire stopping is limited depending on the type of construction. Newer construction is commonly found to be of lightweight materials in both Class 3 and Class 4 construction.

2.3 Peaked roofs are designated according to construction features including mansard, gable, hip, shed, or gambrel types. Roof covering may be asphalt, asphalt roll roofing, asbestos shingles, slate or Spanish tile. Flat roofs or roofs of low pitch may have a scuttle and/or skylight.

2.4 Two entrances are most common. The main entrance is usually located in the front, but sometimes is located on the side as seen from the street. Secondary entrances can be located on the front, side and/or rear. In structures more than one story, the interior stairs to the cellar will usually be located under the main stair. With semi-attached structures or those with minimal space on one side, the inside cellar stair will usually be found near the side or rear entrance.

Throughout the city there have been many renovations to private dwellings. As part of these renovations, the interior stairway may have been moved or sealed off. It is common to find a closet in the area where the stairs were once located.

2.5 Complicating fire operations, units should expect obstacles such as hilly terrain, set-backs, overhead wires, fences, trees, shrubbery, diverse architectural features, solar panels, and numerous floor plans. Dwellings built on sloped terrain can cause communication and operational problems. A dwelling which has 2 or 3 stories in the front may be 3 or 4 stories in the rear. (Photos 1.1, 1.2) The top floor may be used as a point of reference as the difference in floor levels may not always be apparent from the front. The outside team should make this a part of their size-up. Coordination between members operating inside and outside is necessary.

3. SPECIFIC DESCRIPTIONS

The buildings listed are a few types of Private Dwellings found in New York City. The general description is included to assist with understanding building construction for these structures.

3.1 **Straight Line Colonial** (Figure 1.1 & Photos 1.3 & 1.4)

These dwellings are typically 2½ to 3 stories and 20'x40'. Balloon frame construction is commonly found. The side door generally gives access to the kitchen and to the cellar stairway. The utilities are found in the cellar. The 1st floor has a front porch area, a living room with an open stairway to the 2nd floor, a dining room, and a kitchen in the rear. The kitchen contains the stairway leading to the side door and cellar. The 2nd floor has 2 or 3 bedrooms, a bathroom, and access to the attic. This access space can be as large as a normal stairway or as small as a hatch in a closet. Due to the limited ventilation of the attic/3rd floor, conditions in this area will be extremely punishing. The roof of the front porch allows for easy access to upper floor bedrooms.

3.2 **Cape Style Houses** (Photos 1.5 & 1.6)

Cape houses usually come in two different styles. One is called an A frame cape and the other a wide line cape. The A frame cape has a front entrance and usually a side entrance with a stoop. The wide line cape will have a rear entrance and may have two window dormers that are normally found facing the street. The presence of dormers usually increases the likelihood of 2nd floor bedrooms. Portable laddering of these dormers can be very difficult. The easiest exterior access to these rooms, via portable ladders, is through windows that are found on the exposure 2 & 4 sides of the house. These homes may have a full sized second floor or a dormer on the rear only.

3.3 **Queen Anne** (Photos 1.7 & 1.8)

The overall size of these structures range from 2½ to 3½ stories in height, 25 to 30 feet in width, and 30 to 50 feet in depth. Construction is wood frame with exteriors of wood siding, asphalt shingles, brick veneer, or stucco. The roofs have many peaks, dormers, overhanging eaves and possibly a cupola. (A cupola/turret is a tower-like room with a round or dome shaped roof). The roof coverings are roof tile, slate, or layers of asphalt shingles over the original wood shingles. Multiple variations in size and number of dormers and gables create a maze of peaks and valleys at roof level. Balloon construction is most common and early attempts at built-in fire stopping are negated by poor workmanship, open holes for house service lines, etc. Large open stairs in the living room connect the 1st and 2nd floors. A narrow rear or side stair connects the 1st, 2nd and 3rd floors, or a stair may lead directly to the 3rd floor from the 1st floor. Vertical arteries supplied by old hot air ducts, dumbwaiter shafts, boxed in space around fireplaces and pipe recesses, contribute to undetected and fast upward fire travel. There are hidden voids in attics around hips, valleys, dormers, ridges, etc. They may have a fire escape or a sprinklered stairway. The fire escape will be attached to a combustible wall. Careful consideration should be given to its use due to age, or if that wall is exposed to or involved in fire.

3.4 **Flat Roof Private Dwellings** (Photos 1.9 & 1.10)

In most cases, it is readily apparent from street level that these structures have flat roofs. However, in some areas of the city, flat roof structures have a decorative peak in the front. (Photos 1.11 & 1.12) The absence of a window in this peak may be an indication of a flat roof. Once it is confirmed that the structure has a flat roof, all members must be informed. Flat roof dwellings may be found isolated, attached in pairs, or attached in a row occupying an entire block. These structures may have a skylight and/or scuttle. Many attached dwellings were built with firewalls that cannot be relied on. Exposures must be monitored.

3.5 **Ranch** (Photo 1.13)

These are asymmetrical, single-story structures with simple floor plans. Common shapes include rectangular, L-shaped or U-shaped design. The kitchen, living room and bedrooms are located on the first floor. There is a basement/cellar where all the utilities are located. It is also possible to find living quarters in the basement/cellar.

3.6 **Split Level** (Photo 1.14)

A sidesplit is a split-level home configuration where the multiple levels are visible from the front elevation. Typically, the garage is on one side of the house and there is a floor above the garage housing the bedrooms. The other half of the house is the main living area, half a story above the garage level and half a story below the bedroom level. Grading or steps connect the exterior street to the front door on the main level. Each floor is separated by a half flight of stairs. Most have a crawlspace that is half the size of the house. Others may have a split foundation with a full basement below the lower main living area.

3.7 **Semi Attached Private Dwellings** (Photo 1.15)

Semi-attached housing consists of pairs of houses built side by side as units sharing a common wall. Each house's layout is a mirror image of its twin.

3.8 **Private Dwellings Constructed Using Newer Lightweight Materials** (Photos 1.16, 1.17 and 1.18)

Many newly constructed dwellings are incorporating wooden I beams, metal "C" joists and lightweight wooden trusses into their construction. These lightweight construction systems are used in place of both conventional floor joists and/or roof rafters. Floor collapse can be as serious a threat as a roof collapse. When fire extends from the building contents to the structure, early collapse can be expected. Any building with lightweight construction must be entered into the CIDS program.

Note: See Chapter 6 for a full description of lightweight construction and tactics.

4. SPECIAL CONSIDERATIONS

The following features are common in private dwellings and create special fire safety and firefighting problems: (Figure 1.2)

- Cellar areas used as living quarters with no secondary means of egress.
- Cellar areas may have an unfinished cellar ceiling. Open joist construction combined with heavy fire and an overloaded first floor, may cause an early collapse of the first floor. This can either be a local or a complete collapse.
- Lack of a secondary means of egress from upper floors. Interior stairs are often narrow and sometimes winding. Landings are small; thus restricting movement of the operating forces and making an interior attack more difficult. CONTROL AND MANAGEMENT OF THE INTERIOR STAIRS IS CRITICAL TO A SUCCESSFUL OPERATION.
- In some dwellings the stairs to the attic or third floor are found behind a small door resembling a closet door. Access may also be found in a bedroom closet with no ladder provided. In other homes, access to the attic is via a pull-down type stairs with a rope attached for ease of use. These are lightweight stairs and should not be used for attic access or line advancement. A portable ladder should be used.
- Many private dwellings are found with multiple secondary entrances. These entrances may be found on all types of private dwellings, and on all sides of the building. Sometimes they are on two different sides of the building (Exposure 2 and 4, Exposure 2 and 3, …) and sometimes they are found on the same side of the building.
- When multiple secondary entrances (one with a stoop, and one at ground level) are found adjacent to each other on the same side (exposure 2 or 4) of the building, this indicates most likely that; One secondary entrance at ground level will have a few steps leading to the kitchen and also a half flight of stairs leading to the cellar. The other secondary entrance with the stoop typically has a staircase that runs to the second floor and may be the only access to that level.
- The presence of a stoop at a secondary entrance on the exposure 2 or 4 side of the building may indicate that the entrance leads to a second-floor stairway. This is especially pertinent when there are multiple secondary entrances and only one or two offset windows are seen from the exterior on the same side of the dwelling as the stoop entrance. These offset windows are at the top and/or bottom of the second-floor staircase and should not be used for VEIS (see Chapter 1--Photo 1.4. and Chapter 2--Photos 2.1 and 2.2)
- When it is obvious that the dwelling has two or more families (separate entrances, multiple mailboxes or doorbells, etc.) bedrooms can be found on all floors.
- Attached and built-in garages may have a door that opens directly into the house which can be avenues for fire extension. Storage of automobiles, flammable liquids, propane and lawn or pool chemicals may be found. Some attached garages may also be converted to living spaces.
- Alterations and repairs may use sub-standard materials and/or faulty workmanship.
- Fires involving the electrical service may energize the aluminum siding. A ground is completed when an aluminum ladder is placed against, or a firefighter makes contact with the siding.

- Use extreme caution when operating with aluminum ladders in proximity to overhead electrical service. Power lines may burn through when exposed to heavy fire conditions causing live wires to fall to the ground. If these wires fall on a chain link fence, the entire fence may become energized.
- Thoroughly examine areas under windows (especially when found in the open position), and porch roofs, as victims may have jumped prior to the arrival of units. These victims may be easily overlooked if trees and bushes surround the house.
- Central air conditioning systems may spread smoke and toxic gases throughout the building. Dual heat and air-conditioning units will be in operation throughout the year.

Photo 1.1

Photo 1.2

Photos 1.1 and 1.2

These photos show the difference in height from the front (2 stories) and rear (3 stories) of attached homes. If no garage is located in the front, then a community driveway may be present in the rear providing for easy access. With attached homes it is not always apparent from the front what conditions may be in the rear.

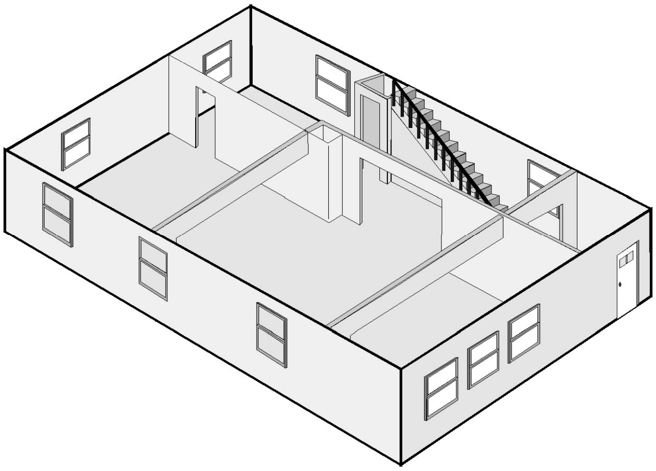


Figure 1.1

Typical first floor layout of a Straight Line Colonial

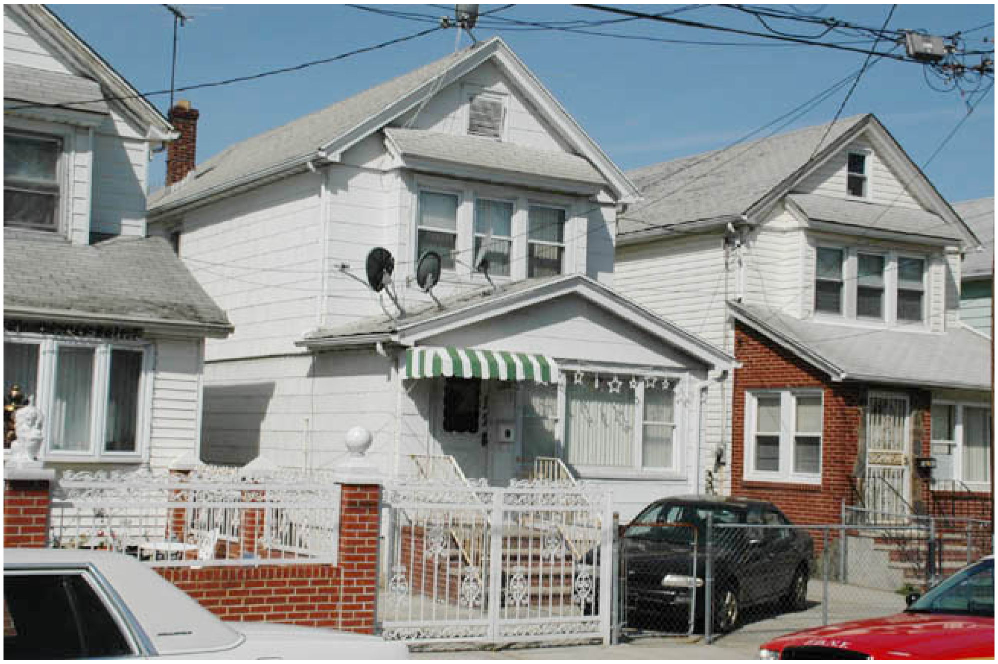


Photo 1.3
Straight Line Colonial

Photo 1.4
Straight Line Colonial Showing Side Entrance

Note: Single offset window on 2nd floor indicating the top of the interior stairs leading to the second floor.

Photo 1.5
An “A” Frame Cape with side entrance stoop

Photo 1.6
Wide Line Cape with window dormers

Photo 1.7
Queen Anne

Photo 1.8
Queen Anne with Cupola

Photo 1.9

Photo 1.10

Photos 1.9 and 1.10
These photos show the front and rear of attached Flat Roof Private Dwellings. The main entrance is located at the top of the stoop. It is not apparent from the front what conditions may be in the rear. Note the complications in gaining access to the rear (fencing, shrubbery, pools, etc.) making ladder maneuverability difficult.

Photo 1.11

Photo 1.12

Photos 1.11 and 1.12
Flat Roofs may not be apparent from the front

Photo 1.13
Ranch Style House

Photo 1.14
Split Level Type House

Photo 1.15
Semi-Attached Private Dwelling

Photo 1.16

Photo 1.17

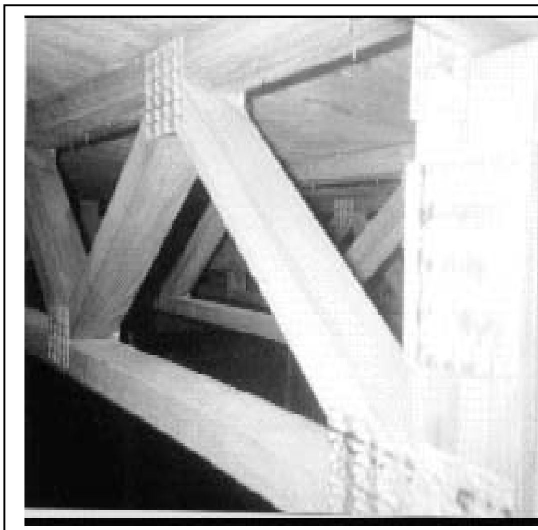
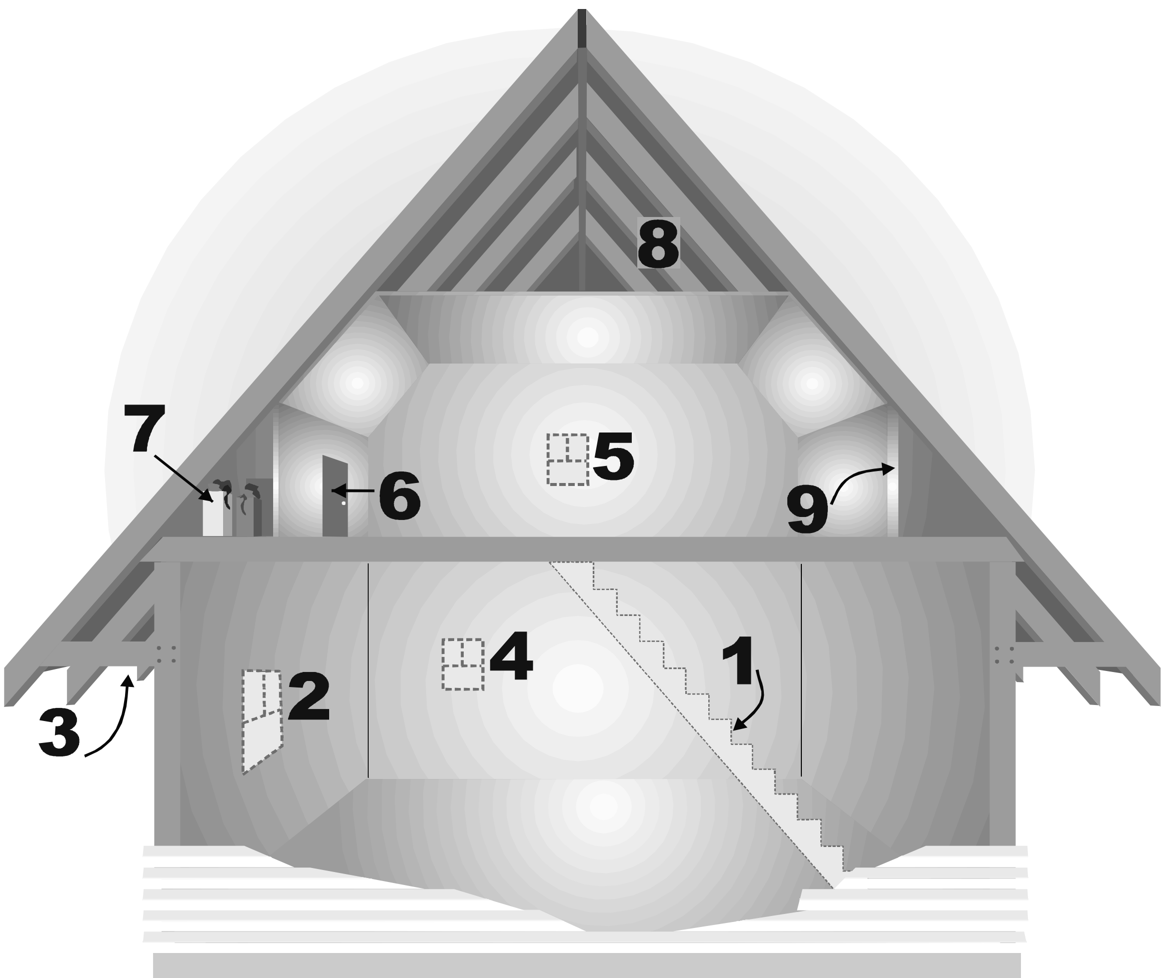


Photo 1.18



1. **STAIRS - May or may not exist.**
2. **WINDOW - Uncontrolled venting of this window can extend fire to eaves.**
3. **EAVES - Eaves (not fire stopped) extend fire to attic.**

4. & 5. WINDOWS – Control, communicate, and coordinate ventilation of these windows when ordered by the Ladder Company Officer operating in this area.

6. **DOOR - Existence of door indicates closet.**
7. **BOXES - Possible storage of combustibles.**
8. **CEILINGS - Attic may be finished (all or part) concealing fire.**
9. **INSULATION - Insulation with combustible covering may exist.**

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SIZE-UP

1. INTRODUCTION

Size-up begins with the receipt of the alarm and continues until the fire is under control. It is an ongoing process that may require modification as operations progress. As with all other types of occupancies, size-up in private dwellings is essential to a successful operation. Observations upon arrival are key to formulating appropriate strategies and tactics. The following are factors that can be included in the size-up for engine and ladder companies operating at private dwellings:

2. SIZE-UP

2.1 Alarm Source

- ♦ How was the alarm reported? UCT 911/ Phone, ERS, Class-3, BARS, Verbal.
- ♦ Phone alarms may provide more accurate information, e.g. specific address, "across the street from 10 Main St." "next door to 12 Smith St."

2.2 Alarm Assignment

- ♦ In general, response distances in private dwelling areas are greater than other areas of the city because they are more sparsely populated. First arriving units may be operating alone for longer periods of time.
- ♦ Units should be cognizant of the status of surrounding units. All members should be made aware of the information provided by the response ticket, including the number of companies assigned and depending on conditions found units should be proactive in calling for additional units early.

2.3 Time of Day

- ♦ At night, expect a greater number of sleeping occupants and delayed alarms.

2.4 Type of Occupancy (Photo 2.1)

Private dwellings are intended to be occupied by one or two families. They are often illegally converted into SRO's or multiple dwellings with the possibility of living areas found in cellars and/or attic areas. Possible indications of multiple families may be: the number of electric meters, several mailboxes, fire escapes, multiple entrance doors, numerous cars in driveway, exterior cellar/basement entrance, and/or garage doors removed and replaced with a normal entrance door.

- ♦ Modern three family MDs are often built with three separate entrances that have no common area. These structures require private dwelling tactics due to their PD style design.

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- Possible indications of attic occupancy may be: attic area with a dormer, adequate height (approximately seven feet in attic), air conditioner at attic level, and/or windows of fair size and normal appearance with curtains and drapes.

2.5 Life Hazard

- A rapid build-up of heat and smoke in the confined areas of a private dwelling aided by the normally open interior stairs is an extreme threat to the occupants. A coordinated effort by the inside team and outside team to search for and remove all endangered occupants is required.
- Additional families and "roomers" may be found living in attic spaces and in cellars. Due to their often transient nature, accounting for all occupants will be extremely difficult.

2.6 Construction

- The main entrance is usually located in the front of a PD, but sometimes it is located on the side as seen from the street. Secondary entrances can be located on the front, side and/or rear. (Photos 2.2, 2.3, 2.4, 2.5 and 2.6)
- Platform frame construction limits fire extension.
- Balloon frame construction lacks fire stopping between floors on exterior walls, allowing for rapid fire extension.
- Combustible exterior walls may contribute to auto exposure.
- Wood truss, wood "I" beams and "C" joists exposed to fire will lead to early failure and collapse. See Chapter 6 for more information on lightweight construction and tactics.
- Open joist construction of cellar ceilings increases the potential for the rapid spread of heat, smoke and fire. Open lightweight construction (absence of a sheetrock ceiling) will lead to early collapse.

2.7 Windows

- If the upper floor windows are inaccessible, or cannot be entered due to their size or construction, the Ladder Company Officer shall be notified and those rooms will have to be searched by the interior team. Any ventilation of these windows shall be coordinated and vented as directed by the Ladder Company Officer operating inside the area to be vented. All horizontal ventilation tactics must be coordinated with interior operations.
- Window spacing can be an indication of room locations. (Photo 2.7)
- Window size up on the exposure 2 and 4 side of the dwelling may indicate the location of staircases to the upper floors. For example, when there are only one or two offset windows (not in line with the other windows of the house) on the exposure 2 or 4 side of a dwelling, this indicates that these are the windows at the top and/or bottom of the second floor staircase. The lack of windows on the side of a PD combined with a secondary entrance on that side of the house with a stoop is indicative of a possible second floor apartment with the only entrance to the second floor from that side of the house. These offset windows are windows that should **not** be entered for VEIS. (See photos 2.1, 2.2, 2.7)

- Porch and garage roofs of normal wood frame construction may provide a suitable platform from which to work. Windows at these locations will allow quick access to the upper floor rooms. Be aware that screened or open porches may not provide protection from fire venting below.

  Note: Members shall not use porch and garage roofs constructed of aluminum or similar lightweight materials to conduct operations.

- The installation of window bars has become increasingly prevalent in residential occupancies throughout the city. (Photos 2.8 & 2.9) They vary from aluminum child guards to heavy wrought iron. The method of installation and type of structure (brick, wood, etc.) determines how difficult removal will be. They can be found covering windows on all levels. Refer to Safety Bulletin 84 for guidelines on operations when window bars are encountered.

- Windows with sills that are approximately chest high may require a drop of 5-6 feet to floor level. This presents a serious problem if fire conditions force members to exit via this window. Immediately upon entering, consider placing a dresser, chair or another piece of furniture below this window to assist in egress.

- Unconventional locking devices added for security reasons have complicated the problem of opening windows from the inside.

2.8 Roof Design

- Outside ladder company positions are predicated on whether the roof is flat or peaked. This information must be transmitted with the signal 10-75, if this can be determined upon arrival.

2.9 Street Conditions

- Overhead wires, trees, narrow streets, and houses set back from the street, may interfere with ladder apparatus placement.

Photo 2.1

Photo 2.1 shows a typical 2½ story wood frame house. The front door seen here is considered the main entrance.

Note: Offset window indicating the bottom of the stairs leading to the second floor.

Photo 2.2

Photo 2.2 shows a side door, which can be used as a secondary entrance. This side entrance may have a few steps that lead up to the first floor and a stairway that will lead down to the cellar.

Photo 2.3

Photo 2.4

Photos 2.3 and 2.4 show exterior cellar entrances. These entrances lead directly into the cellar. Exterior cellar entrances may be found at the front, rear or sides.

Note: The entrances above both indicate a cellar area used as a living space.

Photo 2.5

Photo 2.6

Photos 2.5 and 2.6 are another example of an exterior cellar entrance. The exterior cellar stairs are covered by a Bilco type door. At the bottom of the stairs there may be a door that provides access to the cellar.
Note: Private Dwellings were constructed with interior cellar stairs. In some cases these stairs were removed or blocked off during renovations.

Photo 2.7

Photo 2.7 shows a private dwelling that has 3 windows across the front of the 2nd floor. There are 2 separate rooms in the front. The distance between windows 1 and 2 is less than between 2 and 3. Windows 1 and 2 give access to the same room.

Note: The awning over the front door should **not** be used for operations. Also note the single offset window on the exposure 4 side indicating a staircase on that side of the house.

Photo 2.8

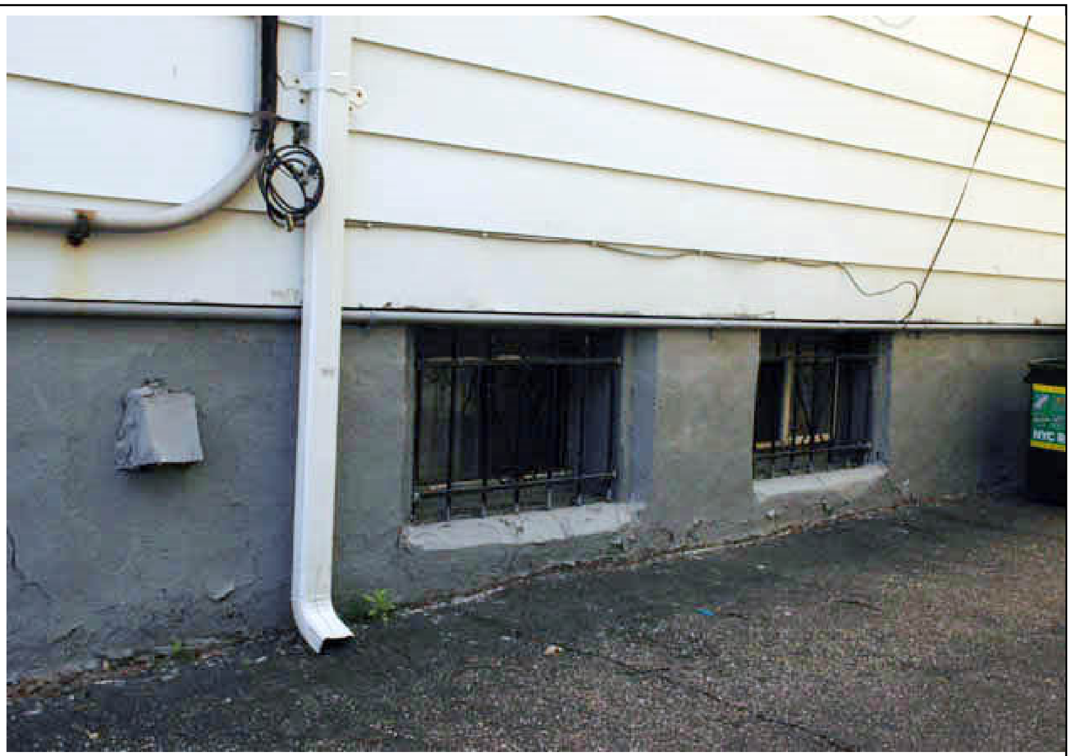

Photo 2.9

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ENGINE COMPANY OPERATIONS

1. GENERAL

1.1 Fires discussed will be based on the need for one or two handlines. Due to the combustible nature of both interior and exterior building materials, fire can spread rapidly. The unprotected, open interior stairwell to the upper floors acts as a natural flue, or flow path, for fire spread. Small rooms and narrow stairs are commonly found in these dwellings. Due to the need for speed and mobility, a 1¾" hoseline is recommended.

1.2 All engine companies shall take a position at a serviceable hydrant. They shall also be alert to the possibility of initiating in-line pumping when it would increase the speed of the operation.

1.3 When the first arriving engine company backstretches to the hydrant, they should consider dropping two handlines in front of the building.

1.4 The engine company officer should consider using booster tank water when conditions dictate. Using booster tank water while hooking up to a hydrant may allow for a quick application of a limited supply of water. The ECC must inform the officer when the pumper is operating on booster tank water and then again when using hydrant water.

1.5 Sufficient hoseline must be stretched to cover the anticipated fire area. Members of the first two engines shall spread out on the hoseline near the entrance selected for attack to provide for efficient advancement. The hoseline should be flaked out, charged, and bled before entering the building. Private dwellings do not provide the space needed to flake out the hoseline inside the fire building.

1.6 The primary consideration in the placement of the first hoseline for access to a fire on the first floor or floors above in private dwelling when an interior attack is ordered is the main entrance door to the building. Generally, this location provides the quickest access to the fire area. It is also a strategic location that enables a charged hoseline the ability to contain fire extension via the open interior stairs and provides a level of protection to members as well as victims trapped or unconscious on the floor(s) above.

1.7 The primary consideration in the placement of the first hoseline for access to a fire in the cellar when an interior attack is ordered is via the entrance door that provides the quickest access to the fire area. This access may be through either the main entrance or a secondary entrance door. The rapid knockdown and extinguishment of the main body of fire provides the greatest protection for both civilians and members. During the initial size-up at apparent first floor and/or second floor fires, members should ensure they check to determine that the fire did not start on a lower floor or in the cellar, before committing the first hoseline.

1.9 All personnel should be familiar with Firefighting Procedures, Engine Company Operations.

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2. CELLAR FIRES

2.1 Many fires in private dwellings originate in the cellar where the following may be a source of fire origin:

- Gas/oil fired boilers for heat or hot water
- Electrical service panel boxes
- Kitchen stoves in cellar apartments

2.2 Cellars that are used for living quarters may contain large amounts of combustible household items, contributing to a large fire load. Some possible indications of a cellar fire are:

- Fire or smoke venting from a cellar window
- Smoke pushing from the chimney (especially during warmer weather)
- High heat and heavy smoke with no visible fire on the first floor
- Very hot floorboards on the 1st floor or smoke showing from baseboard areas on the first floor.
- Smoke from attic windows or louvered vents (especially in older homes with balloon frame construction)

2.3 Cellar fires in dwellings with balloon construction may extend to the attic via hidden voids. Units operating above the cellar must stretch enough hoseline to reach the upper floors. Intermediate floors must be checked for fire before a line is committed to the top floor.

2.4 Most dwellings usually have one interior means of access to the cellar. These stairs must be kept clear and accessible at all times. Members shall not enter the cellar unless specifically assigned.

When entering the first-floor main entrance above a cellar fire, a thermal imaging camera showing heat waves emanating across the first-floor ceiling indicates the interior cellar door is open. Also, smoke showing significant force and speed under pressure will indicate that the interior cellar door is open. This interior cellar entrance door should be immediately closed if possible.

The status of the interior cellar door should always be checked and communicated to the IC. Members operating on the first floor above a cellar fire must also be careful not to open the first-floor interior cellar door while searching as this will likely negatively impact fire conditions by providing oxygen and a flow path to the fire.

Note: Members operating on the first floor above a cellar fire must be aware that they are operating in a very dangerous area. This is particularly important when the cellar door cannot be closed; or when members are operating above a heavy fire; or when members are working over lightweight constructed floors, regardless of the fire severity.

2.7 **First Hoseline:**

2.7.1 Proper placement of the first hoseline requires a coordinated size-up and communication by the first Engine and Ladder Officer. After size-up, the first hoseline should be stretched to the entrance door that provides the quickest access to the cellar in order to extinguish the fire. In detached and semi-attached PD's, the secondary entrance found on the side or rear of the dwelling is usually the option that provides the quickest access to the cellar. Some PD's have secondary entrances to the cellar in the front of the dwelling which lead directly into the cellar and provide quick access. When using a secondary entrance, members should size-up the layout of the entrance, the stairs and the cellar, and then flake the hoseline out for the most efficient advance of the line. This is particularly important when stretching hose via a narrow alley, driveway or rear yard.

Note: Bilco style doors may cover an exterior cellar entrance. This type of secondary entrance often requires extensive forcible entry, and is more indicative of an unoccupied cellar. Utilizing this type of entrance for line placement is the least desirable of the secondary entrances and shall not be utilized for hoseline placement unless it is the only option. (See Photo 2.5 and 2.6 in Chapter 2)

2.7.2 In attached structures (rows of many attached PDs), the use of a rear secondary entrance would not normally provide for the fastest application of water on the fire because it will require members to stretch the first hoseline around multiple buildings. Similarly, a unit stretching an initial line through the first floor of exposure 2 or 4 to access an exterior cellar entrance door will usually find delays negotiating yard fences, shrubs, sheds, locked or blocked doors and a variety of other obstructions.

In this case, stretching the first line through the front door to attempt an attack via the interior cellar stairs is generally the fastest option. The quick application of water on the fire reduces the heat and smoke conditions throughout the building and provides the greatest protection for civilians and members.

In some situations, various factors including the following would preclude the descent of the first hoseline down the interior cellar stairs:

- High heat conditions at the top of the stairs
- Questionable stability of the stairway
- Initial size-up indicating a serious fire condition

In the cases above, hoseline advancement via a secondary entrance or water applied through a cellar window will be available options.

The safety of members is the paramount concern in making the decision to advance down the interior cellar stairs.

2.7.3 Ladder company members operating on the first floor must be withdrawn **before** the first hoseline is repositioned from that floor. Members operating on the upper floors may also need to be withdrawn to a safe area if no portable ladders are positioned and readily available. This is done for reasons of safety and operational efficiency. The forcible entry team will then operate with the engine company and facilitate the advance of the hoseline via a secondary entrance.

2.8 **Second Hoseline:**

2.8.1 Initially positioned and charged outside the fire building as a back-up for the first hoseline. When not needed to back-up the first hoseline, it can be used to extinguish any fire that may extend to the floors above or be positioned as per the IC. Enough hoseline shall be considered in the stretch for possible advancement into the cellar through a secondary entrance.

nicated to all units operating at the scene as per section 2.6 of this chapter.

2.9 ***Redacted for PFS***

3. FIRST FLOOR FIRES

3.1 **First Hoseline:**

Proper placement of the first hoseline requires a coordinated sizeup and communication by the first Engine and Ladder Officer. After sizeup, the first hoseline should be stretched through the main entrance door to the first floor in order to extinguish the fire. The first ladder inside team shall also proceed through the main entrance for their ladder company operations. During the initial size-up at apparent first floor fires, members should ensure they check to determine that the fire did not start in the cellar, before committing the first hoseline.

3.2 **Second Hoseline:**

Initially positioned and charged outside the fire building as a back-up for the first hoseline. If not needed to back-up the first hoseline, it can be used to extinguish any fire discovered in the cellar, on other floors, or in exposures.

3.3 ***Redacted for PFS***

4. UPPER FLOOR FIRES

4.1 First Hoseline:

Proper placement of the first hoseline requires a coordinated sizeup and communication between the first Engine and Ladder Officers. After sizeup, the first hoseline should be stretched through the main entrance door to the upper floor in order to extinguish the fire. The first ladder inside team shall also proceed through the main entrance for their ladder company operations. During the initial sizeup at apparent upper floor fires, members should ensure they check to determine that the fire did not start on a lower floor or in the cellar, before committing the first hoseline.

4.2 Second Hoseline:

Initially positioned and charged outside the fire building as a back-up for the first hoseline. If not needed to back up the first hoseline, it can be used to extinguish any fire discovered in the cellar, on other floors, or in exposures.

4.3 *Redacted for PFS*

5. BUILDING FULLY INVOLVED

5.1 When the first arriving engine company backstretches to the hydrant, they should drop two handlines in front of the building.

5.2 Units shall maintain the front of fire building accessible for tower ladder placement.

5.3 Consider stretching a 2½ inch hoseline for a faster knock down, greater reach of stream, increased volume of water and increased exposure protection.

Note: A 2½ inch hoseline shall also be considered when encountering a wind impacted fire. or a heavily involved first floor fire in a larger style Private Dwelling (Queen Anne).

5.4 Operate the hoseline on the exterior to protect exposures before entering the building.

Note: Buildings fully involved have an increased collapse potential and require a complete evaluation by the IC before entering.

5.5 Wood frame buildings that initially appear fully involved may only have their exterior siding burning.

6. EXPOSURE PROTECTION

6.1 Fire "lapping" out of a window, or burning on the exterior of a building, presents a serious exposure problem.

6.2 Openings in the underside of eaves (i.e., vent openings) or deteriorated siding may allow for fire extension to the attic of an exposure or the original fire building. (Photo 3.1)

6.3 Units operating a hoseline to extinguish fire on the exterior of a building should sweep the stream across the face of the building, starting at the top, so the water cascades down the exterior.

6.4 Consider stretching a 2½" hoseline if increased volume or reach of the stream is a consideration.

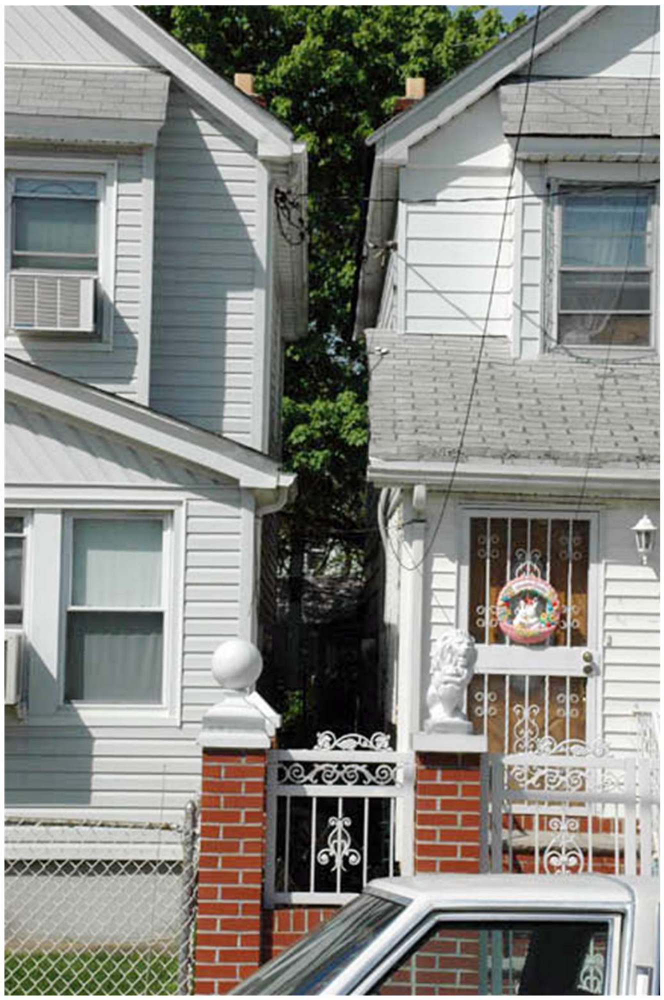

Photo 3.1

Private dwellings may have limited space between them. At ground level there may be a space of 6 – 8 feet and at roof level the space may be as little as 2 – 3 feet.

LADDER COMPANY OPERATIONS

1. VENTILATION

1.1 The controlled and coordinated removal of heat and smoke from a structure, replacing the escaping gases with fresh air. This exchange is bi-directional with heat and smoke exhausting at the top and air flowing in towards the fire at the bottom. The fire will pull the additional air flow into the building towards the fire, which can intensify the fire conditions. This exchange can occur by opening doors, windows or roof structures. Controlled and coordinated ventilation tactics will facilitate quicker extinguishment and limit fire spread.

1.1.1 Ventilation for Extinguishment
The controlled and coordinated ventilation tactic which should coincide with the Engine Company extinguishment of the fire.

1.1.2 Ventilation for Search
The controlled and coordinated ventilation tactic performed to facilitate the movement of a firefighter into an area to conduct a search for victims.

2. SEARCH AND RESCUE

2.1 Immediately upon entering the room from a window, members should make a quick check/sweep of the floor in the hall outside the door for any victims before closing the door. Once this door has been closed, a more detailed search may be permitted. The completely removed window will adequately vent the room and the possibility of pulling fire toward the vented room will have been negated by the closed door.

2.2 When the search of the room has been completed, the door shall be kept closed until the main body of fire has been extinguished.

2.3 Members shall be alert to the fact that if a door is not present, or is not able to be closed upon entry, an uncontrolled flowpath may be created. This could cause severe conditions within the room entered. The need to exit that room via the entry route taken may become necessary.

2.4 If more than one occupant is found on an upper floor, the IC shall ensure that adequate staffing is assigned to effect their removal. The primary function of the engine company during this critical period should be to protect the interior stairs.

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3. FIRE EXTENSION

3.1 Although balloon framing is very common in Queen Anne homes, many of the older and larger 2½ - 3 story peaked roof private dwellings are built of balloon frame construction. In this type of construction, the 2"x4" exterior wall studs are continuous and extend from the sill (located on the top of the foundation wall), to the top floor ceiling, where they are capped with a top plate. A quick determination as to whether a structure is balloon frame is to remove a baseboard on an exterior wall and check for the presence of a sole plate. If none is found, treat the building as balloon construction. High heat accompanied by heavy smoke with no visible fire is a sign of fire burning in these hidden spaces. Advanced fire in these voids may cause the ceiling to be blown down on members pulling ceilings on the top floor. The left side of Figure 4.1 illustrates how fire travel may occur in a balloon frame structure.

3.2 A major concern in all fires is knowing where the fire originated. This is particularly important in balloon frame construction due to the continuous nature of the exterior wall studding. In this type of construction, fires originating in the cellar can easily extend to the attic via the exterior wall channels created by this continuous studding. This type of concealed fire extension will commonly extend to the attic space, while bypassing intermediate floors. (Photo 4.1)

3.3 In platform construction the exterior wall studs extend only from the floor to the ceiling of each individual floor. They are capped at the ceiling level of each floor with a horizontal 2"x4" called a top plate. This construction feature acts effectively as a fire stop, and limits or restricts vertical extension via the exterior walls. (Figure 4.1)

3.4 Rapid fire spread via an open stairway should be a concern to firefighters operating on upper floors.

3.5 The chimney could have been the original source of the fire with heat transmitting through loosened bricks or mortar into the chimney header and trimmer beams, spreading fire into the structure. Some buildings have been found with floor supports butted against or built directly into the chimney itself. Considerable structural damage may be required to adequately open up and expose this area. (Figure 4.2)

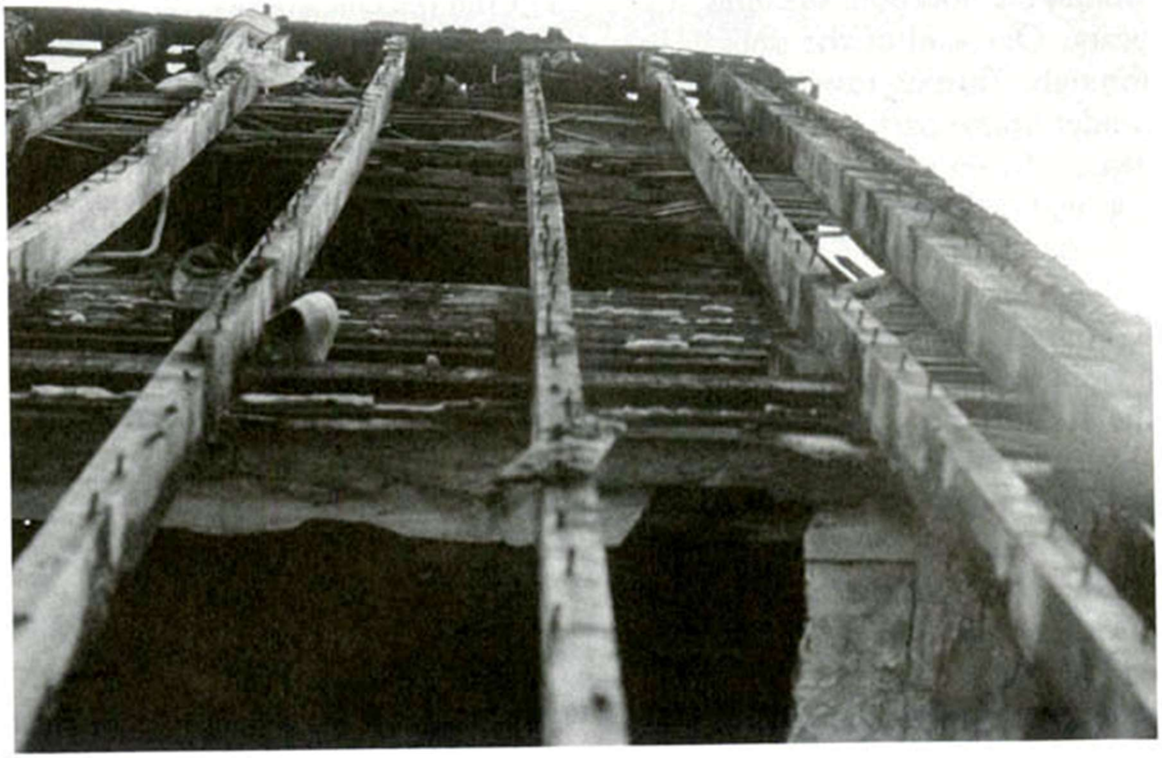

Photo 4.1

Photo 4.1 shows a side view illustrating balloon frame construction

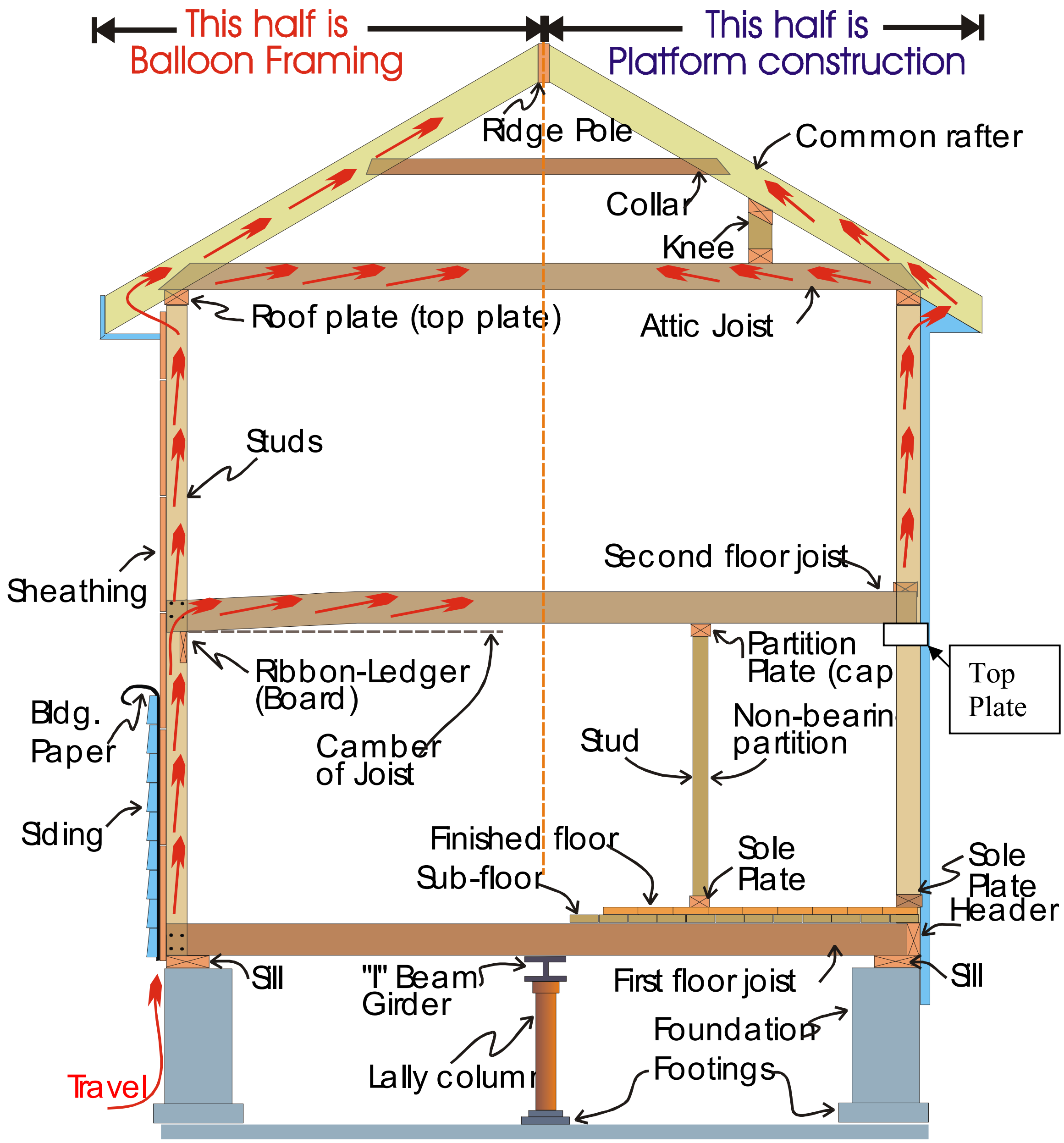
This half is
Balloon Framing
This half is
Platform construction
Ridge Pole
Common rafter
Collar
Knee
Roof plate (top plate)
Attic Joist
Studs
Sheathing
Second floor joist
Ribbon-Ledger
(Board)
Partition
Plate (cap
Top
Plate
Bldg.
Paper
Camber
of Joist
Stud
Non-bearin
partition
Siding
Finished floor
Sub-floor
Sole
Plate
Sole
Plate
Header
Sill
"I" Beam
Girder
First floor joist
Sill
Foundation
Lally column
Footings
Travel

Figure 4.1

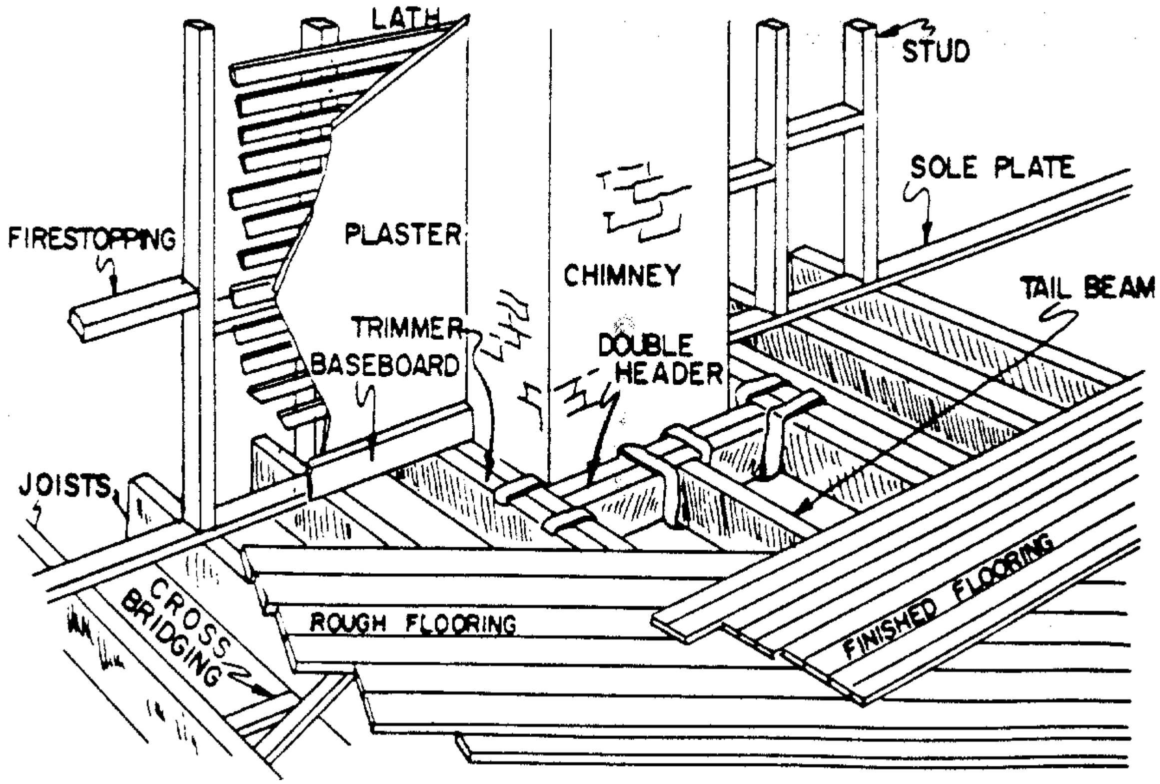
LATH
STUD
SOLE PLATE
FIRESTOPPING
PLASTER
CHIMNEY
TAIL BEAM
TRIMMER
BASEBOARD
DOUBLE
HEADER
JOISTS
CROSS
BRIDGING
ROUGH FLOORING
FINISHED FLOORING

Figure 4.2

4. GENERAL AREAS OF RESPONSIBILITY

4.1 First ladder to arrive:

- Primary search of the fire floor.
- Check near and behind doors that lead to the exterior for any occupants that may have been overcome while trying to escape.
- Determine the life hazard and rescue as required.
- Locate and confine the fire (see exception in cellar fires, section 10).
- Ladder building as needed.
- Attempt an examination of the cellar for fire.
- Pending arrival of the second ladder company, assume responsibility for the entire dwelling.
- Primary search of the perimeter.
- Roof ventilation of flat roof buildings.
- All exterior ventilation (Horizontal and Vertical) must be controlled, communicated and coordinated by the Ladder Company Officer inside the fire area to be vented.

4.2 Second ladder to arrive:

- Primary search of all floors above the fire floor (see exception in cellar fires, section 10).
- Check near and behind doors that lead to the exterior for any occupants that may have been overcome while trying to escape.
- Reinforce laddering and removal operations when necessary.
- Roof ventilation if needed (peak roof).
- Ensure roof ventilation (flat roof).
- Examine above the fire and exposures for extension.
- Ensure that the cellar is examined for fire.
- Shut down utilities. Exercise caution when searching for the electric panel.
- Secondary search of perimeter.
- At cellar fires, if the first ladder did not advance into the cellar, and the second hoseline has been stretched via a secondary entrance, perform search and examination of the cellar using this secondary entrance in coordination with the engine company.

5. PEAKED ROOF DWELLINGS

5.1 FIRST TO ARRIVE LADDER

A. OFFICER - (First To Arrive)

POSITION: At the entrance door providing access to the fire area. Primary consideration for a fire on the first floor or floors above is the main entrance door to the building. Primary consideration for a fire in the cellar is the entrance door providing quickest access to the fire area.

B. EXTINGUISHER FIREFIGHTER - *(First To Arrive)*

TOOLS: Extinguisher and 6' hook.

POSITION: At the entrance door chosen by the first due Ladder Company Officer.

DUTIES:

1. Assist with forcible entry.
2. Conduct searches and ventilate as ordered.

C. FORCIBLE ENTRY FIREFIGHTER - *(First To Arrive)*

TOOLS: Axe and halligan.

POSITION: At the entrance door chosen by the first due Ladder Company Officer.

DUTIES:

1. Force the entrance door being used by the inside team and remove storm door when necessary.
2. Ensure the engine company has access to the fire area.
3. Conduct searches and ventilate as ordered.

Note: The positions, tools, and duties of the officer, extinguisher and forcible entry firefighters, are the same for portable, aerial, and tower ladder operations.

D. CHAUFFEUR, OV, AND ROOF FIREFIGHTERS *(First To Arrive)*

GENERAL DUTIES:

Note: All horizontal and initial vertical ventilation tactics from the exterior shall be communicated and coordinated by the Ladder Company Officer operating inside the fire area to be vented.

1. VEIS via windows for search and rescue coordinated with the ladder company officer.
2. Report the location or extension of fire to the company officer.
3. Where the use of the aerial or tower ladder is negated by obstructions or topography, perform duties via portable ladders.
4. Members proceeding to the side or rear must visually examine cellar windows to determine interior fire conditions. Members shall not vent windows unless ordered to do so by the Ladder Company Officer. All observations must be reported to the Ladder Company Officer and IC.

5. Survey the rear and sides for means of entry to the cellar and other floors, and the presence of window bars and rear extensions. Make an immediate HT notification to the IC of means of entry and other conditions found. Additionally, members of the first ladder outside team should initiate removal of window bars on both the front and rear of the building early in the operation, if conditions allow (e.g. search and rescue duties may preclude window bar removal).

   Note: Some buildings have exterior stairs to second floor (with no interior stairs) and fire escapes to attic.

5.2 PORTABLE LADDER OPERATIONS

A. ROOF/OV TEAM - *(First To Arrive*)

TOOLS: Portable ladder, 6' halligan hook and/or halligan for each member.

POSITION: As determined by probable life hazard on an upper floor.

DUTIES:

1. Roof operations are not an initial consideration at peaked roof dwelling fires. Therefore, the roof firefighter will team up with the OV firefighter to VEIS from the exterior.
2. Conduct a quick survey around the perimeter of the dwelling for occupants in need of immediate rescue. Communicate and coordinate any rescue attempt with the Ladder Company Officer. If there is no visible life hazard, perform VEIS of an area on an upper floor that is most likely to be occupied. This operation must be controlled, communicated and coordinated with the inside teams. Prior to conducting any horizontal ventilation tactics from the exterior, the member(s) shall request permission from the Ladder Company officer operating in the fire area in order to coordinate ventilation tactics with interior operations.
3. Vent for extinguishment, which coincides with the Engine Company applying water to extinguish the fire.

5.3 AERIAL LADDER OPERATIONS

A. ROOF/OV TEAM - *(First To Arrive)*

TOOLS: 6' halligan hook and/or halligan for each member.

POSITION: Operate from aerial.

DUTIES:

1. Prior to using the aerial ladder the Roof and/or OV firefighters shall conduct a quick survey around the perimeter of the dwelling to ensure there are no occupants in need of immediate rescue in the rear or on either side of the building.
2. If an aerial ladder operation and/or rescue are indicated, the Roof/OV Team will make entry. Perimeter searches will be communicated and tasked to the second arriving ladder company.

3. VEIS of upper floors. Prior to conducting any horizontal ventilation tactics from the exterior, the member(s) shall request permission from the Ladder Company officer operating in the fire area in order to coordinate ventilation tactics with interior operations.
4. Vent attic window as directed by the Ladder Company Officer operating in the fire area.
5. Vent fire area/room when ordered by the Ladder Company Officer operating in the fire area to be vented.

5.4 TOWER LADDER OPERATIONS

A. ROOF/OV TEAM - (*First To Arrive)*

TOOLS: 6' halligan hook and/or halligan.

POSITION: Operate from the bucket.

DUTIES:

1. Prior to using the tower ladder the Roof and/or OV firefighters shall conduct a quick survey around the perimeter of the dwelling to ensure there are no occupants in need of immediate rescue in the rear or on either side of the building.
2. If a tower ladder operation and/or rescue are indicated on arrival, the Roof/OV Team will operate from the tower ladder bucket and make entry when appropriate. Perimeter searches will be tasked to the second ladder company.
3. VEIS of upper floors. Prior to conducting any horizontal ventilation tactics from the exterior, the member(s) shall request permission from the Ladder Company officer operating in the fire area in order to coordinate ventilation tactics with interior operations.
4. Vent attic window as directed by the Ladder Company Officer operating in the fire area.
5. Vent fire area/room when ordered by the Ladder Company Officer operating in the fire area to be vented.

5.5 SECOND TO ARRIVE LADDER

A. OFFICER - (Second To Arrive)

POSITION: All floors above the fire. (see exception for cellar fires in section 10)

B. EXTINGUISHER FIREFIGHTER - *(Second To Arrive)*

TOOLS: Extinguisher and 6' hook.

POSITION: All floors above the fire. (see exception for cellar fires in section 10)

DUTIES:

1. Primary search.
2. Check for fire extension.

C. FORCIBLE ENTRY FIREFIGHTER - *(Second To Arrive)*

TOOLS: Axe and halligan.

POSITION: All floors above the fire. (see exception for cellar fires in section 10)

DUTIES:

1. Primary search.
2. Check for fire extension.

Note: The positions, tools, and duties of the officer, extinguisher and forcible entry firefighters, are the same for portable, aerial, and tower ladder operations.

5.6 PORTABLE LADDER OPERATIONS

A. ROOF/OV TEAM - (*Second To Arrive*)

TOOLS: Portable ladder, 6' halligan hook and/or halligan.

POSITION: As determined by probable life hazard on an upper floor.

DUTIES:

1. Conduct an outside survey and VEIS areas not covered by the first arriving outside team. If there is no visible life hazard, perform VEIS of an area on an upper floor which is most likely to be occupied. Prior to conducting any horizontal ventilation tactics from the exterior, the member(s) shall request permission from the Ladder Company officer operating in the fire area in order to coordinate ventilation tactics with interior operations.
2. Vent roof as directed by the Ladder Company Officer operating inside the fire area to be vented.

5.7 AERIAL LADDER OPERATIONS

A. ROOF/OV TEAM - (*Second To Arrive*)

TOOLS: 6' halligan hook and/or halligan for each member, or portable ladder (if necessary)

POSITION:

1. Operate from the aerial.
2. When the first arriving Roof/OV team is using the aerial ladder for VEIS, the second arriving Roof/OV team shall survey the sides and rear of the building and will operate with portable ladders on upper floors in areas with the greatest possible life hazard.

DUTIES:

1. VEIS of upper floors. Prior to conducting any horizontal ventilation tactics from the exterior, the member(s) shall request permission from the Ladder Company officer operating in the fire area in order to coordinate ventilation tactics with interior operations.
2. Vent roof as directed by the Ladder Company Officer inside the fire area to be vented.

5.8 TOWER LADDER OPERATIONS

A. ROOF/OV TEAM - (*Second To Arrive*)

TOOLS: 6' halligan hook and/or halligan for each member, also a portable ladder (if necessary)

POSITION:

1. Operate from the bucket.
2. When the first arriving Roof/OV team is using their tower ladder bucket for VEIS, the second arriving Roof/OV team should survey the sides and rear of the building and operate with portable ladders on the upper floors in areas with the greatest possible life hazards.

DUTIES:

1. VEIS of upper floors. These actions should be controlled, communicated and coordinated with their Officer. Prior to conducting any horizontal ventilation tactics from the exterior, the member(s) shall request permission from the Ladder Company officer operating in the fire area in order to coordinate ventilation tactics with interior operations.
2. Vent roof as directed by the first to arrive Ladder Company Officer operating inside the fire area.

6. PEAKED ROOF OPERATIONS

6.1 Physically cutting and opening the roof is usually not considered an initial operation at peaked roof dwelling fires. The venting or removing of attic windows or louvers is frequently sufficient for ventilation purposes. When required, however, it is normally assigned to the second arriving ladder company. If roof skylights are found, they should be vented prior to cutting the roof only when directed by the ladder company officer operating in the fire area.

6.2 ROOF ACCESS *(Order of Preference)* Tower Ladder, Aerial Ladder, Portable Ladder

A. Tower Ladder

1. At an advanced fire, the main objective is to position a tower ladder in front of the fire building.
2. The tower ladder is the most versatile, efficient and safest method to ventilate the roof.
3. When possible, the preferred position of the apparatus is parallel to the front of building, so the basket can be placed over the corner of the building near the peak of the roof. The turntable should be positioned to enable the basket to cover two sides. This would facilitate:
    - ♦ Rescue of occupants or operating forces at 2nd and 3rd floor levels.
    - ♦ Ventilation of the front and side.
    - ♦ Entering the upper floors when stairs are unusable.
    - ♦ Overhauling difficult to reach or unstable areas.
4. If the apparatus cannot be placed in the preferred position, place the basket to the "valley" area where a hook ladder can be used to reach the peak.

B. Aerial Ladder

1. Used in preference to portable ladders as they provide a more stable platform and better maneuverability.
2. Position the apparatus to facilitate raising and extending the ladder over the corner of the building. This permits maximum coverage of the front and one side of the building.
3. Extend ladder at least 5' above and to one side of the peak. This will:
   - ♦ Ensure easy mounting and dismounting from the aerial.
   - ♦ Ensure that the ladder will be visible in heavy smoke conditions.
   - ♦ Prevent members from passing directly in front of and over the upper window as they ascend the ladder. This ladder placement will prevent members from being directly exposed in the event fires were to vent out of this window.
4. If the ladder cannot be placed adjacent to the peak, position it in the "valley" area where a hook ladder can be used to reach the peak.

C. Portable Ladders

1. Used where setbacks or other obstructions prevent use of a tower ladder or an aerial ladder.
2. A 35' extension ladder may be raised to a dormer roof or into the valley on the side of the dormer where a hook ladder can be used to reach the peak.
3. A portable ladder may be used to the roof of a porch as long as its pitch is not too steep. A portable extension ladder can then be used from the porch roof to the main peak. Prior to ascending this extension ladder, members must ensure that the butt end is securely placed onto the porch roof.

6.3 OPENING A PEAKED ROOF

A. Initial Vent Hole

1. The first hole should be made at the main gable.
2. A center hall usually follows the same direction as the main gable.
3. A hole at the main gable, with the ceiling pushed down, when directed by the ladder company officer will vent the blind attic space, the knee walls and the attic hall and rooms below, allowing rapid line advancement and search by the inside team. Prior to conducting any ventilation tactics from the exterior, the member(s) shall request permission from the Ladder Company officer operating in the fire area in order to coordinate ventilation tactics with interior operations.
4. The power saw may only be used from the basket of a tower ladder as described in Firefighting Procedures, Ladders 6.

B. Cutting the Roof with an Axe

1. Working from a position straddling the peak, cut a hole over the fire, parallel to and on the lee side of the ridge.

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2. The size of the opening is limited by the member's reach and maneuverability, but will generally be about 2' x 3'.
3. A 6' hook (10' for a Queen Anne) should be brought to the roof to push down the ceiling on the top floor after the roof hole has been cut.

Note: A member straddling the peak or working from the ladder has much less maneuverability than would a member in a standing position. Use extreme caution not to be caught by erupting fire once the hole has been opened.

C. Slate or Tile Roofs

1. Slate and tile add a substantial dead load to the roof and may be slippery due to moss or moisture.
2. Fire may be hidden beneath these type roofs, and joists may be close to the point of failure. The added live load of a firefighter may cause the roof to collapse.
3. Members operating below must be aware of the danger present when slate peaked roofs are opened up. Pieces of slate and tile with sharp edges may fall to the ground severing hoselines and causing injuries to members.

7. FLAT ROOF DWELLINGS

7.1 FIRST TO ARRIVE LADDER

The positions, tools and duties of the first to arrive officer, extinguisher and forcible entry firefighters are the same for flat roof and peaked roof structures.

A. ROOF FIREFIGHTER - (*First to Arrive)*

TOOLS: Halligan, 6' halligan hook and life saving rope.

Note: Life saving rope should be taken to the roof when there will be a delay in laddering the rear of the building due to attached exposures and/or the height of the building requires the LSR.

POSITION: The roof of the fire building.

DUTIES:

1. Access to the roof via aerial, tower ladder or portable ladders, dependent upon topography and other conditions (wires, trees etc.). If conditions negate the use of the aerial, tower ladder, or portable ladder, another option is to take the scissor ladder to a similar uninvolved attached exposure top floor to gain access to the roof via the scuttle.

   Note: Use of an attached exposure for interior access to the roof depends on the type of building construction. In attached wood frame type P.D.'s the immediate adjoining building should not be used due to the possibility of cockloft involvement. For attached P.D.'s of ordinary brick construction where firewalls exist between buildings, choose the building offering the easiest access to its interior. Familiarity with a unit's response area will provide for effective operations.

2. Survey the rear, courts and shafts of the building for trapped occupants and/or persons who may have jumped. Check for the presence of any fire escapes. Notify the Officer of any life hazard, location of fire escapes and shafts, and the ventilation profile of the rear and sides of the building.

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3. When trapped occupants are noted:

   A. Assure the victim that help is on the way. This is to deter the victim from jumping, keeping the victim at the window until they can be reached via the interior or exterior.

   B. Contact the Ladder Company Officer via HT, informing them of the exact location of the trapped occupant, so a concentrated inside rescue attempt may be made. An acknowledgement of the above message must be received.

   C. When a LSR rescue is required, contact the chauffeur via HT for assistance on the roof. When the aerial ladder is to be used as a substantial object to tie off the LSR, notify the chauffeur to reposition when necessary.

4. When no trapped occupants are noted, notify the chauffeur that rescue operations are not needed.

5. Notify the Officer that you are in position to perform ventilation tactics and proceed as directed. No vertical ventilation shall be performed unless the roof firefighter directly communicates with and receives approval from the Ladder Company Officer operating in the fire area, or the roof firefighter hears radio transmissions that the inside team has door control of the fire area or a charged hoseline is advancing into the fire area.

   Note: Initial vertical ventilation tactics include the venting of skylights and scuttles over stairways and hallways.

   A. Ventilate skylights. Take out the glass skylight over the stairs, units below shall be warned via HT prior to breaking glass. Break out a small pane of glass as a warning to the members moving up the stairs below before breaking the remaining larger sections of glass. There may also be a draft stop that will need to be removed. Members moving up the stairs shall stay close to the wall, keeping their hands off the stair rail until the glass has been dropped. Remove additional skylights as needed.

   B. Open up the roof scuttle covers. Persons attempting to escape via the roof may have been trapped and/or overcome under the scuttle enclosure. There may be a door on the closet leading to the scuttle. Fire or excessive heat may be immediately behind the door. Do not descend the scuttle ladder to open the door. The scuttle ladder shall never be used to descend to the lower floors unless the fire is under control.

   C. Vent rear windows of the top floor. Prior to venting, the roof firefighter must receive permission from the Ladder Company officer operating in the fire area in order to coordinate ventilation tactics with interior operations. The roof firefighter might not have full awareness of conditions inside the dwelling.

B. OUTSIDE VENT FIREFIGHTER - (*First to Arrive)*

TOOLS: Halligan and/or 6' hook & portable ladder.

POSITION & DUTIES:

1. Assist the first ladder chauffeur in the front with any ladder rescue that may be required.

   Note: For attached private dwellings, when ladder rescue is not required at the front of the building, the 1st OV shall immediately make their way to the rear, to check for life hazard and perform necessary VEIS.

2. Conduct a quick survey around the perimeter of the dwelling for occupants in need of immediate rescue.
3. Survey the rear and sides for means of entry to cellar and other floors, and the presence of window bars and rear extensions. Make an immediate HT notification to the Officer and IC of means of entry and other conditions found.
4. If there is no visible life hazard, VEIS an area on an upper floor which is most likely to be occupied. This search should be accomplished when teamed up with the second arriving Ladder Company OV, or another available member.
5. Vent the fire area/room from the exterior when ordered. Prior to venting, the OV firefighter must receive permission from the Ladder Company officer operating in the fire area in order to coordinate ventilation tactics with interior operations. The OV firefighter might not have full awareness of conditions inside the dwelling.

7.2 SECOND LADDER TO ARRIVE

The positions, tools, and duties of the second to arrive officer, extinguisher and forcible entry firefighters are the same for flat roof and peaked roof structures.

A. ROOF FIREFIGHTER - (*Second To Arrive)*

TOOLS: 6' halligan hook & saw.

POSITION: The roof.

DUTIES:

1. Assist in roof ventilation of the fire building and necessary exposures.

B. OUTSIDE VENT FIREFIGHTER - (*Second To Arrive)*

TOOLS: Portable ladder, halligan and/or 6' hook.

POSITION & DUTIES:

1. Assist second ladder chauffeur in the front of the building with any ladder rescue that may be required.
2. Conduct a survey of the rear and sides for victims.
3. Survey the rear and sides for means of entry to cellar and other floors, and the presence of window bars and rear extensions. Make an immediate HT notification to the Officer and IC of means of entry and other conditions found.

4. Team up with the first arriving Ladder Company OV (or another available member) prior to entry and search. Prior to conducting any horizontal ventilation from the exterior, the member(s) shall request permission from the Ladder Company officer operating in the fire area in order to coordinate ventilation tactics with interior operations.
5. In attached P.D.'s, except for assisting chauffeur in front of the building when aerial or portable ladders are needed for rescue or removal, check rear to ensure ventilation has been completed. If necessary, team-up with second ladder chauffeur to check IDLH exposures.

8. QUEEN ANNE DWELLINGS

8.1 Due to their large size, elaborate construction features (especially the attic and roof area) and unique internal features, Queen Anne type private dwellings presents a more complex fire problem than the average private dwelling.

8.2 These buildings were generally custom built and have been altered over the years so that no two are alike.

8.3 Operations as previously outlined in peaked roof private dwellings shall be the same for Queen Anne dwellings.

8.4 Due to the number of firefighters that may be needed for portable ladder rescue and the number of sleeping areas that may have to be entered and searched, it is good practice to special call an additional ladder company. The Incident Commander will make this decision based upon conditions encountered. Roof ventilation at this type of fire is normally not an initial consideration. It is generally performed by a later arriving unit.

9. TWO FAMILY DWELLINGS

9.1 Some private dwellings originally built as one family dwellings, have been modified to include separate apartments and are occupied by more than one family. Others were built as two family dwellings. Because of their status as two family dwellings, two separate living areas will be found. In most cases, the first and second floors are occupied by separate families with bedrooms on both floors. Access to the second floor is via an enclosed stairway. Because the stairs to the second floor are enclosed, there will not be the initial rapid buildup of smoke on the second floor. (Photo 4.2)

9.2 For cellar and first floor fires, the Roof/OV team of the first arriving ladder company will conduct a survey around the perimeter of the dwelling for occupants in need of immediate rescue. If no visible life hazard is found, they shall VEIS the first floor windows and assist in searches. Prior to conducting any horizontal ventilation tactics from the exterior, the member(s) shall request permission from the Ladder Company officer operating in the fire area in order to coordinate ventilation tactics with interior operations. They must ensure that all bedrooms on the first floor are searched quickly. After completion of first floor, they should VEIS the second floor if the second ladder company has not yet arrived.

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9.3 There are some private dwellings designed with a separate small apartment located at the ground floor or below grade level. These apartments may have a separate and distinct entrance as the only means of access.

10. CELLAR FIRES

10.1 Cellar fires require a coordinated size-up and communication by the Engine and Ladder Officers, who should communicate their findings to each other. After size-up, the first hoseline should be stretched to the fire area via the entrance door that provides the quickest access to the cellar in order to rapidly control and extinguish the main body of fire. The first ladder inside team should proceed to the same entrance as the first hoseline, to provide entry for the engine company. Once the cellar fire is controlled, the inside team is in position to perform VEIS duties.

10.2 When no hoseline is immediately available, and if fire conditions permit, a decision may be made by the first ladder officer to advance down the cellar stairs. In this instance, the first ladder company inside team should descend to conduct a rapid primary search of the cellar for victims and to locate and confine the fire. One member should remain at the top of the cellar stairs to control the door. Door control at the top of the cellar stairs is essential when searching without the protection of a hoseline to ensure ladder company members do not create a flowpath which can dramatically change conditions in the cellar.

Note: It is critical at cellar fires that the first ladder inside team operate in a manner that supports the first hoseline in quickly applying water on the fire. Often, the cellar stair is narrow, confined and problematic for ladder members to descend without the protection of a hoseline. Attempting to descend the cellar stair without the protection of a hoseline may actually delay the engine company advance. Once the cellar fire is controlled, the inside team is in position to perform VEIS duties.

10.3 **Use of a Secondary Entrance**

A secondary entrance (excluding Bilco style doors) should be used for access to the cellar if it provides the quickest access point for attack on the fire. After an initial size-up, the first ladder inside team should proceed to the entrance that provides the quickest access to the cellar, to provide entry for the engine and the quick application of water on the main body of fire. The ladder company shall maintain door control until a charged hoseline advances via the secondary entrance.

10.3.1 When entering the cellar via a secondary entrance, there is often an interior door that leads to the first floor at the top of the stairs. If this door is found open, it should be closed to reduce the amount of oxygen feeding the fire and prevent a potential flowpath for the fire. The officer should communicate the status of this door to the second ladder officer and the IC.

10.3.2 When the first ladder inside team proceeds to the cellar via a secondary entrance, the second ladder inside team will then provide VEIS of the floors above the cellar. It is important that the first and second ladder inside teams communicate with each other so that they do not duplicate efforts.

10.3.3 Bilco style doors may cover an exterior cellar entrance. This type of secondary entrance often requires extensive forcible entry, and is more indicative of an unoccupied cellar. Utilizing this type of entrance for line placement is the least desirable of the secondary entrances and shall not be utilized for hoseline placement unless it is the only option. (See Photo 2.5 and 2.6 in Chapter 2)

10.4 **Use of the Main Entrance**

In situations where the quickest access to the cellar is through the main entrance, the first arriving ladder inside team shall enter through the main dwelling entrance on the first floor to initiate searches and locate the top of the interior cellar stair to evaluate conditions. The ladder company shall maintain door control of the main entrance door until a charged hoseline advances via the main entrance. Findings must be communicated to the officer of the first hoseline and the IC.

10.4.1 When the decision has been made to advance the first hoseline through the main entrance and down the interior cellar stairs to extinguish the fire;

- The first arriving ladder company inside team will perform a primary search of the first floor prior to descending into the cellar to perform the primary search and examination of the cellar. If the engine company requires assistance in order to advance the line through the cellar, one member of the interior team shall be sent to provide assistance, while the ladder company officer and the other member complete the primary search of the first floor.

  Note: It is critical at cellar fires that the first ladder inside team operate in a manner that supports the first hoseline in quickly applying water on the fire. Often, the cellar stair is narrow, confined and problematic for ladder members to descend without the protection of a hoseline. Attempting to descend the cellar stair without the protection of a hoseline may actually delay the engine company advance. Once the cellar fire is controlled, the inside team is in position to perform VEIS duties.

- The second ladder company will report to the Incident Commander and augment search operations and ventilation efforts on all floors above the cellar. If a chief officer is not on the scene, communication between the first and second arriving ladder company officers is essential to identify areas on the first floor and floor(s) above that may require a primary search.

10.4.2 When there is a secondary entrance and the first hoseline does not advance down the interior cellar stair:

- The first arriving ladder company inside team will assume responsibility for primary search and examination of the first floor and floors above. The status of the interior cellar door (open, closed, burned through, unable to locate) is a critical factor. If conditions permit, the status and door construction should be determined and communicated to the Incident Commander. Door construction can be a critical factor in preventing or slowing fire extension (steel, solid wood, luan panel, etc.)

Indications of an open interior cellar door when entering through the entrance door are:

- A thermal imaging camera showing heat waves emanating across the first floor ceiling when entering the first floor via the entrance door.
- Smoke action seen on the first floor seen at the entrance door - such as smoke showing significant force and speed under pressure.

In these situations, the interior cellar door on the first floor must be located and immediately closed, if possible.

Note: Members operating on the first floor above a cellar fire must also be careful not to open the first floor interior cellar door while searching as this may impact fire conditions

♦ The second arriving ladder inside team will coordinate their advance with the second hoseline into the cellar via a secondary entrance. They will assume responsibility for primary search and examination of the cellar.

11. ATTIC OPERATIONS

11.1 Finished attic areas have low ceilings and hidden voids and channels for fire travel. Particular attention must be paid to the eaves, gables and cornices. These construction features tend to trap fire and heat. Of special concern would be the presence of louvers for ventilation, which are often built into the underside of the eaves (soffit). Fire exposing this area readily communicates to the attic and roof.

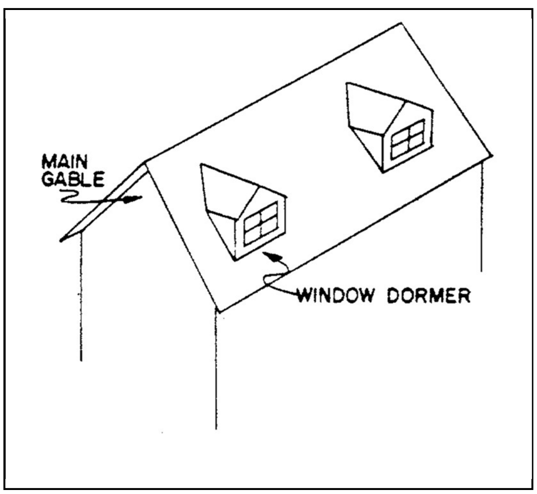
11.2 Members opening knee walls in attic spaces should avoid opening walls near the stairs. Fire venting from these openings could block members egress.

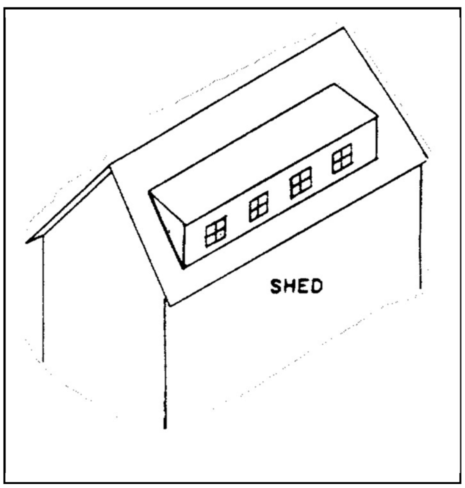
11.3 Due to the limited means of access to most attics, the ladder company must be prepared to assist the engine company in alternate means of getting water on the fire. This can be achieved by opening up a 3' section of the ceiling on the floor below. The engine company could then operate from a small extension ladder to sweep the attic space with the hoseline.

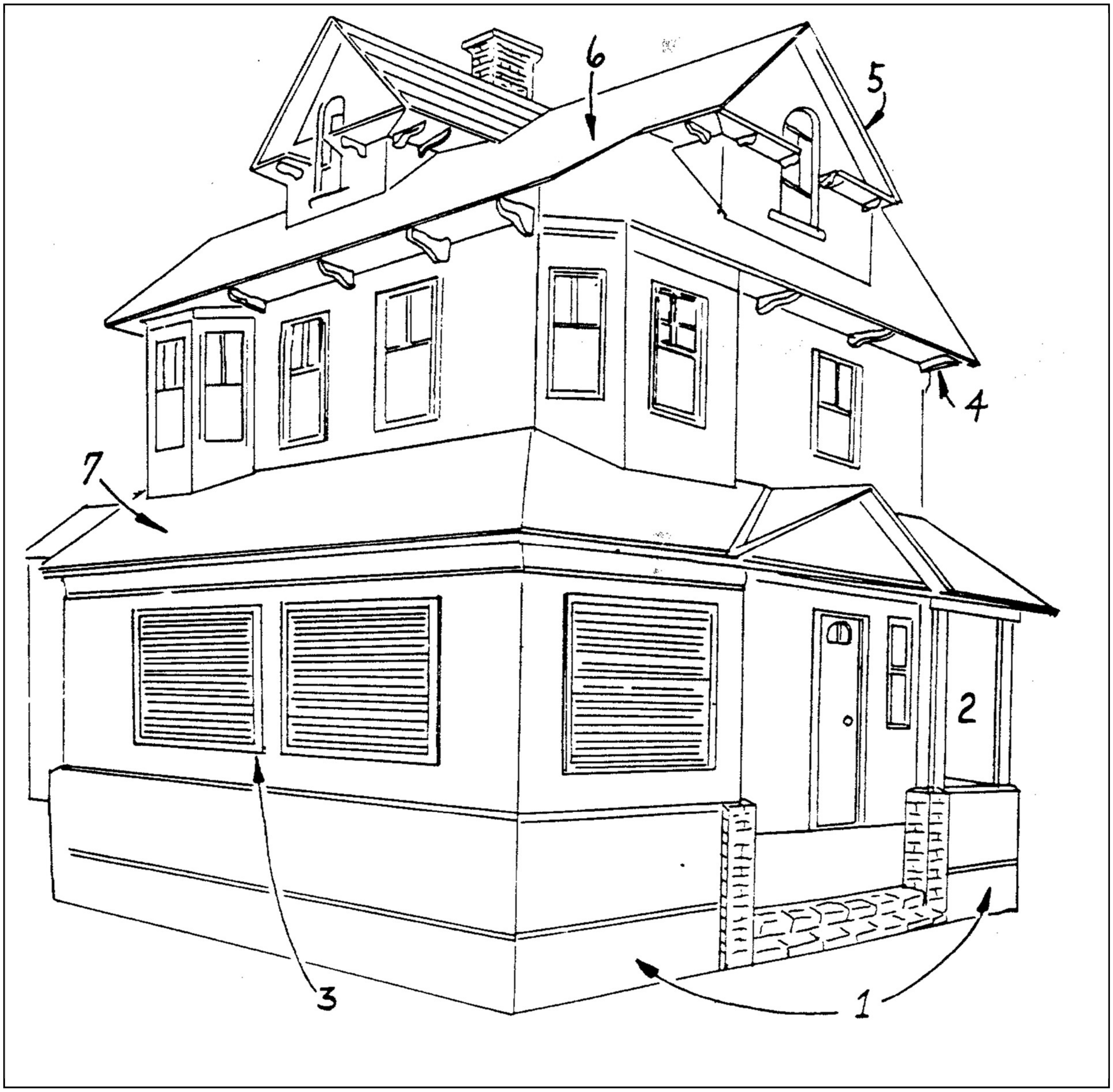
11.4 If wood is encountered when making the initial opening, you may have encountered an attic catwalk. Shifting about three feet to one side and making another opening may avoid this type of obstruction. The bent tip and/or cockloft nozzle may also be used effectively in this situation.

Photo 4.2
Two family dwelling

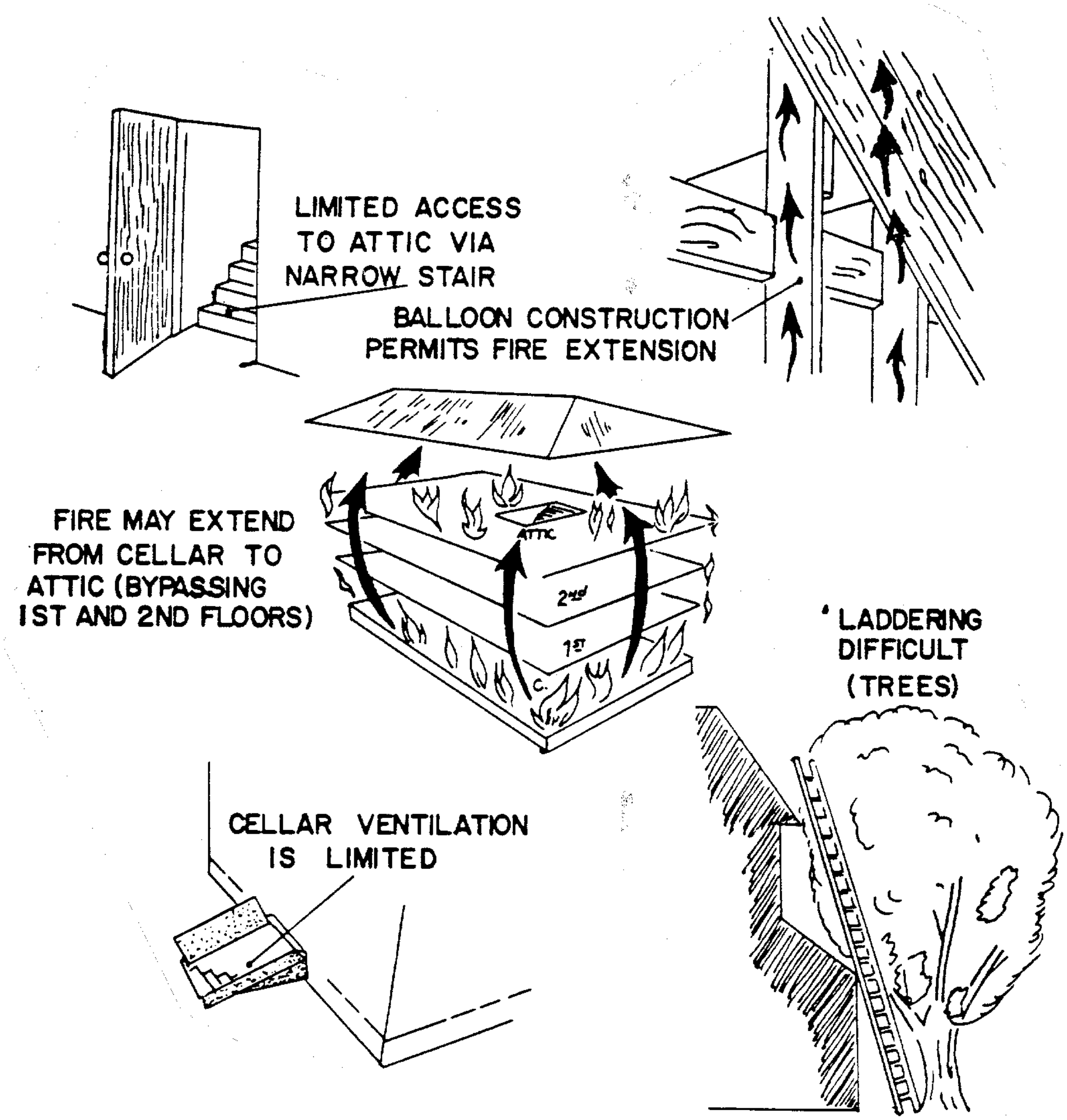
When two front doors are present, the door closest to the side wall will usually provide access to the 2nd floor apartment.







1.	Under the porch area may be a ventilation point. Cellar windows rarely exist here. When they do, they may be inaccessible. Windows may exist in the rear, however.
2.	Open area permits ventilation and easy access to the first floor.
3.	Enclosed porch inhibits access and ventilation.
4.	Roof overhang (eaves) can permit fire to extend into the attic if fire has vented out a window. Three levels of eaves are shown.
5. & 6.	Sharply pitched roofs with many peaks and gables are difficult to walk on.
7.	Rear and side extensions may present many other means of entry and escape. An outside cellar entrance usually exists at the rear or side.



Shown are some of the difficulties firefighters encounter at Queen Anne fires. Even with an obvious upper floor fire, due to balloon frame construction a cellar fire cannot be ruled out.

LIGHTWEIGHT CONSTRUCTION

1. INTRODUCTION

1.1 Over the past several decades, a relatively new construction feature has become prevalent throughout all areas of New York City. With architects and builders seeking greater efficiency via lower material and labor costs, older buildings using traditional, ordinary/wood frame construction have been renovated or demolished and replaced with structures using lightweight building materials. The impact of this lightweight construction from an FDNY operational and safety standpoint is significant. In order to adapt to the potential change in conditions encountered at fires and emergencies in these types of buildings, an adjustment must be made in FDNY tactics and procedures.

1.2 ***Redacted for PFS***

1.3 In the past, builders of private dwellings, and other types of structures using wood frame/ordinary construction, did not know much about the failure points and strength testing of structural materials. To provide the necessary structural support and keep them from collapsing, buildings were designed with a built-in safety factor by increasing the size and mass of the load bearing structural elements. By contrast, in recent years, structural engineers have been able to utilize improved technology to more precisely calculate the collapse points of less costly building materials. With greater frequency, private dwellings are now being constructed with smaller and lighter weight, engineered building materials in preference to the larger, heavier dimensional lumber found in older construction.

1.4 In the absence of increased mass, the strength of a lightweight system is obtained through the interconnection of multiple structural components providing support in compression and tension. Furthermore, the decrease in size and mass of the individual structural components will impact the stability of all other structural components; if one fails, the others may fail as well.

1.5 In any building construction, the critical area subject to failure as a result of fire is the point of connection.

1.6 For fires in "traditional" private dwellings built of ordinary/wood frame construction, early collapse is not a primary consideration. At these types of buildings, depending on the duration and intensity of fire, the size of the structural components, and the type of construction involved, the amount of time before collapse occurs is generally estimated to be an hour. However, when there is no ceiling to provide protection, therefore exposing structural components, failure can occur within 20 minutes.

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1.7 In private dwellings constructed with lightweight materials, when fire extends from the building's contents to its structural components, collapse may occur within 5 to 10 minutes. (Figure 1) Collapse in lightweight structures can occur suddenly, and with little or no warning signs. Collapse is always the primary consideration in buildings constructed with lightweight materials.

Experience has shown that structural collapses have occurred in buildings where the magnitude of fire was relatively small. Therefore, positioning the 1st hoseline for early extinguishment or control of a contents fire that has not extended to the structural components is of paramount importance.

Figure 1

1.8 Lightweight construction often provides for the creation of large rooms. Areas unsupported by columns with spans greater than 25' are generally an indication that lightweight construction is present. The collapse potential in a "wide-open" room of this type is greater than in a compartmented area that has interior walls.

1.9 The most important factor to a safe and successful operation at these types of buildings is the identification of the presence of lightweight construction. It is critical that any member becoming aware of lightweight construction notify the Incident Commander (IC).

1.10-1.12 ***Redacted for PFS***

2. CONSTRUCTION

2.1 General Construction Features:

2.1.1 Private dwellings with lightweight construction are generally 1-3 stories in height, and have either a flat or peaked roof. They are usually built over a crawl space or a cellar constructed of 8" cement block. Some homes may have a full finished cellar. They may be found to be attached, semi-attached, or detached. Attached or semi-attached units are normally separated by a fire wall that may extend through the attic/cockloft.

2.1.2 General Construction Deficiencies:

- Inadequate fire stopping
- Improperly installed metal gang nails
- Inadequate bracing
- Out of plumb structural components
- Cracked or damaged truss components
- Unauthorized alterations
- Unprotected wood floor joists

2.1.3 A combination of both lightweight and ordinary construction may be used in the same structure (i.e. renovated private dwellings).

2.2 Specific Construction Features:

2.2.1 Interior walls – Typically constructed of 1/2" plasterboard supported by metal or wood studs. In attached structures, double 5/8"- 1" plasterboard is used on the partition walls between structures. When these fire-resistant barriers are compromised by shoddy workmanship or renovations, fire may extend into the structure where these lightweight materials are present.

2.2.2 ***Redacted for PFS***

2.2.3 Finished ceilings – May consist of 5/8" or 1/2" plasterboard. A trussloft is an enclosed area between floors and ceiling where open truss construction is found; however ceilings may not be present in basement/cellars. In some cases, the structure is built over a crawl space or cellar with an unprotected first floor support system.

2.2.4 Floors – Generally, the flooring used in lightweight construction is not as substantial as is found in ordinary construction. Vinyl flooring or carpeting is often installed over single-thickness plywood sheathing or oriented strand board (OSB). Floor coverings using cement board, lightweight concrete, nylon pile carpet and tile will retain heat under the floor making it more difficult to detect hot spots on the floor above the fire. These types of flooring may also give firefighters the false impression that they will provide enough support to operate above the fire area.

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2.2.5 Roofs – Lightweight wood truss roofs may be flat or peaked. A large, open cockloft/attic is commonly found in either design.

2.2.5. A The most common type of peaked roof found in lightweight construction is the open-web lightweight wood truss. In an ordinary peaked roof structure with dimensional lumber, the collapse of the roof rafters and roof deck may be supported by the ceiling beams below, thereby protecting firefighters operating on that floor. When a lightweight wood truss peaked roof is exposed to sufficient fire, the rafters (top chord of the truss), the roof decking, and ceiling joists (bottom chord of the truss) can be expected to collapse as one complete unit into the structure, exposing firefighters to falling and burning debris. (Figure 2)

Figure 2

2.2.5. B The cockloft/attic space found above the top floor ceiling is commonly used for electrical/plumbing utilities and HVAC ductwork. This area may also be used by occupants for storage, thus creating an additional live load that may lead to early collapse of the floor of the cockloft/attic. Entry to this space is often via a scuttle or a pull-down type staircase.

2.2.5. C Roof decks found on both peaked and flat roofs are constructed with 3/8” or 1/2” plywood instead of the 1-inch wood sheathing used in ordinary construction. Plywood burns rapidly, and will fail at a faster rate. Fires originating in, or extending to, the cockloft/attic space will quickly vent through the roof.

2.2.6 Voids – Voids for electrical/plumbing utilities may be found on any floor. Utilities may also be found in vertical voids which can run the height of the building. All voids and HVAC ductwork will create avenues for the spread of smoke, heat, and fire.

2.2.6. A ***Redacted for PFS***

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2.2.6. B In some larger private dwellings, the plasterboard ceiling may be installed several inches below the lightweight supporting members to provide for the running of utilities. This type of installation is more prevalent in cellars with wood I-beam and metal C-joist construction than the open web truss due to the lack of horizontal openings to run utilities. The result is a large open area between the ceiling and the joists, creating the potential for rapid fire spread and extension. (Figure 3)

Figure 3

2.2.6. C Decks/Balconies – Outside decks and balconies are often supported by lightweight joists extending through the exterior wall. Any cantilevered deck/balcony should be considered a serious collapse potential.

3. TYPES OF LIGHTWEIGHT SYSTEMS

3.1 There are many different types of lightweight systems in use today. This bulletin will address the four most common types of lightweight systems that may be encountered in private dwellings:

Lightweight parallel chord truss

Laminated wood I-beams

Metal C-joists

Composite truss

3.2 Lightweight Parallel Chord Wood Truss

This type of support system is made up of 2x3” or 2x4” wooden web and chord members connected with sheet metal gusset plates (also referred to as gang nails). Since these connections only penetrate 1/4” - 1/2” into the wooden truss member, the gang nails are the weakest point of the support system. When exposed to fire and/or high heat, failure at the point of connection should be expected before failure of the structural wood components.

3.2.1 When lightweight wood trusses are exposed to fire, high heat, or prolonged exposure to water, the gang nails may loosen and fail, causing the entire span of that particular truss section to fail. The surface-to-mass ratio of the wood trusses provides an abundant fuel source, and the air supply in the concealed truss void allows for rapid horizontal extension. Due to the open-web characteristic of the truss system, fire which has entered a ceiling (trussloft) or roof space (cockloft/attic) may likely affect all truss supports on that level, creating the potential for a large-scale collapse of the area supported by the affected trusses. (Figures 4 and 5)

Figure 4

Figure 5

3.2.2 Another type of open-web wood joist uses finger joints and glue to connect the web and the chords. The finger joints are approximately ¾" deep; and, similar to parallel cord wood truss without the metal gusset plate, these trusses can be expected to fail rapidly when exposed to fire and/or high heat. (Figure 6)

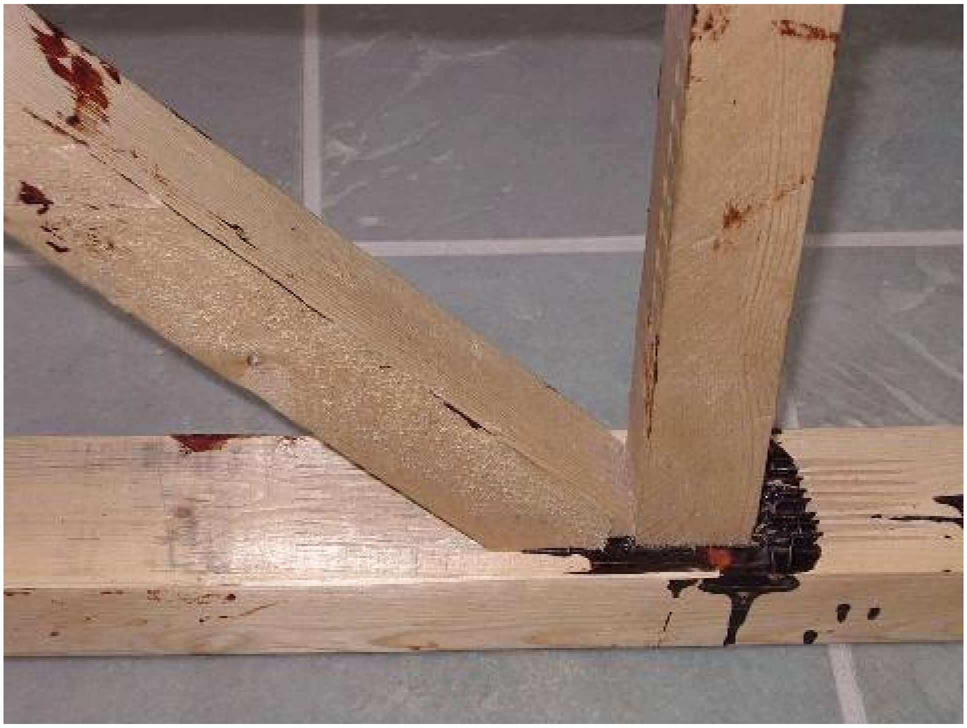

Figure 6

3.3 Laminated Wood I-Beams

3.3.1 This type of support system is primarily comprised of 1/2" oriented strand board (OSB) or 3/8"- 1/2" plywood web members, and 2x3" or 2x4" wood flanges. The web is fitted and glued into a routed slot in the top and bottom flanges. In some cases, they may span lengths of over 60 feet. The strength of the beam is a function of the mass of the flange and the depth of the web. These beams are usually connected to load bearing walls with sheet metal joist hangers.

3.3.2 These I-beams are pre-engineered, and may come with openings in the web to accommodate utilities. In other instances, builders will bore holes in the web for plumbing, electrical lines, and HVAC ductwork, thus compromising its strength. A fire-retardant material sprayed on the beam will tend to dry out the wood over time, making it brittle and further reducing its strength. Once the ignition temperature has been reached during a fire, a laminated wood I-beam will burn rapidly. The sheet metal brackets holding the beams in place may also fail when exposed to fire or high heat. (Figure 7)

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Figure 7

3.4 Metal C-Joists

3.4.1 ***Redacted for PFS.***

3.4.2 Metal C-Joists may come with pre-drilled holes for plumbing and electrical lines. (Figure 8) A newer type of C-Joist, with design characteristics similar to lightweight parallel chord wood truss, has larger openings that allows for the easier running of utilities, and the potential for fire and heat spread is significantly greater. (Figure 9) When exposed to fire and/or high heat, these lightweight steel joists will lose strength and fail rapidly.

3.4.3 ***Redacted for PFS*** .

Figure 8

Figure 9

3.5 Composite Truss

This type of truss system is similar in design to a lightweight parallel chord wood truss, but comprised of two types of materials: wood and steel. A formed sheet metal web is attached to 2x3" or 2x4" wood chords with nails or sheet metal gang nails. It is commercially known as a "Space Joist".

3.5.1 Under fire conditions, the composite truss will react the same as other lightweight (wood or metal) trusses, they will lose strength and fail rapidly (Figure 10)

Figure 10

4. OPERATIONS

4.1 General

4.1.1 Upon arrival, the age of the building and any signs of recent renovations should be included as part of the initial size-up. Lightweight construction must be suspected in newer type buildings and renovations. Prior knowledge and eCIDS will also provide information on the presence of lightweight construction.

4.1.2 It is critical that all firefighting units are made aware that a lightweight support system is present. When lightweight construction is suspected, an immediate examination of the ceiling voids shall be conducted as soon as conditions permit. If any type of lightweight system is found at an operation, an immediate notification to the IC is required.

4.1.3-4.1.6 ***Redacted for PFS***

4.1.7 Unless the fire is minor, or confined to a small area, the primary emphasis for a fire in a lightweight building **under construction** is that of an exterior attack. Exterior streams should be positioned and operated from safe areas outside the collapse zone.

4.1.8 When fire is found in a vertical void, the cockloft/attic space should be promptly checked for extension within the limits of safety.

4.1.9 Fire venting out one or more windows may auto-expose onto the outside of the building and into an eave or attic/cockloft vent opening. Also, the soffit area of the eave may be poorly protected by thin plywood and/or plastic soffit board. As a result, an extending fire could rapidly involve the lightweight roof support system. A careful examination must be conducted for extension into these areas.

4.1.10 A serious fire inside the building may affect the outside deck/balcony supporting members, causing it to fail without warning. When there is any doubt as to its stability, members should not operate on or below the outside deck/balcony.

4.1.11 ***Redacted for PFS***

4.1.12 The presence of smoke pushing at the floor line on the outside of a building may be an indication of a fire in a trussloft. When this warning sign is evident at a private dwelling fire, it is an indication that the probability of collapse is significantly increased.

4.1.13 ***Redacted for PFS.***

4.2 Engine Company Operations

4.2.1 The positioning of the 1st hoseline for a quick knock-down of a contents fire that has not extended to the structural components is of paramount importance.

4.2.2 A 2nd hoseline must be positioned to back up the 1st line. When the 2nd line is needed to address a potential life hazard or is directed by the IC to a location remote from the 1st hoseline, a 3rd hoseline must be positioned as a back-up line. The IC shall special call an additional engine company for a structural fire in a building constructed of lightweight materials.

4.2.3 When the fire is of such magnitude that it cannot be quickly knocked down with the two hoselines, then an outside operation must be considered. The operating personnel inside the building must be limited so that quick egress is not impeded.

4.2.4 A serious problem may occur when radiant heat and fire exposes and weakens the floor decking on the floor supporting members. This condition is often discovered when engine company members moving into the immediate fire area suddenly plunge through the floor deck. When the spacing between the light weight floor supports is 24" apart, the potential exists for a larger opening to be formed for members to fall through to the floor below. Caution should be used when entering the immediate fire area until the integrity of the floor deck can be verified.

4.2.5 To avoid concentrating a load in any given area, the engine officer should ensure engine firefighters do not bunch up while operating the hoseline. Only the minimum amount of firefighters necessary to achieve quick knock-down should be operating in the fire area.

4.2.6 Nozzle FFs should use the leg forward method due to the potential of fire and heat weakening the floor system and causing a collapse.

4.3 Ladder Company Operations

4.3.1 When lightweight construction is suspected, the first arriving ladder company shall make an inspection hole in the ceiling from a safe area in order to determine the type of support system present (i.e. for a fire on the 2nd floor, an inspection hole can be made on the 1st floor). This critical task shall be done immediately upon arrival. The IC must be notified of the results of this examination.

4.3.2 When fire is located in the cellar or the first floor and conditions prevent visual identification of the type of construction, an examination could be made in a similar attached exposure. This inspection shall be assigned by the IC to an available unit.

4.3.3 Before entering any room that was involved in fire, one or more inspection holes shall be made in the ceiling to check for fire extension. The ladder company officer shall ensure that a charged line is in position before any additional openings are made. The IC must be notified of the results of this examination.

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4.3.4 After the contents fire is knocked-down, the ceilings, walls, and other concealed spaces should be opened to check for fire extension. The IC must be notified of the results of this examination.

4.3.5-4.3.6 ***Redacted for PFS***

4.3.7 In order to relieve conditions on the upper floors, the top floor windows shall be vented. However, all exterior ventilation must be communicated and coordinated with the Ladder Company Officer inside the fire area to be vented.

4.3.8 Cutting the roof and pushing down the ceiling could expose the cockloft area to additional heat and fire from the top floor. In addition, a saw cut could sever a structural member causing the failure of one or more trusses/joists. Therefore, under **no** circumstances shall the roof be cut in any peaked or flat roof building of lightweight construction.

4.3.9 ***Redacted for PFS***

4.3.10 When the fire is on the top floor and there is clear indication that the fire **has not** entered the cockloft, roof operations shall be limited to:

- Checking the rear and sides of the building.
- Venting the top floor windows, and skylights if present (see 4.3.7)
- Inspecting HVAC duct vents for unusual heat.

All members shall be removed from the roof upon completion of these duties.

4.3.11 When fire is on the top floor and there are indications that it **has** extended to the attic/cockloft, the IC shall be immediately notified, and members shall not be permitted to operate on the roof. Any fire present in the attic/cockloft represents the potential for a partial or complete collapse of the roof.

4.3.12 Members should use caution when placing an aerial ladder, tower ladder, or portable ladder to a flat roof with a decorative parapet constructed of lightweight materials. The stability of these parapets should be carefully evaluated prior to use as they may not be substantial enough to support the weight of firefighters and/or ladders.

4.4 Floor Above Considerations

4.4.1 Before proceeding above the fire floor, members should determine:

- Location, and extent of the fire.
- Presence of a life hazard (known or suspected).
- Position and progress of the 1st and 2nd hoselines.

4.4.2 Due to the collapse potential, operations above the fire floor in a lightweight constructed private dwelling are extremely hazardous. In all cases, fire conditions will dictate the feasibility of floor above operations. A known life hazard on the floor(s) above must be addressed within the limits of safety. Members should continually evaluate the risks versus the potential benefits.

4.4.3 When not already completed by first Ladder company, the second Ladder company operating on the floor(s) above shall make inspection holes to determine the type of construction and the extent of fire in any concealed areas. The IC must be notified of the results of this examination.

4.5 ***Redacted for PFS***

4.6 Incident Commander

4.6.1 – 4.6.2 ***Redacted for PFS***

4.6.3 Key size-up indicators for the IC include:

- Extent of the fire. (light, medium, heavy)
- Location of the fire (top floor, cellar, void spaces, etc.)
- Volume of smoke and fire (light, medium, or heavy)
- Smoke action (pushing, twisting, or rolling under pressure)

5. CONCLUSION

5.1 The best time to gather information on the specific type of support systems in lightweight buildings is during the construction phase. Units should be cognizant of any new construction or renovation currently underway in their administrative districts.

5.2 ***Redacted for PFS***

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FIREFIGHTING PROCEDURES
COLLAPSE OPERATIONS
October 21, 2015

STRUCTURAL COLLAPSE OPERATIONS

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1. INTRODUCTION

1.1 Structural Collapse is defined as any incident where a building or portion of a building, including walls, floors, ceilings, partitions, or structures such as bridges, scaffolds, signs, construction sites, banners or other items have collapsed or are in danger of collapsing. A structural collapse is one of the most difficult and dangerous operations firefighters will encounter. First arriving units may find clouds of dust and smoke engulfing the area. Debris may cover large areas including streets and automobiles. Injured or disoriented people may require assistance, while others are trapped in the rubble.

1.2 ***Redacted for PFS***

1.3 With this responsibility comes accountability. All FDNY Chiefs, Company Officers, Firefighters and EMS personnel should be knowledgeable of the collapse rescue plan.

1.4 **Causes/Indicators of a Collapse:**

CAUSES	INDICATORS / SIGNS
• Fire/destruction of wood, heating of cast iron or unprotected steel • Water main breaks • Natural causes: earthquakes, hurricanes, tornadoes, floods, heavy snow • Explosions: explosives, fuels, backdrafts • Collision impact • Vibrations, impact loads • Overload on floors and/or roofs, expansion of water absorbent stock • Structural fatigue, old age • Faulty construction, improper alterations, nearby excavations • Cutting or removal of load bearing elements	• Prolonged burning for the class of construction • Heavy floor loading • Unsupported walls • Cracks, sagging or bulging walls • Cracking or groaning noises indicating a strain on structural members • Rumbling noises or heavy puffs of smoke • Walls leaking smoke or water • Soft or spongy feeling as you walk on a floor or roof • Walls or columns out of plumb • Plaster sliding off a wall, windows cracking or doors swinging open or closed, indicates movement of wall • Clean wood at beam ends, indicating roof or floor pulling away from walls

2. *Redacted for PFS*

3. OBJECTIVES OF THE FIRE DEPARTMENT

During collapse operations, control the situation by:

- Extinguishing any fire
- Conduct searches
- Locate and mitigate all Hazards
- Install appropriate protective measures (e.g. shoring)
- Remove trapped victims
- Triage, treat and transport victims

4. FIRST ARRIVING UNITS GENERAL CONSIDERATIONS / RESPONSIBILITIES

4.1. Size-Up

A cautious and deliberate size-up combined with immediate site security actions reduces vulnerability to the public, responders and the environment.

Building Information	Collapse Area	Life Hazard	Utilities
• Address/CIDS • Occupancy • Construction • Occupancy Hazards • Stability	• Size • Floors Involved • Interior/Exterior • Exposures • Fire Status • Extent	• Occupancy/Time of Day • Trapped/Missing • Resources On Scene/ Responding	• Gas Leaks • Electrical Shorts • Water Main Breaks

4.2-4.3 *Redacted for PFS*

4.4 Safety Considerations

- Safety at the scene of a collapse is the single most important consideration during the operation.
  - Identify and immediately report any sign of structural defect that could lead to a secondary collapse. Isolate these areas with barrier tape and/or other suitable means.
  - Do not enter any danger zones except to save life.
  - Place apparatus outside of the potential collapse danger zone.
  - Access control points should be established to regulate entry and exit from the control zone.
  - Doors, stairways, ladders, ramps, ditches and excavations should be made as secure as possible in the event a rapid escape from the site is required.

Note: ***Redacted for PFS***

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- Steps must be taken immediately to prevent further casualties. First arriving units shall examine the collapse site for dangers and take the necessary actions to prevent further injuries including:
  - Stretch hoselines to protect entire collapse area. Ensure a 3½" hoseline is stretched for tower ladder use.
  - Control utilities by shutting down the main building service entrance controls, and ensure the dispatcher has requested the response of the utility company's emergency crews.
  - Remove lightly buried victims and deliver them to the Medical Group. CFR-D Engine Companies can assist EMS.
  - Examine premises for hazardous occupancies or processes.

4.5 Potential Hazards

- **Secondary Collapse:** Structural instability of adjoining buildings.
- **Electrical Hazards:** Downed electrical wires can energize conduits, plumbing and metal structural members of the building.
- **Gas Leaks:** Broken gas pipes may cause fires or explosions.
- **Water Main Breaks:** Broken water pipes may increase the likelihood of electrical shock, threaten trapped victims with drowning, and the increased water weight may cause a secondary collapse.
- **Hazardous Materials:** Including dust, asbestos, bloodborne pathogens (BBP), and the contents of the structure. Dust is present at every collapse. Concrete dust is a strong corrosive and irritant to lung and mucous membrane tissue. The presence of hazardous materials may include flammables, corrosives or oxidizers.
- **Terrorism:** Hazardous materials and/or secondary devices.
- **Rescuer Fatigue**
- **Adverse Weather:** High winds can blow debris from upper floors, heavy rain or snow can cause secondary collapses.

4.6 ***Redacted for PFS***

4.7 **Risk vs. Benefit Analysis**

The safety of personnel needs to be carefully evaluated before attempting complicated rescues. Initial rescue actions should concentrate on removing able-bodied (ambulatory) and surface or lightly buried persons from immediate danger. Re-evaluate the Risk/Benefit Analysis throughout the collapse incident.

5. STREET COORDINATION AT COLLAPSES

5.1-5.2 ***Redacted for PFS***

5.3 **Risk vs. Benefit Analysis**

First-alarm engine companies must position themselves to protect the occupants and rescuers against the threat of fire.

- If possible, both first and second arriving engines should take separate hydrants outside the block, each on separate mains, and prepare to supply handlines and a large caliber tower ladder stream. The third and fourth engines should take similar positions at the rear of the structure.
- Two of the second alarm engine companies should be used to seal off the ends of the street. The chauffeurs of these units must remain in the cab, able to move the apparatus if directed by the IC. Remaining engine companies should be positioned well away from the scene, for they will probably be responding for personnel needs only.

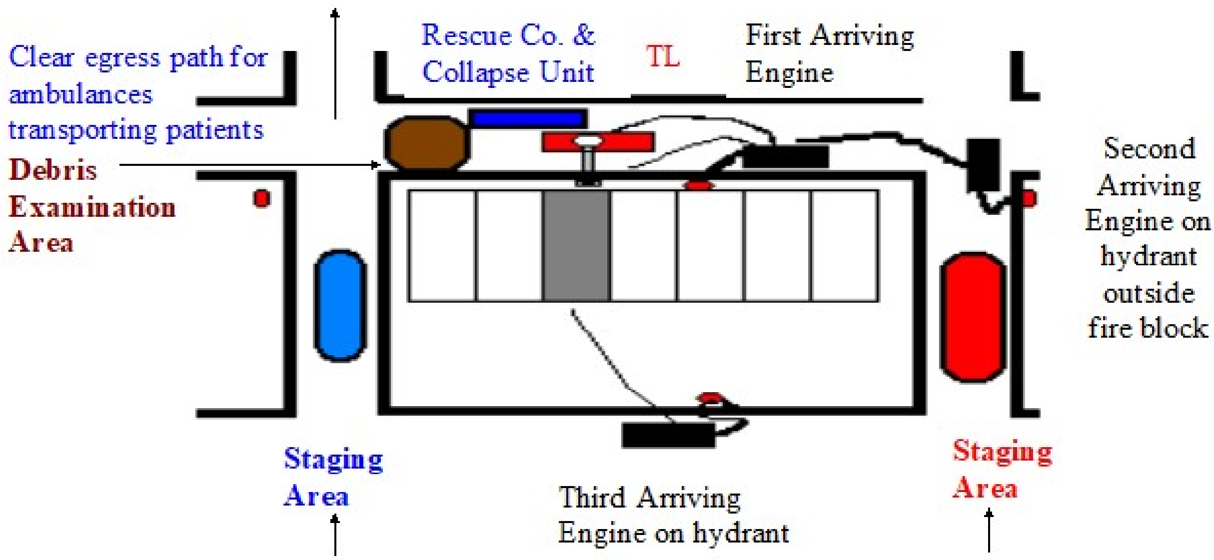

Figure 1
An overhead view of a street plan at a collapse, showing key positions and facilities.

5.4 **Ladder Companies have many roles at collapse incidents.**

- Tower ladders should be placed in front of the collapsed structure, outside of the collapse danger zone. Initially, the first arriving tower ladder should be the only unit in front of the collapse building, unless there is a specific need for additional units. Subsequent arriving tower ladders should be positioned to reach and protect a different exposure. Additional units should be directed to a designated staging area, unless required elsewhere.
- ***Redacted for PFS***
- ***Redacted for PFS***
- ***Redacted for PFS***

5.5-5.8 ***Redacted for PFS***

6. Redacted for PFS

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7. DUTIES OF FIRST ALARM UNITS AT A BUILDING COLLAPSE

7.1. Engine Company Responsibilities

In order of highest to least priority, first alarm engine companies are to:

- Extinguish active fire in the affected building and surrounding debris.
- Protect exposures.
- Extinguish burning vehicles within the vicinity of the collapse.
- At scenes where there is no active fire, stretch and charge precautionary 2½" lines in sufficient number and length to cover the entire operation.
- In addition, a 3½" line shall be stretched and charged to supply the first arriving tower ladder.
- At a suspected terrorist event, 2½" hoselines should be located between two apparatus, or other substantial shielding, to protect personnel from secondary blasts set to injure emergency responders.

Note: If flooding occurs, shutting off the water mains and obtaining dewatering pumps will aid victims trapped in the lower areas.

7.2. First Arriving Engine Company: Water Supply

- Officer
  - Supervise water supply activities / apparatus placement

  Note: At times it may be necessary for the first arriving Engine to take a position within the block for use of the apparatus master stream for fire control or exposure protection. The Officer must ensure a continuous source of water supply for such purposes.
  - Coordinate operations with first arriving ladder company officer.
  - Stretch a 2½" handline of sufficient length to cover the entire site.
  - Consider stretching 3½" line to supply a tower ladder.

- First Arriving Engine Company Members
  - Position and operate handlines as ordered.
  - Members will remain together as a unit unless otherwise ordered by the IC.

7.3. Second Arriving Engine

- Officer
  - Obtain briefing from the IC and/or the first arriving engine company officer.
  - Supervise apparatus placement.
  - Ensure a 3½" supply line is stretched to the first tower ladder.

- Second Arriving Engine Company Members
  - Assist the first engine company with stretching initial handlines and tower ladder supply.
  - Members of the second engine company will remain together as a unit unless otherwise ordered by the IC.
  - If necessary, members of the second arriving engine company may perform CFR-D duties.

7.4. ***Redacted for PFS***

7.5. First Arriving Ladder Company

- Officer
  - Obtain a briefing from the IC.
  - Supervise apparatus placement.

  Note: Officers have the option of splitting the Company into separate teams to cover more area.

- First Arriving Ladder Company Members: Reconnaissance
  - Perform Scene Survey
  - Perform Hazard Assessment and Control
    - Protect members from secondary collapse; mark with hazard tape, tie back or crib.
    - Keep nonessential members from entering the collapse zone.
  - Remove Surface Victims
    - Remove lightly buried victims and deliver to a Casualty Collection Point (CCP).
    - If possible, question survivors regarding the number, identity and location of other occupants prior to and after the collapse.
  - Perform Preliminary Void Search
    As soon as conditions permit, begin searching areas where voids exist for possible survivors.
    - Visually search accessible voids - **DO NOT** cut, lift or remove load bearing members. Call and listen.
    - As survivors are located and removed, members should note their description and location for use in victim tracking.
  - Victims should be directed/brought to a CCP.

7.6. Second Arriving Ladder Company

The second ladder company to arrive shall immediately begin the process of controlling the gas, electric and water services.

- Officer
  - Obtain a briefing from the IC.
  - Supervise apparatus placement.
  - Ensure the dispatcher notified the utility company emergency crews (gas, electric, water, steam).

- Second Arriving Ladder Company Members: Utilities
  - Assist with life safety if necessary. Augment search and rescue efforts.
  - The major priority is controlling the gas, electric and water services.
  - Shut down accessible services.
    1. **Gas**: Main building shut-off or curb valve.
    2. **Electric**: Main disconnect.
    3. **Water**: Main building shut-off or curb valve.

7.7. ***Redacted for PFS***

7.8. **First Arriving Tower Ladder**

- Apparatus Placement

- Operations: Tower ladders can be used to:
  - Provide large caliber streams to protect victims and rescuers from fire.
  - Aid in rescuing victims.
  - Transport heavy tools.
  - Allow rescuers to traverse unstable debris, survey the collapse, access remote areas, and act as a work platform for shoring, breaching, etc.
  - Provide close-up observation and monitoring of the remaining structure for signs of secondary collapse. (Figure 2)

Figure 2
Example of how tower ladders can be utilized at collapses.

7.9-7.12 ***Redacted for PFS***

8. *Redacted for PFS*

9. SAFETY PRECAUTIONS DURING COLLAPSE OPERATIONS

9.1. ***Redacted for PFS***

9.2. The acronym LCES stands for: Lookouts, Communications, Escape Routes, and Safe Havens. It describes additional safety procedures required at collapse incidents.

- **Lookouts**
  - Posted around the perimeter of the collapse site.
  - Monitor hazardous areas for movement; utilize surveyor transits.
  - Have immediate radio contact with all rescue teams in their area of responsibility.

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- Lookouts shall be equipped with handheld air horns, as well as HTs for warning of impending dangers. All Battalions, Divisions, SOC Units and Collapse Rescue Units are equipped with these for use by lookouts at these incidents.

- **Communications**
  - All members must be aware of the evacuation signaling method that will be in use.
  - The following is the standard emergency signaling system used by all FEMA USAR Task Forces and adopted by this Department. It may be sounded on a handheld aerosol can air horn, or on apparatus air horns. Each Safety Officer

    and member monitoring a transit, as well as members positioned as lookouts for hazard monitoring, will be issued an air horn.

1 Long Blast (3 seconds)	Cease Operations/All Quiet
3 short blasts (1 second each)	Evacuate the area
1 long and 1 short blast	Resume Operations

  - Those operating power tools may not hear the announcement over the HT. Apparatus air horns may be beneficial after the initial HT announcement, followed by another HT announcement after the air horns have ceased.

- **Escape Routes**
  - All members operating in the danger zone must have a preplanned escape route, as well as an alternate route.
  - Identify the hazards in your operating area and identify paths away from them.
  - Know how long it will realistically take you to reach safety

- **Safe Havens**
  - In some cases, it may not be possible to reach a remote area quickly. In these cases, rescuers need to create a safe haven in the immediate proximity to the rescue site.
  - In a collapse, this may be done by shoring the area where the rescuers are operating so that a secondary collapse will not affect them, or it may mean removing a hazard, such as by tying back or pulling over a leaning wall before entering the area below it.

9.3-9.4 ***Redacted for PFS***

10. ***Redacted for PFS***

11. RESCUE OPERATIONAL PLAN

11.1-11.3 ***Redacted for PFS***

11.4 Searching Voids

In building collapses, void spaces are often created that could shelter victims. Debris is supported by parts of the foundation or strong items found within the building, resulting in an area large enough for victims to survive. There are four common types of voids: lean-to, V-shaped, pancake, and the individual void.

- **Lean-to voids** result from the failure of the support at one end of a floor or roof. If one bearing wall gives way while the other remains intact, the floor will drop at the end that failed. Everything on the floor will be thrown into a heap at the low end. There is an excellent chance of survival for persons who were on the floor below if they were near the remaining wall. People on the falling floor may also survive if heavy objects don't crush them. The smallest chance of survival is for anyone on the lower floor in the vicinity of the failed wall.

Figure 4
A lean-to is produced when one bearing wall fails, leaving floors suspended from the remaining walls. Lean-to collapses produce large voids that may contain survivors. An unsupported lean-to is extremely dangerous and must be secured early.

- **V-shaped voids** result when a floor fails in the middle, usually a result of overloading or a part of the floor is burned away and under a load. The walls and floors above usually remain intact, although any floors below may collapse because of the weight of the falling debris. The shape of the collapse produces two voids on the sides of the debris, both of which should be searched. Victims on the collapsing floor not in the vicinity of the collapse will be thrown toward the center along with the loose debris.

  Victims directly below the collapse will have the least chance of survival, while those along the perimeters will have the greatest.

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Figure 5: V-shaped collapses produce large voids along the remaining walls. These voids are likely locations to find survivors.

In **pancake collapses**, the floors of the structure fall in layers, resembling a stack of pancakes. Although this may appear to present an unstable situation, this is not the case. Numerous rescues have been made from pancake collapses. Survival depends on the presence of strong objects nearby to keep the weight of the entire load from landing on the victim. Items such as a series of refrigerators, washing machines, and display cases can hold up the floor above, which often remains intact. Locating the victims of pancake collapses is often simpler than in other types of collapses, since the floors usually maintain their physical aspect and the victims aren't as likely to be thrown as they would if the floor were to incline. It may be possible to crawl in or out of the space between floors. Shoring should be installed as members enter a void and progress inward.

Figure 6: This two-story frame home under construction pancaked straight down, trapping one worker in the basement. The worker was face down in wet concrete. The floors above were prevented from reaching the lowest floor by the foundation walls that created a void one-to-two feet high in the basement.

- **Individual voids** may be found in any type of collapse. They result from spaces formed by strong objects that prevent a collapse into that particular section. They are difficult to locate, for they occur at random depending on the layout of partitions and furniture. Searching void spaces should be done immediately after the surface victims have been removed, or simultaneously if sufficient personnel are available.

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Figure 7: Rescue and Squad Companies and Collapse Rescue Units carry search cameras that can extend through holes bored in floors and roofs to quickly identify and survey voids. The cameras have sound as well as video feeds to try to contact potential survivors. Once identified, the fastest and safest means of reaching victims can then be determined.

- In fire related collapses, fire will be trying to fill these same void spaces. The survival of the victims depends on reaching them first, preferably with a hoseline. Trapped victims should be provided a spare SCBA or the FAST-PAK. Attach a search rope to the person to lead other rescuers directly to the victim.

Figure 8:
Fire related collapses can trap firefighters. Our ability to rescue them depends upon all members knowing the critical tasks that must be performed, and carrying out their assignments in an organized and professional manner.

- ***Redacted for PFS***

11.5- 11.7 ***Redacted for PFS***

11.8 **Crush Syndrome**

Crush syndrome is a potentially life threatening condition that develops in buried collapse victims whose circulation to the limbs becomes restricted. Any type of weight that limits blood flow to a limb, similar to a tourniquet, can create this condition. The limb, denied a source of fresh, oxygenated blood, continues to function becoming acidic as the blood remains trapped in the limb, and is not returned to the lungs and kidneys to be cleaned and re-oxygenated. As long as the pressure is on the limb, the patient is stable. Problems develop when rescue personnel are freeing the patient and the pressure on the limb is lessened. When the weight is released, circulation begins again and the acidic blood in the limb is flushed back into circulation. If the patient is not properly treated prior to this happening, the acidic blood can kill the person by triggering cardiac arrhythmias, kidney failure and other deadly disorders. The patient dies what is known as "the smiling death." They are so happy to be freed from the collapse that they smile from ear to ear, only to die of a heart attack on the way to the hospital.

- Crush Syndrome, also known as traumatic rhabdomyolysis, is a **condition** that results from muscle reperfusion with subsequent secondary systemic effects. These are all direct and indirect consequences of prolonged, continuous pressure on the limbs. The condition is characterized by hypovolemic shock and hyperkalemia.

Crush Syndrome is fundamentally based on three criteria:

- Compromised local circulation.
- Involvement of muscle mass.
- Prolonged compression (usually 4-6 hours but possibly less than an hour).

11.8.2 Prevention of the "smiling death" is accomplished by establishing intravenous lines (IVs) into the patient prior to releasing the pressure. With the IVs in place, paramedics can combat the returning acidic blood with injections of a Bicarbonate solution.

11.8.3 ***Redacted for PFS***

11.9-11.13 ***Redacted for PFS***

12. Redacted for PFS

13. Redacted for PFS

BY ORDER OF THE FIRE COMMISSIONER AND CHIEF OF DEPARTMENT

Addition for PFS

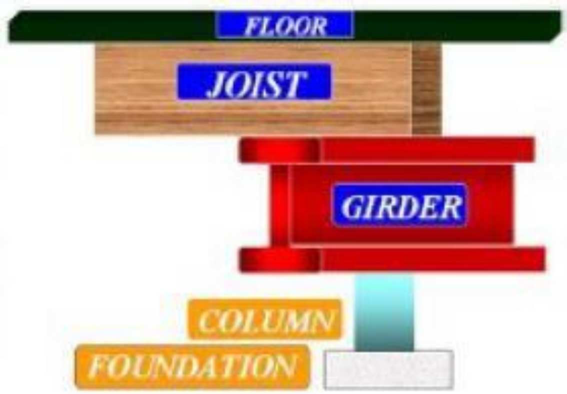
COLLAPSE

A collapse is one of the most dangerous operations a firefighter will encounter. The FDNY might be dispatched to a report of a collapse, or one may happen during firefighting operations. Injured or disoriented people may require assistance, while others may still be trapped inside.

COLLAPSE ZONE The expected ground area a falling wall will cover when it collapses. It is at least the distance away from the wall which is equal to the height.

HORIZONTAL COLLAPSE ZONE – Width of the structure
VERTICAL COLLAPSE ZONE – Height of the structure

PRIMARY STRUCTURAL MEMBER
A structure that supports another structural member in the same building, such as a bearing wall, a column, or a girder. The Collapse of a primary structural member will often cause the collapse of the structural member it supports.



SPALLING Loss of surface material when concrete (or stone) is subjected to heat. It is due to the expansion of moisture in the concrete. Explosive spalling occurs violently, throwing bits of concrete projectiles (Brannigan 331).

CAUSES OF COLLAPSE

Structural Weakness:

- Accumulation of Snow or rain on the roof
- Overloading of floors
- Backdrafts/Smoke Explosions
- Fires
- Excavations
- Improper Renovations
- Weather - Earthquakes, winds, etc.
- Impact load from a Collision

WARNING SIGNS

- Plaster sliding or falling off of walls.
- Prolonged burning
- Sagging floors due to excessive water
- Traveling cracks
- Walls/columns bulging out of alignment
- Sounds – e.g., creaking, rumbling, etc.

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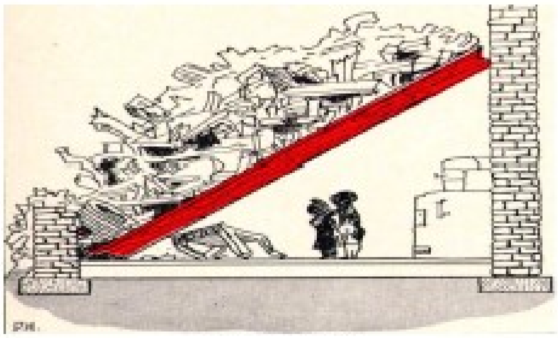
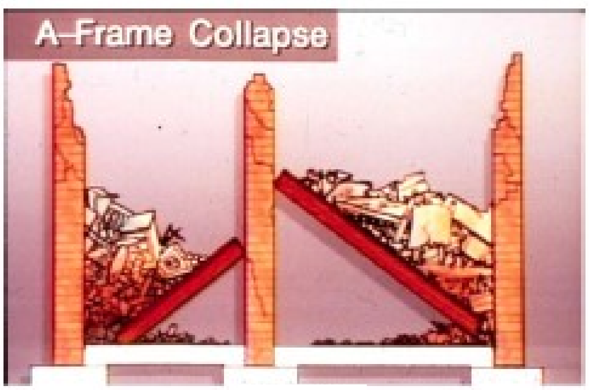
Addition for PFS

TYPES OF COLLAPSES

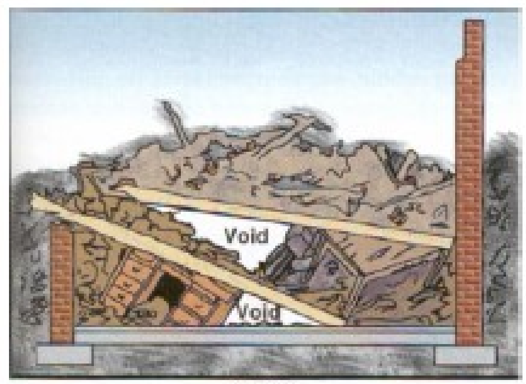


Unsupported Lean-To

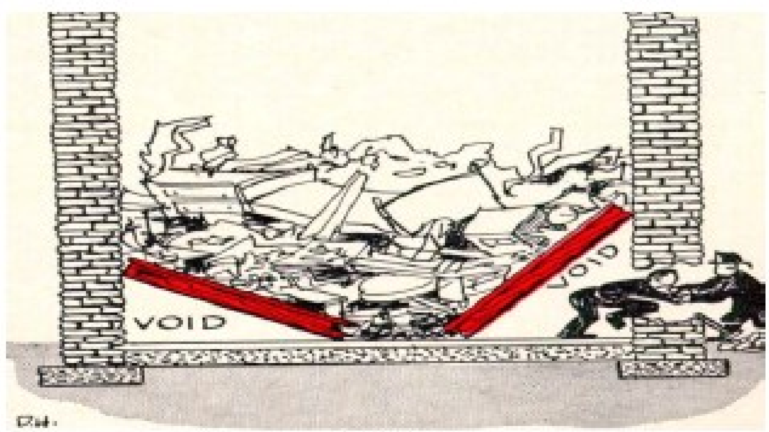
Cantilever Collapse (Unsupported Lean-To)
Greatest Potential For Secondary Collapse



A-Frame



Pancake



V-Shaped

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TYPES OF COLLAPSES

1. Lean-Over Collapse

A type of wood-frame building collapse indicated by the structure slowly starting to tilt or lean over to one side

2. Inward/Outward Collapse

The collapse of an exterior wall that breaks apart horizontally; the top collapses inward back on top of the structure and the bottom collapses outward on to the street. Wood braced-frame constructed buildings collapse this way. Timber truss roof collapse can cause a secondary collapse of a front wall in this manner

3. Curtain-Fall Wall Collapse

Exterior masonry wall drops like a falling curtain cut loose at the top; the collapse of a brick veneer, brick cavity or masonry-backed stone wall. The impact of an aerial platform master stream striking a veneer wall at close range can cause a curtain-fall collapse of bricks

4. Ninety-Degree-Angle Wall Collapse

A type of building wall collapse; the wall falls straight out as a monolithic piece at a 90-degree angle, similar to a falling tree. The top of the falling wall strikes the ground a distance from the base of the wall that is equal to the height of the falling section. Bricks or steel lintels may bounce or roll out beyond this distance

5. Pancake Floor Collapse

The collapse of one floor section down upon the floor below in a flat, pancake-like configuration; when floor beams pull loose or collapse at both ends.

6. Lean-To Collapse

A floor collapse in which one end of the floor beams remain partially supported by the bearing wall and the other end of the floor beams collapse on the floor below or collapses but remains unsupported. Classified as supported or unsupported depending on the position of the collapsed beam ends.

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7. Tent Floor Collapse

A floor collapse in the shape of a tent; when a floor collapses and an interior partition or wall holds up the center of the fallen floor. If the interior partition were not present, the result would be a pancake collapse.

8. V-Shaped Floor Collapse

The collapse of a floor at the center of the floor beams; the broken center of the floor section collapses down upon the floor below and both ends of the floor section remain partially supported or rest up against the outer bearing walls.

9. Secondary Collapse

The collapse of additional portions of the original collapse structure, or taller structures onto smaller structures, causing the collapse of the smaller buildings.

BY ORDER OF THE FIRE COMMISSIONER AND CHIEF OF DEPARTMENT

VENTILATION

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GLOSSARY

Auto-Exposure The extension of fire via the exterior of a building from a fire originating in the same building.

Backdraft Occurs when a fire burns in a closed compartment with a limited amount of ventilation. The products of combustion (smoke) will fill the compartment and create an atmosphere with insufficient oxygen to support flaming combustion. Suddenly, when a ventilation opening introduces fresh air into the hot environment, a mixing of gases will occur. An ignition source inside the compartment will initiate combustion and propagation (burning) of the gases, resulting in a turbulent explosion (deflagration) causing an increase of pressure, forcing the expanding gases out of available ventilation openings. These expanding gasses on the exterior may ignite and burn. Generally, backdrafts will occur in proximity to the main body of fire and require a sudden change in ventilation. Backdrafts can cause significant structural damage and potential collapse. See **Smoke Explosion**.

Decay Stage The stage of fire development within a structure characterized by either a decrease in the fuel load (fuel-limited) or available oxygen (ventilation-limited) to support combustion, resulting in lower temperatures and lower pressure in the fire area.

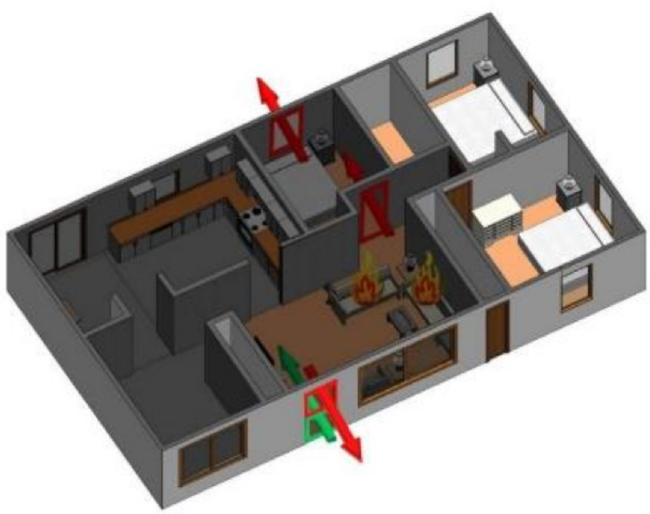
Door Control The process of ensuring the entrance door providing access to the fire area is controlled and closed as much as possible until water is applied to the main body of fire. Steps must be taken to prevent the door from locking behind the entering members. By controlling the door, we are controlling the flow path of fire conditions from the high pressure of the fire area towards the low pressure area on the other side of the door. Door control limits fire development by controlling the flow path of fresh air at the lower level of the open door towards the seat of the fire, and limits the movement of smoke and heat to unaffected areas of the structure.

Fire Growth Potential The potential size or intensity of a fire based on the available fuel load, room size and oxygen.

Flashover A transition in the development of a compartment fire when surfaces exposed to thermal radiation feedback from fire gases in excess of 1100°F reach their auto-ignition temperature more or less simultaneously. This causes the fire to spread rapidly throughout the space, resulting in fire involvement of the entire compartment or enclosed space. This transition can only occur if there is sufficient heat, air and fuel to support combustion.

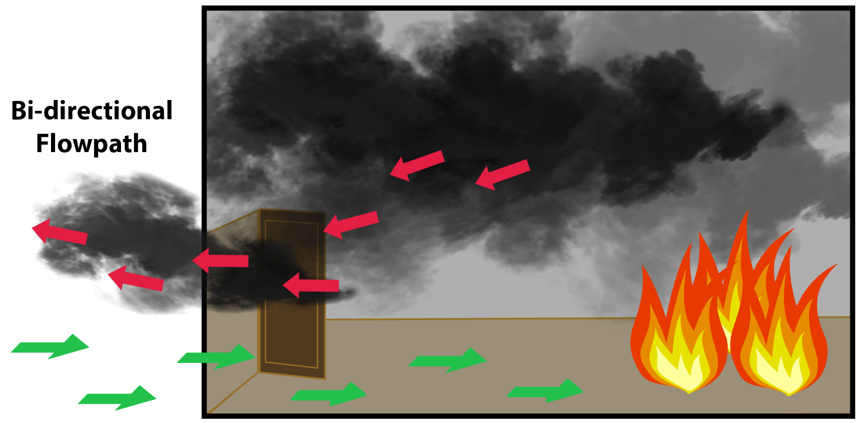
Flow Path The movement of heat and smoke from the higher pressure within the fire area towards the lower pressure areas accessible via doors, window openings and roof structures. As the heated, expanding fire gases are moving towards the low pressure areas, the thermal updraft of the fire is pulling in additional oxygen from the low pressure areas. This can be a bidirectional or unidirectional flow dependent on the location of the main body of fire in relation to the ventilation opening and the neutral plane. Based on varying building designs and available ventilation openings (doors, windows, etc.), there may be multiple flow paths within a structure. Any operations conducted in the flow path will place members at significant risk due to the increased flow of fire, convective heat and smoke toward their position.

Multiple Flow Paths



Bidirectional Flow Path

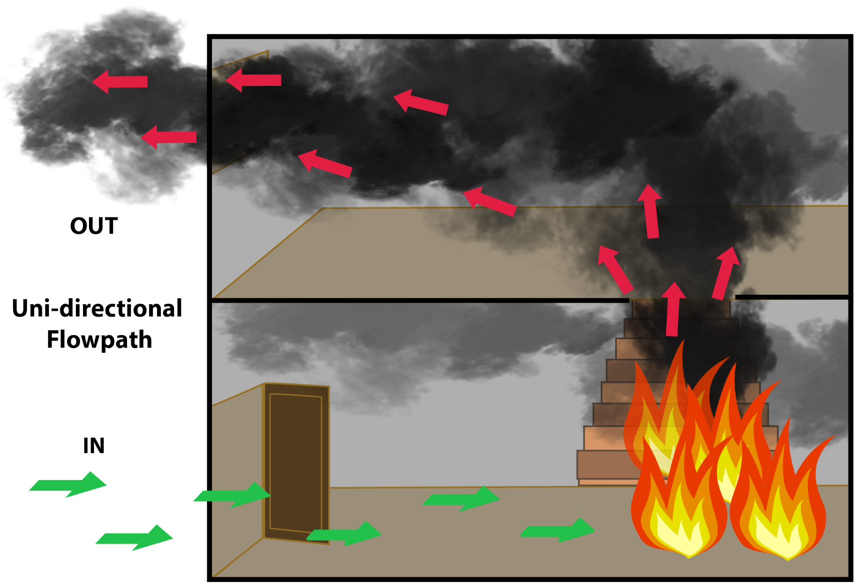
A flow path where hot gasses from the fire area (higher pressure) flow towards a ventilation point (lower pressure) AND an entrainment of fresh air in the opposite direction back to the seat of the fire.



Example of a single room compartment fire - As the fire grows and uses the available oxygen, the neutral plane drops lower in the open doorway. The doorway is a bidirectional flow path. The hot gasses and smoke exhaust out above the neutral plane and fresh air is pulled into the fire compartment below the neutral plane.

Unidirectional Flow Path

A flow path where hot gasses from the fire area (higher pressure) flow towards a ventilation point OR an air entrainment back towards the seat of the fire. <u>All gas movement is in one direction</u>.



Example of a multi-level compartment fire: As the fire grows and uses the available oxygen, the neutral plane will be higher in this compartment due to the ventilation point above. Here we see fresh air pulling in through the doorway in one direction and hot gases exhausting out of the ventilation point on the floor above in one direction.

Flow Path Control The tactic of controlling ventilation points prior to water application will have the following benefits:

- Limit additional oxygen into the space, thereby limiting fire development, heat release rate and smoke production.
- Control the movement of heat and smoke conditions out of the fire area to the exterior and other areas within the building.

Fuel Limited Fire Fires in which the heat release rate and fire growth are controlled by the characteristics of the fuel because there is adequate oxygen available for combustion.

Fully Developed Stage The stage of fire development which has reached its peak heat release rate within a compartment. This usually occurs after flashover, resulting in floor to ceiling burning within the compartment, creating heat conditions untenable for civilians and members.

Growth Stage The stage of fire development when the heat release rate from an incipient fire has increased to the point where heat transferred from the fire and the combustion products are pyrolyzing adjacent fuel sources. The fire begins to spread across the ceiling of the fire compartment (rollover).

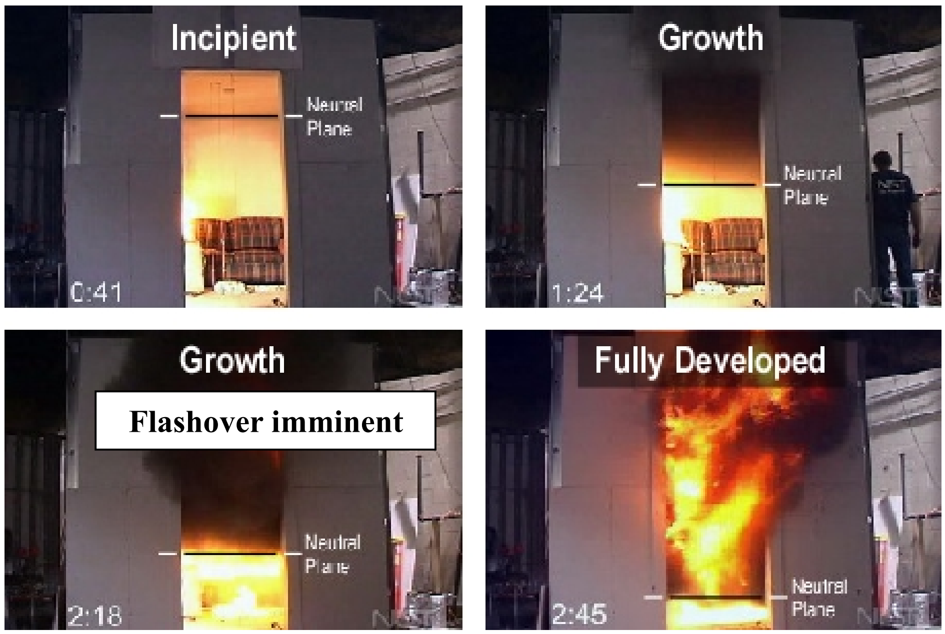
Heat Release Rate The rate at which energy is generated by the burning of a fuel and oxygen mixture. As the heat release rate increases, the heat, smoke production and pressure within the area will increase and spread along available flow paths towards low pressure areas (open doors, windows and roof openings).

Horizontal Ventilation The opening or removal of windows or doors on any floor of a fire building which will become flow paths for fire conditions.

Incipient Stage The early stage of fire development where the fire's progression is limited to a fuel source and the thermal hazard is localized to the area of the burning material.

Modern Content Fire Fires that involve hydrocarbon and synthetic-based contents such as foam rubber, nylon, rayon and polypropylene. Modern fires have a high heat release rate. Modern fires rapidly react to ventilation and the in-flow of additional oxygen.

Neutral Plane The boundary layer in a structure fire where below it, air will be drawn into the structure, and above it, combustion gasses will be exhausted. The neutral plane can be an indicator of the stage the fire is in, and will drop down towards the floor as the fire grows in intensity.



Pyrolysis The transformation of materials into their basic compound when subjected to heat. Contents will continue to off-gas (pyrolize) and add to the flammable fuel load within the compartment as long as the material is subjected to elevated temperatures.

Rollover Occurs in the growth stage when sufficient fuel, heat and oxygen are available to allow flame spread in the upper, hot gas layer inside the compartment. When observed at the ceiling level, rollover shall be taken as an indicator that fire conditions are rapidly deteriorating and flashover may be imminent.

Note: Members encountering rollover conditions must immediately open the hoseline to cool the environment or exit the fire area and control the door until the arrival of the hoseline.

Smoke The combination of airborne solid particulates, liquid particulates and gases emitted when a material undergoes pyrolysis or combustion. Smoke is a heated fuel source and a toxic mixture that contains numerous poisonous gases and carcinogens such as carbon monoxide, hydrogen cyanide and phosgene.

Smoke Explosion Occurs when a fire burns in a closed compartment with a minimum amount of ventilation. The flammable products of combustion form a mixture with sufficient oxygen and are ignited either internally or externally which can result in a turbulent explosion (deflagration) of greater or lesser degree. These expanding gasses may ignite and burn on the exterior. Generally, they occur remote from the fire area and may not necessarily be a high heat condition. They tend to initiate in a void space between floors or in a remote portion of the cockloft. Typically, a light smoke condition may be present in the compartment below the void space prior to the smoke explosion. No additional ventilation is needed to occur for a smoke explosion to occur.
See **Back Draft**.

Situational Awareness The on-going activity of assessing what is going on around you during the complex and dynamic environment of a fire incident. Operations will be more effective and safer by continually observing your surroundings, communicating conditions to other members and monitoring handie-talkie transmissions.

Tenability An assessment on whether units can operate within the fire area based on the conditions encountered and the impact of these conditions to potential victims and members.

Ventilation The controlled and coordinated removal of heat and smoke from a structure, replacing the escaping gases with fresh air. This exchange is generally bidirectional with heat and smoke exhausting at the top and air flowing in towards the fire at the bottom. The fire will pull the additional air flow into the building towards the fire which can intensify the fire conditions. This exchange can occur by opening doors, windows or roof structures. **Controlled, communicated and coordinated** ventilation will facilitate quicker extinguishment and limit smoke and fire spread.

Ventilation-Induced Flashover A flashover initiated by the introduction of oxygen into a pre-heated, fuel-rich (smoke filled), oxygen deficient area. Modern content fires rapidly consume more of the available oxygen within the fire area creating conditions favorable to a ventilation-induced flashover.

Ventilation Profile The appearance of the fire building's ventilation points showing the flow paths of heat and smoke out of the structure as well as any air movement into the structure. This is an evaluation of fire behavior.

Examples of ventilation profile indicators include:

- Changes (increase or decrease) in volume, pressure or velocity of smoke and/or fire venting from an opening.
- Smoke under pressure from an opening converting to flame.

Changes of ventilation profile indicators must be communicated via handie-talkie to the Ladder Co. Officer operating inside the fire area and the IC.

Ventilation Tactics The coordinated and controlled opening of ventilation points in a structure to facilitate fire operations.

VEIS VEIS (Vent, Entry, Isolate, Search) is the approved tactic when entering a structure through an opening (door or window) to search an area for the location of the fire or to locate possible victims. The priority upon entering the area via a window is to close the door to the room or area in order to isolate that area being searched from the fire area. When entering a fire area via a doorway entrance, the door needs to be controlled until the fire area is further isolated or a charged hoseline is advancing on the fire. By isolating the area, we are controlling the flow path of the fire, heat and smoke towards the ventilation point as well as controlling the air flow from the ventilation point towards the fire area.

Ventilation for Extinguishment The controlled and coordinated ventilation tactic which should coincide with the Engine Company extinguishment of the fire.

Ventilation for Search The controlled and coordinated ventilation tactic performed to facilitate the movement of a firefighter into an area to conduct a search for victims.

Ventilation-Limited Fire A fire in which the heat release rate and fire growth are regulated by the available oxygen within the fire compartment.

Vertical Ventilation The vertical venting of structures involving the opening of bulkhead doors, skylights, scuttles and roof cutting operations. These are methods of releasing smoke and heat from inside the fire building and will generally create unidirectional flow paths.

1. INTRODUCTION

1.1 ***Redacted for PFS***

1.2 When ventilation and suppression tactics are controlled and communicated between interior and exterior members, and coordinated by the **Ladder Company Officer inside the fire area**, we dramatically increase the survivability of trapped civilians. In addition, this can increase the safety of our members and improve the effectiveness of overall operations.

2. FIRE DYNAMICS AND VENTILATION

2.1 Successful ventilation tactics begin with the understanding of basic fire dynamics as well as how a ventilation tactic will impact the fire's behavior.

2.2 Controlled, communicated and coordinated ventilation is necessary to remove heat and smoke to facilitate hoseline advancement. The exchange of air is bidirectional when there is a single vent opening on the same level as the fire. Heat and smoke will exhaust at the top and air will flow in towards the fire at the bottom. The fire will pull the additional air flow into the building towards the fire which will intensify fire conditions. This is known as a bidirectional flow path.

2.3 When there are multiple ventilation openings these openings can act as an inlet, outlet or bidirectional vent. In this instance, air will flow in towards the fire from one vent opening known as the inlet while heat, smoke and fire vent or exhaust from another vent opening known as the outlet, thus forming a unidirectional flow path. Recognition of a unidirectional or bidirectional ventilation opening is important in determining the flow path and can be useful in determining the inlet, outlet, number of ventilation openings and the most advantageous attack position for the hoseline.

2.4 Some important fire dynamic concepts to understand regarding fire development are:

2.4.1 Modern content fires are largely comprised of hydrocarbons and synthetics which rapidly consume the available oxygen in the fire area as they burn.

2.4.2 Modern content fires quickly become ventilation-limited fires due to their higher fuel load. An additional contributing factor is the energy efficient construction of buildings, which limits the amount of available oxygen within the fire area as well as retaining the heat of the fire.

2.4.3 Modern content fires enter an early decay stage, producing heavy smoke and varying and decreasing heat conditions, due to the limited available oxygen to support flaming combustion. The fire will remain in the decay stage as long as it remains ventilation limited.

2.4.4 The necessary oxygen to support fire growth can be supplied by improper ventilation tactics or if the windows fail. If indications of an early decay stage exist upon arrival, uncontrolled and/or uncoordinated ventilation can have negative outcomes for both civilians and operating members.

2.4.5 The Traditional Fire Behavior Curve follows the below stages. (Figure 1)

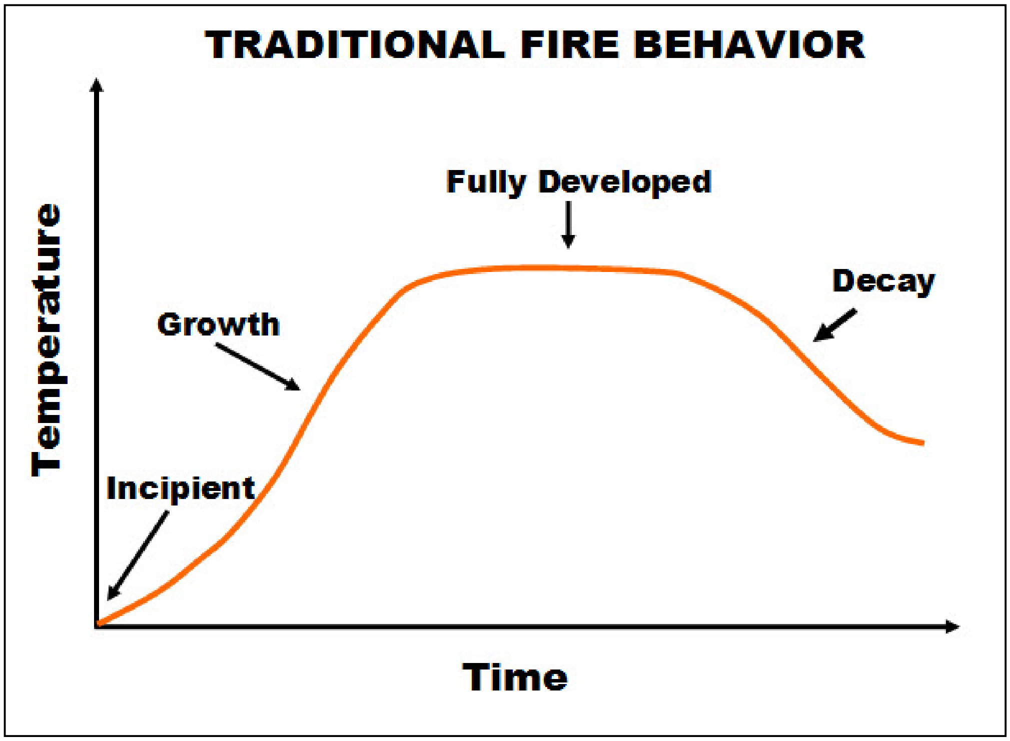
- Incipient
- Growth
- Fully developed
- Decay

2.4.6 The Modern Fire Behavior Curve diagram differs from the Traditional Fire Behavior Curve as follows: (Figure 2)

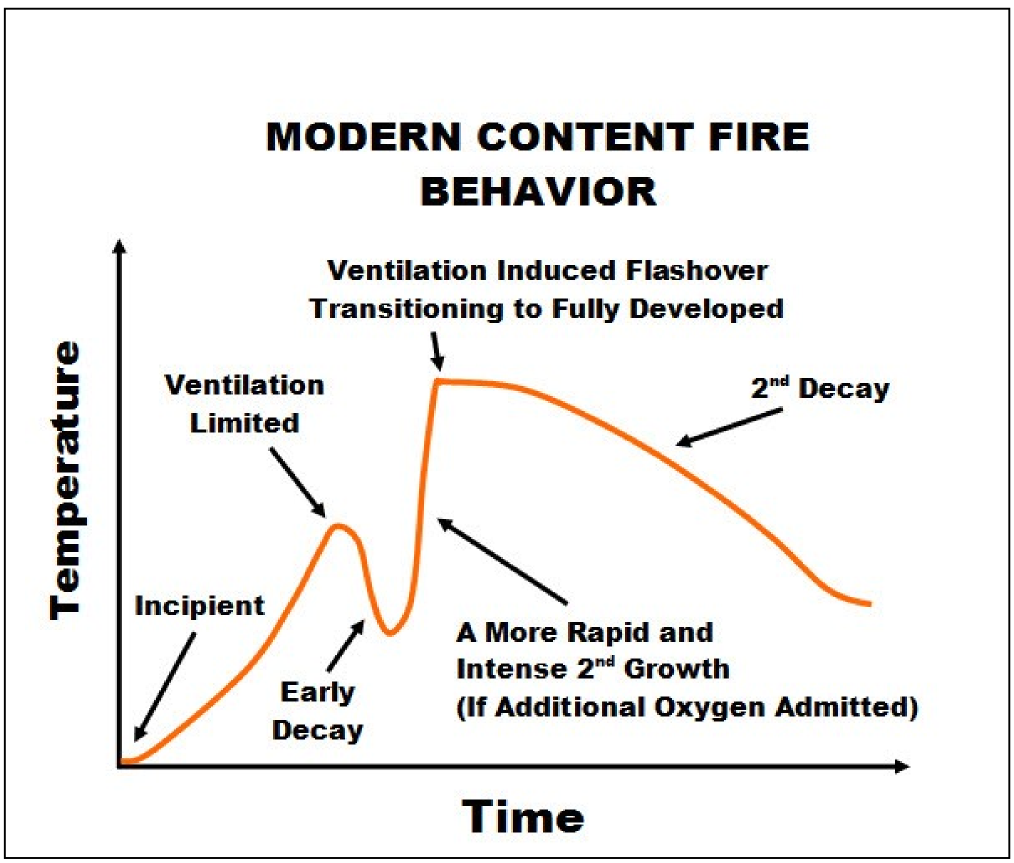
- Incipient
- A Rapid Growth stage that consumes the available oxygen very quickly.
- Due to this rapid consumption, the fire will enter into an earlier oxygen-limited Decay stage when compared to traditional fires, and will remain in the Decay stage if no additional oxygen is introduced to the fire area. When units encounter this earlier Decay stage, they should make every effort to control the ventilation of windows and maintain control of the doors to the fire area. If additional oxygen is admitted to the heated atmosphere through ventilation openings, the following can occur:
  - The fire regains its energy, increases its heat release rate and enters into a Rapid Second Growth stage, generating more heat and increased smoke production.
  - This may be followed by a ventilation-induced flashover and transition into the Fully Developed stage.
  - It ends in a Second Decay stage as the fuel load is depleted or the fire is extinguished.

2.4.7 The Coordinated Attack Fire Behavior Curve- differs from the Modern Fire Behavior Curves as follows: (Figure 3)

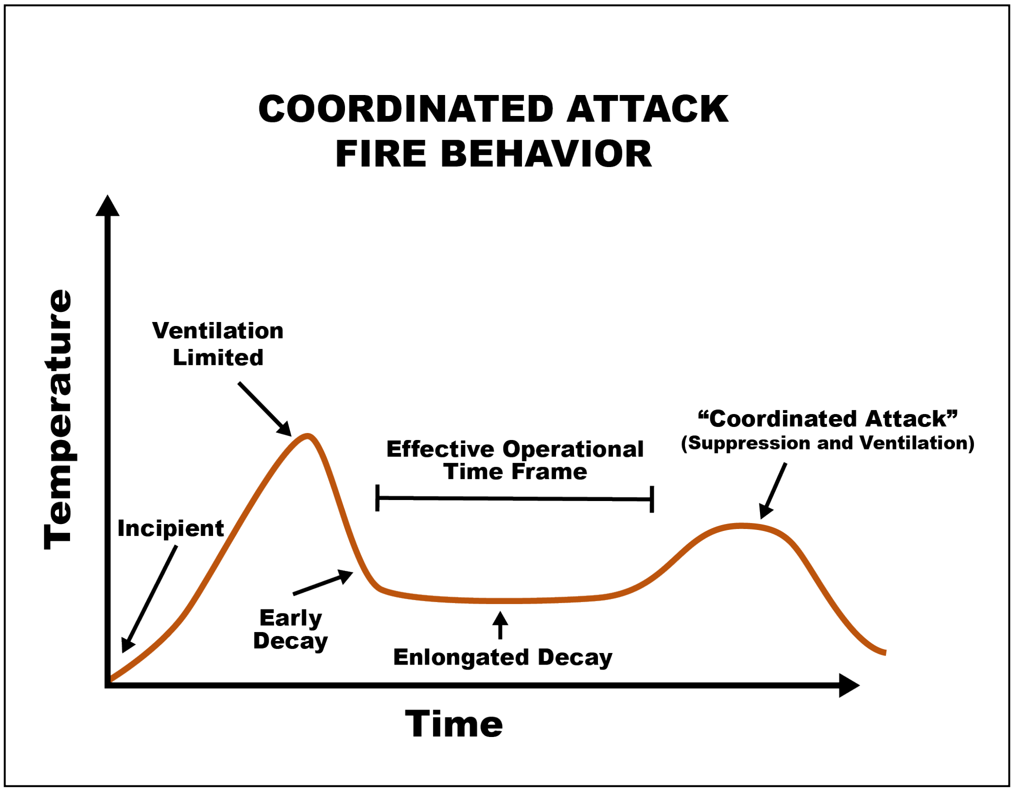
- The fire will behave in the same way up until the Early Decay stage.
- If there is no additional oxygen admitted to the heated atmosphere, the fire will stay in an Elongated Decay stage. An Elongated Decay stage where the fire is kept ventilation-limited is the stage where firefighters can effectively operate and extinguish the fire by denying the fire additional oxygen, thereby limiting fire growth and smoke production. This Elongated Decay stage is maintained by firefighters by coordinating ventilation with the application of water on the fire.
- By controlling, communicating and coordinating the fire attack, ventilation will occur, increasing the fire growth momentarily, which will be followed by suppression and extinguishment.



(Figure 1)



(Figure 2)



(Figure 3)

3. CONTRIBUTING FACTORS AFFECTING VENTILATION TACTICS

3.1 Over the years, the fire service has experienced a series of profound changes that collectively create an increased danger and complexity on the fireground. In addition to understanding the changes in fire dynamics, our ventilation tactics have also been affected by the following:

- Energy efficient building construction (such as energy efficient windows, additional insulation) coupled with modern building contents (hydrocarbon-based products versus natural fibers) expose firefighters to more rapid heat development and intense thermal conditions. The increased heat release rates of modern fires create more convective heat along the flow path from the fire area. This convective heat is absorbed by the member's personal protective equipment (PPE) at a faster rate than radiant heat, putting members at greater risk of burns.

- Due to the potential for rapid fire growth, our PPE has evolved to provide greater overall thermal protection; however, this can often make it difficult to detect deteriorating and unsafe conditions; resulting in members penetrating further into, and remaining longer in, an untenable area. It is critical for members to conduct a proper size-up of the fire conditions prior to entering an IDLH environment. PPE was not designed to allow members to go further within a fire area; it was designed to protect members in the event that conditions quickly transitioned to an untenable situation. Units need to operate in a controlled manner, continually assessing conditions and stages of the fire, and coordinate and communicate ventilation and suppression within, and between, units.

- ***Redacted for PFS***

- Hydraulic forcible entry tools allow quicker access to the fire area resulting in an increase in the time gap between the Ladder Company gaining access to the fire area and the extinguishment of the fire. Prior to the use of hydraulic forcible entry tools, it was common for a hoseline to be in position at the door while the Ladder Company was still forcing entry into the occupancy. Until a charged hoseline is available to advance on the fire, it is critical to control the flow path of fire conditions by maintaining control of the entrance doorway to the fire area and coordinate horizontal and vertical ventilation.

- The above factors make it critical to control, communicate and coordinate our ventilation tactics with interior operations. Proper communication will increase the situational awareness of all operating members, thereby allowing them to anticipate changing conditions.

4. VENTILATION PROFILE SIZE-UP

4.1 On each response, officers and firefighters must conduct an initial size-up which includes the type of building, occupancy and conditions on arrival as well as the known life hazard. Part of this initial size-up should also include a ventilation profile of the fire conditions. This ventilation profile should note:

- The location where smoke or fire is venting from the building.
- Evaluation of the volume, pressure and velocity of the smoke venting from the building. It is equally important to evaluate the air being pulled into the building which is an indicator of a ventilation-limited fire condition.
- When fire or smoke is not venting out of open windows.
- Fire and smoke should be venting outwards and upwards. If the smoke and fire are venting downward, horizontally or pulsing from an opening in the building, this indicates the fire conditions may be wind impacted. Any unusual ventilation profile must be immediately communicated to the Ladder Company Officer inside the fire area to be vented and the IC. Indications of a wind impacted fire require the consideration and implementation of alternate strategies.
- Any change to the fire conditions as the incident progresses, or as the result of ventilation tactics performed by members, must be communicated to the Ladder Company Officer inside the fire area to be vented and the IC.

  Example: When heavy smoke venting from an opening transitions to visible fire.
- The following critical fire indicators observed during size-up may greatly impact safety and operations:

- While in the Decay stage, the fire may no longer have enough pressure to push smoke from the fire area or building. The assumption that the absence of smoke pushing from a building is a positive sign, is not accurate. Modern content fires require the control of ventilation tactics to prevent a ventilation-induced flashover.
- Heavy flames out of a window are usually an indicator of high heat and smoke conditions within a structure, including areas remote from the main body of fire. On arrival, a vented fire should not be considered a favorable condition; we must still control, communicate and coordinate all ventilation tactics.
- The more that venting flames fill an open window, the more members can anticipate severe interior conditions. Modern content fires generate a greater volume of heat and smoke that may overwhelm the ventilation point(s). The excess heat energy and smoke not being vented rapidly pre-heat the interior, causing fire conditions to move toward any other opened ventilation point.

5. VENTILATION COMMUNICATIONS

5.1 To provide situational awareness to all members, while operating, we need to communicate conditions encountered at an incident. Some examples are:

On Arrival Size-up: "E-234 to Brooklyn, Box 1628, 10-75, we have fire out 2 windows on the 3rd floor of a 5-story non-fireproof multiple dwelling. Numerous people on the fire escape."

The above transmission provides information about the incident to responding units. The information about numerous people on the fire escape could indicate that the fire apartment door is open, creating a high heat and smoke condition within the hallway. The occupants from other than the fire apartment who are using the fire escape may have left the windows opened as they exited from their apartment. This potentially creates a flow path if their apartment door is also open.

Exterior Size-up: "L-19 OV to L-19, we have fire on the 13th floor, visible fire in the apartment, no fire or smoke venting out the open windows."

This transmission may indicate that we have a wind impacted fire and these conditions could have a severe effect on interior operations if the apartment door is not controlled. This may also indicate the need for the deployment of a wind control device (in a fireproof structure) and the need for an alternate attack strategy to get water on the fire.

Back to Main TOC

Interior Size-up: "L-26 to Command, we have a fire in apartment 3-D, we have door control and we're in the apartment."

This transmission:

- Indicates the location of the fire apartment for the Engine Company, other members and the IC.
- Confirms that interior conditions are tenable to begin operations and that the door is being controlled.

Fire Floor Operations: "E-58 to L-26, the line is charged and ready to advance"

This transmission:

- Indicates the Engine Company has a charged hoseline at the entrance door, ready to advance. The Ladder Company Officer should direct the Engine Company to the fire area.
  Note: If the fire could not be isolated or located, and based on the smoke and heat levels within the fire area, the interior team may need to exit the fire area. Members should then advance behind the charged hoseline.

Post-Initial Vertical Ventilation Size-up:

"L-165 Roof to L-165, the scuttle is open with heavy smoke pushing out, vented the skylight over a rear room on the exposure 4 side, heavy fire venting from the skylight."

This transmission:

- Indicates units probably have high heat and smoke conditions on the top floor. The location of the skylight and fire conditions can assist interior units in locating the fire.

Initial Roof Operations: "L-102 Roof to L-102, we have heavy smoke pushing out 3rd floor windows in exposure 3-4 corner."

This transmission indicates:

- The Roof FF has conducted an initial size up of the roof and ventilation points, s monitoring handie-talkie transmissions and is about to perform initial vertical ventilation.

6. VENTILATION TACTICS - GENERAL

This document outlines the basic ventilation principles for use at fire incidents. Tactics for specific building types are outlined in the various Firefighting Procedures volumes/books.

6.1 At structural fires, ventilation tactics are used to ventilate the building both horizontally and vertically. When these tactics are properly controlled, communicated and coordinated, the following can be expected:

- An increase in the survivability of trapped civilians and an increase in the safety of our members as they search for the fire and/or victims by controlling flow paths.
- Facilitation of an effective operation by controlling fire development, and limiting the spread of fire, heat and smoke conditions within the fire area and throughout the entire structure.

Note: All members are reminded that conducting ventilation remote from the immediate fire area can have a negative impact on civilians and members caught in the flow path. Uncoordinated ventilation can intensify fire conditions and has the potential to create a ventilation-induced flashover. This also applies to situations where fire is already venting out of window(s) remote from your location. Where door control was lost on the fire floor, members have been severely and fatally injured.

7. HORIZONTAL VENTILATION - GENERAL

7.1 All horizontal ventilation tactics, whether Ventilation for Extinguishment or Ventilation for Search, require communication with, and coordination by, the Ladder Company Officer operating inside the fire area to be vented.

7.2 Horizontal ventilation tactics include controlling the door and window openings until a charged hoseline is advancing **within** the fire area and extinguishing the fire. The benefits of controlling the flowpath and properly performing horizontal ventilation are:

- Reducing temperatures in the fire area, limiting fire extension and auto exposure.
- Limiting the in-flow of additional oxygen, reducing the potential for a ventilation-induced flashover.
- Improving conditions within hallways and stairwells by limiting the movement of heat and smoke from the immediate fire area.
- Maintaining tenability within the fire area, increasing the time available to locate the fire and search for victims.
- Limiting fire growth, permitting a rapid advance of the attack hoseline within the immediate fire area, allowing for quicker extinguishment.
- Reducing the danger of heat and flame passing over or around the attack hoseline.

8. HORIZONTAL VENTILATION OPERATIONS - FIRE AREA

8.1 Interior Operations: All interior and exterior horizontal ventilation tactics **must** be controlled, communicated and coordinated by the **Ladder Company Officer inside the fire area to be vented.** Before ordering any horizontal ventilation, this Officer must evaluate the impact that this tactic will have on interior conditions.

8.1.1 ***Redacted for PFS***

8.2 Exterior Operations: All horizontal ventilation tactics performed from the exterior must be controlled, communicated and coordinated by the Ladder Company Officer operating inside the fire area to be vented.

8.2.1 Members operating on the exterior shall:

- Conduct a size-up and communicate conditions to the Ladder Company Officer (e.g. life hazard, ventilation profile, bars on windows, wind conditions, etc.) while getting into their operating position,
- Monitor handie-talkie transmissions to maintain situational awareness.
- Notify the Ladder Company Officer when they are in position to ventilate as directed; this can either be Ventilation for Search or Ventilation for Extinguishment.
- Communicate to the Ladder Company Officer any change to the ventilation profile caused by ventilation tactics or window failure.

Note: Additional responsibilities of members performing horizontal ventilation are addressed in the various Firefighting Procedures volumes/books.

8.3 ***Redacted for PFS***

9. VERTICAL VENTILATION – GENERAL

The change in the fire dynamics of modern content fires require that ALL ventilation be controlled, communicated and coordinated with operations on the fire floor. Modern content fires generate greater volumes of smoke until the fire is extinguished, or kept vent limited. This continuous smoke generation of modern fires may quickly overwhelm available exhaust ventilation points and will not provide the intended or expected removal of smoke and heat conditions from the interior. If the door to the fire area is open, or not controlled, before a charged hoseline is available to extinguish the fire, and roof ventilation is not controlled or coordinated with interior operations, the immediate vertical air flow created may draw fire conditions into the hallway and up the interior stairs, continuously filling the stairway with heat and smoke. This may place members and civilians on the fire floor and floors above in an untenable environment. In order to minimize the likelihood of this occurring, it is critical that the initial vertical ventilation be coordinated with door control of the fire area.

9.1 The benefits of coordinating vertical ventilation **with** door control of the fire area include the following:

- The vertical flow path can begin to remove the heat, smoke and fire gases from the public hall and stairwell pending the arrival of the charged hoseline.

- It will relieve the upper portions of the building of heat, smoke and fire gases, permitting a thorough examination of the hallways for potential victims. Additionally, it will reduce the potential of smoke migrating into uninvolved areas of the building. Members will still require full PPE, use of the SCBA and TIC to effectively conduct these searches.

10. VERTICAL VENTILATION OPERATIONS - GENERAL

10.1 Interior Operations: Initial vertical ventilation tactics must be controlled, communicated and coordinated by the Ladder Company Officer operating inside the fire area to be vented.

10.1.1 ***Redacted for PFS***

10.2 Exterior Operations: Initial vertical ventilation tactics can be conducted upon reaching the roof. The Ladder Company Officer operating inside the fire area will advise the Roof Firefighter when vertical ventilation is to be withheld or delayed.

Note: Initial vertical ventilation is the venting of bulkheads, scuttles or skylights over stairwells and hallways. When skylights are vented, members must recognize that this action is non-reversible.

10.2.1 Members performing initial vertical ventilation shall:

- Upon arrival on the roof, conduct an initial size-up of the incident and monitor handie-talkie transmissions to improve situational awareness.

- Conduct a size-up of the roof for available vertical ventilation points, including a ventilation profile.

- Conduct a visual survey of the exterior of the building. Look for any life hazard and reassess the ventilation profile of the fire conditions.

- Communicate findings to the Ladder Company Officer (i.e. life hazard and ventilation profile.)

- **Initial vertical ventilation shall be performed unless the Roof Firefighter is ordered to delay or withhold this action.**

- If initial vertical ventilation is delayed or withheld the bulkhead shall be forced open temporarily to check for trapped occupants.

- After initial vertical ventilation is completed, it shall be communicated to the Ladder Company Officer.

- Perform additional venting as needed dependent upon fire conditions.

- Any change in fire conditions caused by vertical ventilation tactics must be communicated to and by the Ladder Company Officer and the IC.

Note: These operational responsibilities regarding vertical ventilation are addressed in the applicable Firefighting Procedures volumes/books.

11. VENTILATION FOR EXTINGUISHMENT

11.1 Ventilation for Extinguishment is the controlled and coordinated ventilation tactic which facilitates the Engine Company's extinguishment of the fire. This tactic must coincide with the application of water on the seat of the fire.

11.2 This ventilation tactic requires venting the window(s) of the immediate fire area while the Engine Company is extinguishing the fire. The member on the exterior may be in position prior to hoseline placement and must coordinate their actions to prevent premature ventilation. Premature ventilation allows the fire to grow and spread through the fire area, endangering occupants and members. Once in position on the exterior, perform a size-up, communicate the ventilation profile and await permission to vent from the Ladder Company Officer.

11.3 To properly coordinate Ventilation for Extinguishment between the interior and exterior operating forces, all members must monitor handie-talkie transmissions to ensure proper communications prior to performing ventilation.

11.4 The member on the exterior waiting to perform the horizontal Ventilation for Extinguishment of the immediate fire area shall listen for the following transmissions from the Engine Company Officer:

- The notification from the Engine Officer to the Engine Chauffeur to start water. "E-162 to E-162 chauffeur, start water."

- The notification from the Engine Officer to the IC that water is being applied to the main body of fire. "E-310 to Command, we have water on the main body of fire.

The transmissions above are indications to the exterior member to **<u>prepare</u>** to conduct Ventilation for Extinguishment. Before venting the window(s), the member must communicate and coordinate with the Ladder Company Officer inside the fire area to be vented. "L-3 OV to L-3, ready to vent." "L-3 to L-3 OV 10-4, vent the windows."

Note: This horizontal Ventilation for Extinguishment tactic only applies to the window(s) in the **<u>immediate</u>** fire area (fire compartment) and only for the member venting the immediate fire area. Any additional horizontal ventilation tactics must be communicated with and coordinated by the Ladder Company Officer operating in that area prior to performing such ventilation. This communication and coordination with interior operations will reduce the likelihood of any negative impact on interior fire conditions.

12. VENTILATION FOR SEARCH

12.1 Ventilation for Search is a horizontal ventilation tactic performed to facilitate the movement of a member into an area in order to conduct a search for a known life hazard; this has the inherent risk of pulling fire towards the ventilation/entry point. This action needs to be communicated to the Ladder Company Officer operating inside the fire area to be vented as the ventilation may also negatively impact the members operating in the interior.

12.2 ***Redacted for PFS***

12.5 Members conducting Ventilation for Search must consider the following:

- When ventilating windows or doors for access to the interior we are creating new flow paths for fire, heat and smoke conditions.
- The ventilation opening will increase the in-flow of air into the building providing additional oxygen for the fire, while at the same time drawing the fire, heat and smoke towards this ventilation flow point and the member performing the ventilation tactic.
- Operating into and through a flow path places members at extreme personal risk. There has been a substantial increase in serious or fatal injuries to members due to members being caught in the flow path of fire conditions.

12.6 The member(s) performing Ventilation for Search shall comply with the following:

- The Ladder Company Officer shall be notified when a search team enters from the exterior to conduct a search for a **known life hazard** or when they are entering to conduct standard search procedures.
- The Ladder Company Officer shall acknowledge the report and take appropriate action to assist and support any rescue operation. If the Ladder Company Officer and interior team have quicker access to the location of a victim or to the area requiring a search, the Ladder Company Officer may decide to disapprove the entry to search in order to limit any negative impact caused by the additional ventilation.
- Members venting for search should be cognizant of the location of the main body of fire and the position of hoselines. Officers must notify these members searching away from hoselines when the hoselines begin to advance toward their position.
- Prior to venting the window for access, the member must determine if the ventilation profile indicates that the area may be tenable for search and does not pose a high risk to the member.

- Members should also consider other factors, such as wind conditions, potential for auto-exposure and if there is a life hazard above their position.

- Once a decision has been made to enter, the member entering should choose the tactic most appropriate. This may initially entail opening the window to judge the ventilation profile; this would maintain the ability to reclose the window if conditions dictate. Prior to entry, member may clear out the window for unobstructed access and entry. Members must be cognizant that the flow path may change in either case.

- Upon completion of clearing the window, and before entering, the member should reassess the smoke and heat conditions to determine if the area is tenable. If conditions now prevent access, immediately notify the Ladder Company Officer of this situation.

- If conditions are tenable, the member should reach in and probe the immediate area for potential victims.

- After venting and entering, the priority action for the member is to isolate the area by closing a door before conducting the search (VEIS). By isolating the area, the conditions in the room should improve as the closed door will stop the flow of fire conditions and the window will provide an exhaust vent allowing a safer and more effective search.

- Search the room and locate any victim. The Company Officer and IC shall take necessary action to support the rescue effort.

  Note: If a victim is found prior to isolating the room, the member shall isolate the room and proceed with the rescue effort.

  Note: ***Redacted for PFS***

12.7 Ventilation tactics, whether Ventilation for Extinguishment or Ventilation for Search, must be coordinated with interior operations and communicated to, and controlled by, the Ladder Company Officer to ensure the safest and most effective operation possible.

13. VENTILATION – NON-FIREPROOF MULTIPLE DWELLINGS - SPECIFIC

13.1 Vertical Ventilation

- The Firefighter(s) operating on the roof of a Non-fireproof Multiple Dwelling should immediately begin vertical ventilation tactics unless this firefighter receives a transmission to withhold or delay vertical ventilation. While moving into position, it is important that the Roof Firefighter listen for handie-talkie transmissions that indicate a lack of door control or a delay in fire extinguishment which is an indication that vertical ventilation may be delayed. After initial vertical ventilation is completed, it shall be communicated to the Ladder Company Officer.

13.2 Horizontal Ventilation

- The tactics for horizontal ventilation are different than vertical ventilation and always require permission from the Ladder Company Officer operating inside the fire area to be vented. Hearing transmissions from the Engine Company Officer, such as ordering the Chauffeur to start water or a transmission to the Incident Commander providing an update on the fire attack, does not alleviate the requirement to obtain permission to vent, but rather, should be a sign to the exterior member to prepare to conduct Ventilation for Extinguishment.

14. VENTILATION - HIGH RISE FIREPROOF MULTIPLE DWELLINGS - SPECIFIC

The following section covers ventilation tactics for High Rise Fireproof Multiple Dwellings. This includes fireproof apartment buildings 75 feet or more in height, including New York City housings projects.

14.1 Horizontal Ventilation

- Horizontal ventilation of the fire apartment in the FDNY is limited and controlled by the first Ladder Company Officer operating inside the apartment. This officer will initiate and/or control (prevent) horizontal ventilation of the fire apartment. No other company officer or firefighter should attempt any ventilation of this apartment without the approval of this Ladder Company Officer.
- Entry and search of this apartment can be extremely hazardous based on the height of the building, weather, wind conditions, location of the apartment and by stack effect. The Ladder Company Officer may decide that the fire can best be extinguished without any horizontal exterior ventilation. The Incident Commander will control all other forms of ventilation other than that of the fire apartment.

14.2 Vertical Ventilation

- Roof ventilation operations can dramatically affect the air flow (from high pressure areas to low pressure areas) inside the building. Changes in building pressures and air flow can cause changes in the fire's growth that could have adverse effects on fire suppression.
- When the roof is remote from the fire floor, venting the stairwell may have little or no effect on smoke removal due to stack effect and decreased thermal lift.
- Vertical ventilation shall only be performed at the direction of the Incident Commander. This must be coordinated through direct communication with the Engine and Ladder Company Officers operating in the fire sector or the area.

- ***Redacted for PFS***
- The firefighter(s) assigned to roof operations, during the ascent to the roof level, must monitor floors for any smoke accumulation that poses a threat to civilians. The location and severity of observed conditions must be communicated to the Incident Commander. Additionally, this member must remain at the roof level to ensure that bulkhead doors remain closed until the Incident Commander orders them vented.
- Firefighters on the roof will be in position to assist the Ventilation Support Group with stairwell pressurization and/or sequential ventilation (floor by floor ventilation; conducted later in the operation).
- When a firefighter operating on the roof discovers a condition that prevents the control of the bulkhead, such as a broken bulkhead window, or a missing or damaged bulkhead door, the Incident Commander and units operating must be notified.

15. LOW RISE FIREPROOF MULTIPLE DWELLINGS

- In New York City, low rise fireproof multiple dwellings are generally older buildings and may be found in proximity to high rise fireproof multiple dwellings. These building are less than 75 feet in height. Since their construction is fireproof, apartment fires will present fire problems similar to those in taller fireproof buildings. Because of the lower building height of these fireproof buildings and the heavy smoke conditions that usually occur in the attack stairway after the attack has begun, emphasis will generally be placed on venting the attack stair bulkhead after approval of the Incident Commander, earlier in the operation. This is done to relieve conditions in the attack stairway and/or public hallways. Sometimes these stairwells are unenclosed and result in a quicker smoke buildup on the upper floors.
- Although roof ventilation is emphasized and conducted earlier in low rise fireproof multiple dwellings, **permission must still be granted** by the Incident Commander before providing vertical ventilation via the attack stair bulkhead. However, similar to high rise fireproof multiple dwellings, the first Ladder Company Officer will initiate and control ventilation of the fire apartment.

16. ***Redacted for PFS***

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BY ORDER OF THE FIRE COMMISSIONER AND CHIEF OF DEPARTMENT

FIREFIGHTING PROCEDURES
OVERHAUL OPERATIONS
August 30, 2023

OVERHAUL OPERATIONS

1. INTRODUCTION

1.1 Overhauling is the practice of opening walls, ceilings, partitions, voids, etc., to check for extension. In the fire area, initial overhaul begins after the main body of fire has been knocked down and a primary search has been completed. In all other areas, checking for extension must begin as soon as possible.

1.2-1.4 ***Redacted for PFS***

2. TOOLS

2.1 Hooks

2.1.1 Come in various sizes: 6, 10, 12, 15, or 20 feet. The six-foot hook is the most commonly used hook. Hooks are the most efficient tool for pulling ceilings and can also be used for opening walls or removing trim.

2.1.2 There are three different types of hooks: (Figure 1)

A. Wooden Hook with a Pike End.

B. Halligan Hook with the shaft made of metal or fiberglass.

C. The Sheetrock Hook which has a sharp cutting head that has proven useful for pulling tin ceilings. It will have a metal or fiberglass shaft.

Figure 1

2.1.3 Specific methods of opening-up with the hook will be discussed later in this bulletin.

2.1.4 Hooks must be carried in a professional manner with the hook straight up and close to the body, ready to be used.

2.1.5 When using the hook to pull ceilings, do not "cup" the bottom of the hook handle. If the hook strikes a solid object, serious injury can occur.

2.2 Halligan

2.2.1 One of the most versatile tools in the FDNY arsenal.

2.2.2 Walls can be opened-up utilizing the halligan in a similar method to the hook.

2.2.3 Specific methods of opening-up with the halligan will be discussed later in this bulletin.

2.3 Portable Lights

2.3.1 One of the most important tools during overhaul operations. Proper lighting will reduce injuries and make the workload easier.

2.4 Saws (Figure 2)

2.4.1 The gas-powered portable power saw is the primary tool for cutting of floors and roofs.

2.4.2 The Dewalt 9-inch battery powered saw can also be used during overhaul. Unlike the gas-powered portable saw, it will operate well in smoke filled environments.

2.4.3 The reciprocating saw, or Sawzall, is extremely useful during overhaul. It can be equipped with a metal cutting blade, wood blade, or combination/demolition blade. Various uses for this saw will be discussed later in this bulletin.

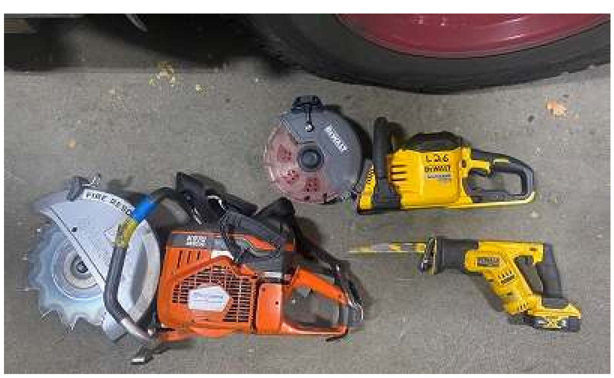

Figure 2

2.5 Thermal Imaging Camera

2.5.1 When used properly, the thermal imaging camera is a tremendous asset for initially locating a fire as well as conducting a rapid primary search. Modern building materials and insulation, coupled with a lack of fully understanding the limits of the camera may lead to smoldering fires being missed. **The thermal imaging camera is not a substitute for properly opening-up voids during overhaul.**

2.6 When any of the above tools are carried into the area of overhaul and not immediately used, they should be grouped together and not placed below the area being opened-up. It is a good practice to drive the pike of a halligan or tip of a hook into a nearby wall at approximately shoulder height (Figure 3). This will help to avoid losing the tool while maintaining it in a readily accessible location.

Figure 3

3. BUILDING CONSTRUCTION

3.1 All members should have a working knowledge of construction features so that they will be aware of the most probable points of fire extension and the simplest manner of opening up for examination. They should also familiarize themselves with the names of common building construction terms so they can properly inform other members of fire travel. Consult specific firefighting procedures for occupancy specific construction information.

3.2 Basic Framing Terms

3.2.1 Bays: The open area between wall studs or between beams in a floor or a roof.

3.2.2 Header: A beam that runs across the top of a window or door opening. It can also describe a beam which carries the ends of joists which are cut off in framing around an opening such as a scuttle or chimney. Headers often carry a load from above, and care should be used if they must be removed.

3.2.3 Lintel: A horizontal building member, supporting the weight above an opening, such as a window or a door. When overhauling, lintels should **not** be removed, regardless of charring, as they support a considerable amount of brickwork.

3.2.4 Rafter: Closely spaced beams supporting the roof and running parallel to the slope of the roof.

3.2.5 Sleeper: Wood strips embedded in concrete to provide a nailing base for the under flooring.

3.2.6 Stud: Vertical structural elements in a wall or partitions arranged in rows and used for the support of lath, plaster wall board, etc.

3.2.7 Joist: A structural framing element that supports the floor above and serves as a point to hang the ceiling below.

3.2.8 Tail Beam: A beam which frames into the header instead of spanning the entire distance between supports.

3.2.9 Trimmer: A joist at the side of an opening and carrying one end of a header.

3.2.10 Furring (Lath): A lightweight piece of wood or metal strips applied to a surface to support plaster, stucco, or other surfacing materials.

3.3 The removal of major structural elements is a very serious matter. Floor joists or roof joists should not be removed if complete extinguishment can be accomplished in any other manner. LINTELS in brick walls over exterior doorways and windows should **not** be removed, regardless of charring, as they support a considerable amount of brickwork. Removing them from their anchorage could result in injury and considerable property damage through partial collapse.

3.4 Properly installed fire stopping is recognized as a great aid in the prevention of both lateral and vertical fire extension. Unfortunately, due to poor workmanship, deterioration due to age, subsequent repairs and renovations, failure to provide any fire stopping initially, removal during electrical and plumbing installations, etc., fire stopping cannot be relied upon to be properly installed or maintained.

4. GENERAL OVERHAULING TECHNIQUES

4.1 Light Fixtures

4.1.1 Light fixtures are both a common location for fires to start and for fire to extend.

4.1.2 All light fixtures in the fire area must be opened up and examined for fire extension (Figure 4). This should be done after the power has been shut off to the fire area.

Figure 4

4.1.3 Members must be aware that in older buildings, gas lines are frequently found near light fixtures. The piping is extremely old and may only be plugged with wax. When opening up around light fixtures, exercise caution to not inadvertently damage gas piping. These pipes are often not controlled by the individual apartment meter and isolating the gas supply to them may be difficult.

4.2 Ceilings and Walls

4.2.1 Generally, the hook is the most efficient tool for opening up ceilings and high areas, while the Halligan is most efficient for trimming doors and windows and opening up lower areas of walls.

4.2.2 Overhauling ceilings and walls is a basic operation that should take place at all structure fires. Several different methods of ceiling and wall construction have existed over the years. Each method provides unique challenges for efficient opening up as well as risks of injury to firefighters. Members should familiarize themselves with all of the following types of wall and ceiling construction.

4.2.3 Sheetrock

A. Sheetrock ceilings may hinge and fall in large sections.

B. Indiscriminately pulling sheetrock walls and ceilings with a hook or halligan may break the sections off into smaller pieces, increasing the workload. If possible, have the engine company wet the ceiling down with a handline prior to pulling sheetrock. This will loosen large sections from their screws and make opening-up easier.

C. To assist in opening sheetrock the "Punch" technique is recommended. Using short forceful blows, punch relief "cuts" into a three-sided upside-down U-shape in the sheetrock (Figure 5A). These cuts should be close but do not necessarily have to connect. The top cut should typically span three to four bays.

D. After the relief cuts have been made, place the tool along the top cut and gently pull to release the sheetrock from its connection points (Figure 5B).

Figure 5A

Figure 5B

E. Repeat this process until the area is completely opened-up.

F. Two Firefighter Technique pulling adjacent bays (Figure 6). Two members with hooks should position themselves next to each other. They should drive their hooks into adjacent bays and pull down in unison. This will cause larger sections of sheetrock to hinge down. The members will move forward together, keeping the sections of sheetrock that they are pulling safely in front of them.

Figure 6

4.2.4 Plaster and Lath

A. Joists generally run parallel to the short side of the building. Lath is attached at right angles to the joists. Each piece of lath usually covers two or more bays. The ceiling is penetrated with one firm stroke with the hook end parallel to the lath (Figure 7A). This breaks only one lath on the upstroke instead of two or three. The hook is then turned to form a right angle to the lath and the ceiling is pulled with short, sharp strokes close to the beam (Figure 7B). This method is fast and conserves energy. The firefighter should not stand directly below the ceiling being pulled. They should keep the work in front of them.

Figure 7A

Figure 7B

B. To make a hole low in a sidewall or partition, the hook or halligan is held like a javelin before penetrating the wall. After an opening has been made, the tool is then pushed down behind the lath, and the lath is removed by pulling the tool away from the wall (Figure 8). This should open the wall to the floor or baseboard. When prying with the hook, hold the tool close to the metal part of the hook. Excessive strain which may break the wooden handle must be avoided.

C. To make a hole high in a sidewall or partition, the wall should be struck with a sharp blow. After penetration with the tool, pull down or pry out if leverage is possible (Figure 9).

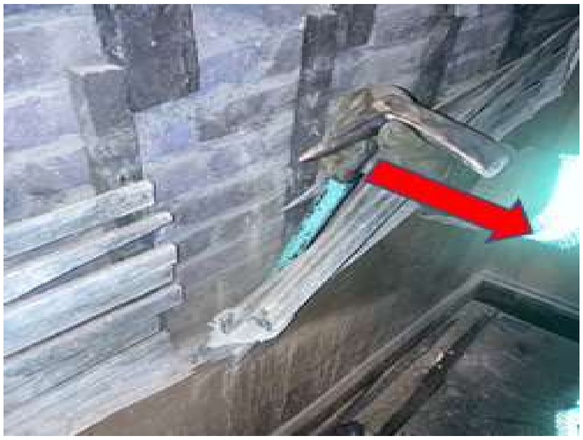
Figure 8


Figure 9

4.2.5 Tin

A. Tin covered ceilings are applied to furring strips which are nailed to the ceiling joists. Small access holes may be made by finding the seam which may run diagonally across the joists (Figure 10A). Once a seam has been exposed, members can strike the hanging seam with the side of a hook to release larger sections (Figure 10B). Alternatively, access may be made near light fixtures. Members should avoid grabbing tin with their hands.


Figure 10A


Figure 10B

B. If it is necessary to remove a large section of tin, it should be pulled with two hooks to reduce fatigue. Two members can efficiently remove large sections of tin by putting holes with the tool near the end and pulling down in unison. (Figure 11)

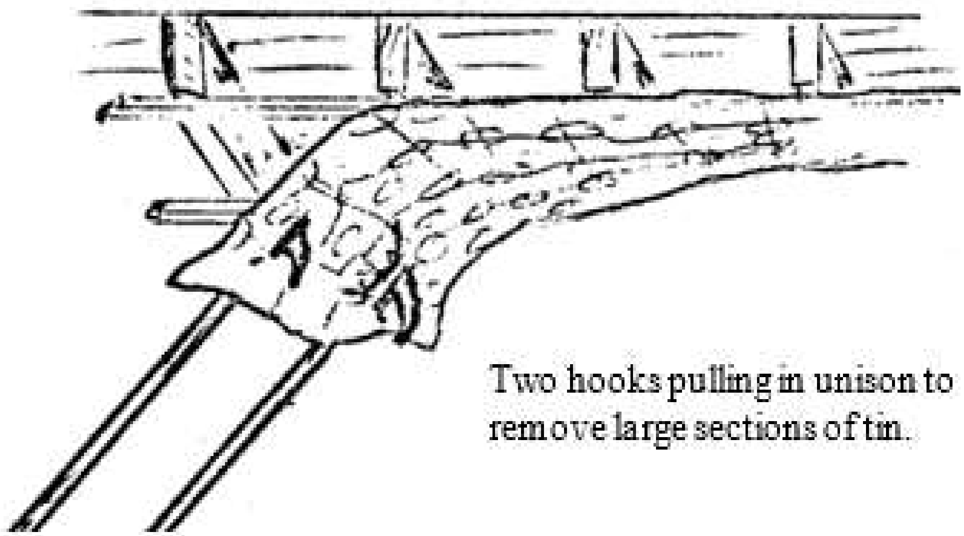

Figure 11

C. For top floor fires where tin ceilings are present, particularly in commercial occupancies, a 12-foot straight ladder should be brought to the roof. After a hole has been cut in the roof, the ladder can be used to push the tin ceilings down from the roof level. This is the most efficient method of opening-up tin ceilings. However, it must be carefully coordinated with members operating in the fire area to prevent injury.

D. Tin should be folded to a size which makes it safe to carry and placed outside away from the line of travel. A minimum amount of handling of tin is advisable to reduce injuries.

4.2.6 Wire Lath

A. Wire lath is one of the most difficult types of walls or ceilings to open up. A technique similar to the “Punch” method can be utilized, with small probing holes being placed along the inside of two adjacent joists. Larger sections can then be pulled down from a safe area. Wire lath can also be found in walls. Large sections can be removed utilizing two flat head axes. The blade of one axe is placed against the plaster and the back of that axe is struck with the flat side of the other. This process is repeated until a larger section of wall has been cut, and then the entire section is removed in one piece.

B. The reciprocating saw with a demolition blade or the Dewalt 9 inch battery powered saw are also extremely useful in opening wire lath walls and ceilings. The blade is run on the inside of a ceiling joist or wall stud for several feet. A corresponding cut is made on the inside of the adjoining joist. A short connecting cut is made forming an inverted "U" shape, this entire section can now be pulled in one piece (Figure 12).

Figure 12

C. Extreme caution must be used to avoid striking members with heavy sections of wire lath ceiling. The weight, along with the sharp edges of the wire lath can cause serious injury.

4.2.7 Suspended Ceilings - General Information

A. There are two distinct types of suspended ceilings: Lightweight suspended ceilings and more substantially framed out drop ceilings. Both present unique issues and safety concerns for firefighters.

B. When pulling ceilings, the joists of the floor above or roof rafters should be visible. If they are not visible, suspect an additional drop or suspended ceiling. It is not uncommon to find several drop ceilings installed in a commercial occupancy (Figure 13). All ceilings must be opened-up to check for fire extension.

Figure 13

C. Suspended ceilings can hide significant fire extension in their plenum spaces.

D. Ceiling supports (sometimes undersized) exposed to fire and the extreme weight of hundreds of gallons of water accumulating on top of the drop ceilings can lead to a sudden collapse of large sections of the ceiling.

E. Members should exercise caution when removing suspended ceilings to ensure that the metal grid strips do not strike them in the face and cause injury.

4.2.8 Lightweight Suspended Ceilings

A. They are suspended by lightweight straps, steel wire or steel bars, all of which are quickly affected by fire (Figure 14).

Figure 14

B. This type of ceiling is commonly found in commercial occupancies. It is also present in many other structures, particularly private dwellings.

C. A rapid collapse of a large ceiling section can occur if the wire supports are exposed to fire. A maze of electrical wiring and HVAC ducts are often found above these ceilings. Entanglement is the primary hazard during a lightweight suspended ceiling collapse. Members will rapidly become tangled in the ceiling grid and the electrical wires.

D. These ceilings should be “punched” with a hook to check for construction, water accumulation, and fire conditions. A ceiling tile should be removed immediately upon entering a room or occupancy to ensure fire has not extended above the members heads.

E. If the entire ceiling is being removed, the best practice is to first remove one full row of tiles. Next, simply remove the adjacent "Cross Tees" and the next row of ceiling tiles will all fall to the floor. Continue with this pattern until the entire ceiling has been removed.

4.2.9 More Substantially Framed Drop Ceilings

A. Found in older commercial occupancies as well as multiple dwellings. These ceilings usually consist of wood framing such as 2'x4's hung from roof or ceiling joists. Sheetrock or plaster and lath is then hung from the underside of this dropped wood framing.

B. A widespread collapse can be anticipated when this type of drop ceiling is encountered, especially if fire is burning in the plenum for a prolonged period of time.

C. The accumulation of water above the ceiling is a major concern, particularly if the space is filled with insulation or sound proofing material. This will act like a sponge, adding thousands of pounds of water weight above the ceiling. A hole should be made with a hook to check for fire as well as water accumulation above the drop ceiling.

D. This type of ceiling is significantly heavier than a lightweight suspended drop ceiling. The primary hazard during the collapse of these ceilings is the danger of members being crushed and trapped.

4.2.10 Mini-Cocklofts (Plenums)

A. Many new law tenements and H-types originally had 9 to 10-foot ceilings in their apartments. In an effort to save money on energy bills and to hide pipes, wiring, and ductwork, landlords installed a second lower ceiling at eight feet. (Figure 15) This framed ceiling creates a 1 to 2 foot-deep "mini-cockloft" or plenum in the apartment. This space is often undivided, extends over a large section of the apartment, and allows for unimpeded fire travel.

Figure 15

B. It is possible for a fire in a remote area to enter this space and rapidly spread throughout the void. If this fire is undetected, it can lead to a collapse of a large section of ceiling. Members have been trapped by sections of ceiling violently coming down behind them, allowing fire to blow down and cut off their means of egress.

C. Similar to lightweight suspended ceilings, an inspection hole should be made in the ceiling immediately inside the apartment door, or another area of entry (OV firefighter entering from a fire escape or portable ladder, etc.) to check for any indications of fire burning in the mini-cockloft.

4.3 Trimming Windows and Doors

4.3.1 Windows and door frames are two common locations where hidden fire is found.

4.3.2 Window and door assemblies should generally be removed in the opposite order that they were installed. The trim around windows and doors is put on last during construction and should be the first pieces removed.

4.3.3 The most efficient and safest way to remove the trim is to start at the top or bottom corner. If the hook is being used, start at the upper corner. Slide the curved end along the wall above the mitered corner of the trim. Pull the tool down with a short powerful motion, setting the tip of the hook behind the trim (Figure 16A). Then, pull the shaft of the hook away from the wall (Figure 16B). This will loosen the top and side molding. Repeat this procedure on the other upper corner. Continue to slide the curved section of the hook behind the molding, prying it away from the wall and work your way down until the entire section of trim has been removed.


Figure 16A


Figure 16B

4.3.4 When removing trim with the halligan, begin on a lower corner and pry the trim away from the wall. Starting at the lower corner will prevent the trim from falling on the member when removal is completed. If difficulty is encountered, strike the trim with the pike end of the halligan. The smaller splintered pieces can then be removed.

4.3.5 If smoldering is visible behind the trim of the window, completely remove the window jamb and sill. This is particularly important in private dwellings and other occupancies where the window is set into a combustible wood frame wall. Furthermore, older windows commonly found in Brownstones, Tenements, and Queen Annes were installed with sash weights in the space between the jamb and studding (Figure 17). Replacement windows can conceal this void requiring removal for examination.

Figure 17

4.3.6 For complete removal of a window to the rough opening, use the point of the halligan to spike and split the sill. Once the sill is removed, the sides of the window can be trimmed by prying with the halligan. After the sides are removed the top portion can easily be removed by pulling downward with a hook or halligan.

5. FLOORS

5.1 The floor must be checked for charring or signs of fire extension. If the floor is charred the ceiling below must be opened-up. Sometimes a deep-seated smoldering fire can occur below the subfloor and along the top of the floor joists below. It is extremely difficult to get water into this area. If fire is suspected in this area, the saw must be called for and the flooring and subfloor must be removed.

5.2 There may be no subflooring in Old Law Tenement buildings. This may allow fire to extend rapidly to the floor above and the floor below.

5.3 Bathroom floors in H-types and other larger New Law Tenements are often made of thick tile wet-laid in concrete. Wood joists support the tile floors and extend underneath bathtubs and showers. If smoke is seen or an odor of wood burning is present, the ceiling must be pulled in the bathroom below, even if no heat is detected. Smoldering fires often occur in this difficult to reach void due to overheated electrical lines igniting floor joists.

6. FIRE FLOOR (FIRST ARRIVING LADDER COMPANY)

6.1 The search for fire extension on the fire floor is started as soon as possible, after completing a primary search. Many fires do not initially ignite the structure. The contents of a building are ignited and burn first, with the flames eventually spreading to the structure. Stuffed chairs, mattresses, clothing, or unattended food cooking on the stove are items that initially burn. After the building contents are extinguished, the structure is checked for fire extension.

6.2 A **SEVEN**-sided approach to overhaul in the fire area will be conducted at all medium and advanced fires. This will include **completely** opening-up all four walls in the fire room and **completely** pulling the ceiling. The sixth side involves a thorough examination of the floor. In addition to looking for extension, all floors and areas under beds must be carefully examined for possible fire victims (or pets) prior to commencing with standard overhaul. The results of this examination should be communicated to the Fire Sector Supervisor. The seventh side will involve opening up all exterior areas of the building exposed to fire, including combustible siding, cornices, soffits, EIFS, etc.

6.3 Overhauling in the immediate fire area begins at the seat of the fire and progresses outward from there. The ceiling of the fire room should be opened-up first, generally starting at the point where the fire was most intense and working towards a clean area of ceiling space. At a minimum, the entire ceiling of the fire room should be pulled. Any ceiling light or fan fixtures should be removed and examined for signs of extension. The practice of opening several small holes in the ceiling and leaving the remainder of the room concealed is unprofessional and must be avoided.

6.4 ***Redacted for PFS***

6.5 There is no exact way that temperature can be determined by touch, but if a wall or a partition is hot to the touch of a gloved hand or shows signs of charring, it must be opened-up. The halligan or 6-foot hook is used to open-up any point where the fire may have entered (pipe recesses, electrical fixtures, etc.). The opening should be made above the hot spot to cut off the extension. As the studs are often 16” apart, it is important to feel for heat at proper intervals so that no bays are skipped. If fire is found in a bay, it and two adjacent bays in each direction should be opened for examination. The entire length of the bay should be opened-up.

6.6 Fire that is found in ceiling bays or adjacent to steel beams that span across partition walls into other uninvolved rooms or apartments must be inspected by pulling ceilings to completely expose the structural member in these remote areas. Be aware that I-beams in larger multiple dwellings may run on a diagonal axis and not simply horizontally. This is particularly true in triangle shaped, curved, or other irregularly shaped buildings. If any I-beams are found, both termination points must be checked for fire extension. The termination points for diagonal I-beams are often found in remote apartment lines and fire can spread via these voids to unexpected apartments.

6.7 Any horizontal or vertical voids exposed to fire, such as pipe recesses, electrical conduits, columns (channel rails), or I-beams must be opened and examined for extension. If fire has extended to any of these areas, this information must be transmitted to the IC and to the ladder company on the floor above.

6.8 ***Redacted for PFS***

6.9 For fires that have started in the cockloft or possibly extended to the cockloft, ladder companies in coordination with a charged hoseline, should open up all ceiling bays in the original fire apartment and those adjoining apartments that share a common partition wall. Enlarge the opening in the ceiling so that the engine company may operate into the cockloft from a high vantage point (table, bureau, chair, etc.). The engine company shall sweep the cockloft with the stream. The same opening can also be used to operate the cockloft nozzle later in the operation.

6.10 ***Redacted for PFS***

7. FLOORS ABOVE (SECOND ARRIVING LADDER AND ADDITIONAL LADDER COMPANIES)

7.1 ***Redacted for PFS***

7.2 Baseboard Removal

7.2.1 On a floor above a heavily involved apartment fire, considerable smoke and heat will be expected around the baseboards. Therefore, when operating above a medium or advanced fire, baseboards shall be pulled. The following procedures should be utilized:

A. The hook or halligan may be used.

B. However, the halligan is the most effective tool for removing baseboards.

C. The most efficient and safest method is to start at a corner or joint and drive the tool down with force between the intact wall and baseboard.

D. The member will systematically work the tool along the length of the wall, prying every 8-12 inches until the baseboard has been removed.

E. Members should attempt to remove the baseboard in one piece.

F. When using the halligan, the preferred method is to have the bevel side of the fork against the intact wall. This will provide the most leverage and will work easily in tight quarters (Figure 18A & 18B)

Figure 18A

Figure 18B

G. The chisel end of the halligan hook is another efficient option for pulling baseboard and is used in a similar fashion to the fork end of the halligan (Figure 19).

Figure 19

H. If the baseboard is obstructed by a large object, use the axe to cut the baseboard at a 45-to-60-degree angle on either side as close to the obstruction as possible.

7.2.2 If extension is found during baseboard removal, a charged line shall be requested along with an immediate notification to the Incident Commander. Members shall operate the portable water extinguisher (can) into the baseboard void in a manner that contains the extending fire. If necessary, pots of water may be poured into the baseboard void to control this extension, pending the arrival of a hoseline.

7.3 Opening Walls

7.3.1 ***Redacted for PFS***

7.3.2 Prior to the arrival of a charged hoseline on the floor above, small inspection holes should be made to define the boundaries of the fire extension. If fire is observed, members shall wait until a charged hoseline is in place before further expanding the openings. Once a charged line is in position, these areas must be completely opened-up.

8. ROOF LEVEL OVERHAUL

8.1 The roof firefighter must pay particular attention to signs that fire has extended from the contents to the structure. This evaluation for extension shall be conducted as part of the roof firefighter's initial roof duties and repeated at regular intervals. If the roof firefighter suspects that fire is extending to the structure, they must immediately call for a saw to be brought to the roof. Signs of possible extension include:

8.1.1 Brown smoke pushing around soil pipes, dumbwaiter shafts, scuttles, or other roof openings.

8.1.2 Heat present around soil pipes.

8.1.3 Radio transmissions indicating fire is extending to other floors or remote areas.

8.2 At a top floor fire that has extended into the cockloft, the roof firefighter will have to cut a hole in the roof and push down a portion of the ceiling. Once the roof has been opened-up, all layers of roofing will have to be examined to ensure that a deep-seated smoldering fire is not still burning.

8.3 If fire is smoldering between two-sistered joists, it can be very difficult to extinguish. The joists can be spread by driving a wooden chock between the two joists to allow the water to flow into this tight space and extinguish hidden fire.

8.4 If fire is burning in the cockloft near a scuttle or skylight, the roof will have to be completely cut around the skylight or scuttle to expose all of the framing material. The most efficient method to make this cut is to make four small cuts approximately one foot in length at a 45-degree angle from each corner. Four more cuts should then be made to connect the four corners (Figure 20). The roofing material can then be opened-up on all sides of the skylight or scuttle for a thorough examination of all the framing material.

Figure 20

9-10. ***Redacted for PFS***

11. ENGINE COMPANY OPERATIONS

11.1 ***Redacted for PFS***

11.2 Overhaul operations provide an excellent opportunity for junior members to gain valuable experience operating the nozzle.

11.3 Once all visible fire has been knocked down, the engine company should back the line out of the immediate fire area. This will keep the engine company members safe while providing the ladder company adequate space to thoroughly open-up.

11.4 The engine company should avoid opening the line near ladder company members while they are in the process of overhauling, except in extreme emergencies. The water will rapidly turn to steam and mix with the cooling smoke, resulting in reduced visibility and a delay in exposing hidden fire.

11.5 Once the engine and ladder company officers determine that the fire area has been adequately opened-up, the ladder company firefighters shall exit the immediate fire area. This will prevent ladder company members from being struck with debris dislodged by the hose stream.

11.6 To perform a proper washdown, the nozzle firefighter should direct the stream at the ceiling bay by bay, allowing the runoff to cascade down and extinguish any smoldering debris on the floor. The line will then be repositioned to the other side of the fire area and the joists shall be washed down again from a different angle. This will ensure that water is applied to all surfaces exposed to fire.

11.7 The hose line must be operated as soon as possible into any pipe chase or other vertical arteries that show signs of charring or fire exposure. The nozzle shall be inserted into the opening and operated up the pipe chase, allowing water and steam to extinguish extending fire. The location of this vertical void must be communicated to units operating above to ensure that the void is thoroughly opened-up and examined for additional extension.

11.8 The engine company officer should consider the use of the ½ inch outer stream tip during overhaul. This will reduce fatigue on the nozzle team, allow for deeper stream penetration, and minimize the amount of water weight being absorbed by the contents of the fire area. This is particularly useful for extinguishing deep seated fires during a heavy clutter condition.

11.9 Engine company members operating remotely on a hoseline shall be alert for signs of fire extension. They shall immediately notify their officer of any possible extension.

11.10-11.11 ***Redacted for PFS***

12. ***Redacted for PFS***

13. SAFETY

13.1 The safety suggestions presented here are generally applicable during the firefighting phase of overhauling operations. A significant amount of operational time is spent during the overhaul stage of a fire.

13.2 Many service-connected injuries are incurred during overhauling operations. The proper use of tools, recognition of the hazards, good practices and close supervision are all required to reduce the injury and illness rate.

13.3 When performing overhaul operations in an IDLH environment, all members must use their SCBA and wear their Department issued PPE including bunker coat, bunker pants, bunker boots, helmet, protective hood, and gloves.

13.4 Members should be relieved frequently to conserve their energy and prevent accidents.

13.5 ***Redacted for PFS***

13.6 It is dangerous for more than one or two members to use tools at the same time in a small area.

13.7 In close quarters firefighters should keep their heads down when pulling ceilings to prevent injury.

13.8 When trimming windows, members shall always pull window mounted air conditioners into the room.

13.9 Holes in the floor are usually small and must be protected. This can generally be accomplished by placing a door over them.

13.10 Members stepping onto roofs must pay attention to upside down scuttle covers and sections of roofing material that have been cut. This is indicative of unprotected holes in the roof, and members should proceed with extreme caution. A roof door or short ladder may be used to cover danger spots.

13.11 All loose or bulging plaster on walls and ceilings must be completely removed.

13.12 Hanging wood lath, metal lath, or tin from a ceiling must be trimmed off and removed.

13.13 Hanging ends of cable such as electric (BX), telephone and coaxial television shall be secured near the ceiling. Loops of cable hanging down shall be pushed up out of the way.

13.14 Electrical power should be shut down to the fire apartment as soon as possible.

13.15 Smoldering goods such as clothing, upholstery, carpet, etc. can produce an abundance of carbon monoxide and other toxic gasses. For this reason, such material should be completely extinguished and/or removed from the premises.

13.16 Care should be exercised when overhauling in bathrooms. Large sections of tile floors can collapse suddenly due to floor beams weakened by fire exposure or rot (Figure 32) from years of water leaks no longer being able to support the weight of fixtures such as cast-iron tubs. Use the reach of the hook and stand outside the bathroom to open the ceiling from a safe area.

Figure 32

13.17 Adequate ventilation must be provided to prevent the accumulation of carbon monoxide when using gas powered saws and generators while overhauling within a building.

13.18 Before exiting the building, you must "STOP" and maintain visual contact with another member until you are assured it is safe to exit the building.

13.19 When water has seeped down through several floors, the possibility of wet wires and short circuits require that fuses be removed, or circuit breakers opened for the affected areas and apartments.

13.20 All broken glass must be trimmed from window frames and/or all sashes must be removed so that glass shards or other material will not fall and cause injury or damage. If possible, broken glass and sashes should be pulled into the room when removed from the window frames.

13.21 Reposition all drop ladders and ensure fire escape ladders and landings are free of debris.

13.22 Ensure all assigned tools and equipment are removed from the building.

14-15. ***Redacted for PFS***

BY ORDER OF THE FIRE COMMISSIONER AND CHIEF OF DEPARTMENT

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FIREFIGHTING PROCEDURES (VOLUME 2)
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APPARATUS

1. ENGINE APPARATUS OVERVIEW

1.1 The engine company apparatus is a complex piece of equipment that serves both as a vehicle and as a high capacity water pump.

1.2 There are two primary functions of an engine apparatus in the FDNY:

1.2.1 Transport members and equipment to the scene of a fire or emergency.

1.2.2 Deliver water with sufficient pressure to the fire area for firefighting operations.

1.3 In order to properly use the engine apparatus effectively, it is necessary for all members to be knowledgeable about the critical components of the apparatus.

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1.4 This chapter will describe the critical components of the engine apparatus as it exists in the FDNY. This includes the components listed below, which are described in the following sections:

- Apparatus Pump
- Booster Tank
- Inlets and Outlets
- Drain Valves
- Pump Panel
- Deck Gun
- Hose Beds
- Standpipe Hose
- Hydrant Connections
- Drafting Connections
- Additional Hose and Equipment

1.5 Components of the apparatus itself are described in this chapter. For further information on a specific apparatus, refer to the manufacturer's manual. For a full description of the equipment mentioned above that is carried on the apparatus, see *Chapter 3: Engine Company Equipment*.

2. APPARATUS PUMP

2.1 ***Redacted for PFS***

2.2 Conventional Engine apparatus have the capability to operate their two stages in two different fashions:

2.2.1 Volume Operation

A. When in Volume Operation, the two stages of the pump are operated in parallel, in which water passes through both stages at the same time before it is discharged.

B. Volume Operation enables the pump to discharge up to its maximum rated flow capacity.

C. The idle pressure of an apparatus in Volume Operation is roughly 55 psi.

D. Volume Operation is the default setting for FDNY engine apparatus and is used for the vast majority of engine operations.

2.2.2 Pressure Operation

A. When in Pressure Operation, the two stages of the pump are operated in series, in which water passes through the first stage, and then passes through the second stage afterwards.

B. Pressure Operation enables the pump to reach its highest rated discharge pressure, but only half of its maximum rated flow capacity.

C. The idle pressure of an apparatus in Pressure Operation is roughly 110 psi.

D. ***Redacted for PFS***

2.3 Engine apparatus should be maintained in "Volume Operation" unless the pumping operation needs to overcome head pressure (such as when supplying a standpipe system in a high-rise building). When overcoming head pressure is required, the pump should be switched to "Pressure Operation".

2.4 ***Redacted for PFS***

3. BOOSTER TANK

3.1 The booster tank is a 500-gallon water tank carried by all FDNY Engine apparatus. It is capable of quickly supplying water to a hoseline or deck pipe for a limited period of time.

3.2 ***Redacted for PFS***

3.3 A Tank Vision Gauge is a lighted, multi-color booster tank water level indicator. There are two on the apparatus, which are located on the pump panel and the panel on the opposite side of the apparatus. (Figure 1)

Figure 1

Back to Main TOC

4. INLETS AND OUTLETS

4.1 The apparatus is equipped with a number of connections by which water can be either taken into the apparatus (inlets) or discharged from the apparatus (outlets).

4.1.1 Inlets (Figure 2) are connections by which water can be supplied to the apparatus.

A. Inlets are also called “suctions”.

B. Inlets exist in a number of sizes, including 3”, 4 ½”, and 6”.

C. Inlets may be gated or non-gated. Gated inlets are controlled by an operating handle, which may be located adjacent to the inlet, or at the pump panel.

D. Gated inlets should always be used in the fully opened position.

Figure 2

4.1.2 Outlets (Figure 3) are connections by which water can be discharged from the apparatus.

A. Outlets are also called “discharges”.

B. Outlets come in a number of sizes, including 2 ½”, 3”, and 4 ½”. A reducer is placed on 2 ½” outlets for hose stretches utilizing 1 ¾” hose.

C. All outlets are gated and are controlled by an operating handle located at the pump panel. Outlets are often operated in a partially open position to regulate pressure.

Figure 3

4.2 Inlets and outlets may be color coded to match their corresponding operating handle and bleeder valves.

5. DRAIN AND BLEEDER VALVES

5.1 Drain and bleeder valves are located at a number of points around the bottom of the apparatus and serve the purpose of bleeding air and draining water from the pipes that supply and discharge water from the apparatus. ***Redacted for PFS***

5.2 ***Redacted for PFS***

5.2.1 Drain valves can be opened to drain water from a discharge pipe, which can facilitate breaking down hoselines after an operation, as well as prevent freezing in cold weather. (Figure 4)

Figure 4

5.2.2 For inlets, the bleeder valve is also used to bleed air coming from an intake hose in order to reduce the introduction of air into the pump, which may cause a loss of prime during pumping operations.

5.3 The apparatus pump itself is also equipped with a designated drain valve. (Figure 5)

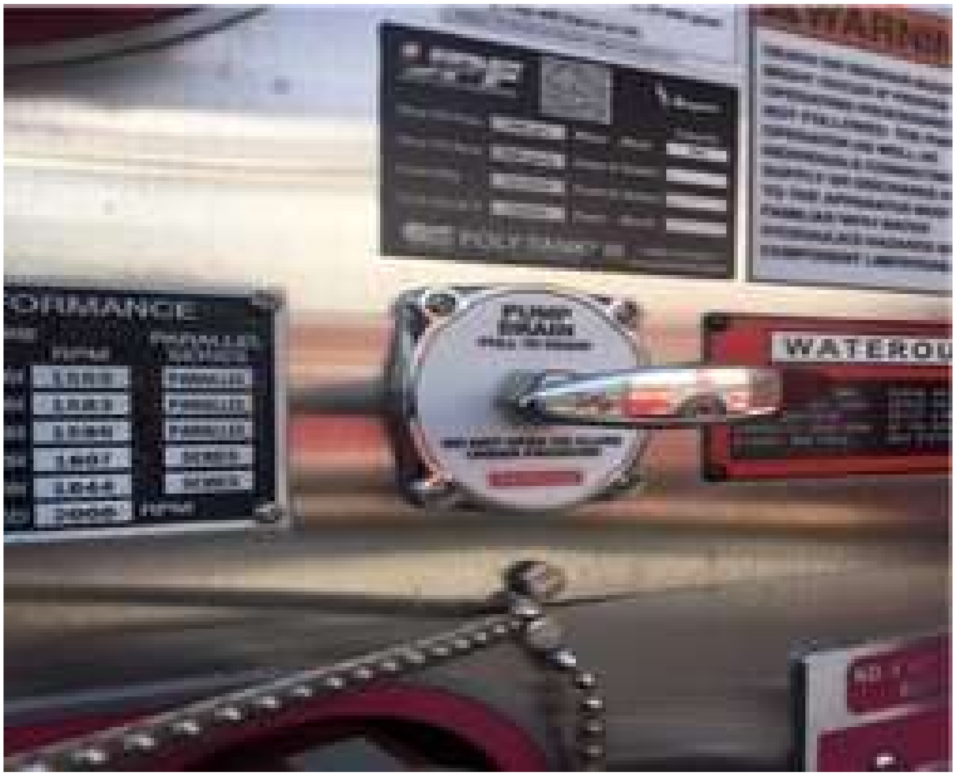

Figure 5

Back to Main TOC

6. THE PUMP PANEL

6.1 The pump panel (Figure 6) is the area on the Chauffeur's side of the apparatus that provides controls and gauges for managing water flow and monitoring the status of the apparatus pump. Discussed below are the key components of the pump panel and their primary functions.

Figure 6

6.1.1 Operating handles for gated inlets (Figure 7) and outlets (Figure 8)

A. The flow of water via the various gated inlets and outlets are controlled by operating handles. All operating handles for outlets are at the pump panel, and the operating handles for gated inlets can either be at the pump panel, or adjacent to the inlet.

Figure 7

Figure 8

6.1.2 Discharge Outlet Gauges

A. Adjacent to the operating handle for each discharge outlet, there is a pressure gauge that provides a reading of the pressure being supplied to that outlet.

B. There is also a flowmeter for each discharge outlet that provides a reading of the amount of water currently flowing via the discharge outlet.

6.1.3 Booster Tank operating handles

A. At the pump panel, there is an operating handle to control the supply of water to the booster tank (Figure 9), as well as an operating handle to control the supply of water from the booster tank to the pump.

Figure 9

6.1.4 Master Inlet Pressure Gauge (Figure 10A)

A. ***Redacted for PFS***

B. This gauge provides a reading of the intake pressure of the apparatus. This is the pressure with which the apparatus is being supplied. For example, this gauge will show the pressure a hydrant is supplying to the apparatus.

6.1.5 Master Pressure Gauge (Figure 10B)

A. ***Redacted for PFS***

B. When properly primed, this will be equal to the sum of the pressure with which the Engine is being supplied (from a hydrant and/or from another pumper relaying water) and the additional pressure being generated by the pump.

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Figure 10A Figure 10B

6.1.6 Transfer Valve (Figure 11)

A. The Transfer Valve is the handle that switches the operation of the apparatus pump from “Volume Operation” to “Pressure Operation”.

Figure 11

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6.1.7 Pro Pressure Governor (Figure 12)

A. The Pro Pressure Governor (PPG) is a computer that controls engine throttle which ultimately adjusts the pump speed. Its purpose is to automatically maintain the uninterrupted supply of proper operating pressure to all hoselines supplied by an apparatus.

B. ***Redacted for PFS***

Figure 12

6.1.8 Primer Button (Figure 13)

A. Adjacent to the PPG, there is a button labelled "Push to Prime". Pushing and holding this button will "prime" the pump, which has the effect of ejecting air from the pump as water is supplied. This prevents air from entering the hoselines that are being supplied.

Figure 13

7. DECK PIPE

7.1 The apparatus deckpipe (Figure 13) is permanently affixed to the engine apparatus and supplied directly by a 3-inch pipe from the pump.


Figure 13

7.2-7.4 ***Redacted for PFS***

8. HOSEBED

8.1 Conventional Engine apparatus in the FDNY are equipped with 4 hosebeds in the rear of the apparatus.

8.2 While the specific organization of the hosebeds may vary among companies based on their response area and response patterns, the following guidelines must be adhered to:

8.2.1 At least one bed must contain 6 lead lengths of 1 ¾” hose.

8.2.2 At least one bed must contain only 2 ½” hose

8.2.3 At least one bed must contain only 3 ½” hose

8.3 The lead length of all hosebeds with either 1 ¾” hose or 2 ½” hose must be maintained with a straight-stream nozzle attached. These hosebeds are intended for fire attack.

8.4 The 3 ½” hosebed is intended to be used as a supply line. It can be oriented with either the male or female coupling leading away from the apparatus and may be maintained with necessary fittings attached to the coupling.

8.5 When a hosebed contains 1 ¾" hose, the first 6 lengths of this hosebed must be 1 ¾" hose. No more (and no fewer) than 6 lengths are permissible. This limitation is due to the high pressures required to overcome the friction loss of more than 6 lengths of 1 ¾" hose.

8.6 The proper loading of hose in a traditional hosebed arrangement will allow the hose to play out smoothly when stretched. When properly loaded, 4 folds of hose in the hosebed is roughly one 50' length of hose. The procedure of packing hose in a traditional hosebed arrangement is fully described in *Chapter 3, Addendum 3: Hose Maintenance.*

8.7 To facilitate stretching hose, the lead lengths of hose in a hosebed may be maintained in a horseshoe arrangement (Figure 14). The procedure of packing hose in a horseshoe arrangement is fully described in *Chapter 3, Addendum 3: Hose Maintenance*.

8.7.1 Both 1 ¾" hose and 2 ½" hose can be arranged in a horseshoe.

8.7.2 Each horseshoe should be comprised of at least one 50' length of hose.

8.7.3 A hose bed can have multiple horseshoes. Horseshoes can be stacked on top of each other on the hosebed, with the lead length on top.

Figure 14

9. STANDPIPE HOSE

9.1 All Engine apparatus must carry a number of lengths of hose arranged into a “roll-up”, intended for use when stretching from a standpipe system. The roll-up is more fully described in *Chapter 3, Addendum 3: Hose Maintenance*

9.2 This hose may be carried on the side board of the apparatus, and is secured using straps and buckles. They may also be carried inside apparatus compartments.

9.3 The following is required to be carried on all engine apparatus:

9.3.1 1 length of 2” lightweight hose, maintained as a roll-up and kept with the 2” nozzle and 1” MST attached. This hose is colored green with a red stripe.

9.3.2 3 lengths of 2 ½” lightweight hose, maintained as roll-ups. One of these lengths must be kept with the 2 ½” nozzle and 1 1/8” MST attached. This hose is white with a red stripe.

9.3.3 For companies staffed with 5 firefighters, 1 additional length of 2 ½” lightweight hose must be carried, maintained as a roll-up.

9.4 Refer to *Chapter 3: Engine Company Equipment* for a complete description of the capabilities of all hoses and nozzles.

10. HYDRANT CONNECTIONS

10.1 All Engine companies must carry a number of hydrant connections, as follows:

10.1.1 3 ½” hose to be used for hydrant connection

A. 3 ½” hose may be carried in the side trays located on each side of the apparatus. This is in addition to the 3 ½” hose on the rear hosebed.

10.1.2 5” yellow hose to be used for hydrant connection

A. A 35-foot length of 5” yellow synthetic hose (soft hydrant connection) is carried on the apparatus to be used exclusively as a hydrant connection.

B. It is carried on the front of the apparatus but may be used to supply inlets on both the front and side of the apparatus.

10.1.3 4 ½” semi-rigid suction and/or 3 ½” soft suction hydrant connection

A. These are used exclusively for hydrant connection.

B. Carried on a designated tray on the Chauffeur’s side of the apparatus.

10.2 *Chapter 3: Engine Company Equipment* has a complete description of all hydrant connections

11. DRAFTING CONNECTIONS

11.1 All Engine companies must carry a number of connections designated to be used for drafting water. FDNY engine apparatus are equipped with the following 3 drafting connections:

11.1.1 10-foot hard connection.

11.1.2 10-foot ribbed drafting connection – with a strainer.

11.1.3 10-foot ribbed drafting connection – without a strainer.

11.2 All 3 connections are carried on designated trays on the Chauffeur's side of the apparatus (Figure 15). Drafting operations are further discussed in *Chapter 5: The Engine Company Chauffeur.*

Figure 15

12. ADDITIONAL HOSE

12.1 In addition to the standpipe hose maintained in roll-ups and hose carried in the hosebeds, additional hose is required to be carried on the apparatus as follows:

12.1.1 At least 4 lengths of 1 ¾" hose shall be carried, rolled or arranged in a roll-up, for use as an additional length in a hose stretch as described in *Chapter 10: Engine Company Emergencies*. One of these 1 ¾" hose lengths should be maintained with a nozzle attached.

12.1.2 Two lengths of 1 ¾" hose to be used as a "booster line". This hose should be maintained with a fog nozzle attached to one length (Figure 16).

A. This hose is intended to be used on outside fires, such as rubbish fires or car fires. In an emergency, it can also be used to apply water from the exterior of the fire building.

B. It should be maintained pre-connected to a discharge outlet. It may also be maintained pre-connected to a gated wye attached to a discharge outlet.

C. This hose may be maintained either rolled or folded. Generally, it is stored on the front bumper of the apparatus.

Figure 16

13. ADDITIONAL TOOLS AND EQUIPMENT

13.1 A wide range of additional tools and equipment are also carried on all engine apparatus. For a full description of the primary functions and capabilities of all equipment carried by conventional engine companies in the FDNY, refer to *Chapter 3: Engine Company Equipment*.

ENGINE COMPANY OPERATIONS
CHAPTER 2, ADDENDUM 1
August 5, 2021

PRO-PRESSURE GOVERNOR

1. OVERVIEW OF THE PRO-PRESSURE GOVERNOR

1.1 The Pro-Pressure Governor (PPG) is a computer located on the pump panel of the engine apparatus that controls the operating pressure of the apparatus pump. (Figure 1)

1.2 Its central purpose is to maintain constant pump discharge pressure at each operating outlet throughout the operation, regardless of the opening or closing of other discharge outlets on the apparatus.

1.3 When effectively engaged, the PPG will maintain the selected pressure setting in the LED display regardless of the number of discharges that are opened or closed, as long as the water supply is capable of supplying the amount of water required.

1.4 This is especially important for operations at which a single apparatus is supplying multiple hoselines. In these situations, the PPG will adjust the engine revolutions per minute (RPMs) whenever a hoseline is opened or closed, in order to maintain the desired pump pressure for each hoseline.

1.5 ***Redacted for PFS***

Figure 1

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2. FEATURES OF THE PPG

2.1 PPG Operating Modes

2.1.1 The PPG can be operated in two different modes, as described below:

A. **PSI Mode** – In the PSI (pounds per square inch) mode, the PPG will automatically maintain the discharge pressure set in the LED display. This is the setting used by all apparatus in the FDNY.

B. ***Redacted for PFS***

2.1.2 ***Redacted for PFS***

2.2 PPG Digital Displays

2.2.1 The PPG has several digital displays, each of which is described below:

A. **SETTING** – This display is located in the center of the PPG and displays the pressure level at which the PPG is currently set.

B. **PUMP DISCHARGE** – This displays the total amount of pressure currently being generated by the apparatus pump and available for supply to discharge outlets. This value will match the "Master Pressure" gauge on the pump panel.

C. **PUMP INTAKE** – This displays the pressure with which the apparatus pump is supplied. This value will match the "Master Inlet Pressure" gauge on the pump panel.

D. ***Redacted for PFS***

2.3 PPG Buttons

2.3.1 The PPG is equipped with 6 buttons, each of which is described below:

A. **IDLE** - The "Idle" button will bring the engine to idle. This has the effect of deactivating the PPG.

B. **INCREASE** - The "Increase" button will increase the pressure setting on the PPG. When pressed momentarily, the pressure increases by 1 psi. When the button is held down, the pressure increases in increments of 5 psi and 10 psi.

C. **DECREASE** - The "Decrease" button will decrease the pressure setting on the PPG. When pressed momentarily, the pressure decreases by 1 psi. When the button is held down, the pressure decreases in increments of 5 psi and 10 psi.

D. **PSI** - The "PSI" button will change the PPG operation to the PSI mode (as previously described). This is the standard setting for all FDNY apparatus.

E. ***Redacted for PFS***

F. **PRESET** - The "Preset" button brings the pump pressure quickly to a pre-determined setting. This setting is further described below.

2.4 PPG Preset Value

2.4.1 A key feature of the PPG is the "Preset", which is a pre-determined pressure value that is uniquely set for each engine apparatus. The purpose of this feature is to quickly set the PPG to a level which will most commonly effectively engage the PPG. This value is the sum of the apparatus idle pressure and the pressure of the water supplied to the apparatus in Volume Operation.

A. This feature is critical because the PPG will not activate unless the setting on the PPG is at least as high as the actual pressure being generated by the apparatus pump. If the PPG setting is lower than the actual pressure generated, the PPG will not be effectively engaged.

B. To ensure the activation of the PPG, the "Preset" is set to the minimum pressure generated by the apparatus, which is equivalent to the total combination of the apparatus idle pressure and the pressure of the water supplied to the apparatus.

C. In various parts of NYC, hydrant pressures can vary significantly, ranging from 40 psi to 100 psi. Due to this variation, the preset value should be set for each apparatus using the procedure described below.

2.4.2 ***Redacted for PFS***

3. PUMP OPERATIONS WITH PPG

3.1 Single Line Operation

3.1.1 Before pressure can be supplied to a hoseline, the apparatus pump must be engaged using the following steps:

A. Place the apparatus transmission in "neutral".

B. Engage the apparatus maxi-brake.

C. Move the "pump shift control" to the pump position (located in the cab).

D. Place the apparatus transmission in "drive".

3.1.2 Once the apparatus pump is engaged, water can be supplied to a hoseline using following steps:

A. Introduce water to the apparatus.

B. Press and hold the "Push to Prime" button on the pump panel.
(this expels air from the pump system).

C. Press the preset button on the Pro-Pressure Governor.

D. Open the desired discharge gate to charge a hoseline.

3.1.3 Slowly open the discharge outlet until the desired line pressure is reached. If the discharge gate is fully opened and more pressure is required, depress the Increase Button until the desired pressure is reached.

3.1.4 The Pressure Governor will adjust engine speed to maintain indicated pump pressure as the hoseline's nozzle is opened or closed.

3.2 ***Redacted for PFS***

4. RELAY OPERATIONS WITH PPG

4.1 At a relay operation, the pumper supplying the water is called the "supply pumper" and the pumper receiving water is called the "operating pumper".

4.2 A concern at a relay operation is ensuring the activation of operating pumper's PPG.

4.2.1 This can be a problem because the operating pumper is receiving water from the supply pumper at a pressure greater than hydrant pressure. The operating pumper is receiving the discharge pressure of the supply pumper, which is hydrant pressure, plus the idle pressure of the supply pumper. This number will be roughly 55 psi higher than regular hydrant pressure. Based on local hydrant pressure, this number can range from 95 psi to 155 psi.

4.2.2 Since the operating pumper's PPG will only effectively engage if the setting on the PPG is higher than their actual pump pressure, the PPG will not activate at their normal Preset value.

4.3 - 4.5 ***Redacted for PFS***

ENGINE COMPANY EQUIPMENT

1. OVERVIEW

1.1 This chapter will describe the various equipment used by engine companies in the FDNY. The aim of the chapter is to describe key physical attributes of each piece of equipment, as well as its pertinent operating capabilities and capacity.

1.1.1 For information on the inspection requirements and out-of-service procedures of standard engine equipment, refer to *Chapter 3, Addendum 1: Engine Equipment Inspection and OOS Procedures*.

1.1.2 For information on the maintenance and routine inspections of hydrants, refer to *Chapter 3, Addendum 2: Hydrant Maintenance*.

1.1.3 For information on the maintenance and annual testing of hose, refer to *Chapter 3, Addendum 3: Hose Maintenance.*

1.1.4 For information on the equipment that exists as part of the water supply infrastructure in NYC that is used by engine companies, specifically, this includes hydrants, sprinkler systems, and standpipe systems, refer to *Chapter 3, Addendum 4: Water Supply Infrastructure Equipment.*

2. HOSE

2.1 Hose is the primary tool for the application and transfer of water in the FDNY. A variety of different size and types of hose are used by units in the Department. This section will describe key characteristics of each type of hose used in the FDNY.

Figure 1

2.2 1 ¾” rubber-lined hose (Figure 1)

2.2.1 1 ¾” hose is the primary attack hose for firefighting operations in the FDNY. Its smaller size and reduced weight provide the benefits of increased speed and mobility while operating.

2.2.2 1 ¾” hose is carried on the hosebeds of all engine and squad companies for rapid deployment at a fire or emergency operation.

2.2.3 Operational specifications

A. Each length of hose is 50 feet long.

B. The coupling size is 1 ½”.

C. Operating pressure is normally limited to 250 psi.

D. The friction loss in each 50-foot length of 1 ¾” hose is 20 psi.

2.3 2 ½” rubber-lined hose (Figure 2)

Figure 2

2.3.1 2 ½” hose is the most versatile type of hose in the FDNY. It can be used as an attack line at a fire or emergency. Additionally, it can be used as a supply line in a number of situations.

2.3.2 2 ½” hose is carried on the hosebeds of all engine and squad companies for rapid deployment at a fire or emergency operation.

2.3.3 When used as an attack line, 2 ½” hose provides increased water flow, but is heavier and more difficult to maneuver than the 1 ¾” line.

2.3.4 Operational specifications:

A. Each length of hose is 50 feet long.

B. The coupling size is 2 ½”.

C. Operating pressure is normally limited to 250 psi.

D. The friction loss in each 50-foot length of 2 ½” hose is 5 psi.

2.4 2” polyurethane-lined lightweight hose (Figure 3)

Figure 3

2.4.1 2” lightweight hose is colored green with red stripes.

2.4.2 2” lightweight hose is carried by all engine and squad companies.

2.4.3 It is only used as the lead (nozzle) length on the attack line when using a standpipe system in residential buildings.

2.4.4 Operational specifications

A. Each length of hose is 50 feet long.

B. The coupling size is 2 ½”.

C. Operating pressure is normally limited to 250 psi.

D. The friction loss in each length of lightweight 2” hose is 10 psi.

E. The midpoint of the hose is painted red. This marking can facilitate a smooth deployment of the hose and is called the “A-fold”.

F. There are reflective arrows on each female coupling that serve as a directional indicator. The arrows point in the direction of the water source.

2.5 2 ½” polyurethane-lined lightweight hose (Figure 4)

Figure 4

2.5.1 2 ½” lightweight hose is colored white with red stripes.

2.5.2 2 ½” lightweight hose is carried by all engine and squad companies.

2.5.3 It is used as an attack line when using a standpipe system.

2.5.4 Operational specifications

A. Each length of hose is 50 feet long.

B. The coupling size is 2 ½”.

C. Operating pressure is normally limited to 250 psi.

D. The friction loss in each length of lightweight 2 ½” hose is 5 psi.

E. The midpoint of the hose is painted red. This marking can facilitate a smooth deployment of the hose and is called the “A-fold”.

F. There are reflective arrows on each the female coupling that serve as a directional indicator. The arrows point in the direction of the water source.

2.6 3 ½" rubber-lined hose (Figure 5)

Figure 5

2.6.1 3 ½" hose is carried by all engine and squad companies.

2.6.2 3 ½" hose is only used as a supply line.

2.6.3 Operational specifications

1. Each length of hose is 50 feet long.
2. The coupling size is 3".
3. Operating pressure is normally limited to 300 psi.
4. The friction loss in each 50-foot length of 3 ½" hose is approximately 3 psi. This number depends upon several factors including the length of the stretch and the amount of water flowing.

3. NOZZLES

3.1 A nozzle is a hose line appliance that is used to direct the flow of water, increase the velocity of flow, or disperse water in various patterns. Nozzles are identified by the type of water pattern created and size of the tip used.

3.2 A nozzle is typically comprised of two components: a shut-off and a tip.

3.3 A shut-off is the portion of the nozzle that contains a handle which controls the opening and closing of the nozzle. Shut-offs may sometimes be equipped with a "pistol grip" handle.

3.4 A tip is an attachable component that shapes the stream of water as it leaves the nozzle.

3.4.1 Tips can either be solid stream or fog stream and exist in a variety of different sizes.

3.4.2 Tips are also classified as Main Stream Tip (MST) or Outer Stream Tip (OST).

A. MST's attach directly to the shut-off and have a threaded outlet orifice. In the FDNY, nozzles to be used for fire attack are equipped with MST's.

B. OST's are smaller and can attach to the threaded outlet orifice of the MST. The only OST used in the FDNY is the ½" tip. The OST should only be attached to the MST for overhaul operations, if deemed necessary.

3.5 There are three basic metrics used to describe the performance of a nozzle:

3.5.1 ***Nozzle pressure*** - In order to create the desired stream, nozzles must be supplied with sufficient pressure "at the tip". This pressure is called nozzle pressure. It is generally measured in psi (pounds per square inch).

3.5.2 ***Nozzle reaction*** - This is a metric that measures the reaction force of water flowing through an open nozzle. It is a mathematically derived metric that is based on the size of the tip and the supplied nozzle pressure. Nozzle reaction provides a standard measure of how strong the force of the nozzle "feels", which allows for comparison between nozzles of different sizes. It is generally measured in pounds.

3.5.3 ***Flowrate*** - This is a measurement of how much water is discharged by the nozzle. It is generally measured in gallons per minute.

3.6 Solid Stream Nozzles

3.6.1 Solid Stream nozzles (also called "Smooth Bore" nozzles) create a solid, straight stream of water when used (Figures 6, 7 & 8). They provide high volume flows at low pressure and have long stream reach, superior penetration, and manageable nozzle reaction.

3.6.2 1 ¾" Nozzle

Figure 6

A. The 1 ¾" nozzle is used with the 1 ¾" hose.

B. It has a 1 ½" coupling and a 15/16" MST that is used for attack.

C. The required nozzle pressure is 50 psi at the tip.

D. At 50 psi nozzle pressure, the flowrate is 180 GPM.

E. The nozzle reaction at 50 psi nozzle pressure is 68 lbs.

F. A ½" OST can be attached to the MST for overhaul purposes.

3.6.3 2 ½" Nozzle

Figure 7

A. The 2 ½" nozzle is used with the 2 ½" hose.
B. It has a 2 ½" coupling and a 1 1/8" MST that is used for attack.
C. The required nozzle pressure is 40 psi at the tip.
D. At 40 psi nozzle pressure, the flowrate is 235 GPM.
E. The nozzle reaction at 40 psi nozzle pressure is 78 lbs.
F. At 50 psi nozzle pressure, the flowrate is 265 GPM.
G. The nozzle reaction at 50 psi nozzle pressure is 98 lbs.
H. A ½" OST can be attached to the MST for overhaul purposes.
I. The 2 ½" nozzle should be marked with a white stripe around the MST.

3.6.4 2” Nozzle

Figure 8

A. The 2” nozzle is used with the 2” lightweight hose.
B. It has a 2 ½” coupling and a 1” MST that is used for attack.
C. The required nozzle pressure is 50 psi at the tip.
D. At 50 psi, the flowrate is 210 GPM.
E. The nozzle reaction at 50 psi nozzle pressure is 77 lbs.
F. At 55 psi nozzle pressure, the flowrate is 220 GPM.
G. The nozzle reaction at 55 psi nozzle pressure is 85 lbs.

3.7 Fog Nozzles

3.7.1 Fog nozzles can produce either a straight stream or a fog pattern (Figures 9, 10, 11 & 12). The straight stream is hollow. The fog pattern is adjusted by rotating the outer barrel and the reach of the stream depends on the width of the pattern: when the fog pattern is wider, the reach of the pattern will become shorter.

3.7.2 Removable fog tips may have a fixed fog pattern without the option of a straight stream. These can be attached directly to a shut-off.

3.7.3 Fog patterns are effective for maximizing hydraulic ventilation, dispersing gas vapors, and extinguishing fire near electrical equipment. However, fog patterns can have limited stream reach and can entrain air as they operate.

3.7.4 Fog nozzles used in the FDNY are classified in the following two ways:

A. *Variable flow* fog nozzles provide a different flowrate depending on the fog pattern selected. All fog nozzles in the FDNY are variable flow.

B. V*ariable pressure* (also called non-automatic) fog nozzles will allow their nozzle pressure to change as the fog pattern is adjusted. All fog nozzles in the FDNY are variable pressure.

3.7.5 1 ¾" Fog Nozzle

Figure 9

A. The 1 ¾" fog nozzle is used with the 1 ¾" hose.
B. It has a 1 ½" coupling and a fog tip.
C. The required nozzle pressure is 100 psi at the tip.
D. At 100 psi nozzle pressure, the flowrate can reach 200 GPM.
E. At 200 GPM, the nozzle reaction is 101 lbs.
F. This fog nozzle can be adjusted from a straight stream to a fog pattern.
G. To operate as a straight stream, the tip is rotated to the right.
H. To operate as a fog pattern, the tip is rotated to the left.
I. The further to the left the tip is rotated, the wider the fog pattern will be.

3.7.6 2 ½" Fog Nozzle

Figure 10

A. The 2 ½" fog nozzle is used with the 2 ½" hose.
B. It has a 2 ½" coupling and a fog tip.
C. The required nozzle pressure is 100 psi at the tip.
D. At 100 psi nozzle pressure, the flowrate can reach 250 GPM.
E. At 250 GPM, the nozzle reaction is 121 lbs.
F. This fog nozzle can be adjusted from a straight stream to a fog pattern.
G. To operate as a straight stream, the tip is rotated to the right.
H. To operate as a fog pattern, the tip is rotated to the left.
I. The further to the left the tip is rotated, the wider the fog pattern will be.

3.7.7 2 ½" fog tip

Figure 11

A. Also called the "Aquastream".

B. It is used to produce a fog spray for a mass decontamination procedure.

C. It has a 2 ½" coupling and a non-adjustable fog pattern.

D. The recommended operating pressure range is 50 to 80 psi.

E. At 100 psi nozzle pressure, the flowrate is 750 GPM at full fog.

F. It may be connected directly to an apparatus outlet or ladder pipe. It may also be used on a 2 ½" hoseline in conjunction with a shut-off for decontamination.

3.7.8 Akron Turbomaster Fog Tip

Figure 12

A. The Turbomaster is connected directly to a Tower Ladder basket waterway.
B. It is used to produce a fog spray for a mass decontamination procedure.
C. It has a 2 ½" coupling and an adjustable fog pattern.
D. The required nozzle pressure is 100 psi at the tip.
E. It has 4 settings, capable of producing flows of 500, 750, 1000, or 1250 GPM.

3.7.9 High-Rise Nozzle

Figure 13

A. The High-Rise Nozzle (Figure 13) is designed to be used from the floor below the fire when standard interior handline attack methods are not possible, such as conditions caused by wind-driven fires. Refer to *Chapter 8 Addendum 3* for a full discussion of High-Rise Nozzle operations.

Note: ***Redacted for PFS***

3.7.10 Cockloft Nozzle

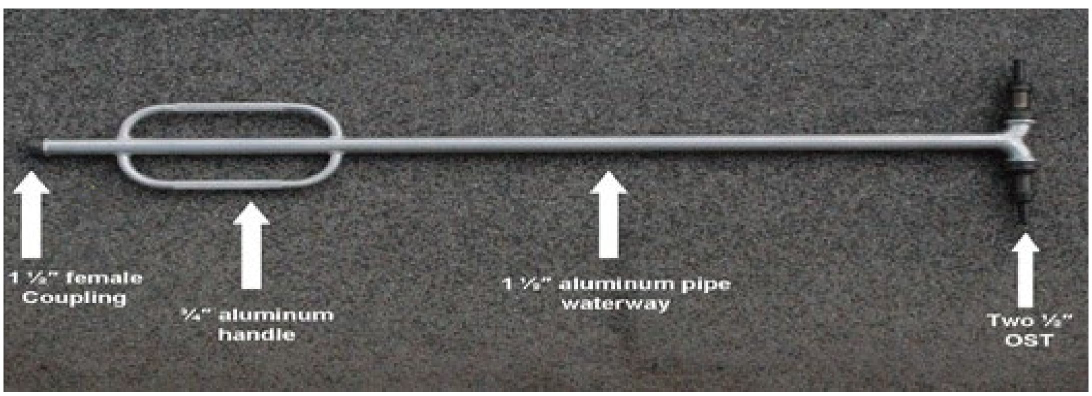

Figure 14

A. The Cockloft Nozzle (Figure 14) is primarily designed for use at cockloft fires but may also be used in other situations such as in a vertical application to extinguish fire on the outside of a building from a window on the floor below. When the Cockloft Nozzle is being used to extinguish fire in a cockloft, the nozzle may be placed above the ceiling on the top floor of a building or inverted and lowered into the cockloft area from the roof of the building. For more information on Cockloft Nozzle operations see Chapter 7, Addendum 1.

Note: ***Redacted for PFS***

3.7.11 The Combination Nozzle is a two-piece system that allows for the use of either a High-Rise Nozzle attachment or a Cockloft Nozzle attachment to a single base pipe section.

A. It is comprised of 3 different components, as follows:

1. *Base Pipe* – a 48" long aluminum alloy pipe with a 1 ½" diameter. It is equipped with a permanently attached 2 ½" shutoff and has a 1 ½" quick connect for attaching one of the two different nozzles (Figure 15). Attached to the aluminum pipe is a support rod with a quick connect at the top and a T-handle at the bottom. The Base pipe should be stored with the 1 ½" x 2 ½" increaser attached to the 2 ½" shut off.

Figure 15

B. *High Rise Nozzle (HRN) Tip* - a 44" long aluminum pipe with a 68 degree, 2-foot bend to provide the proper angle for the water stream (Figure 15A). It has a 1 1/8" tip attached to its outlet and a 1 ½" quick connect at the bottom. The HRN tip has a support rod attached with a quick connect.

Figure 15A

Figure 15B

C. *Cockloft Nozzle Tip* - a 32" long aluminum pipe divided at the tip into two ninety-degree bends to provide the proper angle for the water stream (Figure 15B). Each bend terminates with a 15/16" MST and a ½" OST. The two ½" OSTs are NOT to be removed; these tips increase the reach of the stream in excess of 60 feet. They also facilitate the generation of steam that enables a more rapid extinguishment of fire in the confined spaces of a cockloft. The Cockloft Nozzle tip has a support rod attached with a quick connect.

D. The Combination Nozzle has been issued to a number of companies in the field. It is carried in a kit mounted above the portable ladder rack on the apparatus.

Note: The original one-piece HRN has not been removed from Companies equipped with the Combination Nozzle. These Companies carry both so that non-trained members can use the one-piece HRN. Engine Companies not trained in the use of the Combination Nozzle System should continue to use the conventional High-Rise Nozzle or Cockloft Nozzle as required. ***Edited for PFS***

E. The Combination Nozzle System shall be visually inspected weekly. If repairs are deemed necessary, contact Research and Development (718) 281-8490. The out of service equipment shall be tagged with an RT-2 documenting the nature of the defect.

3.7.12 Bent Tip

A. The bent tip is designed to extinguish fire in confined spaces, such as ducts, shafts and void spaces between walls, floors, and ceilings (including cocklofts).

B. It is 16" long and has a 3" section bent at a 90-degree angle with a 1/2" outlet orifice. It is equipped with 1 ½" female threads for connection to a shut off.

C. The discharge rate of the bent tip is approximately 50 GPM.

D. The bent tip can be supplied by either a 1 ¾" or 2 ½" hoseline and is supplied with 50 psi at the tip.

E. The bent tip is equipped with a hand lever that can be used to rotate the nozzle 360-degrees.

Figure 16

4. FITTINGS

4.1 A fitting is a hose connection which allows dissimilar couplings to become coupled. Specifically, fittings allow for different size couplings to be connected and for couplings of the same sex to be connected.

4.2 There are four categories of fittings:

4.2.1 *Reducers* – allow for larger male couplings to connect to smaller female couplings. The male threaded orifice on a reducer is smaller than the female threaded orifice. These are typically used for water to flow from a larger hose to a smaller hose. (Figure 16A)

4.2.2 *Increasers* – allow for smaller male couplings to connect to larger female couplings. The male threaded orifice on an increaser is larger than the female threaded orifice. These are typically used for water to flow from a smaller hose to a larger hose. (Figure 16B)

Figure 16A Figure 16B

4.2.3 *Double males* – allow for two female couplings of the same size to be connected. (Figure 17)

Figure 17

4.2.4 *Double females* – allow for two male couplings of the same size to be connected. (Figure 18)

Figure 18

4.3 Fittings are available in all necessary sizes in each of the four categories above.

4.4 There also exists a fitting specially designed as a hydrant connection, which is a double female with different sized couplings. One side has 4 ½" threads (for hydrant connection) and the other side has 3" threads (for connection to a 3 ½" hose).

Figure 19

4.5 By using the proper fittings, any hose in the FDNY can be connected to any other hose. Be aware that multiple fittings may have to be used to make coupling possible.

5. ADAPTERS

5.1 An adapter is a fitting that allows connection between a coupling with FDNY threads and National Standard threads or between FDNY threads and National Pipe threads.

5.2 The following different types of adapters exist:

5.2.1 Adapter with a male FDNY coupling and female National Standard (or National Pipe) coupling.

5.2.2 Adapter with a female FDNY coupling and male National Standard (or National Pipe) coupling.

5.2.3 Double male adapter, with a male FDNY coupling and male National Standard (or National Pipe) coupling.

5.2.4 Double female adapter, with a female FDNY coupling and female National Standard (or National Pipe) coupling

5.3 National Pipe threads (NPT) adapter can be differentiated by the length of the threaded coupling; National Pipe threads (Figure 20) are longer (deeper) than FDNY or National Standard (NST) threads (Figure 21).

Figure 20

Figure 21

6. IN-LINE PRESSURE GAUGE

6.1 Digital In-Line Gauge

6.1.1 The Digital In-Line Pressure/Flow metering device (Digital In-line Gauge) is used to monitor the pressure and flow being delivered from the standpipe outlet. It does not regulate water flow; it simply monitors the pressure and flow of the water supplied (Figure 22)

Figure 22

6.1.2 The Digital In-line Gauge has 2 ½" couplings and has a built-in 45-degree elbow.

6.1.3 To turn the gauge on, press and hold the green ON/OFF button. The digital display will show "- - - -" under PRESSURE and "r3.00" above FLOW. When the button is released, the digital display will show "0" PRESSURE and "0" FLOW. The gauge is now ready to be used. (Figure 23)

Figure 23

6.1.4 The red digital display shows the pressure at the gauge in psi.

A. *High Pressure Warning*: red display flashes "HI-P" when pressure exceeds 200 psi.

6.1.5 The blue digital display shows water flow at the gauge in GPM.

A. *High Flow Warning*: blue display flashes "HI-F" when flow exceeds 250 GPM.

B. *Low Flow Warning*: blue display flashes "LO-F" when flow is less than 80 GPM.

6.1.6 If there is no water flow for 15 minutes, the display goes into "sleep" mode and will not display any readings. Resumed water flow automatically re-activates the display. If there is no water flow for 30 minutes, the display will power off automatically. To resume operations, the gauge has to be re-started manually.

6.1.7 The Digital In-line Gauge is powered by special 9v rechargeable lithium ion batteries.

A. **Only the supplied batteries may be used**.

B. A fully charged battery will supply approximately 5 hours of continuous operation.

C. After 3½ hours of usage, the digital display will slowly flash "LO batt".

D. When 10 minutes of battery life remains, "LO batt" will flash rapidly. Immediately replace the battery if this occurs.

E. To test the battery, press the "Battery" button. A battery in serviceable condition will display as "Batt Good".

F. Units are issued 4 batteries. One is used in the gauge, one is carried in the clear battery pouch of the carrying case, and 2 are placed in the charging unit at quarters.

G. Batteries on the charger should be rotated weekly and switched with the batteries in the gauge and the carrying case.

H. The battery charger indicators are as follows:

1. Indicator is steady red color = the battery is charging.
2. Indicator is slowly blinking red color = defective battery must be replaced.
3. Indicator is steady green = fully charged battery.

6.2 Analog In-Line Pressure Gauge (Figure 24)

Figure 24

6.2.1 The analog in-line pressure gauge is used to monitor the pressure being delivered from the standpipe outlet.

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A. Like the digital in-line gauge, it does not regulate water flow; it simply monitors the pressure of the water supplied.

B. Unlike the digital in-line gauge, the analog gauge does not measure water flow.

6.2.2 It has 2 ½” couplings and an analog dial to measure the supply pressure.

6.2.3 The analog in-line gauge is not battery powered.

7. FOAM EDUCTOR AND NOZZLE

7.1 All Engine and Squad companies carry a foam eductor and nozzle, capable of producing finished firefighting foam.

7.2 The eductor and nozzle are carried together in a black pelican case. The foam nozzle can be identified by white markings on the tip, handle, and pistol grip.

7.3 When supplied with 200 psi, it has a flow of 125 GPM.

7.4 Refer to *Training Bulletin: Foam* for a full discussion of foam operations.

8. *Redacted for PFS* (This tool is addressed in better detail in Ch. 9)

9. *Redacted for PFS*

10. Bresnan Distributor

Figure 27

10.1 The Bresnan Distributor (Figure 27) is an appliance carried by engine companies that attaches to a hoseline to distribute water in a 360-degree pattern. It is designed to be used remotely in a fire area that cannot be accessed by a hoseline. Generally, it is used for fires below grade, such as cellar fires.

10.2 It is comprised of 9 angled ports for water delivery. When in operation, the angled force of the water will cause the Bresnan distributor to spin, which maximizes the distribution of water.

10.3 When supplied at 50 psi nozzle pressure, it will deliver 250 GPM of water.

10.4 The Bresnan distributor is supplied with a 2 ½" hose. A shut-off should be placed one length from the distributor, allowing flow to the distributor to be controlled.

10.5 To properly use the Bresnan distributor, it should be lowered into the fire area via an opening and the shut-off should be opened to begin water flow. The distributor is lowered until it hits the floor, then raised several feet to position for optimal distribution.

11. SINGLE GATE

11.1 The primary function of a single gate (also called "one-way gate") is to enable firefighters to control the flow of water at a point other than the water source itself. By using a single gate, flow can be augmented, or even halted, without having to shut down the water source itself. (Figure 28)

Figure 28

11.2 Commonly, single gates are used on the 2 ½" outlet of a hydrant, but they are also often used to control flow from standpipe outlets, deck guns, or multiversals.

11.3 Single gates exist in a number of different sizes for use on hydrants, standpipe outlets, or other appliances (such as a deck pipe or multiversal).

11.4 To use a single gate, it must be attached before the water source is turned on. Once attached, the water source is opened and the flow can be controlled at the single gate.

12. GATED WYE

12.1 The primary function of a gated wye is to allow a single source of water to supply two separate hoselines. A gated wye has one inlet and two outlets. Each outlet is equipped with a gate that allows for the control of water flow. (Figure 29)

Figure 29

12.2 Commonly, gated wyes can be found attached to an outlet on fire apparatus, most often on the front bumper. Gated wyes can also be attached to a hydrant or attached to a hoseline to facilitate the stretching and operation of multiple hoselines.

12.3 Gated wyes exist in all available sizes, from 4 ½” to 1 ½”. The most common size has one 2 ½” inlet and two 1 ½” outlets and is often found on the front outlet of the apparatus.

12.4 To use a gated wye, it must be attached before the water source is turned on. Once attached, water flow can be controlled by the quarter-turn ball valve at each outlet. Units should be aware that when two hoselines are operating from a gated wye and one of those hoselines is shut down, backpressure may impact the other operating hoseline.

13. SIAMESE CONNECTION (WITH SINGLE GATE)

Figure 30

13.1 A Siamese connection performs the opposite function of the gated wye. Its primary function is to supply a single outlet by way of two separate hoselines. A Siamese connection has two inlets and one outlet. (Figure 30)

13.2 Siamese connections are not typically carried on engine apparatus in the FDNY, but they are carried by aerial ladder apparatus for use with their ladder pipe.

13.3 The Siamese used in the FDNY has two 3" inlets and one 3" outlet. It is used in conjunction with a single gate to supply the 3 ½" hose used when an aerial ladder pipe is placed in operation.

14. SPANNER WRENCH

14.1 The primary function of a spanner wrench (Figure 30) is to tighten and loosen hose couplings.

Figure 30

14.2 Every firefighter is issued a spanner wrench and is required to carry it with them at a fire operation.

14.3 Two basic types of spanner wrenches exist:

14.3.1 Flip-open spanner (often carried in a bunker coat pocket)

14.3.2 Straight spanner (often carried on the apparatus)

14.4 A spanner wrench is used by gripping the lugs to tighten or loosen the coupling. While a single spanner can be used, it is most effective to use two spanners together, facing opposite each other and pulled in opposite directions.

15 HOSE STRAP

Figure 31A

Figure 31B

15.1 The primary function of a hose strap is to secure a hoseline that has been stretched a distance vertically, with the purpose of preventing the hose from falling back down the vertical space through which it was stretched.

15.2 Hose straps are commonly used when performing a well-hole stretch, fire escape stretch, or a rope stretch.

15.3 Every firefighter is issued a hose strap and is required to carry it with them at a fire operation. Two basic types of hose strap exist:

15.3.1 ***Rope hose strap with hook*** - One end has a metal hook and the opposite end has a loop in the rope (Figure 31A)

15.3.2 ***Nylon hose strap with carabiner*** - One end has a carabiner and the opposite end has a loop in the nylon strap. There are a number of small metal loops on the strap, which are not normally used when securing a hose (Figure 31B)

15.4 When used properly, the looped end of the hose strap secures the hose by using a girth hitch. This uses the weight of the hose to tighten the grip of the hose strap. The carabiner (or hook) end of the hose strap is used to attach to an anchor point. The hose strap is attached to the anchor point by passing over the anchor point and is attached back to the strap itself.

15.5 The ideal location on the hose to secure the hose strap is just below a coupling. This minimizes the likelihood of the hose slipping through the girth hitch, while also relieving pressure on the coupling.

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16. HYDRANT WRENCH

Figure 32A

Figure 32B

16.1 There are two basic types of hydrant wrenches available, both of which are carried by all engine and squad companies:

16.1.1 ***Standard Hydrant Wrench*** - Used to open the standard 5-sided hydrant operating nut (Figure 32A). Hydrant is turned clockwise to open.

16.1.2 ***Custodian Hydrant Wrench*** - equipped with a magnetic cup (Figure 32B) that allows the operation of hydrants equipped with a Custodian lock. It can also operate Hydra-Shield equipped hydrant caps and can operate the standard 5-sided hydrant operating nut. Hydrant is turned clockwise to open.

17. CURB VALVE KEY (Figure 33)

Figure 33

17.1 Carried by all engine and squad companies and is used to operate the curb valve that controls water flow from the water main to a hydrant.

17.2 The wrench is placed over the operating nut and turned counterclockwise to close.

18. HYDRANT PLUG

Figure 34A

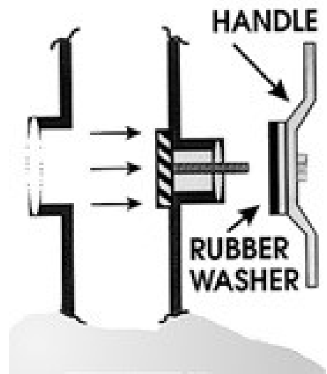

Figure 34B

18.1 Carried by all engine and squad companies. If the outlet threads of a hydrant are damaged or missing, a hydrant plug can be used to close the 2 ½" outlet before using the hydrant.

18.2 The hydrant plug (Figure 34A) consists of a T-bolt, (which has a threaded rod) and a handle with an attached rubber washer. The T-bolt may be equipped with a rope in case it falls into the barrel of the hydrant during operation.

18.3 To use the hydrant plug, maneuver the T-bolt through the 4 ½" outlet into the hydrant barrel (as pictured). Place the threaded rod out through the 2 ½" outlet, centering it in the middle of the opening. Hold the T-Bolt firmly against the inside of the hydrant barrel with one hand and turn the handle onto the threaded end of the T-Bolt with the other hand until handle is tight to the barrel. The washer must be on the outside of the hydrant Figure 34B).

19. Drafting Connections

Figure 35

19.1 There are 3 different drafting connections on the apparatus (Figure 35):

19.1.1 One ribbed 10-foot hard connection.

19.1.2 One ribbed 10-foot hard connection with strainer.

19.1.3 One smooth 10-foot hard connection.

19.2 Each of these connections is equipped with 6" couplings. The connection with a strainer has a strainer on one end and a female coupling on the other. The other two connections have one male and one female coupling.

19.3 When used for drafting, the connection with the strainer is lowered into the water and the smooth connection is used to connect to the ungated inlet on the apparatus. The 3rd connection is to be used between them if more length is needed. Please refer to *Chapter 5: Engine Company Chauffeur* for more information on drafting.

20. 10-FOOT SOFT SUCTION 3 ½" HYDRANT CONNECTION

Figure 36

20.1 The "soft suction" is a black, semi-rigid hose used exclusively as a hydrant connection.

20.2 It is 10 feet long, has a 3 ½" diameter, and is equipped with two 4 ½" female couplings for direct connection to a hydrant.

21. 10-FOOT SEMI-RIGID 4 ½" HYDRANT CONNECTION

Figure 37

21.1 The "semi-rigid connection" is a black, semi-rigid hose used exclusively as a hydrant connection.

21.2 It is 10 feet long, has a 4 ½" diameter, and is equipped with two 4 ½" female couplings for direct connection to a hydrant. It is similar to the older 3 ½" soft suction connection, but is more rigid and has a larger diameter.

22. 35-FOOT SOFT HYDRANT CONNECTION

Figure 38

22.1 The 35-foot soft connection is a yellow, synthetic hose that is used exclusively as a hydrant connection.

22.2 It is 35 feet long, has a 5" diameter, and is equipped with two 4 ½" female couplings for direct connection to a hydrant.

23. 3 ½" HOSE *Addition for PFS*

23.1 Standard 50-foot lengths of 3 ½" hose can be used to hook up to a hydrant through the use of a specialized hydrant connection fitting (4 ½" to 3" double female). There is no limit on the number of lengths that can be used, so this option allows for the greatest flexibility, but provides the least water flow.

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HYDRANT MAINTENANCE

1. HYDRANT MAINTENANCE

1.1 In order to ensure the reliable performance of the NYC hydrant system at fire and emergency operations, field units of the FDNY are responsible for the inspection and maintenance of hydrants in their administrative areas.

1.2 These responsibilities include semi-annual inspection of all hydrants, as well as the prompt reporting of defective hydrants discovered during any other activities.

1.3-1.5 ***Redacted for PFS***

2. HYDRANT INSPECTION

2.1 Every hydrant shall be inspected twice per year. Inspections occur as follows:

2.1.1 Spring hydrant inspection period (March 1st – June 1st)

2.1.2 Fall hydrant inspection period (September 1st – December 1st)

2.1.3 Inspections shall be performed between the hours of 0930 and 1700.

2.2-2.5 ***Redacted for PFS***

2.6 Hydrant discs should be painted with the company number and should be placed on hydrants as follows:

2.6.1 White discs shall be placed on unserviceable hydrants (comes in 4 ½" and 2 ½" sizes).

2.6.2 Yellow discs shall be placed on frozen hydrants (comes in 4 ½" and 2 ½" sizes).

Note: Blue discs are not used on hydrants; they are used on sprinkler and standpipe systems.

2.7-2.8 ***Redacted for PFS***

3. HYDRANT SPRAY CAP PROGRAM

3.1 The Fire Department has been charged with distributing spray caps to the public during the summer months in order to provide heat relief to the public while reducing water consumption.

3.2 ***Redacted for PFS***

3.3 ***Redacted for PFS***

3.3.1-3.3.5 ***Redacted for PFS***

3.3.6 Spray caps shall not be placed on hydrants that: have mains larger than 20 inches, are red or yellow, are on two-way streets, near intersections, on bus routes, or on access routes to main traffic arteries.

3.3.7 Spray caps may only be used from 1000 hours until 2100 hours.

3.4 Units shall carry spray caps on the apparatus. When shutting down open fire hydrants being used for heat relief by the public, the officer should consider having a member place a spray cap on the hydrant, if needed. Units shall fill out a Request for Spray Caps Form for recordkeeping purposes.

4-5. ***Redacted for PFS***

HOSE MAINTENANCE

1. HOSE MAINTENANCE

1.1 This bulletin will outline the basic requirements of hose maintenance for all engine companies in the FDNY. This includes the following:

1.1.1 Hose requirements.

1.1.2 Hose packing.

1.1.3 Hose removal and repacking.

1.1.4-1.1.5 ***Redacted for PFS***

2. HOSE REQUIREMENTS

2.1 Engine companies are required to maintain the amount of hose listed below. This amount includes hose kept on the apparatus and hose maintained in quarters. Minimum requirements are as follows:

2.1.1 1 length of 2” lightweight hose shall be arranged in a roll-up and maintained with a 2” nozzle and 1” MST attached. This hose is colored green with a red stripe.

2.1.2 3 lengths of 2 ½” lightweight hose shall be arranged in a roll-up. One of these lengths shall be maintained with a 2 1/2” nozzle and 1 1/8” MST attached. This hose is colored white with a red stripe.

2.1.3 20 lengths of 1 ¾” hose.

2.1.4 30 lengths of 2 ½” hose.

2.1.5 10 lengths of 3 ½” hose.

2.2 Additionally, hose is required to be carried on the apparatus in the following fashion:

2.2.1 1 length of 2” lightweight hose shall be arranged in a roll-up and maintained with a 2” nozzle attached.

2.2.2 3 lengths of 2 ½” lightweight hose shall be arranged in a roll-up. One of these lengths shall be maintained with a 2 ½” nozzle attached.

2.2.3 For companies staffed with 5 firefighters, 1 additional length of 2 ½” lightweight hose must be carried, maintained as a roll-up.

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2.2.4 At least 4 lengths of 1 ¾” hose shall be carried, either rolled or arranged in a roll-up. One of these lengths shall be maintained with a 1 ¾” nozzle attached (to be used to replace a burst length or to add to a short stretch).

3. HOSE PACKING

3.1 When carried on the apparatus or stored in quarters, hose can be maintained in several different arrangements, as described in the following sections.

3.2 Traditional hose bed arrangement. (Figure 1)

3.2.1 Hose is carried in the hosebeds of all engine apparatus in a traditional hosebed arrangement. This is created as follows:

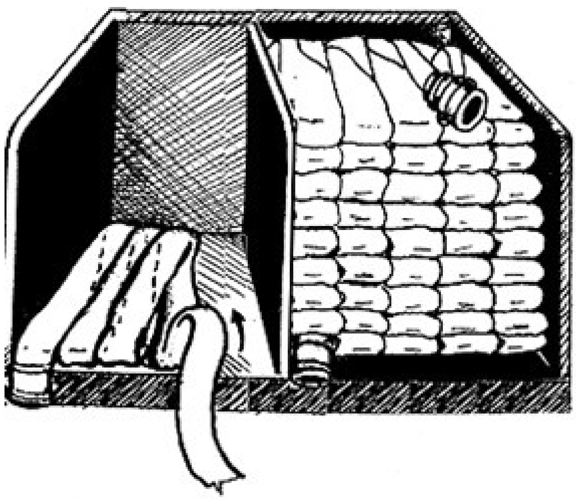

Figure 1

A. Load hose from left to right in the hosebed compartment.
B. Begin on the left side with the coupling extended beyond the hosebed.
C. Lay the hose straight back to the left rear of the compartment.
D. Fold hose at the rear and bring back forward, veering slightly to the right.
E. When at the front of the compartment, the hose should lie alongside the coupling.
F. Fold the hose at the front and repeat the movement until the layer is complete.
G. When a layer is finished, fold the hose at the right rear of the compartment and bring forward diagonally to the front left to begin the next layer.

3.3 Horseshoe Arrangement

Figure 2

3.3.1 The lead lengths of hose in a hosebed can be maintained in a horseshoe arrangement to facilitate the hose stretch. (Figure 2) This arrangement is created as follows:

A. Each horseshoe is comprised of exactly 1 length of hose.

B. Place the hose on its edge on top of the hosebed.

C. Fold the hose back and forth in the shape of a horseshoe.

D. Completed horseshoes should be roughly 4 feet long.

3.3.2 The horseshoe arrangement makes the hose easier to carry and ensures exactly 1 length of hose is carried.

3.3.3 The midpoint of the horseshoe can be located by grabbing the middle ring of the horseshoe. (Figure 3)

Figure 3

3.4 Roll-ups

Figure 4

3.4.1 In order to facilitate the efficient deployment of hose when stretching from a standpipe outlet, dedicated lengths of hose should be folded in a specific arrangement, referred to as a "roll-up". (Figure 4)

3.4.2 The roll-up is created as follows:

A. Lay one length of hose folded halfway with the couplings side by side. Facing couplings (while standing away from the hose, as pictured), the male coupling is on the left.

Figure 5

B. For the lead length, attach the nozzle and fold hose in half so that the nozzle tip is even with the female coupling. (Figure 5)

C. Bring the midpoint fold to the couplings. (Figures 6A with nozzle and 6B)

Figure 6A

Figure 6B

D. Bring the next fold up to the couplings over the midpoint fold. (Figure 7

Figure 7

E. Lift the couplings (and the two folds of hose on top of them) and fold them over on top of the remaining fold of hose.

F. The folded hose should now be arranged with the couplings on top of the hose. Facing couplings (while standing away from the hose, as pictured), the male coupling is now on the right. (Figure 8)

Figure 8

G. Secure completed folds with a strap connector on top.

Figure 9

3.4.3 The roll-up makes the hose easy to carry, allows lengths to be easily connected to each other, and facilitates a smooth deployment when stretched.

3.4.4 The midpoint of the hose can be identified by grabbing the hose fold located directly beneath the couplings. (Figure 10) This point is called the "A-fold" and is painted red on all lightweight hose. Using this A-fold, the hose should be deployed as discussed in *Chapter 8: Standpipe Operations*.

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Figure 10

3.5 Rolled hose (Figure 11)

3.5.1 Spare serviceable hose may be maintained in a rolled length when carried on the apparatus or stored in quarters. This arrangement is created as follows:

A. Lay the hose out and fold the hose back on itself.

B. Lay the male coupling on top, roughly 3 feet from the female coupling.

C. Beginning at the folded end, roll the doubled hose towards the couplings.

D. Rolled hose may be secured with a short piece of rope.

Figure 11

3.5.2 When hose is being placed out-of-service, it is arranged in a single roll. (Figure 12) The male coupling should be placed on the inside when single rolled.

Figure 12

4. HOSE REMOVAL AND REPACKNG

4.1 Hose should be removed and repacked in the spring and fall of each year, in accordance with schedules issued by Division Commanders. Spare hose shall be used to replace hose on the apparatus, when available.

4.2 Any hose 10 years old or older should be placed out-of-service. The first two digits of the serial number stamped on the female coupling will indicate the year of manufacture.

4.3 Hose should be inspected before being placed on the apparatus.

4.3.1 Any hose of doubtful strength should be placed out-of-service. This may be due to cuts, abrasions, wear, or burns to the hose jacket.

4.3.2 Couplings should not be cracked or out-of-round and there should be no burred threads

4.3.3 All female couplings should have a rubber washer. Washers that are dried out or cracked shall be replaced.

5-6. *Redacted for PFS*

WATER SUPPLY INFRASTRUCTURE

1. WATER SUPPLY INFRASTRUCTURE

1.1 This section will discuss critical equipment that is regularly used by Engine Companies but is not carried on the engine apparatus. This equipment exists as part of the water supply infrastructure of New York City and plays a vital role in Engine Company Operations.

1.2 This section will provide a brief discussion of the physical specifications and key equipment as it exists in the field. It is not intended to provide a comprehensive description of the capabilities of the systems discussed, but rather a general overview of key components.

1.3 Specifically, the infrastructure discussed will concern the following:

1.3.1 Hydrants

1.3.2 Sprinkler systems

1.3.3 Standpipe systems

2. HYDRANTS

2.1 Hydrants are the primary source of water for firefighting operations. There are several types of hydrants available in NYC, which may be equipped with a variety of features, as described below.

2.2 Hydrant pressure varies significantly based on local geography.

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2.3 Types of Hydrants

2.3.1 ***Smith Hydrant*** - Has two outlets, one 2 ½" and one 4 ½". Some Smith hydrants have a breakaway feature, but not all. (Figure 1)

Figure 1

2.3.2 ***Dresser Hydrant*** – Has two outlets, one 2 ½" and one 4 ½". All Dresser hydrants have a breakaway feature. (Figure 2)

Figure 2

2.3.3 ***Yellow Hydrants on Parkways and Expressways*** - Some hydrants on parkways and expressways are maintained shut at the curb valve. These hydrants are painted yellow. They must be turned on fully at the curb valve, approximately 17 turns clockwise using a curb valve key, in order to be used.

2.3.4 ***Red Air Cock Hydrants -*** Hydrants on 30" diameter or greater mains in strategic locations (high and low points on the water main). These hydrants are painted red and are excellent sources of water for fire department use.

2.3.5 ***Red Satellite Water System Hydrants*** - Twin hydrant arrangement on large mains for a rapid and adequate source of water for Satellite Units. The hydrants are painted red and may have two 4 ½" outlets. (Figure 3)

Figure 3

Figure 4

2.3.6 ***Wall Hydrants*** – Hydrants that are embedded in the wall of a building (Figure 4). They closely resemble a Fire Department Connection (FDC) but should be labeled as a hydrant. They are operated by turning an operating nut (often located above the outlets).

2.4 Hydrant features

2.4.1 ***Hydrant Markings*** **-** Some hydrants may be marked with a white number on the barrel, which indicates the size of the main supplying the hydrant (in inches). A white line under the number on the barrel indicates the hydrant is on a dead end main and is only supplied from one direction, which may limit water flow.

2.4.2 ***Breakaway Feature*** **-** Some hydrants have a "breakaway" feature, which was designed as a safety feature to minimize damage to the hydrant system if a hydrant is struck by a vehicle. These hydrants will have a "collar" fitted on the lower portion of the barrel which, when broken, will cause the water supply to the hydrant to be shut down. It is sometimes possible to find this collar buried beneath concrete surrounding a hydrant.

2.4.3 ***Curb Valve -*** Hydrants are equipped with a curb valve, which provides a means to shut the water supply to a hydrant from the water main. These valves are generally located in the street, near the hydrant and require a special curb valve key to shut down. The curb valve key is turned counterclockwise 17 full turns to shut the valve. There will not be a noticeable decrease in water flow until about 12 full turns are made.

2.4.4 ***Hydra-Shield -*** This is a threaded hydrant cap with three indentations on its surface. Except for the three tapered indentations, the cap has a smooth rounded surface which prevents removal using conventional tools. The hydrant wrench matches the indentations on both the 2 1/2 inch and 4 1/2 inch caps.

2.4.5 ***Custodian Hydrant Guard -*** This is a free spinning cap which completely covers the hydrant operating nut to prevent it from being turned on by unauthorized users. The Custodian hydrant wrench, which is equipped with an internal magnet, is needed to open the hydrant.

2.4.6 ***Hydrant Drain -*** After the hydrant is shut, the residual water in the barrel will drain out into the ground by way of a small hole in the bottom of the barrel. This hole is the hydrant drain and, if blocked, it may not completely drain.

2.4.7 ***Hydrant Discs -*** If a hydrant is found to be unserviceable, it should have a white disc attached to one of the outlets. A frozen hydrant should have a yellow disc attached. Blue discs are reserved for use on partially OOS auxiliary fire protection systems (standpipe and sprinkler systems).

2.4.8 ***Hydrant Caps*** - All hydrants should be equipped with caps on both the 2 ½” and 4 ½” outlets. This minimizes damage to the hydrant and limits possible obstructions inside the barrel.

3. SPRINKLER SYSTEMS

3.1 Sprinkler systems are found in a wide range of buildings and occupancies in NYC. Depending on the occupancy, the system may be either automatic or non-automatic.

3.1.1 ***Automatic sprinkler systems*** are capable of being activated and issuing water without fire department assistance. They are typically supplied by a city water main and at least one other source. Most common among these other sources are gravity tanks, pressure tanks, suction tanks, or cisterns. Types of automatic sprinkler systems include the following:

3.1.2 ***Wet pipe*** - Wet pipe sprinkler systems contain water in the riser and piping at all times. When a sprinkler head activates, water is immediately discharged.

3.1.3 ***Dry pipe -*** Dry pipe systems are installed where there is a danger of freezing and contain air (or sometimes nitrogen) in the riser and piping. When a sprinkler head activates, the air is exhausted through the open head, allowing water to be admitted to the riser and piping.

3.1.4 ***Deluge -*** Deluge systems are often found in aircraft hangars or where large quantities of flammable liquids are used in industrial processes. A "deluge" valve opens upon an electrical signal received from a detector. In a deluge system, all sprinkler heads (or nozzles) are open and will flow water simultaneously.

3.1.5 ***Pre-action -*** Pre-action systems are most often found in computer rooms or where other sensitive electronic equipment is used. A pre-action type of sprinkler system consists of fusible sprinkler heads, dry piping, and a valve which is opened upon an electrical signal from a detector.

3.1.6 ***Combination -*** A combination sprinkler system or combination sprinkler-standpipe consists of sprinkler heads and standpipe hose outlets attached to a common riser. Combination systems may be either "wet" or "dry."

3.1.7 ***Non-automatic sprinkler systems*** depend solely upon the fire department to supply water for firefighting. They are commonly found in cellars and sub-cellars of older commercial buildings. These systems may contain fusible sprinkler heads, open sprinkler heads, or even perforated pipes.

3.2 While many sprinkler systems will have a fire department connection (FDC) for FDNY units to supply water, it is common to find a sprinkler system with no FDC. These systems cannot be augmented by FDNY units.

3.3 Automatic sprinkler systems are identified by FDC or caps that are painted green. Non-automatic sprinkler systems will have FDC or caps that are aluminum colored. Sprinkler systems that are part of a combination system will have FDC or caps painted yellow.

3.4 ***Redacted for PFS***

4. STANDPIPE SYSTEMS

4.1 A standpipe system is a system of piping installed in a building or other structure that serves to transfer water to hose connections located throughout the structure for firefighting purposes.

4.2 In NYC, the requirements for the presence of a standpipe system are described in the NYC Building Code and are based on several criteria, primarily the height and area of the structure.

4.3 ***Redacted for PFS***

4.4 Types of Standpipe Systems

4.4.1 Standpipe systems can be categorized as either “wet” or “dry”. Wet systems contain water in the piping at all times. Dry systems do not contain water in the system under normal conditions.

4.4.2 Standpipe systems can also be considered either “automatic” or “manual”. The description of each type will depend on whether the system is wet or dry, as follows:

A. ***Automatic wet systems*** - capable of providing water under pressure at the standpipe outlets, possibly with the assistance of a fire pump or a gravity tank.

B. ***Manual wet systems*** - connected to a small water supply that will maintain water in the system but is not capable of providing necessary operating pressure to the system.

C. ***Automatic dry systems*** - usually supplied by a public water main but are maintained with pressurized air in the standpipe piping. When a decrease in air pressure is detected in the system, water will automatically be supplied to the system.

D. ***Manual dry systems*** - may or may not be connected to a water supply. If it is connected to a water supply, the provided water supply will only enter the system when a control valve is manually opened. If there is no water supply, the system will remain dry until water is supplied by FDNY units via FDC.

4.4.3 ***Air Pressurized Systems*** - a specific type of manual dry systems that are maintained pressurized by a dedicated air compressor. These systems are required in buildings under construction that are taller than 75 feet. When there is a change in air pressure that exceeds a pre-determined threshold, an alarm will sound on site.

4.4.4 ***Combination systems -*** systems that supply both the standpipe system and an automatic sprinkler system. The FDC or caps for combination systems are painted yellow.

4.4.5 ***Multi-zone systems*** - standpipe systems that are vertically subdivided into zones to limit the maximum operating pressure in the system. Each zone may have its own FDC, or the entire system may be supplied from a single FDC.

4.4.6 ***Express Piping Systems*** **-** Some taller high-rise buildings may have separate "Low Zone" and "High Zone" standpipe systems (Figure 5). These separate risers are not interconnected and may have separate FDC. The FDC shall be identified with signage stating either "Low Zone "or "High Zone" and indicate the floors they serve. The High Zone riser is also known as "Express Piping".

Figure 5

4.4.7 ***Interconnected Building Systems*** - systems in which the standpipes of multiple buildings are interconnected to each other via underground piping. This is common in residential housing complexes, especially those owned by the NYC Housing Authority (NYCHA).

A. Generally, the water supply to the entire interconnected system is by way of a single gravity tank located on one of the buildings.

B. Each building will have a Post Indicator Valve (PIV) that can be used to isolate that building from the rest of the system. When the PIV is closed, the building will be disconnected from all other buildings, including the gravity tank, and will not be connected to any additional water supply.

C. When the PIV is open, the building will be connected to the rest of the complex. When all PIV's are open, all standpipes in the system can be supplied by way of any building.

D. The PIV will generally be located outside and in close proximity to the building and is often found in the direction of the building that contains the gravity tank for the system.

4.5 Components of Standpipe Systems

4.5.1 Standpipe systems include a variety of different components. The most significant of these are described below. This list is not exhaustive and additional components may exist.

4.5.2 ***Fire Department Connections (FDC)*** - Formerly known as "Siamese connections", FDC are the 3" connections by which the Fire Department can supply water to the standpipe system. (Figure 6)

A. The FDC (or FDC caps) of a standpipe system should be painted red.

B. For a combination system, the FDC (or FDC caps) should be painted yellow.

C. If the system is out-of-service, a white disc should be affixed to the FDC.

D. If the system is partially out-of-service, a blue disc should be affixed to the FDC. Yellow discs should not be used on FDC.

Figure 6

4.5.3 ***Section valves -*** can be used to shut down water supply to a section of the standpipe system (Figure 7). These are OS&Y type valves (Outside Stem & Yoke) and can be located at various points in the system. Often, they can be located in a cabinet below the standpipe outlet. If the valve is open, the stem will be visible outside the attached wheel. If closed, the stem is not visible. These valves may also be called a Riser Control Valve or an Isolation Valve.

Figure 7

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4.5.4 ***Post Indicator Valves*** - exist in Interconnected Building Systems and are used to isolate a building from the rest of the system. They are painted red and are generally located outside and in close proximity to the building (Figure 8). If the valve is open, the word "OPEN" should be visible on the face of the valve. If closed, the word "CLOSED" should be visible.

Figure 8

4.5.5 ***Gravity Tank -*** a large container that uses the force of gravity to supply water pressure to a standpipe system. To work properly, the gravity tank needs to be located a distance above the highest outlet, so they are commonly located above roof level. For standpipe systems in an interconnected building complex, a single gravity tank may supply the system for the entire complex (Figure 9 and Figure 10). In larger high-rise buildings with low-zone and high-zone systems (such as mega-high-rises), it is possible for additional gravity tanks to be found inside the building.


Figure 9


Figure 10

4.5.6 ***Roof Manifold -*** the top of the standpipe riser, where the piping extends to the roof level (Figure 11). It is terminated with three outlet connections, which are used when testing water flow in the standpipe. It may be used by fire companies to supply a hoseline at the roof level.

Figure 11

4.5.7 ***Pressure Reducing Device (PRD)*** - a device installed at the standpipe outlet for the purpose of reducing the water pressure (Figure 12 and Figure 13) flowing from the outlet. PRD's are removable and are adjustable.

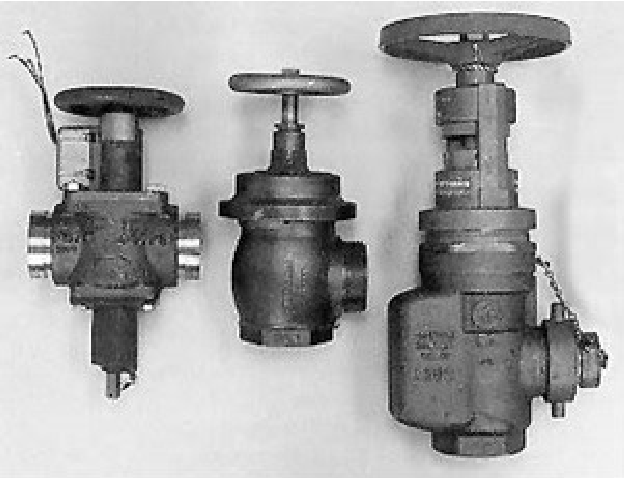

Figure 12

Figure 13

4.5.8 ***Pressure Reducing Valve (PRV) -*** a valve (Figure 14) that is permanently attached to a standpipe outlet for the purpose of reducing the water pressure flowing from the outlet. PRV's are not removable and cannot be adjusted.

Figure 14

ENGINE COMPANY OFFICER

1. OVERVIEW OF THE ENGINE OFFICER

1.1 The primary function of the engine company officer is to facilitate fire extinguishment by overseeing the placement of a hoseline to the fire area and directly supervising its operation to extinguish the fire.

1.2 In the fulfillment of this primary function, the engine officer is responsible to make a number of critical decisions and take decisive action. While the decisions to be made will differ depending on the specific operation, the following is an outline of the actions the engine officer should expect to make at a fire operation. They are listed here and will be further discussed in the sections to follow.

1.2.1 Determine if a hoseline needs to be stretched.

1.2.2 Determine the size of the hoseline to be used.

1.2.3 Determine the placement of the hoseline.

1.2.4 Determine the path by which the line will be stretched.

1.2.5 Call for the hoseline to be charged.

1.2.6 Begin fire attack.

1.2.7 Supervise fire extinguishment.

1.2.8 Ensure relief of operating members.

2. CALLING FOR A HOSELINE

2.1 As soon as the Engine Officer has determined a hoseline is needed, they should contact the nozzle firefighter via the handie-talkie and order a hoseline to be stretched. With this transmission, the Engine Officer should include the following information:

2.1.1 The location to which the line is to be stretched.

2.1.2 The size of the line to be stretched.

2.1.3 The route and method by which the line should be stretched (if not obvious).

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2.2 If possible, this information should be communicated by handie talkie, even if the nozzle firefighter is within voice contact. This ensures all units on the fireground are aware a line is being stretched and where it will be located.

2.3 If the need for a hoseline is evident before the exact location of the fire is confirmed, the engine officer may elect to call for a line to be initially stretched to the front of the fire building. This can save time, as the line will be readily available to be advanced to the fire area as soon as it is located.

2.4 Before the engine officer can direct the hoseline to the fire area, they must know where the fire area is. While a line may be called for before the exact location of the fire is discovered, the officer must identify the location as soon as possible, so as to ensure the hoseline is stretched to the correct location.

2.5 As searching for the fire location is a primary function of the ladder company, the engine officer will work in close coordination with the ladder company and will often rely on information from them to effectively lead the hoseline to the fire.

2.6 ***Redacted for PFS***

3. LINE PLACEMENT

3.1 The engine officer must determine the proper placement of their hoseline. The location to which the line is stretched must be clearly communicated to their nozzle firefighter, as well as the engine company that will be assisting them in stretching the line.

3.2 1st Hoseline Placement

3.2.1 Generally, the purpose of the first hoseline is to extinguish the main body of fire. This line should be placed to attack the main body of fire while also protecting the primary egress of the building. This position will allow the hoseline to extinguish the fire while enabling civilians and firefighters to safely use the primary egress.

3.2.2 One exception to this may be a situation in which fire is actively endangering civilians that are evacuating the building via windows or fire escapes and the immediate application of water from the exterior is needed to protect them. In this case, the first line may be operated from the street to partially extinguish or knockdown fire and protect the fleeing civilians (this is further discussed in a later section).

3.3 2nd Hoseline Placement

3.3.1 The placement of the 2nd hoseline will depend on the purpose of the line. Generally, the 2nd hoseline will be stretched for one of the following purposes:

A. Back-up the 1st hoseline.

B. Address extending fire.

C. Attack the main body of fire from an alternate access point.

D. Protect a life hazard from fire.

3.3.2 ***Back-Up the 1st Hoseline*** - At most fires, the primary purpose for the 2nd hoseline will be to back up the 1st line.

A. This line will protect the 1st line in case of a burst length or other water loss.

B. This line can also be used simultaneously with the 1st line if warranted by advanced fire conditions.

C. When the 2nd hoseline is stretched to back up the 1st line, it should be stretched to the same location as the 1st line and use the same path to get there.

D. If the 2nd hoseline is not needed to back up the 1st line, it can be advanced to address possible fire extension. Most commonly, this will be on the floor above the fire.

3.3.3 ***Address extending fire*** - The 2nd hoseline may be stretched to address extending fire when it is not needed to back up the 1st line, or when the need to address extending fire demands the immediate placement of a hoseline.

A. When stretched to address extending fire, the 2nd hoseline will be stretched to a different location than the 1st line.

B. If the 2nd hoseline is stretched to address vertical fire extension, the likely location will be the floor above the fire. This occurs often at multiple dwelling fires (tenements, brownstones, row frames, etc.) when heavy fire has extended above the fire floor due to internal voids or auto exposure. If this line is to be stretched above the fire, the officer must confirm the existence of a safe area to flake and charge the line.

C. If the 2nd hoseline is stretched to address horizontal fire extension, it may be stretched to a different building than the 1st line. This occurs often in structures (private dwellings, row frames, etc.) in which horizontal fire extension is an immediate concern due to heavy fire extending laterally via windows, combustible exteriors, or shafts.

3.3.4 Attack from alternate access point - The 2nd hoseline may be stretched to attack the main body of fire from a different access point if the fire can be more readily accessed from a different location than the position of the 1st line, or if the 1st line is having difficulty advancing to the seat of the fire.

A. If a second access point is identified as providing a more effective attack on the fire, the 2nd hoseline can be stretched to this point. This may be common at a cellar fire (private dwellings, tenements, places of worship, etc.), where multiple access points to the fire area might exist.

B. If the 1st hoseline has difficulty gaining access to the fire area due to heavy fire conditions, obstructions, or other delays, an alternative access point may allow the 2nd hoseline to reach the fire. This may be the case at an advanced cellar fire, when fire conditions prevent the advancement of the hoseline down the interior stairs. It may also be the case when a fire escape or balcony provides access to the fire area, or if stretching the 2nd line by way of a ladder is possible.

C. If the fire is on the building exterior in the rear (deck or patio fire, etc.), the fire might be more effectively attacked with a 2nd hoseline stretched to an access point in the rear of the building.

D. When stretched to attack the main body of fire from a different access point, the operation of the 2nd hoseline must be closely coordinated with the operation of the 1st line.

3.3.5 ***Protect life hazard from fire*** - This may be done if a person is at a window, fire escape, or other exposed position and the immediate application of water from the exterior is needed to protect them while the 1^{st} hoseline is being put into operation.

A. If the 1st hoseline is already committed to extinguish the fire, an immediate life threat to a person seriously exposed at a window or other location may require the 2nd hoseline to be operated as an exterior hoseline from the street level.

B. In this situation, the 2nd hoseline should be operated so as not to drive heat, smoke, or fire into the building. This is accomplished by operating the hoseline into the window at a steep angle, directing the stream at the ceiling. The stream should be kept stationary; it should not be moved in the circular motion that is used to advance an interior hoseline. This circular motion can create an air current into the fire area and negatively affect conditions opposite the stream.

3.4 Additional Hoseline Placement

3.4.1 ***Redacted for PFS***

3.4.2 ***Cellar fires*** – If a hoseline is operating in a cellar or similar area below grade, an additional charged hoseline must be positioned at the top of the cellar stairs.

A. This position may be covered by the 2^{nd} hoseline, but if the 2^{nd} hoseline is stretched elsewhere, an additional hoseline must be stretched to this location.

B. This hoseline is critically important because it is protecting potentially the only egress for the members operating in the cellar. In this case, all members operating in the cellar may need to pass through the floor above the fire to get to safety.

3.4.3 **Additional exposure protection** – If fire is extending to more than one location, additional lines will be required at each location of extension.

A. This position may be covered by the 2nd hoseline, but if the 2nd hoseline is stretched elsewhere, an additional hoseline must be stretched to this location.

B. This hoseline is critically important because it is protecting potentially the only egress for the members operating in the cellar. In this case, all members operating in the cellar may need to pass through the floor above the fire to get to safety.

3.5 Typically, the 2nd arriving engine company will team up with the 1st arriving engine to operate the 1st hoseline. However, there are situations in which the 2nd arriving engine company may stretch and operate a 2nd hoseline. This should only be done when all of the following conditions exist:

3.5.1 The 1st arriving engine company must have secured a positive water source. The 2nd arriving engine officer can communicate with the 1st arriving chauffeur to confirm this.

3.5.2 The 1st arriving engine company does not require the help of the 2nd arriving engine to get the 1st line in operation. The 2nd arriving engine officer must communicate with the 1st arriving engine officer to confirm this.

3.5.3 The hose stretches are sufficiently short, so the 1st arriving company will not require immediate assistance in operating the line once it is charged.

3.5.4 There is an immediate need for a 2nd hoseline to address fire extension or a life hazard.

Note: The Incident Commander (Chief Officer or Acting Chief Officer) may order the second engine in any situation to immediately stretch a second line for any purpose including the need for a backup line or exposure protection.

3.5.5 Generally, this situation will only occur in 1 or 2 story structures where the length of the stretch is manageable. The decision by the second engine officer to immediately stretch a 2nd line, even in these buildings, must be weighed against the need to assist the 1st arriving engine in quickly getting the 1st hoseline in operation. Getting the first line into operation is the primary tactical concern.

3.6 Typically, the 3rd arriving engine company will team up with the 4th arriving engine to stretch and operate the 2nd hoseline at an operation. However, if the 2nd arriving engine has already begun stretching a 2nd hoseline (as described above), the 3rd arriving engine should team up with the 1st arriving engine and assist in the operation of the 1st hoseline.

3.6.1 There may be situations in which the 3rd arriving engine may need to assist the 1st and 2nd arriving companies in getting the 1st hoseline in operation. This may be the case if there is an excessively long or difficult stretch, or if there was a problem with the stretch. The 3rd arriving engine officer should make sure their assistance is not required with the 1st line before ordering a 2nd line stretched.

3.6.2 In extreme situations where fire extension in multiple occupancies is an immediate threat, there may be a need to quickly stretch a 3rd hoseline to address extension. If both the 1st and 2nd arriving engine companies are able to stretch and operate their own hoselines and do not require assistance, it may be necessary for the 3rd arriving engine to stretch and operate a 3rd hoseline.

3.6.3 The 3rd arriving engine should only stretch a 3rd hoseline when ordered by the Incident Commander.

4. DETERMINING THE SIZE OF THE HOSELINE

4.1 Determining the size of the hoseline to be stretched is a critical decision to be made by the engine officer.

4.1.1 When making this decision, the advantages of the speed and mobility of the smaller 1 3⁄4” hoseline need to be weighed against the limitations of the flowrate provided.

4.1.2 Similarly, the advantages of the increased flowrate of the larger 2 1⁄2” hoseline need to be weighed against the limitations of the heavier weight and decreased maneuverability of the hoseline.

4.2 The engine officer should determine the size of the hoseline stretched based on the conditions faced and the specific purpose of their hoseline.

4.2.1 All hoselines stretched at an operation do not need to be the same size; if the initial hoseline stretched is a 2 ½” line, subsequent hoselines are not required to also be 2 ½” hose. If the engine officer determines the use of a smaller hoseline would be appropriate, subsequent hoselines may be 1 ¾” hose.

4.3 To aid the engine officer in making this decision, the following sections discuss the capabilities of both the 1 ¾” and 2 ½” hoselines, as well as their applicability to various situations. These guidelines are intended to assist the engine officer in making a difficult and important decision.

4.4 1 ¾” hoseline is the primary attack line in the FDNY.

4.4.1 The 180 GPM flowrate provided by the 1 ¾” hoseline is sufficient to extinguish the majority of fires encountered.

4.4.2 When the 1 ¾” hoseline is supplied with 50 psi at the 15/16” tip, the nozzle reaction is 68 lbs. This is the force felt by the nozzle firefighter.

4.4.3 The increased speed and mobility of the 1 ¾” hoseline enables the nozzle firefighter to more effectively operate the hoseline and direct the water stream as needed.

4.5 There exist situations where the flowrate provided by the 1 ¾” hoseline may not be sufficient and the larger flowrate provided by the 2 ½” hoseline is needed.

4.5.1 When supplied with a nozzle pressure of 40 psi, the 2 ½” hoseline will provide a flowrate of 235 GPM and a nozzle reaction of 78 lbs. This is the force felt by the nozzle firefighter.

4.5.2 If this flowrate proves inadequate, the engine officer can request an additional 10 psi be supplied to the 2 ½” hoseline. This will provide a nozzle pressure of 50 psi and a flowrate of 265 GPM. The nozzle reaction will be 98 lbs., which is nearly 50% greater than the nozzle reaction of the 1 ¾” hoseline.

4.6 While the elevated flowrates of the 2 ½” hoseline provide increased extinguishment power, the resultant nozzle reactions reduce the maneuverability of the hoseline. The advance of the line will be slower, and it may be more difficult for the nozzle firefighter to maneuver the stream as needed.

4.7 There are five situations in which the use of the 1 ¾” hoseline would not be appropriate and a larger hoseline should be used:

4.7.1 ***Redacted for PFS***

4.8 Each of these situations is further described below:

4.8.1 ***Defensive position*** – If a hoseline is to be used from a purely defensive position, a 2 ½” hoseline should be used. This includes hoselines stretched at an exterior operation, when the line will be operated exclusively from outside the building, such as from an adjoining rooftop, or from street level.

4.8.2 ***Unknown size or extent of the fire area*** – If the size of the fire area cannot be determined by the engine officer, a 2 ½” hoseline should be used. This situation could be encountered in larger, non-typical buildings, where the size or extent of the fire area cannot be readily determined at the outset of the operation.

4.8.3 ***Advanced fire conditions*** – If the fire conditions on arrival are advanced to such a degree that the officer feels the flow provided by the 1 ¾” line would not be sufficient, the 2 ½” hose may be used. The reduced maneuverability of the 2 ½” line should be considered in this case, especially if the fire is above the first floor or the fire is in a smaller, compartmented building like a Brownstone or Row Frame.

4.8.4 ***Large, uncompartmented fire area*** – If the fire area is large and is uncompartmented, a 2 ½" hoseline should be used. While the officer should use their discretion in assessing the size of the fire area, a general guideline is that a fire area over 50 feet wide can be considered "large". The area should also be "uncompartmented", which means that it largely consists of open areas and floor space. An uncompartmented fire area may also have high ceilings, or directly access a potential roof vent. This may include large industrial or commercial occupancies, such as warehouses, places of worship, large stores, or one-story taxpayers. In such cases, the large, uncompartmented area will allow the reach of the stream to be unimpeded and hit the seat of fire from a distance.

4.8.5 ***Standpipe operations*** – When a hoseline is stretched from a standpipe system, the 1 ¾" hose must not be used due to its high friction loss. In order to achieve a reliable and effective firefighting stream, larger hose with less friction loss must be used from a standpipe system. For residential occupancies, the lead length of the stretch from the standpipe outlet should be 2" lightweight hose, as the relative speed and mobility is more appropriate for the compartmented conditions encountered in these occupancies. In all other situations (commercial, subways, etc.), all lengths stretched should be 2 ½" lightweight hose.

4.9 Considering the above guidelines, further clarification may be required for specific situations, as follows:

4.9.1 Commercial occupancies

A. The presence of a commercial occupancy (OLT with a store, etc.) does not mandate the use of a 2 ½" hoseline. Unless one of the conditions described above is met, the use of 1 ¾" hose may be appropriate. If any of the above described conditions exist, a 2 ½" hoseline is required.

B. For fires in a 1 or 2 story taxpayer, the large fire area and large amount of combustible contents will require the use of a 2 ½" hoseline. Also, the high ceilings and availability of a roof vent directly over the fire area constitute an uncompartmented fire area.

C. For fires in a commercial portion of a mixed occupancy building (two or three story building with a store on the first floor and one or two apartments above), the use of 2 ½" hose may not be necessary. These commercial occupancies are not a taxpayer, and they generally do not have a large fire area. Such commercial occupancies are commonly less than 50 feet wide, do not have a direct opening to a roof vent, and may have narrow aisle space with limited open area. This situation may not fit the above described criteria of a "large, uncompartmented fire area". Unless the fire area is sufficiently large, or one of the other described conditions is present, the use of 1 ¾" hose may be appropriate in these occupancies.

4.9.2 Standpipe-equipped buildings

A. When a hoseline is hand stretched from the apparatus into a building with a standpipe system, the use of 2 ½" hose is not mandated. Unless one of the conditions described above is met, the use of 1 ¾" hose may be appropriate.

B. Larger diameter hose (2" and 2 ½") is used from standpipe systems in order to achieve a firefighting stream from the limited pressure available at the standpipe outlet.

C. 1 ¾" hose is not used from a standpipe because of its high friction loss, not because of its inability to address fire conditions.

D. If the standpipe system is not used, and none of the other above conditions is met, 1 ¾" hose may be appropriate in these buildings.

4.9.3 Fireproof multiple dwellings

A. Similar to other standpipe equipped buildings, when a hoseline is hand stretched from the apparatus into a fireproof multiple dwelling, the use of 2 ½" hose is not mandated. Unless one of the conditions described above is met, the use of 1 ¾" hose may be appropriate. This is true for high rise and low rise fireproof multiple dwellings alike.

B. The flowrate provided by 1 ¾" hose is sufficient to extinguish the majority of fires in fireproof multiple dwellings. Due to the fireproof construction, these fires will involve the contents only. Considering the compartmented layout common in multiple dwellings, the speed and mobility of 1 ¾" hose may be most effective in these buildings when hand stretched from the apparatus.

C. In the event of wind-impacted conditions, in which fire or high heat is driven down the hallway, even the increased flow of a 2 ½" line has proven ineffective. Consequently, alternative fire attack procedures will be implemented (such as the KO curtain, or the high-rise nozzle). The practice of combating wind-impacted conditions with one or more hoselines operating down a hallway is not a primary tactic, regardless of the size of the hoseline.

5. DETERMINING THE PATH OF THE HOSELINE

5.1 When ordering a hoseline stretched, the engine officer is responsible for determining the path by which the hoseline is stretched. If the path is not obvious, it will need to be clearly communicated to the nozzle firefighter when the line is called for.

5.2 When stretching the first hoseline, the hoseline should be stretched in such a way to protect the primary egress of the building while accessing the fire area. Generally, this will require the path of the hoseline to be via the stairway.

5.2.1 In rare situations, unique building characteristics may necessitate the first hoseline to be stretched via an alternative method (such as a rope stretch). In these cases, the path of attack should protect the primary egress as best as possible. These situations should be noted in CIDS.

5.3 If multiple stairways are available, the Engine Officer should select the stairway that will provide the most efficient stretch and attack possible based on the type of occupancy, existing conditions and communications with the ladder officer. In most situations, this will be the stairway that provides the shortest path to the fire area. Once selected, the Engine Officer shall notify the IC of the identity of the attack stairway.

5.3.1 Consideration should be given to using the stairway that provides the shortest stretch on the fire floor. This is particularly relevant when scissor stairs are used.

5.3.2 If a more remote stairway would provide an easier stretch, consideration should be given to using that stairway instead. This is relevant if the closer stairway provides a difficult stretch (such as a wrap-around stretch), or if a more distant stairway provides a much easier stretch (such as a well-hole stretch).

5.3.3 Consideration should also be given to reserving an evacuation stairway for building occupants. This is relevant if there are multiple stairways, but only one is enclosed, in which case it should be used as an evacuation stairway and not for fire attack. The hoseline will have to be stretched via a different stairway.

5.4 The engine officer determines when a well-hole stretch is to be executed. The presence of a well-hole and the intention to use it should be clearly communicated to the nozzle firefighter. This information is also critical to the control firefighter for estimating the stretch.

5.4.1 The presence of a well-hole does not mean it must be used.

5.4.2 The engine officer will need to determine the location at which the hoseline will be taken out of the well hole and secured with a hose strap. The following locations should be considered:

A. ***On the floor below*** – Hose can be secured on the floor below the fire if conditions or limited space on the fire floor prevent it from being secured on the fire floor. This will provide a safe area to flake out hose. From this location, the hose will be stretched via the stairway to the fire floor, providing an element of protection to the primary egress.

B. ***On the half landing*** – If there is a half-landing present in the stairway (which is common when a well-hole is present), the hose may be secured at this point. This will provide a safe area to stage the hose but may provide limited space to flake the hose out.

5.5 Path of the 2nd hoseline

5.5.1 If the 2nd hoseline is stretched to the same location as the 1st line, it should be stretched using the same path as the 1st hoseline and access the fire floor using the same attack stairway. A second dry hoseline should not be stretched into a building until the first hoseline has been charged with water. This is because this practice may cause confusion at operations as to which line is being referred to. Additionally, it may cause the two lines to get tangled with each other.

5.5.2 If the second hoseline is stretched to a different location (to address extending fire, to attack the main body of fire from an alternate access point, or to protect life), it will be stretched via the most effective path for that destination, as determined by the engine officer.

5.6 Path of additional hoselines

5.6.1 At a fire operation, only 2 hoselines should be stretched on a stairway. If a 3rd line is to be stretched, it will need to be stretched by an alternative means.

5.6.2 If additional lines are to be stretched in the fire building, the engine officer should consider other options available, which may include using a different stairway, or possibly an exterior stretch.

5.6.3 For exterior stretches (such as a rope stretch, fire escape stretch, or stretch via aerial or portable ladder), the engine officer will have to determine the location at which the line will be brought into the building.

A. In most situations, the line will be brought in the building on the floor below the fire. This ensures the hoseline is flaked out in a safe area below the fire. The hoseline will then be advanced to the point of operation via the interior stairs.

B. Depending on the situation and building characteristics, it may be possible to bring the line in the building on the floor on which it will be operated. This should only be done if the hose can be flaked out and charged in a safe area before being advanced to the point of operation.

C. In the case of a fire escape stretch or a stretch via a ladder, it may be possible to charge the hoseline outside the building and advance it directly into the building on the fire floor while charged. This operation must be closely coordinated with all other units operating on the fire floor.

5.7 Priority order of stretching hoselines

5.7.1 Depending on the situation, the engine officer may have several options available for stretching hoseline. In the event that multiple methods are available, the following is the priority order of methods for stretching hoselines:

A. Interior stairs
B. Rope
C. Fire escape
D. Portable ladder
E. Aerial ladder

6. CHARGING THE HOSELINE

6.1 As the hoseline is being stretched, the engine officer must determine the point at which the hoseline will be flaked out and charged. This point should be in a safe area, as close to the fire area as possible.

6.2 In some occupancies and building types there are no public hallways to flake out and charge the hoseline before entering the fire area, thus the hoseline will be charged outside the fire building. In these cases, the hoseline should be flaked out and charged as close to the building entrance as possible. This includes hoselines stretched at private dwelling fires, place of worship fires, and taxpayer fires (among others), where hoselines are flaked out and charged outside the fire building.

6.3 If the hoseline is to be stretched dry into the building, it should be flaked out and charged in a safe area as close to the fire area as possible. This includes fires in all types of multiple dwellings, as well as fires in lofts, and other large commercial or industrial spaces.

6.4 If the door to the fire apartment (or fire area) is controlled and conditions in the public hallway are tenable, the hose should be flaked out and charged at the apartment door.

6.5 If the door is not controlled and conditions in the public hallway are not tenable, the hoseline may have to be flaked out and charged before entering the hallway. If the stairway is a safe area, the hoseline may be flaked out and charged in the stairway. If the stairway is not a safe area, or there is no space to flake out the hose, it may be necessary to charge the hoseline in a safe area on the floor below the fire.

7. EXTERIOR WATER APPLICATION

7.1 The application of exterior water into an occupied structure is a valuable tactic under the right set of circumstances.

7.2 In the FDNY, the first hoseline is normally stretched at fires to the interior of the structure to protect the primary egress route, and to confine and extinguish the fire. The NFPA compliant staffing of FDNY Engine Companies greatly contributes to the FDNY's ability to quickly and efficiently stretch and operate handlines to protect life and property with little delay.

7.3 On occasion, when heavy fire is venting out a front window or door on arrival, the first hoseline may be used to momentarily extinguish venting fire. This is tactic of opportunity which does not unnecessarily delay interior operations.

7.4 There are situations where the standard approach of interior attack may not lead to a quick extinguishment of the fire enabling the fire to grow larger. In these situations, the proper application of water from an exterior stream may facilitate the rapid advance of interior attack hoselines by partially extinguishing the fire.

7.5 Exterior stream application may significantly improve interior conditions that may have otherwise been untenable. It may also provide a limited amount of additional time for the interior attack team to overcome obstacles and facilitate advance for final extinguishment.

7.6 The single best way to always improve conditions at any fire is to apply water on the fire. In structures that are not built with fireproof construction, the failure to rapidly apply water on the fire allows a contents fire to extend to the structure. This creates a greater fire problem because the structure is weakening, fire is extending, and heat and smoke conditions are becoming worse.

7.7-7.8 ***Redacted for PFS***

7.9 The acronym to allow for easy mental recall of the manual technique of applying water correctly from an exterior handline to the interior of a building is **"S.S.S.S"**

7.9.1 **Solid** (bore) stream – fully open, do not partially open, do not use a fog tip (occlusion)

7.9.2 **Steep** Angle – will assist with breaking up and cooling the hot gases at the upper levels of the room as it strikes the ceiling.

7.9.3 **Steady** – no circular or whipping motion (occlusion/entrainment) to allow hot gases and smoke to exit as well as preventing less air being drawn inward to fuel (feed) the fire.

7.9.4 **Sprinkler** –a solid stream held steady and positioned at a steep angle will create a "sprinkler effect" to cool the hot gases and knock down the fire.

7.10-7.14 ***Redacted for PFS***

8. BEGIN THE FIRE ATTACK

8.1 Once the hoseline is properly flaked out and in position, the engine officer will call for the line to be charged.

8.1.1 Before calling for water, the engine officer should confirm that sufficient hose has been stretched and flaked out to allow for a smooth advance into the fire area.

8.1.2 The engine officer should also confirm with the nozzle and back-up firefighters that they are ready for the line to be charged. The officer should ensure each firefighter is properly equipped with all required PPE and that their SCBA is donned and in use.

8.2 Once the line is charged, the engine officer should ensure the line is properly bled before the attack begins. This is to confirm water at the nozzle, allow air to escape the hoseline, and to allow for the proper setting of the operating pressure.

8.2.1 At standpipe operations, a long bleed will be necessary to allow the control firefighter to properly set the operating pressure at the standpipe outlet.

8.2.2 The long bleed will also be necessary when a 2 ½" hoseline is stretched from the apparatus. In this case, the low operating pressure may be below the preset of the Pro-Pressure Governor. This will require the ECC to set the pressure manually and necessitate a long bleed by the nozzle firefighter to allow the pressure to be properly set.

8.3 Prior to opening the door to the fire area for advancement of the hoseline, the engine officer must assure that no firefighters will be exposed in the hallway or on the stairs above as the fire attack is initiated. This can be done via handie-talkie or in person.

8.4 Immediately before moving into the fire area with the hoseline, the engine officer should ensure the nozzle team is crouched low, on the same side of the door and relay to the nozzle team information gathered while the line was being stretched. This may include directions to the location of the fire, or any hazards found in the fire area. At this point, the officer should ensure the nozzle team is ready both physically and mentally. If needed, this is the time for the nozzle team to take a deep breath to reset themselves for the fire attack.

8.5 The nozzle team must begin every interior fire attack through the door to the fire area crouched low, near the floor, regardless of conditions. A sudden ceiling collapse, rapid self-venting, or a fire driven by wind could create a blowtorch effect at the entrance door and seriously injure any firefighter in its path. After entry is made into the fire area, the engine officer can evaluate conditions and adjust or modify the method of advance used.

8.6 The decision to open the nozzle is made by the engine officer. Based on the conditions encountered, the officer may decide to open on smoke. Smoke is to be considered fuel and flowing water on the approach to the fire can cool the area, preventing flashover and rapid fire development. The overhead temperatures within the smoke layer are often unknown and "conditioning the area" with the hoseline may be beneficial.

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8.6.1 If there is a smoke condition with high heat, the nozzle should be opened on the smoke and operated as necessary to cool the area and then advance toward the fire. If turbulent smoke is encountered at the entry point the nozzle should be opened and operated at this location until it is able to advance.

8.6.2 When an area is heavily involved in fire, the area adjacent to the fire room may also be at extreme temperatures. In this case, the officer should order the nozzle opened as the team approaches the area. This will cool the area and allow the nozzle team to make entry for extinguishment.

8.6.3 When opening the nozzle on smoke, the officer may either order the nozzle opened intermittently or have the nozzle opened for constant flow during the advance.

8.6.4 The officer needs to decide if opening the nozzle can wait until they see visible fire, or the team is just outside the fire room. In the absence of high heat and turbulence in the smoke, conditions may be such that advancing the charged line in the smoke condition without opening the nozzle would be more effective. In this case, the line can be advanced with the nozzle closed until the fire can be hit directly with the stream.

8.6.5 Once the hoseline arrives at the fire area, the line should be operated into the overhead area initially to wet the ceiling and adjacent walls then lowered to hit burning objects in the room. Sweep the floor and enter for final extinguishment.

9. SUPERVISE THE FIRE ATTACK

9.1-9.6 ***Redacted for PFS***

9.7 Engine company officers should develop a physical communication system with the nozzle firefighter for use when voice communications cannot be heard. The following system of touch signals can be used in conjunction with verbal commands to relay orders:

9.7.1 open or close the nozzle – one or two slaps on the back or shoulder.

9.7.2 direction of stream – tug on the arm or nozzle, either left or right.

9.7.3 advance hoseline – steady push on back or SCBA.

9.7.4 stop line advance – pull back on shoulder, bunker coat, or SCBA.

9.7.5 emergency withdrawal – 4 slaps on the shoulder and pull in direction of retreat.

9.8-9.11 ***Redacted for PFS***

9.12 After final extinguishment, the engine officer may order a fog or broken stream directed out a window in the fire area to assist in removal of heat and smoke conditions. A broken stream can be produced for venting purposes by removing the MST and partially shutting down the control handle.

10-13. ***Redacted for PFS***

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ENGINE COMPANY CHAUFFEUR

1. ENGINE COMPANY CHAUFFEUR OVERVIEW

1.1 The primary responsibilities of the Engine Company Chauffeur (ECC) involve three general areas:

1.1.1 The safe delivery of the members and apparatus to the scene of a fire or emergency.

1.1.2 Locating and establishing a positive water source.

1.1.3 Delivering and maintaining a water supply to the firefighting force throughout the operation.

1.2-1.3 ***Redacted for PFS***

2. RESPONDING TO A FIRE

2.1-2.4 ***Redacted for PFS***

2.5 Hydrant past the fire building

2.5.1 The ECC should position the apparatus to hook up to a hydrant past the fire building whenever possible. This allows for an efficient hose stretch, while providing engine company members with a view of the entire frontage of the fire building before they stretch their line.

2.5.2 When the hydrant is in close proximity to the fire building, the ECC may elect to initially position the apparatus directly at the hydrant itself. An initial position at the hydrant will facilitate hooking up to the hydrant but may result in a longer hose stretch from the apparatus to the fire building.

2.5.3 When the ECC plans to use a hydrant more distant from the fire building, they may elect to initially position the apparatus in the immediate vicinity of the fire building, so as to facilitate the stretch of the attack line. In this case, the hose stretch will begin at this initial position and the ECC will reposition the apparatus to the hydrant while the stretch is in progress. This evolution is called a “backstretch” (Figure 1).

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2.5.4 When executing a backstretch, the ECC will initially position the apparatus in the vicinity of the fire building, but so as not to impede ladder company positioning. In most cases, this will be a proper distance past the front entrance and is normally based on the type of ladder apparatus responding directly from behind. At most structural fires, the location of the ladder apparatus turntable normally dictates how far past the front entrance of the building the engine backstep should initially be placed on arrival. For longer stretches in larger buildings (such as H-types), an initial position just opposite the front entrance may significantly facilitate a more efficient stretch.

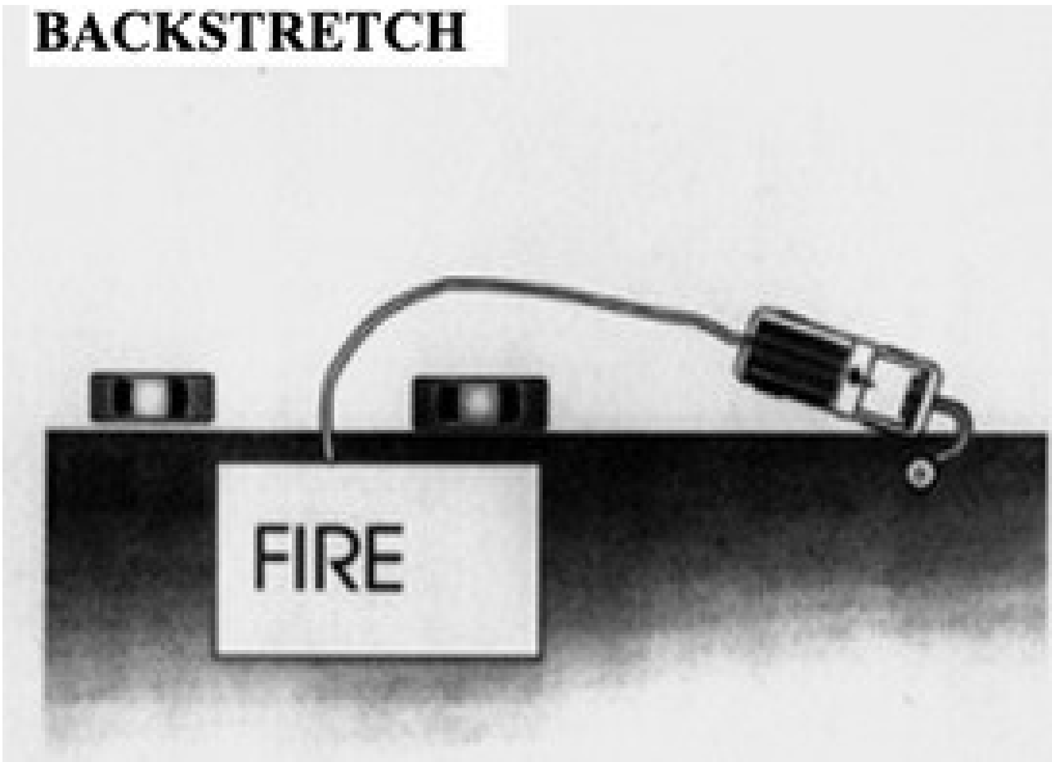

Figure 1

2.5.5 After firefighters remove sufficient hose to reach and cover the fire area, the ECC proceeds with the Engine to the hydrant to be used, playing out hose as the apparatus moves. If deemed advantageous, a 2nd hoseline may also be removed before the engine repositions to the hydrant.

2.5.6 When positioned for a backstretch, the ECC should be mindful of any company approaching from the opposite direction that might prevent the engine from reaching their desired hydrant and should be prepared to contact them via handie-talkie to coordinate their response, if necessary. Similarly, if engine company positioning prevents access for a ladder company responding from the opposite direction, the ECC should inform them either via handie-talkie, or through the dispatcher.

2.5.7 Another benefit of positioning for a backstretch is that the apparatus will be positioned in close proximity to the fire building at the outset. This initial positioning allows for the use of the deck gun, when needed. This is important when the immediate application of exterior water could facilitate life-saving operations due to extreme fire conditions.

2.6 Hydrant before the building

2.6.1 When the ECC elects to use a hydrant located before the fire building, a more challenging stretch will result, as members will be forced to stretch the line around the apparatus. This forces the hoseline to make an extra turn and commonly requires a member to remain at the backstep until sufficient hose has been stretched to reach and cover the fire area.

2.6.2 When the hydrant is in reasonable proximity to the fire building, the hose stretch may be initiated from a position directly at the hydrant. This also may be required if ladder apparatus positioning prevents the engine from moving closer to the fire building.

2.6.3 When there is room to reposition the apparatus closer to the fire building without blocking out ladder apparatus, in-line pumping may be used to facilitate a shorter and more rapid hose stretch. This is executed by stretching 3 ½" hose to the hydrant to be used. This can either be hand stretched back to the hydrant or stretched using the apparatus.

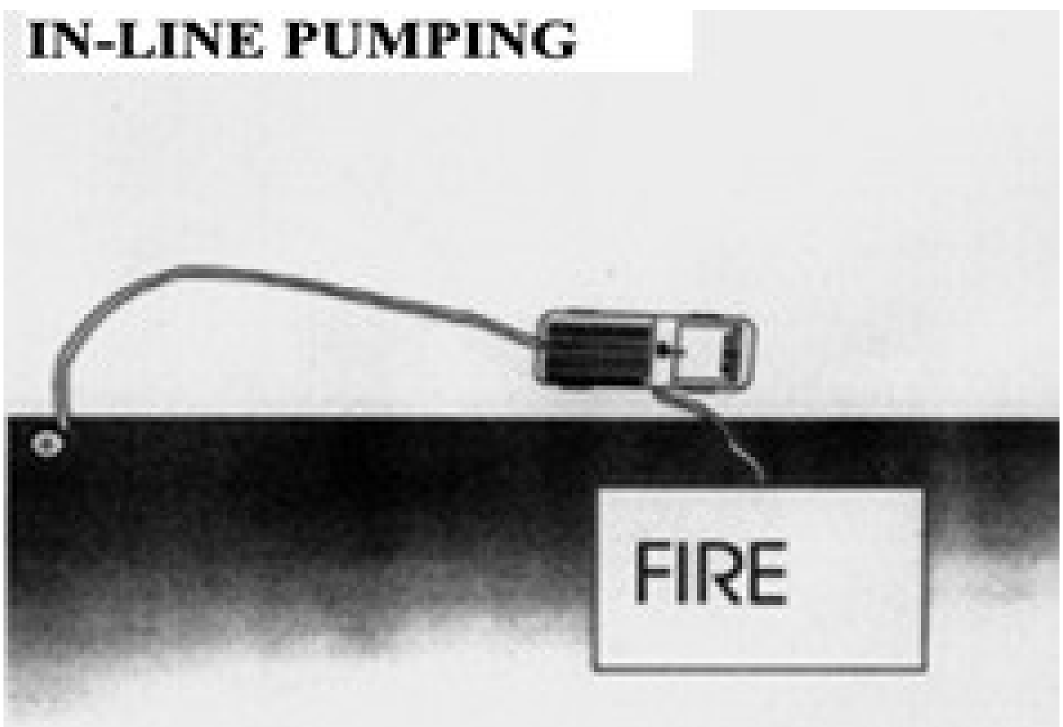

Figure 2

2.6.4 When the apparatus is used to stretch the 3 ½" hose, the Control firefighter will first "key" the hydrant with the 3 ½" hose, wrapping it around the hydrant to anchor it in place. The apparatus will then proceed to a more advantageous position closer to the fire building. The 3 ½" hose will play out as the apparatus is repositioned. If time permits, the Control firefighter should connect a 2 ½" gate to the hydrant's 2 ½" outlet for possible augmentation.

2.6.5 When the apparatus is repositioned, in-line pumping can result in shorter hose stretches to the fire area, but longer stretches from the apparatus to the hydrant. This also necessitates the use of the smaller 3 ½" hose as a hydrant connection, which may limit water supply.

2.7 In-line pumping

2.7.1 The term "in-line pumping" refers to any situation in which 3 ½" hose is used to connect to a hydrant (Figure 2). In these situations, the apparatus will be more distant from the hydrant and will be pumping "in-line" between the hydrant and the fire building.

2.7.2 In-line pumping is not exclusive to a situation with a hydrant before the fire building and can be used regardless of the position of the hydrant or apparatus. In-line pumping can be used if the hydrant and apparatus are positioned past the fire building as well.

2.7.3 It is important to specifically identify "in-line pumping" because the smaller size of the 3 ½" supply hose may limit the available water supply. Whenever in-line pumping is used, the ECC should be mindful of the possible need to augment their water supply. If intake pressure drops below 15 psi, the ECC must have their water supply augmented.

2.8 ***Redacted for PFS***

3. LOCATING A WATER SOURCE

3.1 Hydrants are the primary source of water in the FDNY. Before connecting to a hydrant, it must be visually inspected for obvious defects, properly flushed, and tested to ensure sufficient water supply.

3.1.1 Flushing a hydrant allows for any debris inside the barrel to be removed. The hydrant should be opened slowly to allow water to flow from the outlets without having the outlets completely filled with water. This will permit debris trapped inside the barrel to flow out with the water. If large debris is noted inside the barrel, all efforts must be made to remove it.

3.1.2 After the hydrant is properly flushed out, it must be flow tested for proper pressure. This is done by opening the hydrant until sufficient water flow under pressure is observed, indicating there is appropriate water volume available for supply. Once sufficient flow is noted, the hydrant is shut down. The hydrant is now ready for connection

3.2 To connect to a hydrant, the ECC has four options available:

3.2.1 ***10-foot soft suction*** – This 3 ½” soft suction has 4 ½” couplings, so it can be connected directly to a hydrant. It can be bent but will straighten when charged with water and is very difficult to kink. At 10 feet long, it is the shortest hydrant connection and requires accurate positioning close to the hydrant.

3.2.2 ***10-foot semi-rigid suction*** – This 4 ½” semi-rigid hose has 4 ½” couplings, so it can be connected directly to a hydrant. It can be bent and will straighten when charged.

3.2.3 ***35-foot soft connection*** – This 5” synthetic hose is yellow and has 4 ½” couplings for direct connection to a hydrant. It is 35 feet long, so it allows for some distance from the hydrant and provides the ability to maneuver around obstructions. It provides the largest flow of any hydrant connection, but has the potential to kink, so it needs to be properly flaked out.

3.2.4 ***3 ½” hose*** – Standard 50-foot lengths of 3 ½” hose can be used to hook up to a hydrant through the use of a specialized hydrant connection fitting (4 ½” to 3” double female). There is no limit on the number of lengths that can be used, so this option allows for the greatest flexibility, but provides the least water flow.

3.3 Hydrants are operated using a hydrant wrench. It is placed over the five-sided operating nut on the top of the hydrant and turned clockwise to open. If the hydrant is equipped with a Custodian Lock, the magnetic cup feature of the Custodian hydrant wrench is placed over the Custodian lock and turned clockwise to open.

3.4 White hydrant discs are used to identify inoperable hydrants. If the ECC encounters a hydrant with a white disc, it should be considered unserviceable. Yellow hydrant discs are used to identify frozen hydrants. If a hydrant is discovered to be inoperable or frozen, the ECC should use the proper disc to identify it.

3.5 If increased water supply is anticipated, the ECC may consider attaching a 2 ½” single gate to the 2 ½” outlet of the hydrant before the hydrant is initially opened for water supply. This will make it possible to later self-augment if the need for elevated water flow arises. If needed, a second supply hose can be connected to this single gate, which can be opened to further supply the engine apparatus. This maximizes the water supply from a single hydrant.

3.5.1 Self-augmentation by way of a 2 ½" single gate can also be used to bypass the initial supply line in the event an obstruction in the supply line interrupts water flow to the apparatus. In this case, a second supply line from the 2 ½" single gate can ensure continued water supply.

3.6 Signal 10-70: no positive water source

3.6.1 In the event an ECC cannot hook up to a positive water source, the ECC should transmit a signal 10-70 via handie talkie. The EAB should be used and the signal transmitted as per *Communications Manual Chapter 9: Company Unit Communications*. This will alert all on-scene units that the 1st due engine does not have a positive water supply and they require assistance in obtaining one.

3.6.2 It's important to also transmit the 10-70 on the department radio, which informs incoming units of the situation and allows dispatch to assign a water resource unit. The second arriving engine will be the water resource unit when a 10-70 is transmitted by the first arriving engine.

3.6.3 Once the 10-70 is transmitted, the ECC should coordinate with assisting units, including the water resource unit, and make clear what assistance is needed.

3.7 Receiving a Relay

3.7.1 In a variety of situations, an engine apparatus may not be able to hook up to a positive water source and may have to receive water from another engine company. This could happen when there are no hydrants available in the area, if access is blocked to a hydrant, or if a hydrant is found to be inoperable. There are also times when an engine may have a water source but needs to be augmented via a relay.

3.7.2 When receiving water via a relay, the engine apparatus delivering the water is called the "supply pumper" and the engine apparatus receiving water is called the "operating pumper". *REDACTED FOR PFS

3.7.3 The ECC of the operating pumper opens the inlet gate and should verify incoming water with the ECC of the supply pumper. The ECC of the operating pumper must also open the air bleeder valves to the inlet being used, so as to prevent air from the supply hose from entering the pump.

3.8 Drafting

3.8.1 Engine companies can also use a standing body of water as a positive water source. This can be used when there are no hydrants available, or in situations where more water is required than can be supplied by the hydrant system.

3.8.2 ***Redacted for PFS***

3.8.3 To draft water, the apparatus priming pump is used to remove air from the drafting hose. To make this possible, all inlets and outlets not used must be capped and spanner tightened. All gates and drains must be closed.

3.8.4-3.8.5 ***Redacted for PFS***

3.8.6 FDNY apparatus carry 3 connections intended exclusively for use in the drafting evolution. Each of the connections is 10 feet long and one is a smooth connection, while the other 2 are rigid connections.

A. The 10-foot smooth connection is hooked up to the 6” ungated inlet on the Engine.

B. The rigid connection equipped with a strainer is lowered into the water.

C. The 2nd rigid connection is connected between the other two connections.

3.8.7 The connection equipped with the strainer is secured in the water with a rope. The rope is tied to the connection just above the strainer using a clove hitch and binder and lowered until the strainer is at least 2 feet under the water’s surface. The other end of the rope is secured to a substantial object, using the substantial object knot.

3.8.8 A limiting factor on the apparatus’ ability to draft water is the vertical distance water needs to travel from the water’s surface to the apparatus. In practice, a pumper can draft water a maximum distance of roughly 22 feet, though lifting water vertically beyond 10 feet reduces the Gallons Per Minute (GPM) capability of the pumper.

4. SUPPLYING WATER

4.1 The ECC is responsible for supplying water to firefighting forces via hoselines and maintaining the provision of sufficient operating pressure throughout the operation. This occurs in a number of different ways:

4.1.1 Supplying water to handlines.

4.1.2 Supplying water to a standpipe system.

4.1.3 Supplying water to a sprinkler system.

4.1.4 Supplying water to a large caliber stream (LCS).

4.1.5 Supplying water to another pumper via a relay.

4.2 Supplying handlines

4.2.1 In order to properly supply a hoseline, the ECC must know the number of lengths stretched, the size of the hose stretched, and the elevation to which the line is being stretched. Generally, this information is confirmed by communicating directly with the control firefighter.

4.2.2 Supplying water to a hoseline is the responsibility of the ECC, however, all members should be capable of placing the apparatus in pump and supplying a hoseline, in case of an emergency. To accomplish this, the following steps should be taken:

4.2.3 Before pressure can be supplied to a hoseline, the apparatus pump must be engaged using the following steps:

A. Place the apparatus transmission in “neutral”.

B. Engage the apparatus maxi-brake.

C. Move the “pump shift control” to the pump position (located in the cab).

D. Place the apparatus transmission in “drive”.

4.2.4 Once the apparatus pump is engaged, water can be supplied to a hoseline using the following steps:

A. Press the “Push to Prime” button (Figure 3) on the pump panel (this expels air from the pump system)

Figure 3

B. Press the preset button on the Pro-Pressure Governor (Figure 4) (this engages the PPG)

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Figure 4

C. Open the desired discharge gate to charge (Figure 5) a hoseline.

Figure 5

4.2.5 The maxi-brake on the apparatus must be set for the apparatus pump to be engaged. The pump will not engage if the maxi-break is not set.

4.2.6 The ECC ensures proper pressure is supplied to the handline by calculating the pressure needed to overcome the friction loss in each length of hose and the pressure loss due to the elevation of the hoseline, while still providing the correct nozzle pressure “at the tip”. This practice is known as “street hydraulics”.

4.2.7 The following are the rules of thumb that govern the quick calculations involved in street hydraulics:

A. add 20 psi friction loss per length of 1 ¾" hose.

B. add 5 psi friction loss per length of 2 ½" hose.

C. add 5 psi per floor of elevation (one floor is roughly 10 feet).

D. subtract 5 psi per floor of elevation loss below grade (one floor is roughly 10 feet).

E. 1 ¾" hoseline nozzle (15/16" tip) requires 50 psi at the tip.

F. 2 ½" hoseline nozzle (1 1/8" tip) requires 40 psi at the tip.

G. Fog nozzle requires 100 psi at the tip.

4.2.8 ***Redacted for PFS***

4.2.9 The ECC should inform the engine officer via handie-talkie when water is being supplied. In this transmission, the ECC should also inform the officer whether they are being supplied by a hydrant or if they are only supplied by the booster tank (for example: "255 Chauffeur to 255, Here comes your water…you're on hydrant water").

4.2.10 In a situation where there is delay in hooking up to a hydrant and the officer calls for the hoseline to be charged, it may be necessary for the ECC to supply the line with the booster tank. This may also occur if the officer calls for quick water in an attempt to immediately protect life. When the officer calls for water, the ECC must supply water as soon as possible. Supplying water to a hoseline from the booster tank should not be delayed by the ECC continuing to hook up to a hydrant after the officer has called for booster water.

4.2.11 Whenever a line is supplied with the booster tank, the ECC must communicate to the Engine Officer that they are on booster water. The Engine Officer should also be notified when the water level in the booster tank is half empty. Once they are hooked up to a hydrant, the "tank to pump" valve is closed, and there is sufficient intake static pressure (pressure when water is not flowing) and residual pressure (pressure remaining after a line is charged and water is flowing), the ECC must notify the officer that they are now on hydrant water.

4.3 Supplying a standpipe system

4.3.1 When a hoseline is to be operated from a standpipe outlet, the ECC must hook up to the standpipe system and augment the system. This supply line should be the first line stretched from the apparatus.

4.3.2 ***Redacted for PFS***

4.3.3 When supplying water to a standpipe system, the ECC should use 3 ½" hose (or 3" hose if high-pressure pumping) to supply the appropriate Fire Department Connection (FDC, formerly known as Siamese connections). The standpipe FDC is entirely painted red or may just have red caps (Figure 6A). If part of a combination system (Figure 6B), the FDC is entirely painted yellow or may just have yellow caps.

Figure 6A


Figure 6B

4.3.4 ECC's can encounter a wide range of difficulties when connecting hose to a FDC. This can include defective or damaged threads, frozen female swivels or swivel that will not turn, caps that cannot be removed, broken clapper valves, or outlets stuffed with debris. In these situations, there are various possible solutions to this problem:

A. Tapping the swivel(s) on the FDC with a tool (spanner) may loosen paint, dirt, etc., and allow the swivel to operate.

B. Twist the supply hose 4-5 turns to the left, insert the male end, then twist the male end to the right (clockwise) into one of the female swivels of the FDC.

C. Insert a 3" x 3" x 3" Siamese into one of the female swivels of the FDC, this provides a female coupling for the male coupling of the 3 ½" supply hose to attach to.

D. Using a 3" double male fitting and a 3" double female fitting. The double male fitting is attached to the malfunctioning female coupling of the FDC (the fitting will be turned, not the broken swivel). The double female fitting is then coupled to the double male, which provides a female coupling for the male coupling of the 3 ½" supply hose to attach to.

4.3.5 If the FDC is found to be inoperable, or if the position of the FDC in relation to the hydrant makes connection to the FDC impractical, the standpipe system can be supplied by way of the first-floor standpipe outlet as an alternative.

4.3.6-4.3.11 ***Redacted for PFS***

4.4 Supplying a sprinkler system

4.4.1 Upon being ordered to supply a sprinkler system, the ECC should supply the system with a 3 ½" hoseline to the FDC. Not all sprinkler systems have a FDC, so only those with an available connection need to be supplied.

4.4.2 Automatic sprinkler system FDC's are painted green (Figure 7) or are equipped with green caps. If part of a combination system, either the FDC or the caps are painted yellow. If the FDC is aluminum or has aluminum caps, it indicates a non-automatic sprinkler, or a system of perforated pipe.

Figure 7

4.4.3-4.4.4 ***Redacted for PFS***

4.4.5 When the building is equipped with both a standpipe and a sprinkler system, the first supply line stretched should be to supply the standpipe FDC. Once the standpipe FDC is supplied, a second line should be stretched to supply the sprinkler FDC.

4.4.6 ***Redacted for PFS***

4.5 Supplying a Large Caliber Stream (LCS)

4.5.1 LCS are streams that deliver at least 350 GPM of water. Streams of this size are delivered through several different appliances, including tower ladder monitors, aerial ladder pipes, engine apparatus deck pipes, Blitzfire Oscillating Monitors, and the New Yorker Multiversals.

4.5.2 ECC's should supply LCS with 3 ½" hose. When their use is anticipated, or if the LCS apparatus is not yet in position, the ECC may stretch 3 ½" hose to the location.
Note: The Blitzfire Oscillating Monitor should only be supplied with a 2 ½" hoseline.

4.5.3 During LCS operations, all valves and gates should be opened slowly to avoid a "water hammer". This sudden force that results when a water supply is quickly shut down can result in damage to pump, appliances, and hose.

4.5.4 ***Redacted for PFS***

4.6 ***Redacted for PFS***

5. ***Redacted for PFS***

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THE BACKSTEP

1. OVERVIEW

1.1 "The Backstep" is a term used to describe the team of firefighters in an engine company whose primary purpose is to stretch and operate hose lines to extinguish fire.

1.1.1 The Backstep is comprised of the following 4 firefighters and does not include the Engine Company Chauffeur (ECC):

A. Nozzle firefighter

B. Back-up firefighter

C. Door firefighter

D. Control firefighter

1.2 The duties of each of these positions is described in the sections below. Additionally, all firefighters should be able to perform the following basic operations (which are fully discussed in *Chapter 5: The Engine Company Chauffeur*):

1.2.1 Properly operate and connect to a hydrant.

1.2.2 Engage apparatus pump and properly supply a hoseline.

1.2.3 Supply and operate the apparatus deck pipe.

1.3 All firefighters should be familiar with buildings within their districts which pose extreme difficulties when stretching hoselines (interconnected buildings, wrap-around stretches, etc.)

1.4 All firefighters must be proficient in executing all types of hose stretches and must be familiar with the proper usage of all related tools and equipment.

1.5 All firefighters must be proficient in forcible entry and must be familiar with the proper usage of the halligan, axe, and all related forcible entry equipment.

1.6 All firefighters must conduct many individual size-ups during any incident, each of which may have a direct impact on the success or failure of the operation. This includes reading the response ticket for all relevant information, including CIDS, as well as a thorough size-up of the fire building itself.

1.7 The following sections will describe the general responsibilities and techniques relevant for the positions of the Backstep. The techniques specific to the various types of hose stretches will be discussed in *Chapter 7: Stretching Hoselines*.

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2. THE NOZZLE FIREFIGHTER

2.1 The firefighter assigned the nozzle occupies one of the most challenging and dangerous positions on the fireground. The duties associated with the nozzle position routinely take this firefighter in close proximity to the fire and require a determined and experienced member.

2.2 This position is assigned by the officer at the start of each tour, but can be flexible throughout the tour, allowing a less experienced firefighter to move up to the nozzle position at a minor fire to gain valuable "on the job" experience.

2.3 In addition to their standard size-up, the nozzle firefighter should pay particular attention to the various factors that influence the hoseline stretch and operation. This includes the location of the fire apartment within the building, the type of stretch to be executed, the type of stairway present, and the size of public hallways and stairway landings.

2.4 Stretching the line

2.4.1 The Nozzle firefighter stretches the first length of hose with the nozzle attached via the route and to the location determined by the officer (Figure 1). If the hosebed is maintained using a horseshoe arrangement, the nozzle firefighter takes their length by carrying the first horseshoe. If horseshoes are not used, the nozzle firefighter takes their first length by grabbing the top 3 folds of the hosebed.

Figure 1

2.4.2 The hose should be stretched to a safe location in proximity to the fire area. If the line is to be charged inside the building, such an area could be a stairway landing, hallway, or adjoining area. From this point, it is the nozzle firefighter's responsibility to flake out the lead length of hose.

2.4.3 The techniques specific to the various types of hose stretches are discussed in *Chapter 7: Stretching Hoselines.*

2.5 Flaking out hose

2.5.1 The nozzle firefighter is responsible for flaking out the lead length of the hose stretch. A determining factor in the technique used to flake out the lead length will be whether the hose is to be charged inside the structure (as in multiple dwellings, etc.), or outside the structure (as in private dwellings, taxpayers, etc.).

2.5.2 In either scenario, the nozzle firefighter should carry the entire lead length intact to the entrance to the fire area and flake out the hose from that location. This should be in a safe area, but as close to the fire area as possible.

A. If the line is being charged inside the building, this point may be the door to the fire apartment.

B. If the line is charged outside the building, this point will be the entrance to the building.

2.5.3 When stretching hose carried in a horseshoe, an effective technique is to use the midpoint of the length to efficiently flake the hose out. This is accomplished by laying the horseshoe down at the point of deployment and pulling the hose from the middle "ring" of the horseshoe (which is approximately the midpoint of the length). The midpoint can then be walked or tossed away from the point of deployment for a smooth flake out (Figure 2).

Figure 2

2.5.4 When properly flaked out, the nozzle and first coupling should be side by side at the entrance to the fire area, ensuring an entire 50-foot length of hose is available for the interior of the fire area.

A. This "U-shaped" orientation will facilitate a smooth advance into the fire building by allowing the lead length to pivot at the first coupling. This allows the lead length to advance without having to pull the weight of the entire line. In effect, the nozzle team only has to advance the weight of one length of hose, rather than the weight of the entire stretch.

2.5.5 When flaking out hose outside the structure (private dwellings, taxpayers, etc.), consider the following:

A. The availability of space to flake the hose is not usually a problem when flaking out outside the structure.

B. If possible, hose should be flaked out in line with the entrance to be used. This is especially important when stretching 2 ½" hose, which is heavier and more difficult to maneuver.

C. Avoid areas where the hoseline could be damaged by falling glass, heat, or fire.

2.5.6 When flaking out hose inside the structure (multiple dwellings, etc.), consider the following:

A. The availability of space to flake out hose is a central concern when flaking out inside a structure.

B. The condition of the public hall is also a critical concern. If conditions in the hall allow, the nozzle length should be carried to the door to the fire area and flaked out from there. If the public hall is untenable, the lead length will need to be flaked out elsewhere (Figure 3).

C. If conditions allow, hose should be flaked out in the hallway on the fire floor. If necessary, other apartments on the fire floor, on the same side of the public hallway as the fire apartment, can be used for additional space.

D. If more space is needed, hose can be flaked up the interior stairway to the half landing or the floor above, which allows gravity to assist with the advance of the hose line into the fire apartment. Hose can also be flaked down the interior stairway to the half landing or to the floor below the fire. When flaking out on the floor above the fire, be mindful to allow space for the possibility that an additional hoseline may be stretched to that area. When flaking hose out above the fire floor, the nozzle firefighter should ensure the door to the fire area is being controlled.

E. When hallways and landings are extremely small, hose can be flaked out on the floor below the fire and advanced to the fire area.

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Figure 3

F. The hose needed to reach the fire area should be supplied by the length carried by the back-up firefighter. This ensures the nozzle firefighter's length is reserved for the fire area itself. Additional hose from the back-up firefighter's length will be used to make sure there is enough extra hose available and flaked out to facilitate a smooth advance into the fire area.

G. While most apartments require one length of hose, it is possible for larger apartments or duplexes to require additional hose for the fire area. With this in mind, the nozzle firefighter should estimate the amount of line needed to cover the entire fire area and communicate this need to the back-up firefighter, who may have to adjust the location of their drop point to accommodate the additional hose required for the fire area.

H. When the public hall on the fire floor is untenable, the lead length will have to be flaked out in a safe area elsewhere. This may be on the floor below, or possibly inside the stairway (if the stairway is enclosed). Ideally, the lead length should be flaked out in the same manner at the point of deployment, with the nozzle and first coupling next to each other as close the fire area as practical.

2.5.7 When flaking out the lead length, the hose should be laid out as neatly as possible to reduce the chances of kinking or snagging the line once the line is charged.

2.6 Charging the line

2.6.1 After flaking out the line in preparation for its advance, the nozzle firefighter should keep a knee on the nozzle to protect it from being kicked or moved while they don their SCBA facepiece.

2.6.2 Once their protective equipment is donned and the line is flaked out, the nozzle firefighter should signal the engine officer that they are ready for water. The decision to charge the line is ultimately made by the engine officer.

2.6.3 When the engine officer calls for water the nozzle firefighter must prepare for a "long bleed" of the hose line. This allows for the release of air trapped in the hose, confirms serviceability of the nozzle, and allows the operating pressure to be accurately set.

A. To bleed the line, the nozzle is fully opened after water reaches nozzle, allowing water to flow. While waiting for the line to be charged, the nozzle can either be kept closed or cracked slightly open, allowing air to escape.

B. When bleeding the line, it should be directed towards the fire area, if possible. In buildings with elevators, an attempt should be made to direct the bleed away from elevator shafts. This can help keep elevators serviceable for firefighting operations.

C. The long bleed is especially important at standpipe operations, as it allows the control firefighter to accurately set the operating pressure at the standpipe outlet while water is flowing.

D. The long bleed is also particularly important when a 2 ½" hoseline is stretched from the apparatus. At these operations, the lower friction loss of the 2 ½" hose will require lower discharge pressures and the operating pressure may be below the preset on the Pro Pressure Governor. In such cases, the ECC will need to manually set the operating pressure at the discharge gate while water is flowing. Without a long bleed, the ECC may not have the opportunity to set the pressure properly.

2.6.4 The nozzle firefighter must be at a position at the door to the fire area crouched low and out of the doorway opening itself, regardless of conditions. A sudden ceiling collapse, rapid self-venting or a fire driven by wind could create a blowtorch effect at the entrance door and seriously injure any firefighter in its path.

A. This position also allows unobstructed access and egress for the ladder company operating in the fire apartment prior to the line being charged. After entry is made into the fire area, the advancement technique may be adjusted based on conditions encountered.

2.6.5 The nozzle firefighter should never enter the fire area without a charged hoseline. To do so could allow the fire to rapidly extend and overtake the nozzle team causing burns to them and any firefighters operating behind or above them.

2.7 Operating the hoseline

2.7.1 There are a number of decisions the nozzle firefighter is empowered to make while operating a hoseline. They are as follows:

A. Direction of the stream.

B. Rate of advancement.

C. Sweeping the floor with the stream.

D. Calling for more line.

E. Partially closing the nozzle to reduce nozzle reaction and regain control.

F. Opening the nozzle in an emergency.

G. Communicating the need to be relieved on the nozzle.

2.7.2 The nozzle firefighter must understand that the decision to open or close the nozzle is made by the engine officer. Based on the conditions encountered, the officer may decide to have the nozzle opened on smoke and high heat, or they may decide to advance the line until the nozzle can be opened on visible fire.

2.7.3 Opening the nozzle on smoke is a preventive measure taken so that hidden fire can be extinguished while reducing the chance of flashover. If there is a smoke condition with high heat, the nozzle should be opened on the smoke and operated as necessary to cool the area and advance toward the fire. This is done only at the direction of the engine officer.

2.7.4 Advancing a hoseline under a smoke layer without opening the nozzle is not unusual at fires. In the absence of high heat and turbulence in the smoke, conditions may be such that advancing the charged line in the smoke condition without opening the nozzle would be more effective. The line can be advanced with the nozzle closed until the fire can be hit directly with the stream.

2.7.5 Once fire is visible, the nozzle should be opened and the fire extinguished, as ordered by the engine officer. Never pass fire; extinguish it and continue to advance the line. This includes fire visible in the upper levels of a smoke condition, which should be extinguished to prevent a pre-flashover condition from reaching flashover.

2.7.6 Operating the 1 ¾" hoseline

A. When operating the 1 ¾" line (Figure 4), the nozzle firefighter should keep one hand firmly holding the hoseline just behind the nozzle coupling and the hoseline itself should be held tight under the opposite side armpit.

Figure 4

B. The nozzle firefighter should keep the nozzle out ahead of their body at a distance such that they can comfortably operate the nozzle handle with their arm extended (Figure 5). This distance allows them to manage the movements of the nozzle, giving them the ability to achieve complete coverage of the fire area from ceiling to floor.

Figure 5

C. When using the 1 ¾" hose, most movements of the nozzle are made by the nozzle firefighter simply turning the nozzle itself. The bend in the hoseline will occur in the distance of line between the nozzle itself and the nozzle firefighter's body.

D. Using the pistol grip while operating the hoseline is not recommended, as it will limit the nozzle firefighter's effective maneuverability.

2.7.7 Operating the 2 ½" hoseline

A. When operating the 2 ½" hoseline, the nozzle firefighter's hand position will be the same as with the 1 ¾" line. The nozzle should be out ahead of their body, with one hand firmly behind the nozzle coupling and the hoseline held tight under the opposite side armpit.

B. When turning the 2 ½" hoseline, the nozzle firefighter will have to make the turn by using their body, not just by moving the nozzle itself (as is done with the 1¾"). As the nozzle firefighter turns, the back-up firefighter must quickly move in the opposite direction into a position behind the nozzle firefighter, keeping the line as straight as possible.

C. By keeping the line as straight as possible (Figure 6), the hoseline itself will help overcome nozzle reaction. This will also decrease the chance of a kink developing behind the nozzle firefighter.

Figure 6

2.7.8 In the FDNY, there are two basic nozzle advancement techniques used: “Flow and Move” and “Stop and Flow”. Both of these techniques are effective with both the 1 ¾” hose and the 2 ½” hose.

2.7.9 ***“Flow and move”*** is a technique that involves opening the nozzle and advancing the line with the nozzle open and water flowing until extinguishment is reached. This is the standard technique taught in the FDNY Fire Academy and is effective in nearly all fire situations.

A. This technique makes for a rapid advance on the fire while providing a reduced temperature environment in which to travel. Additionally, temperature rebound does not occur, as the line will not be shut down and the fire will not have a chance to regain strength.

B. This technique provides for increased nozzle team safety by enabling the nozzle team to direct a flowing nozzle as the need arises, as in the situation of the discovery of an additional room of fire. It also allows the nozzle team to pace their rate of advancement to meet conditions encountered; once an area is cool enough to enter, the line can be quickly advanced.

C. By flowing water as the nozzle team advances down the hallway towards the fire area, the reach of the stream is being used to facilitate extinguishment. Additionally, surface cooling and gas contraction will be maximized, both of which contribute to effective extinguishment.

2.7.10 ***“Stop and Flow”*** is a technique that involves opening the nozzle and operating from a stationary position while extinguishing fire. The nozzle is then partially closed as the line is advanced further without water flowing. Upon reaching the next point of operation, the advance is stopped and the nozzle is re-opened for extinguishment.

A. This is the primary technique to be used when advancing a 2 ½” hoseline.

B. This technique is useful in situations where obstructions or other physical obstacles create a difficult path of advancement for the line, such as heavy clutter conditions. It is also useful when faced with fire in multiple, separate locations.

C. “Stop and Flow” has the effect of cooling an area so the nozzle can be further advanced to a position from which the main body of fire can be extinguished.

D. “Stop and Flow” should not be used when faced with heavy fire conditions or high heat. It requires sufficient knockdown of the fire to allow for the advancement of the line before the fire can regain strength.

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2.7.11 The nozzle firefighter must constantly be aware of the need to sweep the floor ahead of the advancing nozzle team. This is true when using either nozzle advancement technique.

A. This should be a quick and deliberate side to side motion to achieve good coverage of the floor area ahead of the nozzle team.

B. Sweeping the floor will clear the path of debris, burning embers, and hot water. It also allows the nozzle firefighter to detect a change in the impact noise of the stream, which could indicate an obstacle or the lack of a solid floor ahead of the nozzle team.

C. The nozzle firefighter should sweep the floor (Figure 7) each time the nozzle team makes another forward push, and not just a single sweep when entering the fire area.

Figure 7

2.7.12 While operating, the nozzle firefighter can use the stream impact noise as a guide to which direction to advance or direct the hoseline.

A. The lack of impact noise, while operating the nozzle above the floor level, could indicate an opening such as a doorway or a window. Conversely, an increase in impact noise could indicate an obstruction and the need for the nozzle to be operated in a different direction. The nozzle firefighter should have the ability to 'see what they hear' when deciding on direction of the stream.

2.7.13 When advancing the hoseline, the nozzle firefighter should normally operate from a "knee-up" position, with one knee up in front of them and one knee down.

A. This position provides a stable platform that allows the nozzle firefighter to keep the hoseline in tight and close to their body as they operate. This is especially important in cluttered areas where unsure footing could cause the nozzle firefighter to lose balance.

B. This position also naturally forces the nozzle to be directed upward toward the ceiling, which causes the line behind them to be directed downward toward the floor. This can assist the nozzle firefighter in handling the nozzle reaction.

2.7.14 When using this "knee-up" position, the hoseline can be advanced using two methods:

A. ***Step forward*** - The nozzle firefighter can use the forward leg, which has the knee up, to step forward while lifting and dragging the other knee.

B. ***Alternating knees*** - The nozzle firefighter can roll one knee forward and down, while raising the other knee, thereby alternating knees which have contact with the hot floor surface.

2.7.15 As an alternative to the knee-up position, the nozzle firefighter can also operate with their front leg outstretched, while their other knee is down.

A. This method gives the nozzle firefighter a lower profile, which can provide more control of nozzle and direction of the stream. It also allows them to check the integrity of the floor surface ahead of the advancing hoseline.

B. However, the outstretched leg method can make it more difficult to continually advance the line, especially in clutter conditions.

2.7.16 While it is possible to operate the hoseline with both knees off the ground in a "duckwalk" technique, this can be difficult to execute while wearing bunker pants. The duckwalk was primarily used before the development of bunker pants, which provide the knees with a degree of protection that makes it possible for them to stay in contact with the floor.

2.7.17 Advancing a hoseline down a flight of stairs can be an especially challenging operation for the nozzle firefighter. While descending stairs with a hoseline, the following techniques should be considered:

A. Before advancing down the stairs, the nozzle firefighter should communicate with the back-up firefighter to ensure enough hose is available to reach the bottom of the stairs without delay.

B. Do not delay the descent once initiated, as a position on the stairway places the nozzle team in an exposed and dangerous area.

C. Keep one leg out in front to check for the presence and integrity of each step as you descend. Leaning back against a wall can help guide the descent.

D. If high heat is present, the nozzle should be kept open during the descent and lifted upwards to cool the stairway while descending.

2.7.18 If fire appears behind the nozzle team as it is advancing the hoseline, it must be immediately addressed. Fire behind the nozzle is a serious threat, as it blocks the egress of the nozzle team and any other members operating ahead of the nozzle.

A. This problem can be complicated if the nozzle team is operating in a narrow area that would prevent the nozzle firefighter from simply turning around to extinguish the fire behind them.

B. In this case, the nozzle firefighter should bend the hoseline back on itself and pass the line to the back-up firefighter, who is better positioned to extinguish the fire behind them. The nozzle firefighter will act as their back-up while they operate the hoseline.

C. When passing the nozzle back, the nozzle firefighter should be sure to turn towards the hoseline to avoid getting tangled in the line. The nozzle will pass overhead as it is bent back and should be maintained open, if possible.

D. Once the fire behind the nozzle team is extinguished, the back-up firefighter will similarly bend the line back in the original direction and pass the nozzle back to the nozzle firefighter to continue advancing the line.

E. It should be noted that the nozzle firefighter is not “giving up the line” in this case; they are simply working together with the other half of their nozzle team to temporarily address an immediately dangerous situation.

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3. THE BACK-UP FIREFIGHTER

3.1 The back-up firefighter works together with the nozzle firefighter to form the "nozzle team" and is responsible for providing the nozzle firefighter with physical and moral support as the hoseline is advanced.

3.2 In addition to their standard size-up, the back-up firefighter should pay particular attention to the various factors that influence their ability to properly execute the stretch and flake out the hoseline. This includes sizing up the specific route of the stretch, as well as the size and location of public hallways and stairway landings.

3.3 Stretching the hoseline

3.3.1 The member assigned the back-up position is the second firefighter on the hoseline. This firefighter is responsible for removing the second length of hose from the hosebed and then proceeds, in unison with the nozzle firefighter, to the fire area. If the hosebed is maintained with the 2nd length in a horseshoe, the back-up firefighter carries the second horseshoe. If there is no horseshoe, the back-up firefighter takes their length by grabbing the next 3 folds of the hosebed.

3.3.2 The back-up firefighter will drop and flake out their length of hose in coordination with the nozzle firefighter. The proper deployment of the length of hose contained in the back-up firefighter's horseshoe is essential, as it is the hose the nozzle firefighter will need to reach the fire area with their full length intact.

3.3.3 Once their length is properly deployed and flaked out, the back-up firefighter should also help flake out hose from the nozzle firefighter's length.

3.4 Charging the hoseline

3.4.1 Before the hoseline is charged the back-up firefighter should ensure the hoseline near the fire area is properly flaked out and that the nozzle firefighter has enough hose available to make an advance on the fire.

3.4.2 When the line is charged, the back-up firefighter should make a quick check for kinks and take a position behind the nozzle firefighter providing physical as well as moral support as the fire attack is commenced.

3.5 Operating the hoseline

3.5.1 It is the back-up firefighter's responsibility to absorb as much nozzle reaction as possible. This enables the nozzle firefighter to more effectively handle the nozzle and advance the line.

3.5.2 The back-up firefighter should avoid pushing the nozzle firefighter forward as they operate the line. Instead, they should work to absorb the backwards thrust of the nozzle reaction and advance at the pace set by the nozzle firefighter.

3.5.3 In order to achieve this, the back-up should be on the same side of the hose as the nozzle firefighter and as close as physically possible behind them (Figure 8).

Figure 8

3.5.4 In a situation in which the line is flowing but not advancing, the back-up firefighter can pin the line to the floor and achieve the same desired results (Figure9).

Figure 9

3.6 The back-up firefighter should be positioned so they can look forward as they advance. This allows the back-up firefighter to see what the nozzle firefighter sees and enables them to anticipate the nozzle firefighter's movements.

3.7 The back-up firefighter should maintain a firm grip of the advancing hoseline at all times. If this member was to lose control of the line, the reaction of the opened nozzle could pull it through the grasp of the nozzle firefighter and leave the nozzle team unprotected from the fire.

3.8 When the nozzle firefighter wants to change the direction or elevation of the stream, the back-up member should maneuver the section of hose behind the nozzle firefighter in the opposite direction. This is especially true when operating a 2 ½" handline, in which the back-up firefighter can hinder the operation if they do not coordinate their movements with the nozzle firefighter.

3.9 During the initial hoseline advance, the back-up firefighter should maintain the hoseline below the level of the operating nozzle and keep the line as straight as possible. Any change in direction could lead to a severe kink between the back-up firefighter and the nozzle.

3.10 In the event the advance of the hoseline is stalled due to insufficient available hose, the back-up firefighter may need to momentarily leave the nozzle firefighter to retrieve the hose necessary to continue the fire attack. This must be coordinated with the officer and nozzle firefighter.

4. THE DOOR FIREFIGHTER

4.1 The door firefighter is responsible for supplying the nozzle team with sufficient hose to make the fire attack and ensures the proper flaking out of the hoseline.

4.2 In addition to their standard size-up, the door firefighter should pay special attention to the particular route of the stretch and the size and location of areas to flake out excess hose.

4.3 Stretching the hoseline

4.3.1 The member assigned the door position is the third firefighter on the hoseline. This firefighter is responsible for removing the third length of hose from the hosebed and carrying it to an appropriate drop point in the hose stretch. If the hosebed is maintained with the 3rd length in a horseshoe, the door firefighter carries the third horseshoe. If there is no horseshoe, the door firefighter takes their length by grabbing the next 3 folds of the hosebed.

4.3.2 After dropping their hose, the door firefighter assists with flaking out the hoseline in preparation for it being charged. The door firefighter is also responsible to check the stretch for kinks while proceeding to the entrance of the fire area.

4.4 Charging the hoseline

4.4.1 The door firefighter should also identify any potential pinch points the hoseline will encounter. Any potential pinch point should be dealt with by placing extra hose in the area of the pinch point itself, prior to advancing to the entrance of the fire area. Such pinch points can include a stairway newel post, a doorway, or any abrupt turn.

4.5 Operating the hoseline

4.5.1 After the nozzle team enters the fire area with the charged line, the door firefighter takes a position at the entrance of the fire area and slowly feeds line into the advancing nozzle team. The door firefighter must not push the hoseline to the nozzle team, but instead provide enough slack in the line so that they can advance easily.

4.5.2 The door firefighter should maintain a bow in the section of hoseline between the door and the nozzle team. This tactic will allow the door firefighter to monitor the advance of the nozzle team by observing the straightening of the hoseline. As the hose straightens the member restores the bow in the line (Figure 10).

4.5.3 When maintaining bow in the line, avoid placing the hose high up against a wall where it will be subjected to high heat levels and possible burn through. Additionally, a firefighter attempting to exit the area by following the hoseline may lose contact with the hoseline if the bow is maintained high against the wall.

Figure 10

4.5.4 In large rooms or open areas, it may be possible to maintain a horizontal bow in the line, rather than a vertical bow. This will look like a large loop in the line, laid horizontally on the floor. As the line is advanced, the door firefighter can feed hose to the nozzle team the same way as with a vertical bow (Figure 11).

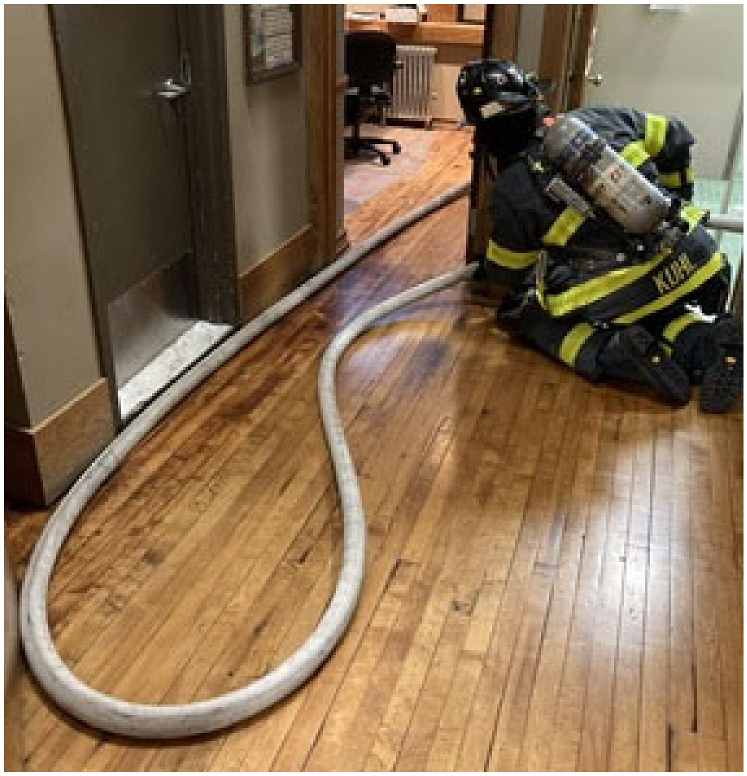

Figure 11

4.5.5 In larger apartments or private homes the door firefighter may be forced to move into the fire area to keep line of sight with the nozzle team. Maintaining visual contact with the nozzle team is necessary to ensure they are supplied with enough line as they advance.

4.5.6 If either member of the nozzle team requires relief or is injured, the door firefighter can quickly move into position and the attack on the fire can continue. The door firefighter should consider leaving their flashlight on which would serve as a guide for members exiting the fire area.

4.5.7 An important task of the door position is to monitor and observe heat, smoke and fire conditions at the entrance doorway. Undetected or extending fire could suddenly erupt or appear between the entrance and the nozzle team. The door firefighter is in a prime location to detect this situation and warn the nozzle team. This position at the entrance to the fire area also gives the door firefighter the ability to monitor and warn the firefighters going above the fire in the case of a sudden change in conditions or water loss.

5. THE CONTROL FIREFIGHTER

5.1 The member assigned the control position is the last firefighter on the hoseline. The control firefighter's primary function is to ensure the correct amount of hose is stretched to enable the nozzle team to advance to the seat of the fire.

5.2 The success of an engine company hoseline operation relies greatly upon the actions of the control firefighter. Where possible, only experienced and knowledgeable firefighters should be assigned the control position. This will assure a more accurate hose estimate and removal from the apparatus.

5.3 In addition to their standard size-up, the control firefighter should pay special attention to the route of the stretch and the various factors that influence the number of lengths of hose required to reach the fire area. This includes sizing up the location of the fire apartment, type of stairway present, and any possible obstacles in the stretch.

5.4 Estimating the stretch

5.4.1 The control firefighter is responsible for the accurate estimation of the amount of hose to be stretched. Their objective is to ensure enough hose is stretched to reach the seat of the fire, while minimizing the number of excess lengths used. Excessive hose increases both friction loss and the potential for kinks, which can cause a considerable reduction in both flow and stream quality at the nozzle.

5.4.2 The control firefighter must pay close attention to the particular route of the stretch in order to accurately estimate the amount of hose to be used. This includes consideration of the following:

A. Distance from apparatus to building entrance.

B. Distance from building entrance to foot of stairs.

C. Type of stairs to be used.

D. Number of floors to ascend or descend.

E. Distance to fire area from stairs or building entrance.

F. Size of fire area.

5.4.3 When estimating the amount of hose to be used, the distance involved in each of the building features listed above needs to be accounted for. The following are guidelines to be considered:

A. At least 1 full length of hose is needed to cover the fire area. Larger apartments or fire areas may require 1 ½ lengths.

B. Roughly 1 length is needed to travel up (or down) 1 floor.

C. For a wrap-around stretch, roughly 1 ½ lengths are needed to travel 1 floor.

D. For a well hole or rope stretch, 1 length of hose stretched vertically can travel roughly 5 floors.

E. Generally, return type stairs may require more hose than straight run stairs.

5.5 Controlling the stretch

5.5.1 To effectively control the hose stretch, the control firefighter must remain last in the stretch. This is true even when they are assisted by another unit in the stretch. When the 2nd engine arrives to assist the stretch, the 1st control firefighter should not delegate or transfer the control position to the 2nd control firefighter. Instead, they should maintain a position at the hose bed and complete the hose estimate and removal.

5.5.2 The control firefighter's position at the hosebed is especially critical when performing a backstretch, as the ECC may be waiting for the necessary hose to be removed prior to proceeding to a hydrant.

A. If the control firefighter was to abandon this position, it may delay the ECC in securing a water source. It may also give the ECC the false impression that sufficient hose has already been stretched, which could lead to the apparatus being prematurely repositioned to a hydrant. If this occurs before enough hose is removed, a short stretch could result.

B. To avoid the above mistakes, direct face to face communication between the control firefighter and ECC regarding the number of lengths removed should take place prior to moving onto the hydrant.

5.5.3 The control firefighter shall remove hose from the hosebed in a manner that allows for later arriving firefighters to easily pick up their length of hose in the street.

A. After the nozzle, back-up, and door firefighter take their lengths from the hosebed, the control firefighter shall remove additional required lengths of hose individually and place them on the ground in the direction of the stretch. Later arriving firefighters can more readily stretch these lengths, as needed.

B. The control firefighter should avoid simply pulling hose off the hosebed and piling it on the ground. This complicates the stretch and delays the positioning of the line.

5.5.4 After sufficient hose is removed from the hose bed, the line must be broken and connected to a pump discharge outlet. The control firefighter must inform the ECC of the size of hose, total number of lengths stretched, and which floor the hose is stretched to.

A. If a backstretch is performed, once sufficient hose has been stretched, the control firefighter will signal the ECC to proceed to the hydrant to be used. At this point, the line will be broken and connected to a discharge outlet.

B. When a second hoseline is dropped at the same time as the first hoseline, the control firefighter must be sure to correctly identify to the ECC which hoseline each unit is operating.

5.5.5 If the hydrant used is in close proximity to the fire building, the control firefighter may assist the ECC with hydrant connection after controlling the hose stretch. This should only occur after the hose stretch has been completed.

A. If in-line pumping is used, the control firefighter may similarly assist the ECC with connections as necessary after the stretch is completed.

5.6 Charging the hoseline

5.6.1 After sufficient hose has been stretched and the ECC does not require their assistance, the control firefighter should assist in flaking out hose between the apparatus and the building entrance door, in addition to feeding slack toward firefighters ahead on the line. In doing this, they should remain mindful of the following:

A. Minimize the number of turns made by the hoseline outside the building.

B. Hose should not be stretched or flaked out in the middle of the street.

C. If apparatus positioning or the presence of cars makes stretching in the street difficult, bring the hoseline onto the sidewalk close to the apparatus and stretch by way of the sidewalk.

D. If the hoseline needs to cross the street, cross over as close to the fire building as possible, while remaining mindful of ladder company positioning.

E. Leave room for the hoseline to move around any obstructions or pinch points, such as parked cars, trees, fences, or doorways. Be especially mindful of car tires, which can easily snag the hoseline.

5.6.2 Once the line is charged, the control firefighter will eliminate kinks in the hoseline as they move along the line toward the fire area. This may require repositioning of hose in halls and stairways and straightening any bends that are restricting the water flow.

5.7 Operating the hoseline

5.7.1 Once the line is charged and the stretch is checked for kinks the control firefighter should take a position at the entrance to the fire area, this allows the door firefighter to move into the fire area allowing them to better supply the nozzle team with line.

5.7.2 When an engine is staffed with four firefighters the control firefighter will also assume the responsibilities of the door firefighter.

5.8 Standpipe operations

5.8.1 The responsibilities of the control firefighter differ significantly when the hoseline is stretched from a standpipe outlet. In this case, the control firefighter is responsible for supplying the proper pressure to the hoseline from the outlet.

5.8.2 The control firefighter's responsibilities at a standpipe operation are fully discussed in *Chapter 8: Standpipe Operations*.

6. 2ND ARRIVING ENGINE

6.1 Generally, the backstep of the 2nd arriving engine will assist the 1st arriving engine in stretching and operating the 1st hoseline. Members should maintain their assigned order as they assist in the stretch, with the nozzle firefighter closest to the 1st arriving company, followed by the back-up, door, and control firefighters

6.2 If the 2nd engine arrives on scene before the 1st engine begins the stretch, they should join the 1st arriving engine at the back of the apparatus and assist in the stretch. If necessary, members of the 2nd arriving engine should carry a full length each by grabbing 3 folds of hose from the hosebed. This may be needed for a long stretch.

6.3 If the 2nd engine arrives after the 1st engine has begun stretching, the 2nd arriving members should begin assisting with the stretch only after they have confirmed the position of the 1st arriving engine and the progress of the stretch. This may require the 2nd arriving members to enter the building and follow the line to determine the progress made by the stretching members.

6.4 When backing up a hoseline in operation, the members of the 2nd arriving engine should ensure the smooth advance of the hoseline. This will require the members be positioned in proximity to the 1st arriving company, while remaining adequately spaced out on the hoseline.

6.5 However, members of the 2nd arriving engine should also strive to conserve air and remain outside of an IDLH atmosphere as much as possible, as they may be assigned to relieve the 1st arriving engine on the nozzle at a prolonged operation. Their position should consider both the need to advance the charged line and the need to conserve air for possible relief.

7. LATER ARRIVING ENGINES

7.1 For later arriving engine companies at a fire operation, the hoseline operations of the members of the backstep will be determined by whether the company is stretching and operating their own hoseline, or whether they are the company backing the hoseline up.

7.2 Engine companies that are stretching and operating their own hoselines should operate similar to the 1st arriving engine company, as described above.

7.3. Generally, this will include the 3rd arriving engine, who is usually responsible for stretching and operating the 2nd hoseline at a fire operation.

7.4. Any company stretching their own hoseline must determine the destination of their hoseline and the location of the apparatus from which they will stretch the hoseline. Depending on the location and availability of engine apparatus, this may not necessarily be the same apparatus from which the 1st hoseline was stretched.

7.5 Engine companies that are backing up additional hoselines should operate similar to the 2nd arriving engine company, as described above. They must confirm the identity of the unit who is stretching the hoseline they will be backing up.

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ENGINE COMPANY OPERATIONS
CHAPTER 7
August 5, 2021

STRETCHING HOSELINES

1. STRETCHING HOSELINES

1.1 In the FDNY, the primary method of fire extinguishment is by way of a hoseline hand-stretched from the engine apparatus. The method used to stretch the hoseline depends on a variety of factors, including the fire situation encountered, building construction, and stairway type.

1.2 When stretching hose lines from an apparatus, the FDNY stretches either 1 ¾” hose or 2 ½” hose to extinguish fires. The decision of which line to stretch is made by the engine officer and is further discussed in *Chapter 4: The Engine Company Officer*. All of the hose stretching techniques discussed in this chapter are effective for stretching either size hose line.

1.3 The placement of the hose line and the path of travel are also determined by the Engine Officer and are also discussed in *Chapter 4: The Engine Company Officer*. However, the 1st and 2nd hose lines are generally stretched to the fire area by way of the building’s primary means of egress.

1.4 The interior placement of the first hoseline by way of the primary means of egress provides protection for evacuating occupants and firefighters alike, while allowing direct fire extinguishment. However, in some situations (cellar fire in a private dwelling, fire in a place of worship, etc.), hoselines are stretched by way of the entrance which provides the quickest access to the fire.

Note: At an advanced cellar fire in a non-fireproof structure (OLT, taxpayer, row frame, etc.) it is frequently safer and more efficient to initially attack the fire using an exterior entrance if such access exists. Members must be mindful of the fact that operating directly above an uncontrolled cellar fire is an extremely hazardous operation as the possibility of floor collapse is greatly increased in these situations.

1.5 Depending on the occupancy and conditions encountered, the first hoseline may either be flaked out and charged outside the fire building, or it may be stretched into the fire building and flaked out in a safe area in proximity to the fire area before it is charged.

1.5.1 Generally, the hoseline is charged outside the fire building for fires in buildings that do not contain public hallways or stairs which are separated from the occupancy areas. This includes private dwellings, places of worship, taxpayers, and similar occupancies. This tactic may also be necessary if units are met with fire at the main building entrance of any occupancy type.

1.5.2 For fires in buildings that contain public hallways or stairs which are separated from the occupancy areas, like multiple dwellings, lofts, and similar occupancies, primary hoselines will be stretched dry inside the fire building and will be flaked out and charged in a safe area as close to the fire area as practical.

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1.6 When stretching hoselines inside the fire building, the most critical factor in determining the manner in which the first and second hoselines are stretched is the type of interior stairs to be used. The concerns that are of the greatest consequence for stretching hoselines are the following (which will be further described in the sections below):

1.6.1 Does the stairway provide a safe area to operate from?
(*Is the stairway open, or enclosed?)*

1.6.2 What portion of the building does the stairway access?
(*Is the stairway transverse, wing, or isolated?)*

1.6.3 Is the layout on each floor identical in relation to the stairway?
(*Are return stairs present? Scissor stairs?)*

1.6.4 Does the layout of the stairway complicate the stretch, or can it make it easier?
(*Is there a well hole? Does it wrap around an elevator shaft?)*

2. TYPES OF STAIRWAYS

2.1 Each of the concerns listed above should be determined when a stairway is to be used to stretch a line. This is accomplished by categorizing the stairway based on the following questions:

2.1.1 Is the stairway open, or enclosed?

2.1.2 Is the stairway straight run, return, or scissor stairs?

2.1.3 Is the stairway transverse, wing, or isolated?

2.1.4 Does the stairway have a well hole?

2.1.5 Does the stairway wrap around an elevator shaft?

2.2 Each stairway type is further described in the sections below.

2.3 Open Stairways (Figure 1)

2.3.1 Open stairways are directly exposed to the public hallway and generally extend from the ground floor to the roof. They do not have doors separating them from the public hallway and cannot be isolated to provide a safe area on the fire floor.

2.3.2 It is common to have a roof vent at the top of an open stairway (skylight, bulkhead, scuttle, etc.), which can be used to relieve the early upper level smoke travel that is common in an open stairway.

2.3.3 The floors above the fire will become quickly filled with smoke, which can complicate stretching and operating additional hoselines on upper floors.

Figure 1

2.4 Enclosed stairways (Figure 2)

2.4.1 Enclosed stairways are separated from the public hallway on each floor by a door (Figure 3). If conditions in the public hallway are untenable, this stairway door can be controlled to provide a safe area from which to operate on the fire floor.

2.4.2 This stairway provides a barrier to smoke travel and allows safe passage for egress on all floors (in stairways other than the attack stair).

2.4.3 Smoke conditions on floors above the fire can be less severe in the case of an enclosed stairway, as each floor will be isolated from the path of smoke travel.

Figure 2

Figure 3

2.5 Straight run stairways

2.5.1 Straight run stairways are stairs that run in a single direction from floor to floor (Figure 4). As a result, the entrance to the stair at the bottom of the stairway will not be directly beneath the exit from the stairway on the floor above.

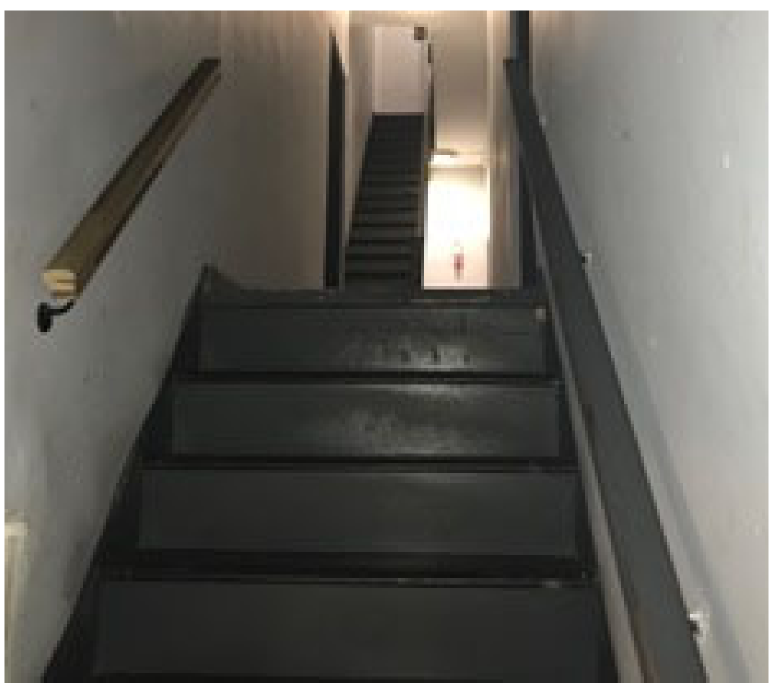

Figure 4

2.5.2 Typically, these stairs are stacked over each other in most buildings. Sometimes, the straight run stairs are oriented so the stairway is a continuously straight run for a number of floors. While climbing a continuous straight run staircase, the access point on each floor will be increasingly further away from the original stairway entrance. This type of stairway can be found in loft buildings and other large occupancies (such as theaters).

2.6 Return stairways

2.6.1 The defining characteristic of a return stairway is that the stairway's access point is located at the same place on each floor. When using this stairway, you will "return" to the same spot when you enter each floor.

2.6.2 Return stairs generally exist in one of three possible orientations: straight run stacked stairs, half-landing return stairs, or wrap-around stairs.

2.6.3 Straight run stacked stairs involve a straight run stairway connecting each floor. However, the stairway is not continuous; to continue up the stairway, you will have to walk down a hallway on each floor to return to the bottom of the next flight. The result is a series of straight run stairs oriented in the same direction and stacked on top of each other.

2.6.4 Straight run stacked stairs (figure 5) can be found in a variety of occupancies, but are common in brownstones, old law tenements, and some styles of private dwellings.

Figure 5

2.6.5 Half-landing return stairs have a platform (half-landing) between floors, which allows the stairway to change direction and return to the same access point location on each floor. In effect, there are two sets of stairs between each floor: one going from the floor to a half-landing, and another going from the half-landing to the next floor (facing the opposite direction).

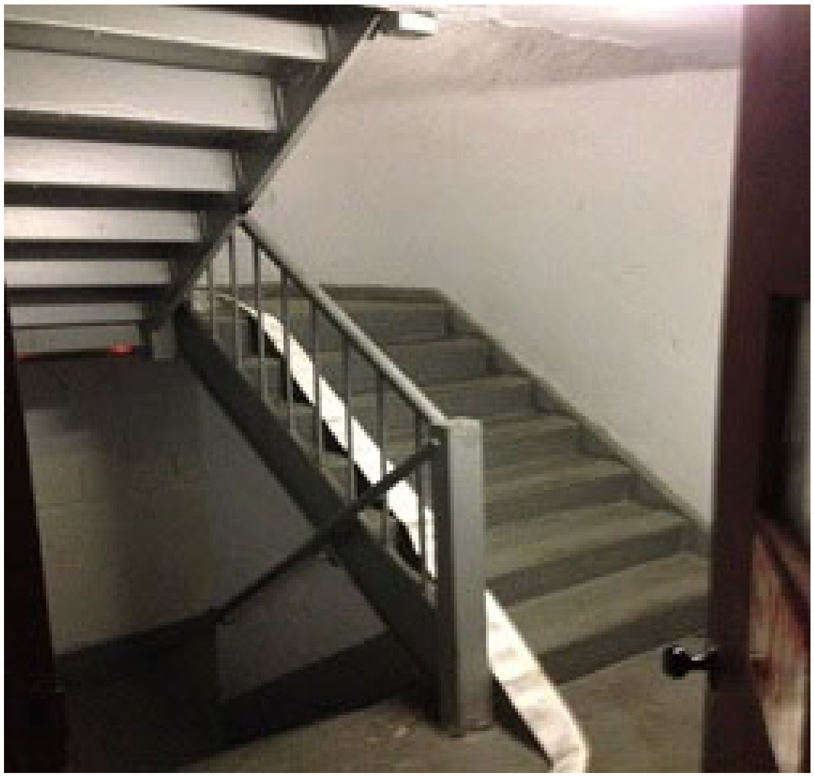

Figure 6

2.6.6 Half landing return stairs (Figure 6) can be found in a variety of occupancies, but are commonly found in new law tenements, larger apartment houses, and high-rise multiple dwellings (including Class 2 buildings).

2.6.7 It is possible for a half landing return stair to have more than one platform (half-landing) between floors. If there is more than one change-of-direction platform, the result will be a "wrap-around" staircase that wraps around between floors as it returns to the same access point on each floor.

2.6.8 These "wrap-around" stairs can exist in larger buildings of various occupancies, including new law tenements and larger apartment houses. The stairway may wrap around an elevator shaft, or it may have a large well-hole.

2.6.9 Wrap-around staircases (Figure 7) can have one or more half-landings between floors. In either case, it will also be necessary to walk around the remaining turns on each floor to access the next flight of stairs. In essence, these wrap-around stairs combine the elements of straight run stacked stairs and half-landing return stairs. When wrapped around an elevator shaft (or other obstruction), wrap-around stairs present a challenging stretch.

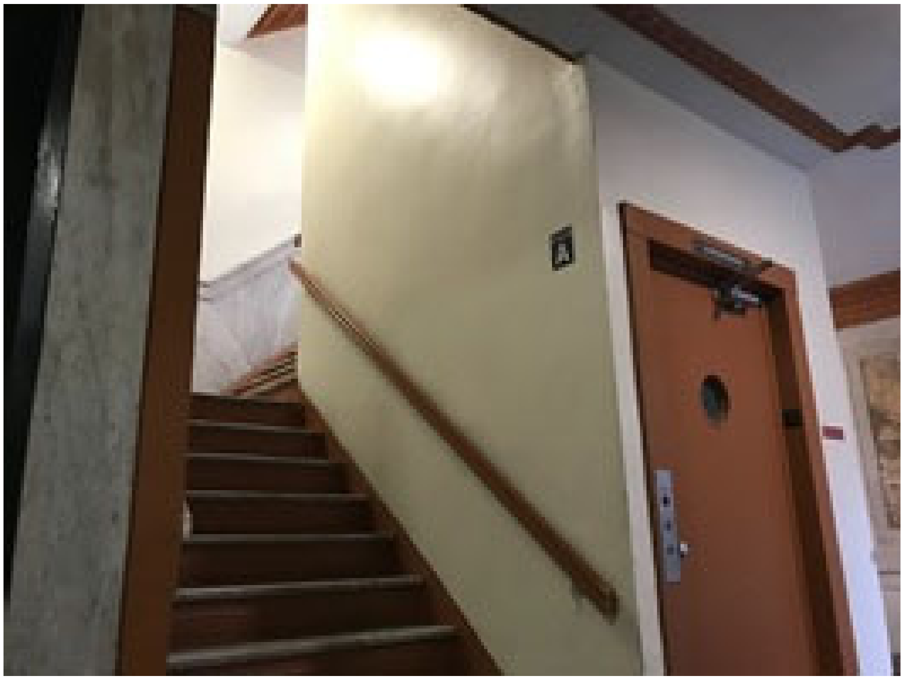

Figure 7

2.7 Scissor stairs

2.7.1 Scissor stairs are a series of continuous stairs (Figure 8) that change direction at each floor. A flight of stairs will run in one direction up to the next floor where a landing is found, allowing the stairway to change direction. The direction of the stairway changes at the landing and the next flight of stairs will be oriented in the opposite direction. These stairs are continuous in the sense that you don't have to leave the stairway to continue to the next floor.

2.7.2 The result is that the stairway access point in the public hallways will not be the same on each floor. Rather, the location of the access point will alternate from floor to floor. However, the access point on alternating floors will be in the same location (if you climb two flights up, the stairway exit will be in the same location). This can be a source of confusion at a fire operation.

Figure 8

2.7.3 Typically, scissor stairs exist in pairs; there will be two stairways that mirror each other as they continue from floor to floor. The staircases will crisscross as they go between floors and their access points will be at opposite (Figure 9) and alternating locations on each floor.

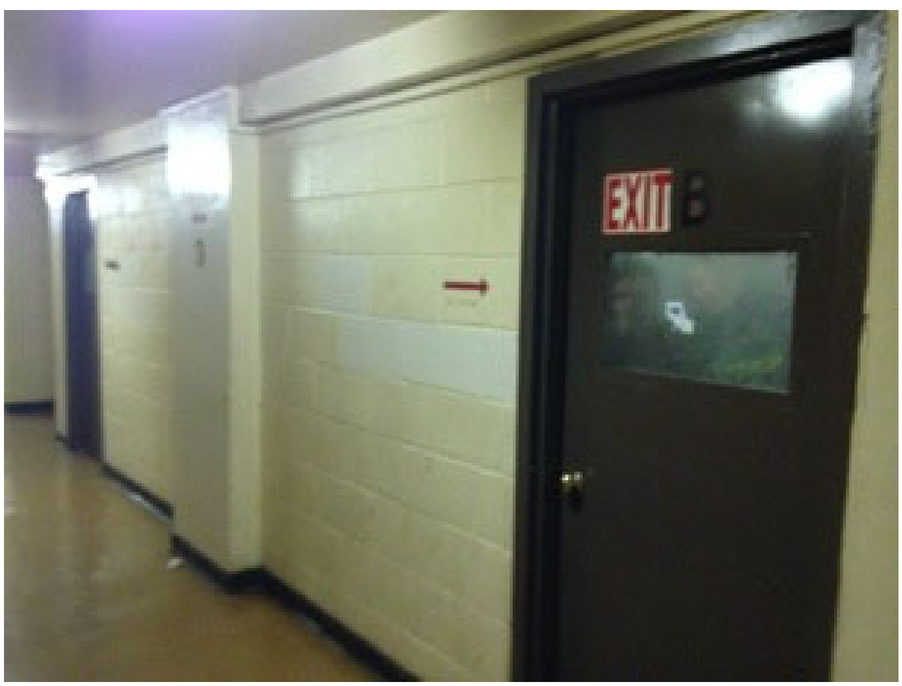

Figure 9

2.7.4 Scissor stairs must be properly labelled. Mislabeled scissor stairs can cause great confusion at an operation. Each stairway should have the same letter designation throughout its span; it does not alternate as you climb from floor to floor. Instead, the orientation of the lettered staircases in relation to each other on each floor will alternate. The Incident Commander must be notified immediately when members find stairs mislabeled at an operation so that all units can be made aware of this matter.

2.7.5 Scissor stairs are most commonly found in high-rise multiple dwellings, high-rise commercial buildings, and other large occupancies. They can also be encountered in various styles of newly constructed low-rise multiple dwellings.

2.8 Transverse stairs

2.8.1 Transverse stairs are stairways that provide access to all apartments on a floor. By using a transverse stairway, access is possible to all apartments.

2.8.2 Transverse stairs are a key concern in buildings with multiple stairways, such as new law tenements or larger apartment houses. Typically connected by a "transverse hallway", these stairs are often located at the ends of the hall. The hallway allows members to transverse to all apartments and all stairways.

2.9 Wing stairs

2.9.1 Wing stairs are stairways that provide access to only the apartments found in a specific section (or "wing") of a building. By using wing stairs, there will be apartments in the building that cannot be accessed.

2.9.2 Wing stairs can access a "wing hallway", which only provides access to apartments in that specific section (wing) of the building. While smaller than transverse hallways, these wing hallways are often large enough to accommodate flaking out hose.

2.9.3 Wing stairs are often found in new law tenements and larger apartment houses and are a key concern when stretching hose. Care must be taken to ensure the correct stairway is used to access the fire apartment.

2.10 Isolated stairs

2.10.1 Isolated stairs are stairways that access only a small number of apartments and are isolated from other areas of the building. By using isolated stairs, there will only be access to the apartments immediately accessed by the stairs.

2.10.2 There is typically no hallway associated with isolated stairs. Rather, these stairs open onto a landing on each floor, from which the apartments are accessed. This landing area can be small and may present difficulty in flaking out hose.

2.10.3 Isolated stairs can be found in a number of building types, including new law tenements, apartment houses, and other newly constructed multiple dwellings. When faced with isolated stairs, care must be taken to ensure the correct stairway is used to access the fire apartment.

2.11 Well hole stairway

2.11.1 While a "well hole stairway" is not a specific type of stairway in a strict sense, the presence of a well hole is a critical concern when stretching hose. A well hole stretch can save time, energy, and minimize the amount of hose needed.

2.11.2 A well hole is the empty area in the center of the stairway that serves as a vertical void spanning the length of the stairs. If the space is large enough, this area can be used to aid in the hose stretch.

2.11.3 Well holes can exist in all three types of return stairways (straight run stacked stairs, half-landing return stairs, or wrap-around stairs) and may also exist in some scissor stairways.

3. TYPES OF STRETCHES

3.1 Typically, at fires above the first floor, the first hoseline at a fire operation is stretched by way of the main building entrance and the interior stairs. This is done to protect the primary means of egress.

3.2 However, there may exist specific building characteristics or situational considerations may necessitate a variation from stretching via the primary means of egress and an alternative method may be appropriate (such as a rope stretch or fire escape stretch). Buildings where these alternative methods may need to be employed should be identified in CIDS.

3.3 The following sections describe various techniques to stretch hoselines using different types of interior stairways and various techniques of exterior stretches.

4. TRADITIONAL STAIRWAY STRETCH

4.1 In a traditional stairway stretch, the hoseline is stretched by carrying the hose up the interior stairway and to the fire area (Figure 10). As the hose is stretched, each member carries their length (in folds or a horseshoe) and the hose plays out on the stairway behind them.

Figure 10

4.2 In this type of stretch, two critical concerns are managing the turns on the staircase and determining the proper drop point for the length of hose carried by each member.

4.3 To properly manage the turns on the stairway, the hose should be carried in the outside arm of the stretching members. This will help the members make wide turns with the hose as they climb the stairs. This is important because, if stairway turns are taken too tight, the hose can get caught on the turns as the members climb. If this happens, the back-up firefighter or other members may have to go back to loosen the hose around the caught turn.

4.4 The nozzle firefighter will carry their length (folds or horseshoe) intact to the point of deployment, which will be as close to the fire area as possible. They should keep their length intact to be used in the fire area itself. If the hallway is tenable and if there is enough room, the hose should be flaked out in the hall.

4.5 If there is not enough room in the hallway on the fire floor, the length can be flaked up to the half-landing (if present) or all the way up to the next landing. Hoselines can also be laid out in adjoining apartments (on the same side as the fire apartment) on the fire floor if additional space is needed. Alternatively, the hose can be flaked out on the floor below the fire and advanced up to the fire floor.

4.6 If the public hallway on the fire floor is untenable the hoseline may need to be flaked out and charged on the floor below the fire.

4.7 The back-up firefighter carries their length (in folds or a horseshoe) and must determine the proper drop point at which to deploy their length. This should be coordinated with the nozzle firefighter. The proper deployment of the length of hose contained in the back-up firefighter's folds or horseshoe is essential, as it is the hose the nozzle firefighter will need to reach the fire area with their full length intact.

4.7.1 The location of the back-up firefighter's drop point will depend on the distance of the fire area from the stairway. If the hallways are long, this may be on the fire floor. If the hallways are small, or if the fire area is close to the stairway, the back-up firefighter may need to drop their length on the floor below the fire.

4.8 Similarly, the hose carried by the next firefighter in the stretch should be deployed at the proper drop point. This will depend on the type of stairway present, as some stairways can require more hose than others. Generally, the next length of hose should be dropped on a floor below the fire.

5. WELL HOLE STRETCH

5.1 The presence of a well hole in the stairway makes it possible to execute a well hole stretch as an alternative to a traditional stairway stretch. This type of stretch will use significantly less hose, will take less time, and will be less physically demanding, while still protecting the primary egress of the building.

5.2 In order for the well hole to be used, it must be large enough to accommodate the hose. An effective test for size is a closed hand (Figure 11); if you can fit your gloved fist inside a well hole, it should be large enough to execute a well hole stretch.

Figure 11

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5.3 The presence of a well hole does not require the execution of a well hole stretch. The decision to use the well hole is made by the engine officer and should be clearly communicated to the members executing the stretch.

5.4 Before the decision is made to use the well hole, be sure the path of the well itself is clear. This is accomplished by looking up from the bottom of the well. Obstructions in the well hole (such as metal bars) can complicate the stretch. Also, be sure the well continues above the first floor, as variations in layout may impact the well hole. Conversely, be mindful that variations in layout may create a well hole that begins on the 2nd floor. If desired, the well hole stretch can begin from that point.

5.5 The engine officer should also determine the point at which the hose will be pulled out of the well and flaked out for fire attack. This point should be in a safe area as close to the fire apartment as practical. Most commonly, this will be on the floor below the fire (or half landing) and stretched to the fire apartment by way of the stairs. In larger buildings, it may be possible to pull the hose out of the well hole and secure it on the fire floor, if the stairs are sufficiently remote from the fire apartment to allow for members to flake out the required lengths and secure the hose.

5.6 Before the hose is secured, the engine officer must confirm that enough hose is available on the fire floor to reach the fire area.

5.7 ***Well hole technique 1: Nozzle firefighter carries their length***

5.7.1 The nozzle firefighter will carry their entire length intact to the fire apartment, where it will be flaked out for fire attack. Only the "tail" of the hose that leads from the nozzle length towards the back-up firefighter should be placed inside the well. There is no need to carry the folds or horseshoe in the well hole itself.

Figure 12

5.7.2 This is best accomplished by carrying the length in their outside arm as they walk up the stairs. This allows the nozzle firefighter to use their inside hand to guide the "tail" of the hose into the well and avoid obstructions (such as newel posts).

5.7.3 By using this technique, the entire lead length can be carried up to the fire floor intact, regardless of the size of the well. The "tail" hose of the nozzle firefighter's length can easily fit in a narrow well. This ensures an entire lead length of hose is readily available to cover the fire apartment and eliminates the need for the nozzle firefighter to hoist an entire length of hose up the well.

5.7.4 Before the nozzle firefighter can begin climbing the stairs, there needs to be a length of hose available at the bottom of the well. This is the hose that will be hanging in the well hole. This hose will be provided by the back-up firefighter, who will drop their length at the base of the well. As the nozzle firefighter begins to climb the stairs, the back-up firefighter should ensure the smooth advance of hose up the well hole.

5.7.5 Upon arrival at the fire floor, the nozzle firefighter will set their length aside (keeping it intact), step on the hose to prevent it from falling down the well, and pull up any additional hose needed on the fire floor, being mindful that their entire lead length should be reserved for advance into the fire apartment. If there is enough room in the hallway, line can be more easily pulled up by simply walking with the hose away from the well hole.

5.7.6 Once enough hose is on the fire floor, the hose hanging in the well hole needs to be properly secured using a hose strap. A girth hitch is placed around the hose, and the hook/carabiner is used to secure it to the stairway railing. Allow the weight of the hose to hang freely on the hose strap to ensure it is properly secured. Ideally, the hose strap should be placed just below a hose coupling, but this exact placement is not necessary.

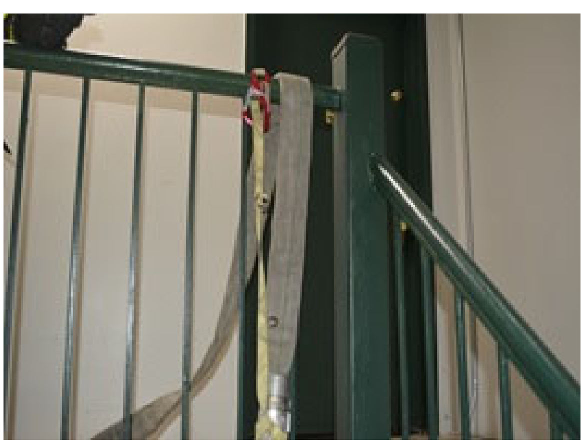

Figure 13A

Figure 13B

5.7.7 Once the hose is secure, the nozzle firefighter should pick up their length, carry it intact to the fire apartment, flake it out, and prepare to advance, as described in *Chapter 6: The Backstep*.

5.7.8 As the stretch is being executed, the back-up firefighter should ensure the smooth deployment of hose up the well hole and make their way up to the fire floor as soon as practical. Once there, assist the nozzle firefighter in pulling up the necessary hose, securing the hose strap, and flaking out the hose before preparing to advance as in *Chapter 6: The Backstep*.

5.8 ***Well hole technique 2: Nozzle and back-up firefighters both carry their lengths***

5.8.1 When conditions allow, a more efficient alternative to the above evolution would allow both the nozzle and back-up firefighters to carry their lengths up the stairs (Figure 14). This technique should be considered when the floors are larger and more hose is required on the fire floor.

Figure 14

5.8.2 To do this, the control (or door) firefighter would supply the length of hose at the bottom of the well hole and guide the hose up the well. This is the 3rd length in the stretch and the control (or door) firefighter would stretch it to the base of the well hole behind the nozzle and back-up firefighters.

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5.8.3 With the 3rd length on the floor at the bottom of the well, both the nozzle and back-up firefighters will carry their lengths up the stairs (in their outside arms) and the "tail" of the back-up firefighter's hose would be placed inside the well, as described above. The "tail" of the nozzle length will hang between the nozzle and back-up firefighters on the stairway as they climb. Working together, the nozzle and back-up firefighters would then carry two entire lengths up to the fire floor, being careful not to entangle the hose hanging between them.

5.8.4 Upon reaching the fire floor, two lengths will already be present, so it is likely that no additional lengths will need to be pulled up. The hose can be secured using the hose strap and the line stretched to the fire apartment as described above.

5.9 ***Well hole technique 3: Nozzle firefighter carries nozzle only***

5.9.1 When there is an obstruction in the well hole, the line will need to be passed around the obstruction at every turn. Such an obstruction may be a pole or other construction feature. If there is a hoseline already stretched in the well hole, it will also be an obstruction. For this reason, a second hoseline stretched in a well hole should be executed as described below.

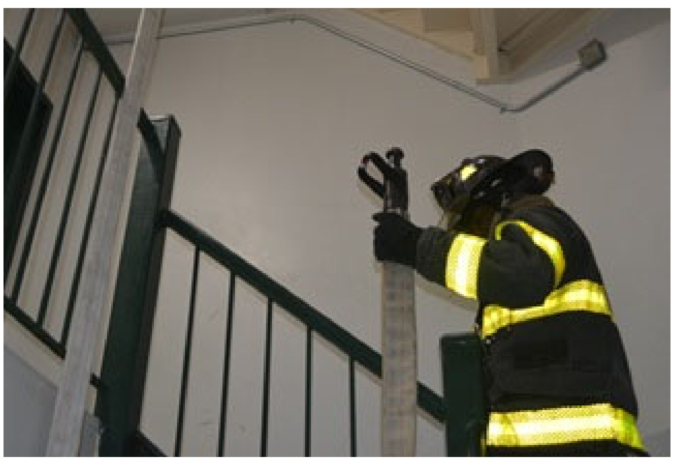
Figure 15

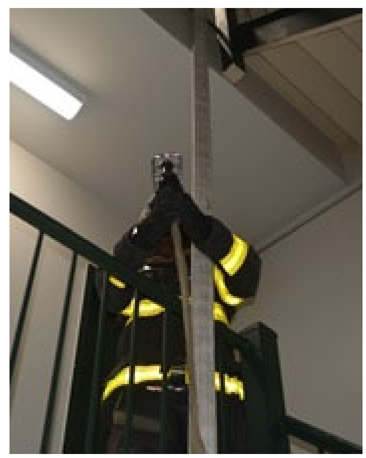
Figure 16

5.9.2 Even if it is possible to pass an entire length around an obstruction, it is not easily accomplished and greatly complicates the stretch. To avoid this, the nozzle firefighter should drop their length at the base of the well hole and carry only the nozzle itself up the well, passing it around the hanging hose (or other obstruction) as necessary.

5.9.3 Upon arrival on the fire floor, all hose required for operation will need to be hoisted up and properly secured. This is likely at least 2 lengths, as at least one length will be needed to reach the fire area and another entire length will be needed to cover the fire area itself.

5.9.4 The hose can be secured using the hose strap and the line stretched to the fire apartment as described above.

6. ROPE STRETCH

6.1 If the stairway is not to be used to stretch the hoseline, an alternative method is to use a rope to hoist the hoseline into position. This can commonly occur when two lines have already been stretched on a single stairway, or when a hoseline is stretched to a roof.

6.2 The decision to execute a rope stretch is made by the engine officer and should be clearly communicated to the members executing the stretch.

6.3 In some cases, the first hoseline may be stretched using a rope stretch. This may be appropriate when a rope stretch would greatly facilitate line placement due to unique building characteristics or other similar circumstances. In this case, the engine officer should be aware that the primary egress to the building will not be fully protected. Buildings where these alternative stretches may need to be employed should be identified in CIDS.

6.4 To execute a rope stretch, the engine officer carries the rope to the drop location to which the hose will be hoisted. This will be a window (or similar opening), balcony, or roof parapet. The officer must ensure windows are sufficiently opened, which may involve removing child gates or other obstructions.

6.5 The rope is carried in a bag or a similar container. Commonly, a modified bleach bottle may be used (this evolution is sometimes called a “bottle stretch”).

6.6 The hoseline will be stretched to a point directly below the drop location and the nozzle and back-up firefighters will arrange their lengths neatly on the ground (Figure 17). The back-up should be careful not to place their hose on top of the nozzle firefighter’s hose.

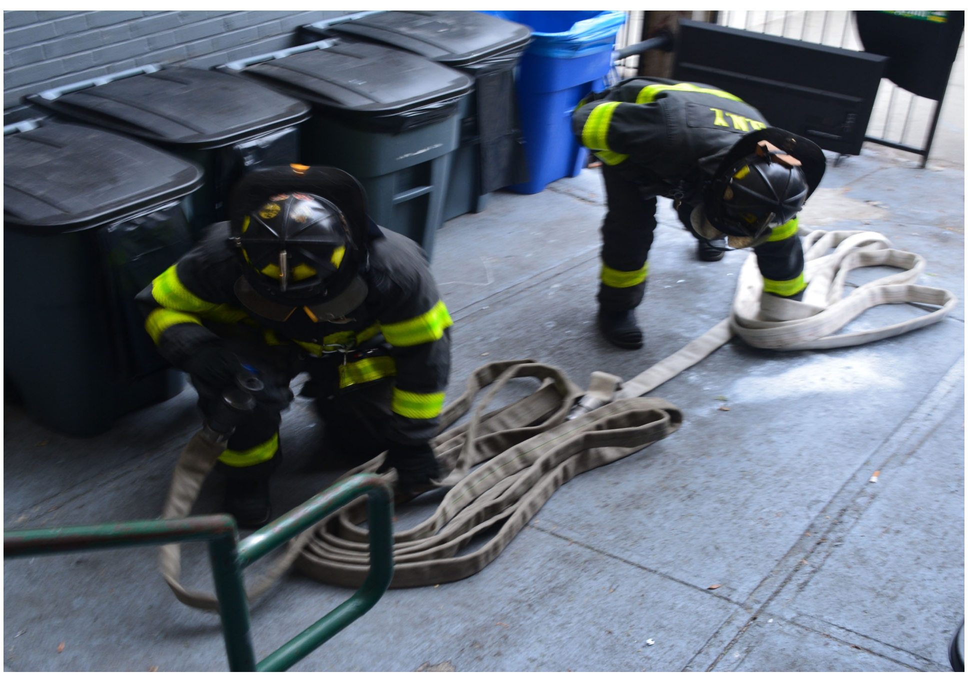

Figure 17

6.7 If the hose is going to be stretched from outside the building, the nozzle and back-up firefighters will drop their lengths on the ground outside the building, directly underneath the drop point.

6.8 A rope stretch may also be executed from inside the building. This can be beneficial in cases of long and difficult stretches (such as a wrap-around stretch) and would require a window available on the ground floor, in addition to another window available directly above this window to serve as the drop point.

6.8.1 If the hose is going to be stretched from inside the building, the nozzle and back-up firefighters will carry their lengths inside the building and neatly drop them next to the window to be used on the ground floor.

6.8.2 The rope will be lowered to this window from the drop point above and the nozzle firefighter will pull the rope into the window on the ground floor and secure their length of hose (as described below).

6.8.3 The rope will then be lifted out of the window on the ground floor and hoisted up to the deployment point above. On the ground floor, the hose should pass through the upper pane of the window, while the hose should pass through the lower pane on the upper floor.

6.9 The engine officer will send the rope to the members below. This can be accomplished two different ways:

6.9.1 ***Toss the rope -*** The officer can hold the working end of the rope and toss the rope container itself to the members below. This may be necessary if the rope needs to be thrown a distance away from the building, but it introduces the possibility of the rope becoming caught in an obstruction, or not reaching the ground if it does not play out of the container properly. It also requires the members in the street to make a more complex knot to secure the hose.

6.9.2 ***Lower the rope -*** The officer can lower the working end of the rope to the members below, keeping the container upstairs with him. This ensures a smooth play-out of the rope as it is lowered and allows the members below to use a carabiner or clip on the working end of the rope to secure the hose.

6.10 Once the rope reaches the ground, the nozzle firefighter secures it to the hose. If the working end of the rope is lowered, this can be done using a carabiner or clip, if present. If there is no carabiner or clip, a clove hitch or slipknot can be tied to secure the hose. If the working end is not lowered, the hose will need to be secured in the middle of the rope. To do this, either a slip-over clove hitch or a slipknot can be used (Figure 18 and Figure 19).

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Figure 18

Figure 19

6.11 When the hose is secured, the rope is hoisted up. The engine officer may start this process, but either the nozzle or back-up firefighter should make their way to the drop point as soon as possible to hoist the hose up. Enough hose will need to be hoisted to reach and cover the fire area.

6.12 When available, a hose roller can be used to help hoist the hose. This will remove the friction of pulling the hose over the window or roof edge. The hose roller is placed over the window sill (or roof edge) and serves as a channel through which hose is pulled, allowing it to roll smoothly over the edge. When the hose roller is used, the attached rope should be properly secured with a substantial object knot.

6.13 One member should stay at ground level to ensure enough hose is available below the drop point to allow for a smooth and complete stretch (Figure 20).

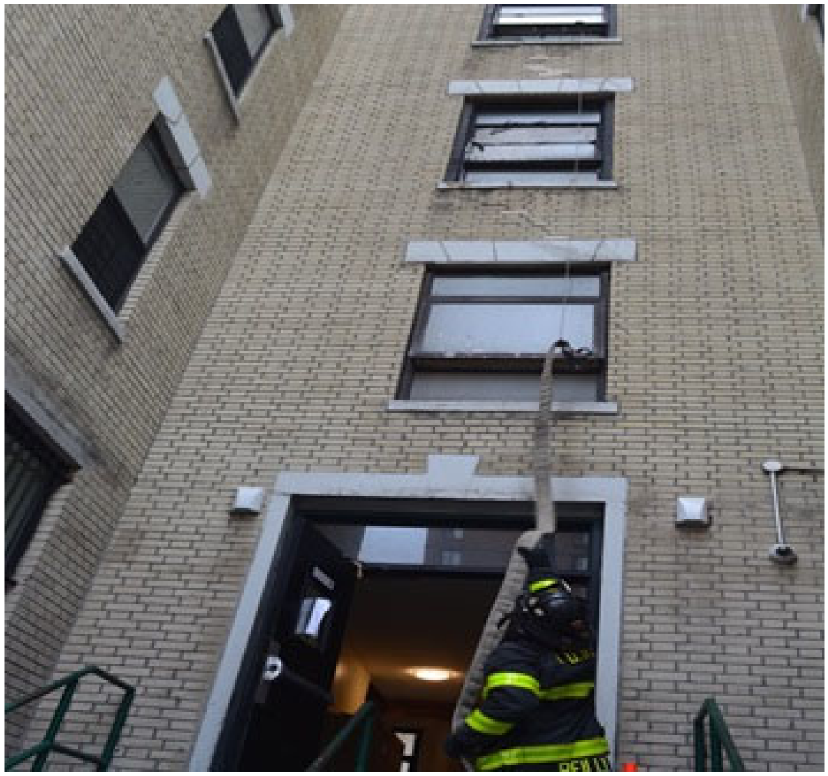

Figure 20

6.14 Once sufficient hose has been hoisted into the window (or onto the roof), the hose must be properly secured. This should be done directly below a hose coupling. Generally, a hose strap secured to a substantial object inside the building will effectively secure the hose.

6.15 At higher elevations, the increased weight of the hose may make it necessary to use a rolling hitch to secure the hose. The rolling hitch is used when the weight of the line hanging vertically is heavy enough to cause the hose to kink when a hose strap is used. The width of the rolling hitch (wrapped 4 times around the hose) prevents such kinking. When used, the rolling hitch must be properly tied directly below a hose coupling and properly placed in a vertical position outside the window. It is anchored with a substantial object knot inside the building.

6.16 Once the line is secured, the nozzle and back-up firefighters will stretch and flake out their hose for fire attack, as described in *Chapter 6: The Backstep*.

7. WRAP-AROUND STRETCH

7.1 When stretching up a wrap-around stairway, the technique used needs to be modified somewhat from the traditional stairway stretch. Due to the additional turns in the stairway and limited visibility, these stretches are more time consuming, demand greater coordination, and require additional hose.

7.2 These stairways require 4 turns to be made for each floor, which is twice as many as typical return stairways. In addition to being obstacles themselves, the added turns demand more hose per floor. Instead of a single length per floor, a more accurate estimate would be 1 ½ lengths per floor for a wrap-around stretch.

7.3 Commonly, wrap-around stairways are located around an elevator shaft. This further complicates the stretch by hampering communication between members on the line. The solid walls of the elevator shaft eliminate visibility between members on different floors and make verbal communication difficult.

7.4 The keys to this stretch are adopting a methodical pace and keeping the lead lengths intact for deployment on the fire floor. The numerous turns on the staircase will invariably catch on the hose and stop forward progress. When this happens, stretching members may need to put down their length (without deploying it) and go back down the stairs to help move the line forward. This is especially true for the back-up firefighter, but it may be necessary for the nozzle firefighter as well.

7.5 After the line has been advanced on the floors below, the back-up (and possibly the nozzle) firefighter should return to their folds, pick them back up, and continue the stretch without prematurely deploying their lengths.

7.6 To minimize the incidence of the hoseline being caught on the wrap-around turns, both the nozzle and back-up firefighters should carry their lengths in their outside arms and make their turns around the elevator shaft as wide as possible. This will allow the stretch to progress as far as possible before the hose becomes caught up on the turns of the staircase.

7.7 A technique that is effective in maintaining the methodical pace necessary to minimize hose being caught up is to use visual contact between members to execute the stretch one turn at a time. This is accomplished as follows:

7.7.1 The nozzle firefighter climbs the stairs to the first turn, at which point they turn back to make visual contact with the back-up firefighter (Figure 21).

Figure 21

7.7.2 Once they make visual contact, the nozzle firefighter proceeds to the next turn and waits there until they can make visual contact with the back-up firefighter again (Figure 22).


Figure 22

7.7.3 The back-up firefighter does the same (Figure 23); they await visual contact from the next member in the stretch below them (this may be the door firefighter, control firefighter, or the 2nd due nozzle firefighter).

Figure 23

7.7.4 If there is no one there, they may have to go back and lighten up on the line themselves (if necessary). If another member is in the stretch, the back-up only moves forward when they have visual contact with them.

7.8 By using this technique, the pace of advancement is driven by the back of the hoseline, which ensures methodical, but steady progress as hose becomes available and prevents the nozzle and back-up firefighters from prematurely deploying their lengths.

7.9 Once the fire floor is reached, the nozzle and back-up firefighters will flake out their line and prepare for fire attack as described in *Chapter 6: The Backstep*.

8. FIRE ESCAPE STRETCH

8.1 When stretching a hoseline up a fire escape, the hose is not stretched up the fire escape in the same manner as a stairway; rather the line is stretched vertically, brought in over the side, and secured with a hose strap.

8.2 To execute this stretch, members can use a six-foot hook to pass the hoseline up the exterior of the fire escape. As an alternative, a rope stretch may be executed, as described in the previous section.

8.3 Initially, the hose is stretched to an area near the fire escape drop ladder. Once the hose is available below the fire escape, one member will climb to the second floor of the fire escape and wait for the line to be passed to them.

8.4 Using an inverted six-foot hook to hold the shut-off handle of the nozzle (Figure 24), the line will be passed up to the member on the fire escape. As this is happening, another member will climb to the 3rd floor of the fire escape. Once there, the hook will be used to pass the line up to them (Figure 25). This procedure will continue until the floor below the fire is reached.

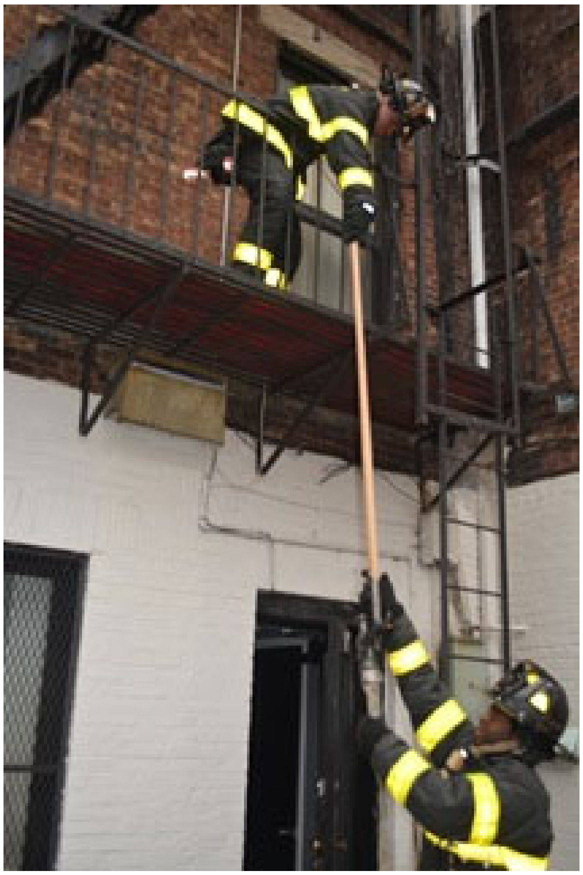

Figure 24

Figure 25

8.5 On the floor below the fire, the member receiving the hoseline will pull up sufficient hose to reach and cover the fire area. The hose will then be secured with a hose strap to the fire escape railing. This one hose strap will effectively secure the hose; additional hose straps are not necessary.

8.6 If the hoseline is to be stretched directly to the fire floor by way of the fire escape, the necessary hose needs to be flaked out on the fire escape balcony on the floor below. This would occur if the line was to be charged outside the building (on the fire escape) and the fire attack made via the window.

8.7 If the hoseline is to be stretched to the fire floor by way of the interior stairs from the floor below the fire, then the line will be brought in the window on the floor below and stretched to the fire area via the stairs.

9. AERIAL LADDER STRETCH

9.1 Using an aerial ladder is an additional option for stretching hose to a roof, upper floor window, or other elevated position. The hoseline may be stretched to the desired location via the aerial ladder or the hoseline may be operated from the aerial ladder itself.

9.2 Stretching a handline up an aerial ladder requires that the aerial not move during the stretch or throughout the operation of the hoseline.

9.3 The engine officer should proceed to the elevated location via the aerial ladder.

9.4 The hoseline is stretched to the area near the turntable of the aerial apparatus and is placed neatly on the ground. The back-up firefighter should be sure not to place their hose on top of the nozzle firefighter's hose. Enough hose to complete the stretch should be brought to this point.

9.5 The nozzle firefighter will leave their length on the ground and carry the nozzle with them as they climb the aerial with the hose playing out behind them. The hose is carried under the left arm (Figure 26) and the nozzle is draped upward across the front of their torso and back over their right shoulder (Figure 27). This technique will allow the hose to advance smoothly and prevents the nozzle from being caught in the rungs as the nozzle firefighter keeps both hands on the rails of the ladder.

Figure 26

Figure 27

9.6 Once the nozzle firefighter has reached the destination, they should momentarily pass the nozzle to the engine officer, allowing them to safely dismount the aerial. Once off the aerial ladder, the nozzle firefighter pulls sufficient hose onto the roof (or into the building).

9.7 As the nozzle firefighter climbs the aerial, the back-up firefighter climbs the ladder behind them, advancing hose as they climb. The hose should be maintained on the left side of the aerial ladder.

9.8 Initially, the control firefighter should guide hose onto the aerial from the position on the ground. When there is a member available to guide hose (possibly the 2nd due nozzle firefighter), the control firefighter should climb the aerial and advance hose behind the back-up firefighter.

9.9 Once the nozzle firefighter has dismounted the aerial and begins to pull hose into the building or onto the roof, the members on the aerial will advance hose from a stationary position on the ladder, keeping the hose on the left side of the ladder. Before doing this, members on the aerial must clip the hook of their personal harness to the rungs of the aerial ladder.

9.10 When sufficient hose has been stretched, a hose strap is used to secure the hoseline to a rung of the aerial ladder at the window or roof level. Once secured, all members on the aerial will complete the ascent up the ladder and proceed to the point of operation.

9.11 The engine officer will wait until all of the firefighters are off the aerial before calling for water in the line. The line should be charged gradually.

9.12 When firefighters are going to operate the hoseline from a position on the aerial ladder, all members must have the hooks of their personal harness clipped to the rungs of the ladder. A hose strap must be used to secure the line in the vicinity of the nozzle firefighter.

10. PORTABLE LADDER STRETCH

10.1 A portable ladder is an additional option for stretching hose to a roof, upper floor window, or other elevated position.

10.2 Hose may also be advanced up portable ladders to access difficult-to-reach places to extinguish fire (such as attic fires or mezzanine areas fires).

10.3 When using a portable ladder, the hoseline may be either stretched dry and charged once in position, or it may be advanced up the ladder while charged.

10.4 When the line is to be stretched dry up the portable ladder, the technique will be similar to the aerial ladder evolution. The engine officer should proceed to the location to which the hoseline will be stretched. This may be by way of the portable ladder, or other route, if more practical.

10.5 Enough hose to complete the stretch should be stretched to the base of the portable ladder. The nozzle firefighter will climb the ladder with the hose under the left arm and the nozzle is draped upward across the front of their torso and back over their right shoulder. This technique will allow the hose to advance smoothly and prevents the nozzle from being caught in the rungs as the nozzle firefighter keeps both hands on the rails of the ladder. The hose is maintained on the left side of the ladder to facilitate a smooth advance.

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10.6 Once the nozzle firefighter has reached the destination, they should momentarily pass the nozzle to the engine officer, allowing them to safely dismount the portable ladder. Once off the ladder, the nozzle firefighter pulls sufficient hose onto the roof (or into the building). When sufficient hose is stretched, the hose is secured to a substantial object using a hose strap.

10.7 The back-up firefighter will feed hoseline to the nozzle firefighter from a position on the ground at the base of the ladder. Once sufficient hose has been advanced, the back-up will climb the ladder and assist the nozzle firefighter in flaking out the line.

10.8 When a charged hoseline is advanced up a portable ladder, the nozzle firefighter should carry the hose in their left hand and the hose should be maintained on the left side of the ladder.

10.9 When the nozzle firefighter is to operate the hoseline from a position on the portable ladder, they should clip the hook of their personal harness to a rung of the ladder and the base of the ladder must be secured.

11. Cockloft Nozzle Stretch—see Chapter 7 Addendum 1 for a complete discussion.

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COCKLOFT NOZZLE

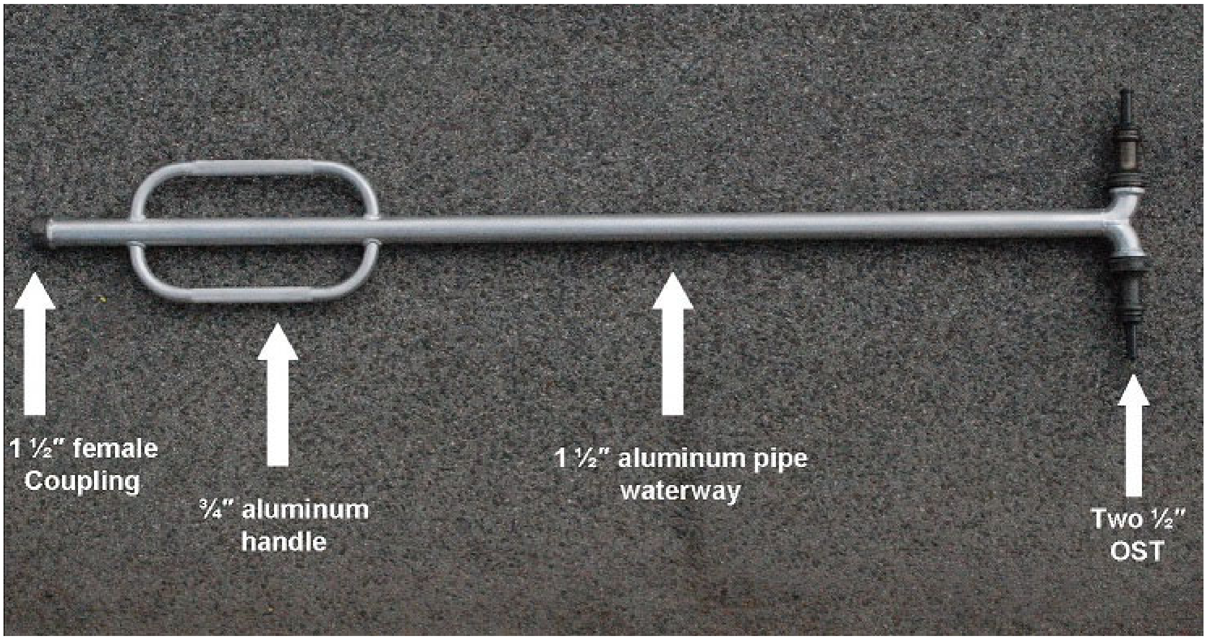

Figure 1

1. DESCRIPTION

FDNY Designation:	Cockloft Nozzle (Figure 1)
Material:	Waterway—1 ½" Diameter Aluminum Pipe
Length:	6' 3" (overall)
Width:	10"
Weight:	Approx 10 lbs.
Misc:	1 ½" male threaded ends receive 15⁄16" Main Stream Tips (MST) to which ½" Outer Stream Tips (OST) are connect.

1.1 The cockloft nozzle is a 6' 3" aluminum pipe with two ½" OSTs. Attached to the body is a ¾ " aluminum handle allowing members control during operation.

1.2 The cockloft nozzle has a 1 ½" female coupling at one end which connects directly to any controlling nozzle shut-off. After removing the MST from the shut-off, members then connect the 1 ½" female coupling of the cockloft nozzle to the shut-off.

1.3 The other end has two ½" OST's. The configuration of these two ½" OST's eliminates backpressure. These two OST's should not be removed when the nozzle is being used to extinguish fire in a horizontal area like a cockloft. The design of the OST's enables the stream to reach in excess of 60 feet. (Figure 1)

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Figure 2

2. INTRODUCTION

2.1 The cockloft nozzle (Figure 2) is a versatile tool that has proven extremely effective in applying water into a narrow, confined area (such as a cockloft). It is primarily designed for use at cockloft fires but may be used in other situations. It is carried by all Divisions and Squad companies, as well as select engines that carry a combination nozzle. When necessary, the IC may contact the dispatcher to identify if there are any engine companies that are responding or on scene that are equipped with a combination nozzle. Any Engine company can be tasked with placing the cockloft nozzle into operation. Engine companies not trained in the use of the combination nozzle should continue to use the conventional cockloft nozzle.

Note: ***Redacted for PFS***

2.2 When the cockloft nozzle is being used to extinguish fire in a cockloft, the nozzle may be placed above the ceiling on the top floor of a building or inverted and lowered into the cockloft area from the roof of the building.

2.3 The cockloft nozzle may also be used to extinguish fire vertically inside of a building (in a vertical shaft) or vertically on the outside of a building (for an EFIS fire) by placing the nozzle so that the OST's are in a vertical position. When used in a vertical application to extinguish fire above, the ½" OST facing downward may be removed and capped with a shut-off, if deemed necessary. This is the only time the ½" OST may be removed.

2.4 The design of the cockloft nozzle greatly minimizes the introduction of air into the confined area of the cockloft, often maintaining the fire in a ventilation limited state.

3. COCKLOFT NOZZLE USE

3.1 To place the cockloft nozzle into operation, a hoseline is needed at the point of operation. This may be an existing handline already in place that is converted to a cockloft nozzle operation, or an additional handline that is stretched and dedicated to operate the nozzle.

3.2 Members should be mindful that only two hoselines may be stretched up an interior stairway, so an alternative means of stretching may be necessary.

3.3 An 1 ¾" or 2 ½" hoseline can be utilized to supply the cockloft nozzle. It should be supplied with a nozzle pressure of 50 psi and is capable of delivering 100 GPM.

3.4 The cockloft nozzle should be inserted into the cockloft between the joists (Figure 3 and Figure 4). Operating members shall alternate the direction of the stream by rotating the nozzle 90 degrees and returning the nozzle to its original position to provide maximum coverage. Do not rotate the cockloft nozzle in a continuous counter-clockwise direction; this action may cause the nozzle to become unscrewed from the shut-off.

Figure 3

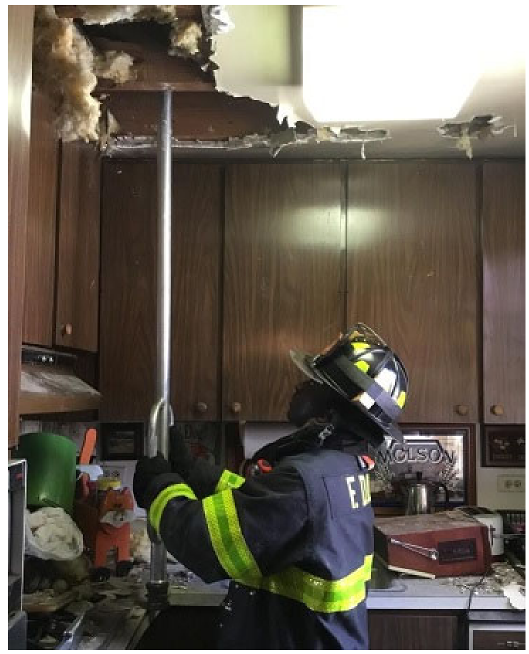

Figure 4

3.5 The cockloft nozzle may be placed into operation for fires in the cockloft areas of taxpayers, row frames, and NFP multiple dwellings like H-types. When deemed necessary, a separate, conventional protection line should be stretched, charged, and in the area of operation before the cockloft nozzle is used on a separate handline.

3.6 This is especially important when members are operating the cockloft nozzle in an area where ceilings may blow down or fire extension may trap members. These events have greater potential at top floor operations in H-type or similar buildings, even when members are operating in another wing.

3.7 There are times when the cockloft nozzle may be needed in an exposure, like a Row Frame building, as a precaution or to prevent extension, and the conditions are such that a protection line is not initially necessary during its operation.

3.8 ***Redacted for PFS***

3.9 The operation of the cockloft nozzle should be supervised by a Chief Officer.

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3.10 The cockloft nozzle is generally placed into operation on the top floor of a building for use in the cockloft area above the ceiling. It may also be lowered into the cockloft from the roof of the building, when the roof is deemed safe to operate on. The Incident Commander and/or Sector Supervisors must determine which is the best location (top floor or the roof) to operate from.

3.11 Operating from the roof is a particularly useful tactic when there are high ceilings or difficult ceilings to pull, which often occurs at taxpayer fires. Operating from the roof may sometimes provide the opportunity for a quicker stretch and safer operation at residential building fires, depending on the existing conditions.

3.12 Ideally, when operating from the roof, members should begin nozzle operation from an inspection hole where fire is not venting and move toward the area of origin as conditions permit.

3.13 If members are operating without a separate, additional protection line, they should operate as follows:

3.13.1 A hoseline with a conventional nozzle should be stretched and charged in case it is needed while members are opening up the ceiling area where the cockloft nozzle will operate.

3.13.2 In non-fireproof multiple dwellings, the area immediately inside the apartment door offers an extra degree of protection provided by the public hallway. This option should be employed when fire conditions dictate.

3.13.3 Members should then open up an area in the ceiling into which the cockloft nozzle will be placed for operation. The hole should initially be limited in size, but large enough for the cockloft nozzle to fit into. Additional holes may need to be made to use the nozzle at different locations.

3.13.4 If fire shows while opening up the ceiling, the fire should be knocked down by the hose line with the conventional nozzle. The MST should then be removed from the hose line and the female coupling of the cockloft nozzle connected directly to the shut-off of the charged line.

3.13.5 The cockloft nozzle should then be placed into the opening, the shut-off handle opened, and the nozzle operated to extinguish fire in the cockloft.

3.13.6 The nozzle should be maintained upright and alternately rotated 90 degrees and then back to its original position, allowing water to be distributed in all directions in the cockloft.

3.14 The use of the cockloft nozzle does NOT eliminate the need of pulling ceilings for final extinguishment and washdown.

3.15 Firewalls, division walls, nogging and other impediments may require the repositioning of the cockloft nozzle into several different areas to obtain final extinguishment.

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STANDPIPE OPERATIONS

1. OVERVIEW OF STANDPIPE SYSTEMS

1.1 In New York City, standpipes can be found in a wide range of buildings containing various occupancies. Standpipe systems can be found in the following locations:

1.1.1 High Rise Buildings (over 75 feet)

1.1.2 Hospitals, Warehouses, and Industrial Buildings

1.1.3 Enclosed Shopping Malls

1.1.4 Parking Garages

1.1.5 Theaters, Stadiums, and Arenas

1.1.6 Bridges and Limited Access Highways

1.1.7 Subway Stations and Tunnels

1.1.8 Piers and Wharves

1.2 All required standpipes in NYC are compatible with FDNY equipment and can be used to provide FDNY hoselines with adequate water supply. Fire companies will use standard FDNY hose and other equipment when using any standpipe system.

1.3 Existing 1 ½" diameter occupant-use hose should not be used, except in rare cases where life is in immediate peril and a FDNY hoseline is unavailable. This situation would most likely occur when a ladder company or rescue company is operating without an engine company.

2. KEY CHARACTERISTICS OF STANDPIPE SYSTEMS

2.1 A more complete discussion of the types of standpipe systems that exist in NYC and their various features and components can be found in *Chapter 3: Engine Company Equipment*. This section will focus on several key practical characteristics of standpipe systems.

2.2 The primary practical concern for a standpipe system is the presence of water.

2.2.1 A wet system is maintained with water in the system at all times. A dry system is maintained without any water under normal circumstances. Both wet and dry systems are supplied and used by the same procedure.

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2.3 The presence of a fire pump is also an operational concern.

2.3.1 While many standpipe systems are equipped with a fire pump, it is common to find a building with a standpipe system, but no fire pump.

2.3.2 Fire pumps are designed to supply the standpipe system with sufficient pressure to operate as needed. Some fire pumps are manually operated, some operate automatically. Units must be aware of the buildings in their response area and what types of fire pump systems exist. Firefighting Procedures High-Rise Office Buildings provides detailed information regarding fire pump operations.

2.4 The location of floor outlets within the system impacts firefighting operations.

2.4.1 Regardless of the type of standpipe system encountered, floor outlets can be found in a variety of locations within the area protected and there are important operational considerations unique to each location that could provide advantages or disadvantages in the execution of the stretch.

2.4.2 Floor outlets inside a stairway (Figure 1) provide direct access to that stairway, but can create a more complex stretch in the event a different stairway is selected for the fire attack.

2.4.3 Floor outlets in a public hallway (Figure 2) can provide more space in the proximity of the outlet to hook up and arrange the lengths of hose, though the floor outlet will not provide direct access to a stairway. However, floor outlets in the hallway can provide easier access to alternative stairways, which would simplify the stretch if a different stairway was used for attack.

Figure1

Figure 2

2.4.4 Standpipe outlets in open areas can present a challenging situation, especially when located in non-residential occupancies, such as subway stations and parking garages. In these cases, the outlet may be located remote from the attack stairs.

3. SUPPLYING STANDPIPE SYSTEMS

3.1 Standpipe systems are supplied with 3 ½" hose. The only exception to this is when 3” high pressure hose is used to supply a standpipe system as part of the High-Pressure Pumping evolution. This is discussed in Chapter 8, *Addendum 1: High Pressure Operations.*

3.2 Standpipe systems may be supplied through Fire Department Connections (FDC) and/or floor outlets. While the FDC is the primary consideration, the standpipe system can be supplied by way of a floor outlet as an alternative. This should be considered in the following situations:

3.2.1 FDC is inoperable (due to vandalism, disrepair, or other damage)

3.2.2 FDC is located remote from the hydrant to be used to supply the system and the floor outlets are more readily accessed from the apparatus.

3.2.3 It is necessary to augment the system and there is no available FDC (all FDC are already being supplied)

3.3 When a building is equipped with both a standpipe system and automatic sprinklers, the first supply line should supply the standpipe system. If the first arriving engine is supplying both the standpipe and sprinkler systems, later arriving engine companies should stretch additional lines to augment both systems.

3.4 When the building being supplied is part of an interconnected building system, one building will have a gravity tank on the roof which supplies water to that building and the other interconnected buildings. These interconnected buildings have a Post Indicator Valve which is normally open to allow water supply into that building. The ECC should be aware of the possibility of a Post Indicator Valve (PIV) being closed to one of the other interconnected buildings. If the PIV is found closed, the ECC should notify the Engine Officer. A closed PIV in one of the interconnected building means that this structure is now isolated from the water supply coming from the building with the gravity tank. The standpipe in that interconnected building will have no access to a water source until the ECC supplies the building system. Until supplied by the ECC, the only water available will be the residual water in the standpipe riser itself. This water can quickly run out, which could place operating units in danger if the Engine Officer is unaware of the PIV closure.

3.5 Due to the possibility of a Post Indicator Valve (PIV) being closed, it is preferred that ECC’s supply the FDC on the fire building when it will not result in any delay of water supply to the standpipe system.

3.6 When the building is equipped with an air pressurized standpipe, the pressurized air must be bled from the system before the system can be supplied with water. These systems are maintained dry and are used in buildings that are being demolished and in buildings under construction upon reaching a height of 75 feet. See Chapter 8, Addendum 4 for a complete description on the operations at buildings with Air-Pressurized Standpipe Systems.

3.7 Supply via Fire Department Connection (FDC)

3.7.1 To supply the standpipe system via the FDC, the male end of a 3 ½" hoseline should be stretched to the FDC and connected. Depending on the orientation of the 3 ½" hose on the apparatus, a double male fitting may be needed.

3.7.2 FDC are color coded for ease of identification (Figure 3). Either the caps or the entire FDC may be painted. The color of the connections are as follows:

A. Red = standpipe system

B. Yellow = combination system (sprinkler/standpipe)

C. Green = automatic sprinkler system

D. Aluminum = non-automatic sprinkler system or perforated pipe

Figure 3

3.7.3 When any part of the system is out of service (OOS), the FDC will have a colored disc attached to indicate the serviceability of the system. The color coding is as follows:

A. White disc = system fully OOS

B. Blue disc = system partially OOS

3.7.4 Whenever possible, a second apparatus should hook up to an available FDC and be prepared to augment water supply, if needed.

3.8 Supply via a floor outlet

3.8.1 If a standpipe system is to be supplied via a floor outlet, proper fittings must be employed to attach the 3 ½" supply hose to the 2 ½" outlet threads.

3.8.2 If a pressure reducing/restricting device (PRD) is found on a floor outlet, it should be removed, if possible. If the PRD cannot be removed, the outlet may still be used, so long as sufficient water can be supplied. The ECC should notify the Engine Officer if an outlet with a PRD is being supplied.

3.8.3 When supplying water to a floor outlet, it is important to keep the outlet valve closed until water is supplied to the outlet via the supply hose. If the outlet is opened prematurely, the water supply on the fire floor may be severely impacted.

3.8.4 To facilitate this operation, the company commander may consider carrying a designated "ECC standpipe kit" on the apparatus. Such a kit should include:

A. Necessary fittings (i.e. double female, 3" to 2 ½" reducer)

B. Pipe wrench

C. Spanners

D. Chocks

E. Adapter

3. SUPPLYING STANDPIPE SYSTEMS

3.1-3.8 ***Redacted for PFS***

3.9 Apparatus Pump Operation

3.9.1-3.9.2 ***Redacted for PFS***

3.9.3 When supplying water to a standpipe system, the ECC should use 3 ½" hose (or 3" hose if high-pressure pumping) to supply the appropriate Fire Department Connection (FDC, formerly known as Siamese connections). The standpipe FDC is entirely painted red or may just have red caps. If part of a combination system, the FDC is entirely painted yellow or may just have yellow caps.

3.9.4-3.9.22 ***Redacted for PFS***

4. SELECTING THE STANDPIPE OUTLET

4.1 It is the responsibility of the Engine Officer to select the floor outlet to be used. This decision should be based on the consideration of a number of criteria, including:

4.1.1 Proximity to fire area.

4.1.2 Proximity to attack stairs.

4.1.3 Operability of outlet.

4.1.4 Outlet is located in a protected area.

4.2 The selected floor outlet should be located on a floor below the fire. This will ensure the outlet is in a protected, smoke-free area. Primary consideration should be given to using an outlet on the floor immediately below the fire. This will minimize the length of the stretch and facilitate verbal communication between the fire floor and the floor outlet.

4.3 The selected floor outlet can be located on any floor below the fire. Generally, the outlet on the floor below the fire will be used, but it may be necessary to use a more distant floor due to an unserviceable outlet on the floor below the fire in a building with a single standpipe riser. A more distant outlet may also be used if it will facilitate an easier stretch due to unique building characteristics (e.g. unusual stairway layout, duplex apartments, etc.)

4.4 In rare cases, using the floor outlet on the same floor as the fire may be permissible due to unusual building characteristics. This would require approval from the Division Commander. A CIDS entry is mandated in these situations. An example of this is where the stretch of the handline from the floor outlet to the fire apartment entrance is via an exterior, open air balcony, and stretching from the fire floor allows the fire apartment to be reached with 3 lengths of hose.

4.5 Selecting a floor outlet on the same level of the fire may also be necessary in non-residential structures with standpipe systems, such as parking garages, subway stations, or large industrial occupancies. This would require approval from the Division Commander. A CIDS entry is mandated in these situations.

4.6 Once selected, the engine officer should clearly communicate the floor outlet to be used to the members of their company. This can be visually communicated, or may be communicated verbally, either by handie-talkie transmission or face-to-face.

4.7 If the control firefighter finds a problem with the selected floor outlet and needs to move to a different outlet, the engine officer should be immediately informed. The engine officer should also ensure the 2nd due engine is aware of the new outlet, so they can assist with the stretch. If scissor stairs are used, it may be easier to move to an outlet two floors away, as this would likely be shorter than having to stretch from the opposite staircase if the immediate floor below is used.

4.8 If a floor outlet has a Pressure Reducing Device (PRD) attached, it should be removed, if possible. If it cannot be removed, the outlet can still be used to supply the hoseline, so long as sufficient pressure can be achieved. The Engine Officer should be notified that the outlet being used has a PRD attached.

4.9 If a floor outlet has a Pressure Reducing Valve (PRV) attached, it will not be removable. As long as sufficient pressure can be achieved, the outlet can still be used to supply the hoseline. The purpose of a PRV is to supply the appropriate pressure to the floor on which it is located under the operation of the building fire pump, so sufficient pressure at the outlet can be expected. The Engine Officer should be notified that the outlet being used has a PRV attached.

5. SUPPLYING THE HOSELINE

5.1 The 1st due control firefighter is responsible for supplying water to the first hoseline from the selected floor outlet. They shall remain at the floor outlet throughout the operation and communicate with the Engine Officer to ensure that adequate pressure is supplied to the nozzle.

5.2 Upon arriving at the selected outlet, the control firefighter should open the outlet and flush it thoroughly. This is to confirm a water supply is available and to clear the outlet of any possible obstructions to water flow. After confirming the availability of water, the control firefighter should connect the in-line pressure gauge and the hoseline to be supplied. The in-line pressure gauge is used to ensure the correct pressure is supplied to the hoseline.

5.3 For the most common standpipe hose stretches, the control firefighter should supply hoselines supplied from an outlet on the floor below the fire as follows:

5.3.1 Residential 3 length stretch (2” lead length) = 80 psi
(two lengths 2 ½” hose, one length 2” hose, nozzle with 1” tip)

5.3.2 Commercial or residential 3 length stretch (2 ½” lead length) = 70 psi
(three lengths 2 ½” hose, nozzle with 1 1/8” tip)

5.4 These standard pressures are calculated based on the guidelines of “street hydraulics” and are explained as follows:

5.4.1 A residential 3 length stretch from the floor below the fire has 2 lengths of 2 ½” lightweight hose (5 psi each = 10 psi total), 1 length of 2” lightweight hose (10 psi), 1 floor of elevation (5 psi) and 55 psi at the 1” tip of the nozzle. This adds up to the target outlet pressure of 80 psi and provides 220 GPM.

5.4.2 The 1” tip of the nozzle is supplied with 55 psi, which is above the minimum recommended nozzle pressure of 50 psi. This additional pressure is added to minimize the likelihood of kinking in the hose.

5.4.3 A commercial 3 length stretch from the floor below the fire has 3 lengths of lightweight 2 ½” hose (5 psi each = 15 psi total), 1 floor of elevation (5 psi) and 50 psi at the 1 1/8” tip of the nozzle. This adds up to the target outlet pressure of 70 psi and provides 265 GPM.

5.4.4 Since the 2 ½” lead length will be stretched primarily for commercial occupancies, which may involve a large, open floor space with a potential for a heavy fire load, the 2 ½” nozzle should be supplied with 50 psi at the tip. This is to enable the full reach of the stream to be used and to achieve the maximum available flow from the standpipe system.

5.4.5 If additional lengths of hose are required for a standpipe stretch, the control firefighter should supply an additional 5 psi for every length of 2 ½” hose added.

5.4.6 If the hoseline will be stretched from further than 1 floor away, the control firefighter should supply an additional 5 psi for every additional floor of elevation needed.

5.5 Pressures at the outlet should be set while water is flowing at the nozzle. When the nozzle is shut, the gauge will read the static pressure (the pressure when water is not flowing) in the hoseline, which will be higher than the actual operating pressure. In order to properly set the operating pressure, the nozzle firefighter must use a “long bleed” and bleed the line for long enough to allow the control firefighter to adjust the pressure accordingly. The long bleed is essential to ensure the proper pressure is set.

5.6 Operating pressure is adjusted by use of the operating wheel at the floor outlet and by observing the in-line pressure gauge. If there is no valve wheel attached to the standpipe outlet, a substitute tool can be used. Such options include a pipe wrench, vise grips, or a removable operating wheel carried in the standpipe kit.

5.7 The Control firefighter should be aware that a properly supplied hoseline may exceed the Hi-Flow alarm of the digital pressure gauge (which alarms when flow exceeds 250 GPM). This activation does not necessarily indicate a problem with water supply. If doubt exists as to the accuracy of the supply pressure reading, the Control Firefighter can communicate directly with the Engine Officer to confirm that sufficient pressure is supplied to the hoseline.

6. STANDPIPE KIT

6.1 The control firefighter carries the standpipe kit. This ensures the control firefighter is in possession of all the equipment necessary to secure a water source at the standpipe outlet.

6.2 The standpipe kit is required to include the following equipment (Figure 4):

6.2.1 2 ½” in-line pressure gauge

6.2.2 Pipe wrench (18 inch)

6.2.3 Spanner wrenches

6.2.4 Chocks

6.2.5 2 ½” nozzle with 1 1/8” MST

6.2.6 1 ½" to 2 ½" increaser

6.2.7 Adapters (National Standard thread and/or National Pipe thread to FDNY thread)

Figure 4

6.3 The following equipment may be included in the standpipe kit as deemed beneficial by the Company Commander, but are not required, as some are not provided by the FDNY:

6.3.1 Spare operating wheels (to be used if wheel is missing)

6.3.2 Mallet (to help remove tightened caps)

6.3.3 Vise grips (to be used as an alternative to the pipe wrench)

6.3.4 Wire brush (to be used to remove paint or debris from outlet threads)

6.3.5 Fog tip (to be used to vent the fire area during overhaul)

6.3.6 Single gate (to ease operation of difficult to operate outlets)

7. STRETCHING HOSELINES FROM THE APPARATUS

7.1 The presence of a standpipe system does not mandate engine companies to use the standpipe to supply their hoselines. The Engine Officer may elect to stretch their hoseline from the apparatus as an alternative to using the standpipe system. When making this decision, the Engine Officer should consider a number of factors, including:

7.1.1 condition of the standpipe system.

7.1.2 proximity of the apparatus to the building.

7.1.3 location and type of stairway to be used for the attack.

7.1.4 length and ease of the stretch.

7.2 ***Redacted for PFS***

7.3 Additional hoselines may be similarly stretched from the apparatus, as determined by the Engine Officer of the unit stretching the hoseline and are not required to be stretched in the same fashion as the first line. For example, if the first line uses the standpipe, the second line may be stretched from the apparatus, as determined by the Engine Officer of the company stretching the line.

7.4 Selecting attack stairway

7.4.1 All hoselines should be stretched from the attack stairway and all access to the fire floor should be made by way of the attack stairway. This is in an attempt to keep all other stairways free of smoke. All stairways, other than the attack stairway, can be considered evacuation stairways.

7.4.2 The attack stairway does not need to be the stairway closest to the floor outlet. The stairway selected should allow for the most efficient stretch possible, with the goal of minimizing the length of the stretch, while allowing for an efficient advance on the fire floor. The selection should be made by the Engine Officer, in consideration of the following criteria:

A. Proximity of the stairway to the fire area on the fire floor.

B. Proximity of the stairway to the floor outlet on the floor from which the hoseline is being supplied.

C. Type of stairway used.

D. Conditions on the fire floor.

7.4.3 ***Redacted for PFS***

7.4.4 The Engine Officer should be sure of the location of the fire before committing to an attack stairway. This is especially important in situations involving a large area and multiple stairway options, such as in commercial high-rise buildings or open areas, such as parking garages. In these situations, a stretch of at least 4 lengths should be anticipated, which may require hose from the 2nd due engine company.

7.4.5 The type of stairway used should be a key consideration when selecting the attack stairway. Certain characteristics of various stairway types may allow for a more efficient stretch, as follows:

A. If available, an enclosed stairway should be used. Open stairways are more readily contaminated and should be avoided, if possible. However, if the building only has one enclosed stairway, the priority will be for the enclosed stairs to be used as an evacuation stairway and an open stairway would need to be used for the attack.

B. Return-type stairs offer several advantages as an attack stairway. The stairway door will be at the same location on each floor, which makes it possible to visualize the path of line advancement on the fire floor by using the layout of the floor below the fire. Also, return-type stairs often have half-landings, which can provide an ideal location to flake out the hoseline. This can be helpful when the public hallway is contaminated and the hoseline needs to be charged inside the stairway.

C. Scissor stairs are effective as an attack stairway, but may introduce an element of complication, as their orientation will vary from floor to floor. It is important to remain aware that the orientation of the attack stairway door on the fire floor will be on the "opposite side" of the scissor stairs on the floor below the fire.

D. When using scissor stairs, consider using the stairway that provides the best access to the fire area on the fire floor, even if it is further from the standpipe outlet on the floor below the fire. This would require stretching from the floor outlet to the selected attack stairway on the floor below the fire.

E. If the floor outlet is located inside a scissor stairway, stretching to the opposite stairway on the floor below the fire will involve additional turns and potential pinch points, as the line will have to be stretched out of the stairway, down the hall, and back into the opposite stairway. As a result, the hoseline will go through at least three stairway doors when using the opposite stairway, instead of just one.

F. In this situation, another method to stretch the line via the opposite stairway is to hook up to the floor outlet 2 floors below the fire. By doing this, the outlet will be located inside the desired attack stairway and the hose need not be stretched around on the floor below. Instead, the hose will remain inside the stairway and be stretched straight up two floors. While the outlet is a floor further away, the total amount of hose used may actually be less and the additional turns and pinch points will be eliminated.

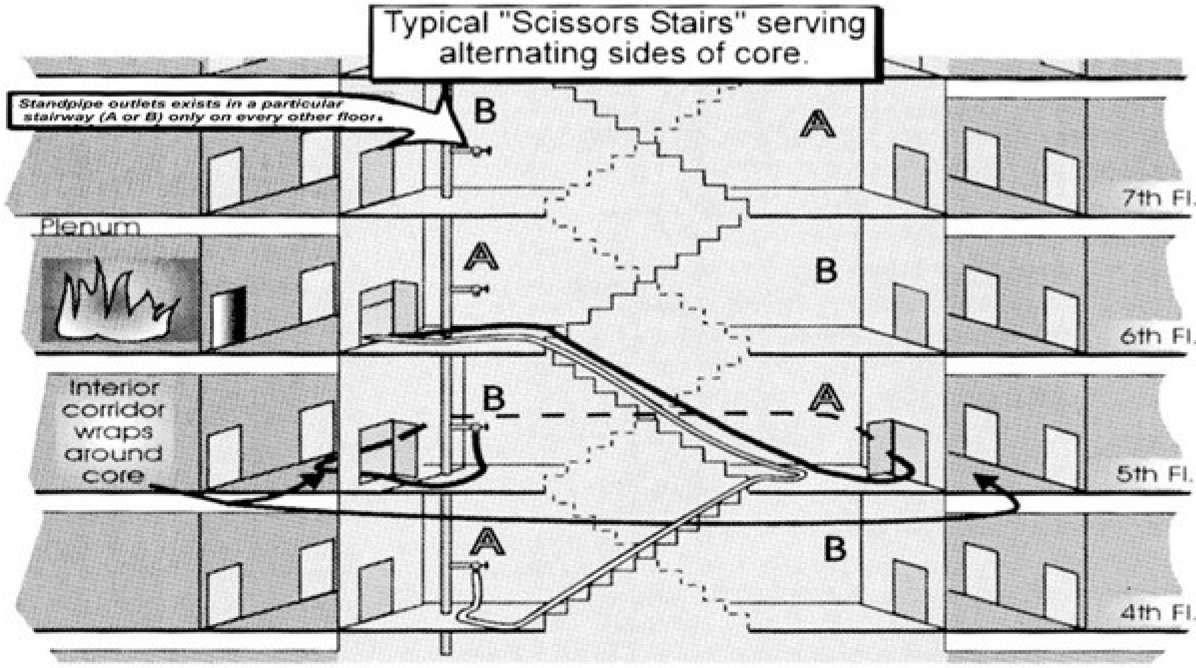

Figure 5

7.5 Estimating the stretch (Figure 5)

7.5.1 In a standpipe stretch, the engine officer needs to estimate the length from the standpipe outlet to the fire area in order to determine if a standard 3-length stretch will be long enough to reach the fire area.

7.5.2 When estimating the length of the stretch, the officer must remember that the nozzle firefighter’s length is designated to be used inside the fire apartment itself and should not be included in the estimation. Consequently, the distance between the standpipe outlet and the fire area must be covered using only two lengths. This means that if the fire area is more than 100 feet away from the standpipe outlet, a 4th length will need to be added to the stretch.

7.5.3 The officer must be sure to estimate using the actual path the hoseline will travel. This includes ensuring the right attack stair is considered. Also, the officer must be sure to consider the vertical distance travelled, especially if a floor outlet is used on a more distant floor.

7.5.4 If the officer finds that a 4th length will be needed, they must notify the control firefighter and second engine that an extra length of hose will be needed for the stretch. When the first arriving engine company is riding with 5 firefighters, they should normally have this extra length available at the standpipe outlet and notification to the second engine for an extra length of hose would then not be required.

7.6 Stretching the 1st hoseline

7.6.1 The 1st due engine and the 2nd due engine will work together to stretch the first hoseline from the selected standpipe outlet to the fire area by way of the designated attack stairway.

7.6.2 When using the standpipe system in a commercial occupancy, all hoselines stretched from the outlet will be 2 ½”. In a residential occupancy, hoselines stretched from the outlet may have a lead length of 2” hose. 1 ¾” hose must not be stretched from a standpipe outlet. The larger diameter hose is required for the purpose of minimizing friction loss in the hose and maximizing water flow from the standpipe system.

7.6.3 In residential occupancies, the lead length will typically be 2” hose. However, a lead length of 2 ½” hose should be considered instead in situations in which adequate pressure may not be immediately available from the standpipe outlet. Such situations may include an outlet with a PRV or a building in which the ECC will be delayed in supplying the FDC due to difficulties accessing the FDC or securing a hydrant. In these situations, the larger diameter of the 2 ½” hose will allow for better performance at lower supply pressures.

7.6.4 Each firefighter will bring one length of lightweight hose, folded into a roll-up. The nozzle firefighter will have a nozzle attached to their length. The roll-up is oriented such that the midpoint of the length is located directly beneath the hose couplings. This will ensure the hose is easily deployed. The midpoint is indicated with a red marking.

7.6.5 For most residential occupancies, lightweight hose will be used as follows:

A. The nozzle firefighter will bring one length of 2” lightweight hose with a nozzle that has a 1” tip attached. This hose has a friction loss of 10 psi per length. The midpoint of this length is indicated with red paint. This point is called the A-fold.

B. This nozzle should be supplied with 55 psi nozzle pressure, which will provide a flowrate of 220 GPM and a nozzle reaction of 85 lbs.

C. The Back-up and Control firefighters will each bring one length of 2 ½” lightweight hose, each of which will have a friction loss of 5 psi per length.

7.6.6 For commercial occupancies (and some residential occupancies), lightweight hose will be used as follows:

A. The nozzle firefighter will bring one length of 2 ½” lightweight hose with a nozzle that has a 1 1/8” tip attached. The midpoint of this length is indicated with red paint.

B. This nozzle should be supplied with 50 psi nozzle pressure, which will provide a flowrate of 265 GPM and a nozzle reaction of 98 lbs.

C. The Back-up and Control firefighters will each bring one length of 2 ½” lightweight hose. All 2 ½” hose has a friction loss of 5 psi per length

7.6.7 If the door to the fire area can be controlled, the 1st hoseline should be stretched to the door to the fire area, flaked out, and charged at that location. If the door to the fire area cannot be controlled and the public hall has become part of the fire area, the hose line should be stretched to the stairway door, flaked out, and charged inside the stairway and public hallway on the floor below.

7.6.8 Flaking out and charging hose in the stairwell below the floor outlet would require the weight of the charged hose to be pulled back up the stairs in a stairwell. Additionally, the turns in the staircase create a greater opportunity for a kink to occur. In these situations, these stairway areas may also become very congested.

7.6.9 When charging a hoseline in the stairwell at the stairway door, the public hallway on the floor below the fire near the floor outlet provides an area where the hose may be more easily flaked out, and more easily advanced under these conditions.

7.6.10 All three roll-ups should be connected to each other (Figure 6) in close proximity to the standpipe outlet (in the stairway, or public hallway) and the control firefighter's length should be connected to the outlet. This will provide visual confirmation that the line is intact and connected to the outlet. The roll-ups should be arranged with the nozzle length closest to the direction of the stretch.

Figure 6

7.6.11 The nozzle firefighter should keep their length intact in a roll-up as they carry it to the point of operation. This will ensure the entire lead length of hose is available to be used inside fire apartment and will aid in flaking out the hose.

7.6.12 To facilitate the efficient stretching and flaking out of the hoseline, consider "splitting" the backup firefighter's roll-up, as follows:

A. The backup firefighter's roll-up can be split into a "male" section and "female" section. The nozzle firefighter can then carry the male section of the backup roll-up in addition to their own roll-up (Figure 7). The nozzle firefighter would then be carrying roughly 75 feet of hose.

Figure 7

B. As the nozzle firefighter approaches the fire area, they can drop the portion of the roll-up at an appropriate drop point (Figure 8 and Figure 9), while keeping the lead length intact in a roll-up, to be used in the fire area itself.

Figure 8

Figure 9

C. The female section of the backup roll-up can be carried and flaked out by the backup firefighter, who is responsible for ensuring both the backup and control roll-ups are properly stretched and flaked out. The female section of the backup hose back can be similarly carried as necessary.

D. If practical, the control roll-up can be similarly separated (Figure 10). The female section of the roll-up would connect to the outlet, while the male end could be carried by the backup firefighter to a drop point and flaked out.

Figure 10

E. This technique allows the nozzle and backup firefighter to both carry sections of hose without being too close to each other, as their roll-ups will be coupled together and it would be impossible to carry both roll-ups intact while coupled.

7.6.13 The nozzle firefighter should carry their entire roll-up to the point of operation and flake out the line from that point. It is preferred that seat-belt buckles be removed from the roll-ups before leaving the protection of the stairway.

A. The first fold of hose beneath the couplings is the midpoint of the length and can be used to flake out the line. This midpoint will be indicated with red paint. (Figure 11 and Figure 12) To flake out, grab the midpoint fold and walk or toss it away from the point of operation. This creates a large “U”, leaving the nozzle and first hose coupling at the point of operation.

Figure 11

Figure 12

B. Depending on the length and complexity of the stretch, the back-up firefighter may be quickly available to help the nozzle firefighter flake their hose out (Figure 13 and Figure 14). In this case, the back-up firefighter can grab the midpoint of the nozzle length and flake it out by walking it away from the point of operation, allowing the nozzle firefighter to prepare for the attack.

Figure 13

Figure 14

C. This “U” shaped configuration makes for a smooth advance into the fire area (Figure 15), as the nozzle team will only be pulling the weight of the first length as it pivots at the first coupling, instead of the weight of the entire charged hoseline.

Figure 15

7.6.14 If the hallway is part of the fire area, the line will need to be charged at the stairway door and the hose flaked out inside the stairway and the hallway on the floor below.

A. Standing inside the midpoint fold and walking it up the stairs (Figure 16) can effectively flake out the line. If possible, flake the line out up the stairs, so line advancement will be aided by gravity once the line is charged. The presence of a half-landing will be helpful and the line should be flaked out on the half-landing platform.

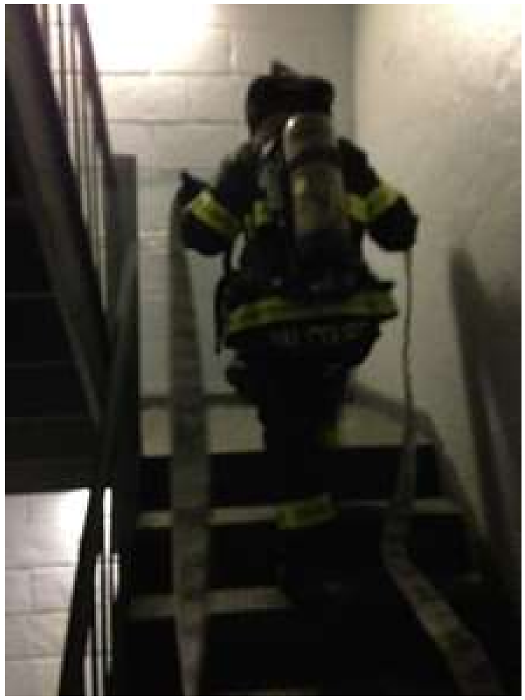

Figure 16

B. If using a scissor staircase, the straight-run configuration of scissor stairs may prove more difficult, but the hose should be similarly stretched up to the next floor and flaked out on the landing (Figure 17). This may require more than one length of hose to be used on the stairway.

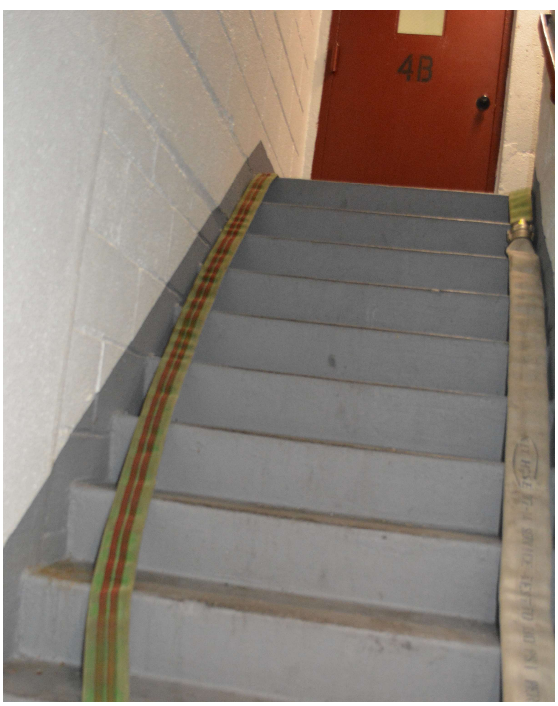

Figure 17

Figure 18

C. When the line is charged at the stairway door, the nozzle side of the hoseline should be oriented on the outside wall of the stairway on the fire floor (Figure 18). This will reduce kinking and ease the advance of the charged hoseline.

Figure 19

D. If more room is needed to flake out hose inside the stairway (Figure 19), it is preferred to use the hallway on the floor below rather than flaking hose down the stairs below the floor outlet.

7.6.15 As the nozzle firefighter is carrying their roll-up to the fire floor, the backup firefighter will flake out the 2nd and 3rd lengths of hose, allowing the nozzle firefighter to bring their entire length to the point of operation. When compatible with the building layout, the backup firefighter may carry a portion of their hose to a drop point closer to the fire area and flake their line out in a similar fashion to the nozzle firefighter. All doors should be chocked.

7.6.16 Once the hoseline is in position, the Engine Officer will communicate with the control firefighter to charge the line. The control firefighter will supply water and maintain adequate pressure in the line from the floor outlet.

7.6.17 As the line is being charged, the nozzle firefighter must “bleed the line” until the operating pressure is set.

A. This allows air in the hoseline to escape and allows the control firefighter to set the proper operating pressure.

B. Allow the water entering the hoseline to reach the nozzle. The nozzle must be opened fully and carefully to ensure an accurate reading at the floor outlet while maintaining control of the line.

C. A “long bleed” may be necessary to allow the Control firefighter to set the proper operating pressure with water flowing. Keep the nozzle open until the Control firefighter has set the correct pressure.

D. If possible, avoid bleeding the line in the direction of the elevators and attempt to use the stairway or compactor chute. This will help prevent flooding in the elevator shafts in an attempt to keep all elevator cars in operation for firefighter use.

7.6.18 As the line is being charged, the backup firefighter should consider taking a temporary position at the stairway door on the fire floor. From this position, they can make sure the line does not become trapped beneath the stairway door as it is charged. As soon as the line is charged, the backup firefighter makes their way to the nozzle, removing any kinks or obstructions they encounter in the hoseline. By the time the nozzle firefighter finishes “bleeding” the nozzle, the backup firefighter should be in position behind them and ready to advance.

7.6.19 The Engine Officer must ensure sufficient pressure is available in the hoseline before committing to the fire area. Once the hoseline is properly charged and in position, the fire attack can begin.

7.6.20 The 2nd engine company will assist with stretching and operating the first hoseline. The 2nd Engine Officer should consider the type and length of stretch when deploying members to properly assist the first engine company.

A. Since the 1st engine’s Control firefighter will remain positioned at the standpipe outlet, members of the 2nd engine will need to be properly positioned to assist the 1st engine’s nozzle team with their advance into the fire area.

B. The second engine officer must exercise proper judgment when deploying members to assist. The factors that must be considered include the status of water supply, the length of the stretch from the fire floor stairway door to the fire occupancy door, size of the fire occupancy, are there any turns in the hallway between the fire floor stairway door and the fire occupancy door, and is the first engine a four or five firefighter unit.

C. The second control firefighter should be positioned at the stairway door on the fire floor to ensure the hoseline does not become kinked or otherwise impeded. This also keeps them in the vicinity of the first control firefighter should water supply issues occur.

D. The second engine officer should then deploy other members in the public hallway as necessary to assist with line advance.

E. When there is a turn in the hallway, such as in a T-shaped hallway, another member should be positioned at that turn to ensure the hoseline does not become kinked or otherwise impeded.

F. The second engine officer should ensure the position at the fire occupancy door is covered to insure a proper advance into the fire area.

G. If the stretch from the fire floor stairway door to the fire occupancy door is long, members may need to be spaced along that path to ensure the line is properly advanced. This may also require the assistance of a third engine company.

H. If the 1^{st} hoseline is charged inside the attack stairway, members of the 2^{nd} engine will be needed to assist with the more arduous task of advancing the charged hoseline up the stairs and then down the hallway to the fire area.

7.7 Stretching additional hoselines

7.7.1 Floor outlet selection can be a challenge when multiple lines are stretched at an operation. Depending on the number of standpipe risers in the building, it may be necessary to stretch additional lines from several floors below the fire. This will result in longer stretches, requiring the assistance of additional engine companies and their hose.

7.7.2 If the first line is stretched from an outlet on the floor below the fire, the second line may have to be stretched from 2 floors below the fire when using the same standpipe riser. If this second line is being stretched as a back-up line on the fire floor, this stretch will be at least 4 lengths long. If the second line is being stretched to the floor above the fire, the stretch will be even longer.

7.7.3 In the extreme case of a third line being stretched to the floor above the fire, and if the floor outlet is located in an enclosed stairway, consideration may be given to hooking up the 3^{rd} line to the outlet on the original fire floor. This outlet will be protected by charged hoselines and the door to the stairway will be controlled, providing the control firefighter of the 3^{rd} line with a protected environment to hook up to the standpipe. Approval by the IC or Fire Sector Supervisor is needed to hook up to an additional line to an outlet on the original fire floor.

7.7.4 The proper operating pressure for additional hoselines should be calculated using "street hydraulics". The Engine Officer should communicate with the Control firefighter to ensure the hoseline is supplied with sufficient pressure.

8. OPERATING THE HOSELINE

8.1 While the line is operating, the control firefighter must remain at the standpipe outlet to ensure proper pressure is maintained in the line throughout the operation. It is important to recognize the difference between the higher static pressure that will exist when the nozzle is closed and the pressure reading when the nozzle is flowing water, which is the true pressure reading in the hoseline.

8.2 If there is inadequate pressure in the line, the Engine officer should communicate with the control firefighter to rectify the problem.

8.3 After the proper operating pressure has been established, if the pressure reading at the outlet is adequate, or even too high, and there is inadequate pressure at the nozzle, this is an indication of kinking in the line. Kinks should be removed manually, not by supplying more pressure.

8.4 After the fire is extinguished, ventilation of the fire area can be difficult. To facilitate ventilation, consideration can be given to using a fog tip on the hoseline. A small, removable tip may be carried in the standpipe kit and can replace the existing tip. The fog tip can be used to move smoke and heat out an open window in the fire area. This can also be accomplished by removing the MST from the nozzle and partially opening the shut-off handle. This should only be considered in the overhaul phase of the operation, well after the fire has been fully extinguished.

9. HIGH RISE NOZZLE

9.1 The 5th due engine on a 10-77 assignment is responsible to bring the High-Rise Nozzle (HRN) to the Incident Command Post (ICP) and when ordered, put the High-Rise Nozzle into operation. If they are not equipped with a HRN, they will obtain it from another unit on scene. If necessary, they should contact the dispatcher to determine which responding unit(s) are equipped with a HRN. See Chapter 8, Addendum 3 for a complete description on the use of the High-Rise Nozzle.

Figure 20

10. *Redacted for PFS*

STANDPIPE SUPPLY CHARTS

Standpipe Suppy Pressures (by floor number)

Floor number	Pressure (in psi)	Floor number	Pressure (in psi)
10	150	56	380
12	160	58	390
14	170	60	400
16	180	62	410
18	190	64	420
20	200	66	430
22	210	68	440
24	220	70	450
26	230	72	460
28	240	74	470
30	250	76	480
32	260	78	490
34	270	80	500
36	280	82	510
38	290	84	520
40	300	86	530
42	310	88	540
44	320	90	550
46	330	92	560
48	340	94	570
50	350	96	580
52	360	98	590
54	370	100	600

Standpipe Suppy Pressures (by elevation)

Elevation (in feet)	Pressure (in psi)	Elevation (in feet)	Pressure (in psi)
100	143	750	426
125	154	775	436
150	165	800	447
175	176	825	458
200	187	850	469
225	198	875	480
250	209	900	491
275	219	925	501
300	230	950	512
325	241	975	523
350	252	1000	534
375	263	1025	545
400	274	1050	556
425	284	1075	567
450	295	1100	577
475	306	1125	588
500	317	1150	599
525	328	1175	610
550	339	1200	621
575	350	1225	632
600	360	1250	643
625	371	1275	653
650	382	1300	664
675	393	1325	675
700	404	1350	686
725	415	1375	697
		1400	708

HIGH-RISE NOZZLE

1. DESCRIPTION

FDNY Designation	High-Rise Nozzle (HRN)
Material	1½" Diameter Aluminum Pipe
Weight	Approx 10 lbs.
Misc.	Standard 2 1/2" shut-off with 1 1/8" MST
	T-handle allows members control of the nozzle.

2. INTRODUCTION

2.1 Experience has shown that members have become caught in wind-driven fires often with minimal or no warning. Members must remain alert and knowledgeable of the conditions which may cause a wind-driven fire, some examples include: a wind condition blowing toward a fire apartment window, an open window, an open fire apartment door with a high heat and smoke condition on the fire floor. If the equipment and resources are available and wind conditions exist, the high-rise nozzle should be placed in position as a precaution even if the need is not immediately evident. Depending upon the fire conditions encountered, if the decision is made to place the High-Rise Nozzle in position, additional resources may need to be called to the incident.

2.2 Dispatch policy dictates that every 10-77 will have at least one HRN equipped engine company assigned. It is the responsibility of the 5th due engine to bring the HRN to the Incident Command Post. If the 5th engine is not equipped with a HRN, they will obtain it from another unit on the scene. If necessary, the officer should contact the dispatcher for the identity of the assigned engine company equipped with a HRN. Upon arrival the officer will have the unit bring the HRN, roll-ups and a standpipe kit to the ICP.

Note: ***Redacted for PFS***

3. HIGH-RISE NOZZLE USE

3.1 The HRN may be used as an alternate attack strategy at high-rise multiple dwelling fires in the following situations:

3.1.1 IC has determined that a direct interior attack with a handline is not possible, such as conditions caused by wind-impacted fires.

3.1.2 The fire apartment is inaccessible to traditional exterior streams (TL, handlines, etc.)

3.1.3 Any situation where the IC determines the HRN will be beneficial.

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4. DESCRIPTION

4.1 The High Rise Nozzle is an eight-foot long aluminum pipe with a 68 degree two-foot bend to provide the proper angle for the water stream. It is attached to a standard 2 1/2" FDNY shut-off that is permanently attached to the nozzle. There is a T-shaped handle that allows members operating the nozzle to control the direction of the stream and maintain control of the nozzle. (Figure 1)

Figure 1

4.2 A 1 1/8" MST is attached to the outlet of the HRN. The tip is removable and should be checked weekly during MUD and before use. (Figure 2)

Figure 2

4.3 The HRN may be supplied by a 2" or 2 1/2" hoseline. The HRN requires a pressure of 50 psi at the tip with water flowing to produce a flow rate of 225 GPM. A stretch of longer than 3 lengths should be anticipated and thus the floor outlet pressure will need to be adjusted accordingly. A properly positioned high rise nozzle in operation is shown in Figure 3.

Figure 3

5. PROCEDURE

5.1 The High Rise Nozzle (HRN) will only be placed into operation at the direction of the IC, who must be a Chief Officer.

5.2 ***Redacted for PFS***

5.3 The IC shall announce over all radio frequencies that the HRN will be placed into operation, and ensure members are safely positioned before the stream is operated. By design, the high rise nozzle provides effective water application based on the principles of exterior water application (discussed further in Chapter 4). Namely the acronym S.S.S.S. of solid bore stream, steep angle, steady stream without circular motion and a steep angle providing a sprinkler effect.

5.4 The IC should ensure a spotter, equipped with a handie-talkie and a pair of binoculars, is in place to clearly observe the operation from the exterior. This member must monitor the conditions in the fire apartment before, during and after HRN deployment. The spotter will provide direction and progress reports to the IC and members operating.

5.5 The officer supervising HRN use will initiate and maintain HT contact with the spotter to ensure the nozzle is being operated effectively and the stream is knocking down the fire.

5.6 The IC should be aware that putting the HRN into operation will generally require additional units to assist the 5th Engine. These units should bring roll-ups, standpipe kits, and/or forcible entry tools to assist with deployment of the nozzle and forcible entry.

5.7 Units will need to gain access to the apartment below the fire apartment and determine which window the HRN will be operated from. Depending on the situation, the hoseline supplying the HRN may have to be stretched from an outlet two or three floors below the fire floor. Officers must size up the number of roll-ups required to reach the area of deployment, if assistance is needed with forcible entry and inform the IC of the conditions, the actions being taken and any needs that they have.

5.8 Once the proper window is chosen and opened, impediments such as window bars, child gates, will have to be removed. In most cases it is **not necessary** to remove the window to operate the nozzle. Some windows are easily removed via clips on the top of the sash.

5.9 The supply line must be attached to the HRN before the nozzle is slid out on the window sill for use. Firefighters operating the HRN will use the T-handle to properly position the nozzle for optimum stream placement. The T-handle will allow the firefighters to move the nozzle along the window sill and maintain control.

5.10 The key to the rapid extinguishment of a wind-driven fire is putting water directly on the seat of the fire. If multiple rooms are involved, it will be necessary to reposition the nozzle to ensure complete knockdown of the fire. If this is the situation, start with the window that the wind is blowing into and extinguish the fire in this room first. Then move to the other windows downwind of the original fire room and complete knockdown of the fire.

5.11 If a wind-driven fire has control of several rooms, it will be necessary to move the HRN from a window in one room to another window in a separate room to achieve knock down of the fire. If this is the situation, company officers must anticipate and make sure the next window(s) that will be used for operation of the nozzle is cleared of window gates, bars etc., this will speed up the repositioning.

5.12 A shut-off shall be placed in line one length back from the nozzle. When repositioning of the HRN is required, the supply line should be shut down at the shut-off located one length back and the nozzle opened to bleed the line. This will make it easier to move the nozzle and supply line while repositioning. Once in position, the officer supervising nozzle operations will order water started. This officer will then notify the IC that the nozzle is in position and ready to operate. The nozzle will not be operated until the IC has given approval.

6. *Redacted for PFS*

AIR PRESSURIZED STANDPIPE

1. PURPOSE

1.1 An air pressurized manual dry standpipe system is required at buildings under construction upon reaching a height greater than 75 feet or buildings undergoing demolition with an existing standpipe (2014 NYC Building Code and Local Law 64 of 2009). The entire standpipe system including the riser, cross connections, and Fire Department Connections (FDC) are pressurized by a dedicated air compressor. This air pressurized standpipe system is designed to alert workers on site when the standpipe has been compromised.

1.2 When the air pressure drops below a predetermined (supervisory) pressure due to an open valve or broken pipe in the system or pressure rises above 25 psi an audible alarm will sound only at the site. The supervisory pressure will vary for each site but will always be below a maximum of 25 psi. The alarm will continue until the opening in the system is closed allowing the compressor to slowly bring air pressure back into the supervisory range or excessive pressure is reduced below 25 psi.

1.3 ***Redacted for PFS***

2. OPERATION

2.1 To use an air pressurized standpipe system at a fire operation the air pressure must be released from the system prior to uncapping the FDC and supplying it with water. Attempting to remove the FDC caps prior to expelling the air from the system may cause the cap to become a projectile causing serious injury. After the air pressure is discharged, units can supply the system with water as they would at a standard dry standpipe operation.

2.2 A 2 ½" manual air release / drain valve (usually a standard standpipe outlet) is required to be installed immediately adjacent to the FDC. (See Figures 1) Remove the manual air release valve cap and open the valve fully. Air will be heard escaping from the manual air release valve. The ECC shall not remove the FDC cap(s) until air pressure has been expelled from the system. Air will be heard escaping from the open manual air release. The number of air release valves is required to be such that air pressure shall be released in no more than 3 minutes. When encountering systems with more than one manual air release valve, all manual air release valves should be opened. (See Figure 3)

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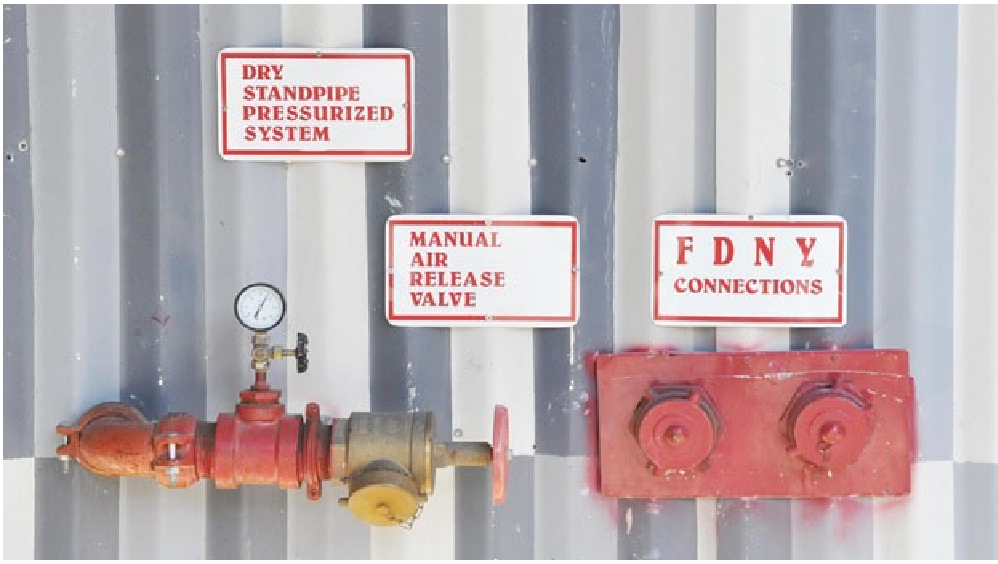

Figure 1

2.3 Once air pressure is expelled, FDC cap(s) may now safely be removed. Connect the supply line, close the manual air release valve, and supply the standpipe with water.

2.4 It is not necessary to deactivate the air compressor as it will shut off when the standpipe is supplied with water.

2.5 The location of the FDC is required to be marked by a sign and lit by a red light at night. Signs are also required indicating that the standpipe is pressurized with air as well as the location of the manual air release valve. (See Figures 1, 2 & 3)

2.6 If air is noticed escaping under pressure from a FDC cap while being loosened, and no sign is present, member should stop cap removal immediately and notify the IC that the standpipe is pressurized with air. Steps shall be taken to bleed the air from a manual air release valve and/or standpipe outlet inside the building prior to removing the FDC cap(s).

Figure 2

2.7 Screw in type FDC caps are required in order to provide the air tight seal necessary for an air pressurized standpipe system. Breakaway caps or other non-screw in type caps on the FDC are indicative of a standpipe that is not pressurized with air.

Figure 3

2.8 The control firefighter, after reaching the floor outlet where the hoseline connection will be made, should remove the cap, open the standpipe outlet control valve, and wait for water to reach this point. This will expedite air removal from the system. Once water is present at the outlet, close it, and make necessary connections. The standpipe system will now function as a standard manual wet standpipe.

2.9 An occupied building with a wet standpipe system will have a check valve installed inside the exterior building wall providing freeze protection for the piping and FDC connection. During the construction or demolition phase with the standpipe pressurized with air, this check valve will be bypassed allowing air pressure to reach the FDC connection. At a fire operation, once the system has been drained of air and charged with water, water will flow past the bypassed check valve(s) out to all FDC connections. If FDC clapper valves are defective or tampered with in the second FDC, its caps may be under pressure.

2.10 The manual air release valve does not need to be opened when augmenting the standpipe with a second pumper. However, when loosening the FDC cap(s) at this second FDC, if water begins spraying out under pressure consider the clapper valves inside this FDC defective. Immediately stop cap removal, and use another option for augmenting the system e.g. supply the drain valve next to the FDC, use another FDC, or supply the first floor or another floor outlet. The manual air release valve can be supplied in the same manner as you would supply the first floor standpipe outlet.

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LARGE CALIBER STREAMS

1. LARGE CALIBER STREAM OVERVIEW

1.1 A Large Caliber Stream (LCS) is a fire stream that delivers 350 gpm of water flow or more. They can be ground based (New Yorker multiversal, Blitzfire Oscillating Monitor), engine apparatus based (deckpipe), or applied through an elevated position (tower ladder or aerial ladder pipe).

1.2 The versatility and increased flow rates of LCS can dramatically impact operations. At fast-moving fires, early use of LCS can limit fire growth and spread.

1.3 Only the Incident Commander may order the use of LCS, which may be the first arriving officer. This includes the first arriving engine using its apparatus deckpipe.

2. SUPPLYING LCS

2.1 Whenever possible, an engine company supplying LCS should be dedicated to that task and not engaged in supplying handlines.

2.2 LCS should be supplied with the largest available hoselines. Most commonly, this will be 3 ½” hose.

Note: The Blitzfire Oscillating Monitor should only be supplied with a 2 ½” hoseline.

2.3 Engine companies supplying a LCS may require additional augmentation, especially when in-line pumping is used. This can be accomplished through the use of a 2 ½” single gate attached to a hydrant for the purpose of possible self-augmentation.

3. LCS OPERATIONS

3.1 If LCS use is ordered after units are operating within a building, all operating forces must be notified, and time permitted for their safe withdrawal to unexposed positions. Confirmation of their safe withdrawal will be verified by way of a Roll Call and all officers should be prepared to account for the members of their company.

3.2 As an additional safety measure, the LCS should be quickly swept through the building without stopping at any window or other opening to serve as a warning to any members left in the area of operation.

3.3 LCS use requires strict adherence to operating procedures to avoid serious injury or unnecessary property damage. LCS can cause structural stress when driven into building components and may dislodge building materials, turning them into dangerous projectiles. Additionally, water accumulation can add significant weight to a building and can precipitate structural collapse.

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3.4 LCS can entrain large amounts of air into a structure with stream application. The effect of air movement resulting from LCS use must be considered by the IC and operating members as conditions may deteriorate in remote areas of the building.

4. NEW YORKER MULTIVERSAL

Figure 1

4.1 The New Yorker Multiversal (Figure 1) is carried by all engine companies and has a two-piece design:

4.1.1 The top section contains the tips, stream shaper, lock, and wheel.

4.1.2 The base section contains the folding legs, attachment points, pins, and supply connections.

4.2 The multiversal is equipped with three stacked tips (1 ¼", 1 ½" and 2")

4.2.1 When the 1 ¼" tip is used, it will flow roughly 465 GPM with 100 psi at the tip.

4.2.2 When the 1 ½" tip is used, it will flow roughly 560 GPM with 70 psi at the tip. When supplied with 100 psi at the tip, it will flow roughly 660 GPM.

4.2.3 When the 2" tip is used, it will flow roughly 840 GPM with 50 psi at the tip.

4.3 Assembling the Multiversal

4.3.1 Extend the three leg supports and the place the base section on the ground. The front leg (with safety chain attached) points in the direction of operation.

4.3.2 Attach the top section to the base section by placing the top section on top of the base section and inserting the two locking plungers fully, one on either side of the appliance.

4.4 Securing the Multiversal

4.4.1 Due to the significant back pressures caused by the nozzle reaction, the multiversal must be secured to ensure a safe operation.

4.4.2 The primary means of securing the multiversal is the proper placement of the supply hose. All hose supplying the multiversal should be brought straight back from the appliance for 15 feet. This configuration of hose will effectively absorb the nozzle reaction and prevent lateral movement of the multiversal.

4.4.3 An additional measure to prevent backward movement of the multiversal is to secure it in position with a utility rope. The following procedure should be used before the supply hose is attached:

A. Before attaching the supply hose, place the middle of the rope on top of the supply connection (Figure 2).

B. Bring the two sides of the rope around the supply connection and up between the two inlets.

C. Bring the two sides of the rope up over the connection and bring each side forward to the large leg of the ground base on each side of the front leg. Make a half hitch on each of these two legs (Figure 3).

D. Bring the rest of each end of the rope forward and secure each end to a substantial object which is forward and at an angle to the multiversal, using a clove hitch and binder on the taut part of the rope.

Figure 2

Figure 3

4.4.4 If there is no substantial object readily available in the area, the supply hose itself can be used as a substantial object. This is done by looping the supply hose in front of the multiversal and tying the rope to it. The supply hose should be laid straight back for 15 feet before it is looped in front of the multiversal.

4.4.5 Additionally, the safety chain can be secured to a substantial object, if one is close enough. The safety chain alone should never be relied on to secure this appliance.

4.5 Supplying the Multiversal

4.5.1 The multiversal is equipped with two 3" female connections.

4.5.2 The multiversal should be supplied with two supply lines whenever possible, though it can be operated when supplied with only one line.

4.5.3 The multiversal should be supplied with the largest size hose available. Generally, this is 3 ½" hose, though it is possible to supply it with 2 ½" hose.

4.5.4 The maximum allowable pressure supplied to the appliance base is 200 psi.

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4.6 Operating the Multiversal

4.6.1 Do not move the multiversal or the 15 feet of supply hose while it is in operation.

4.6.2 The multiversal can rotate horizontally 90 degrees in each direction.

4.6.3 The vertical range of the nozzle is from 15 degrees below the horizontal to 90 degrees above the horizontal. The elevation is adjusted by the operating wheel.

4.6.4 There is a safety stop at 35 degrees above the horizontal. To operate below 35 degrees, release the safety stop by pulling up the release pin**.**

5. APPARATUS DECKPIPE

Figure 4

5.1 The apparatus deckpipe is permanently affixed to engine apparatus and supplied directly by a 3-inch pipe from the pump (Figure 4).

5.2 The deckpipe has 4 stacked tips (2 ½”, 2 ¼”, 2”, 1 ½”).

5.2.1 When the 1 ½” tip is used, it will flow roughly 660 GPM with 100 psi at the tip.

5.2.2 When the 2” tip is used, it will flow roughly 840 GPM with 50 psi at the tip.

5.2.3 The maximum flow of 2,000 GPM is reached when the 2 ½” tip is supplied with 116 psi.

5.3 The deckpipe should be maintained with a single gate connected. The single gate allows the ECC to supply the deckpipe with water prior to operating the stream.

5.4 Deckpipe Operations

5.4.1 In situations where fast water on a rapidly expanding fire is required, the IC may consider using the engine deckpipe for a quick knock-down. This may be the first arriving officer.

5.4.2 Prolonged usage of the deckpipe LCS may necessitate augmentation, especially when in-line pumping. An engine company using a LCS should attach 2 ½ gate to the hydrant for possible self-augmentation.

6. AERIAL LADDER PIPE

Figure 5

6.1 The Aerial Ladder Pipe (Figure 5) is carried by all aerial ladder apparatus. It is comprised of a nozzle attachment, two halyards to control the direction of the stream, and a Siamese connection used to supply the appliance.

6.2 The ladder pipe has a 1 ½" tip that will flow roughly 660 GPM with 100 psi at the tip.

6.3 The nozzle attachment is equipped with a movable tip section and has a 3" female coupling. It is manually attached to the top two rungs of aerial ladder fly section.

6.4 The direction of the stream is controlled by the halyard attachments, which connect to the moveable portion of the nozzle attachment and are operated by a member standing at ground level.

6.5 Aerial ladder companies carry two lengths (100 feet) of 3 ½ hose (Figure 6) that are maintained connected to each other. The male coupling is maintained connected to the ladder pipe (Figure 7) and the female coupling is maintained connected to the outlet of a 3-inch gated Siamese connection. Also carried are two halyards and reels, which are kept in a designated area on the apparatus.

Figure 6

Figure 7

6.6 Aerial Ladder Pipe Operations

6.6.1 To put the ladder pipe in operation, members of the ladder company will attach the ladder pipe (with 3 ½" hose connected) to the first two rungs of the aerial ladder. The 3 ½" hose is secured with a hose strap just below the ladder pipe coupling. The hose strap should be attached to the first rung of the top sliding section of the ladder.

6.6.2 Once the ladder pipe is attached to the ladder (Figure 8), the two halyards are connected to the ladder pipe as follows:

A. One halyard clip is attached to the ladder pipe handle.

B. One halyard clip is attached to the collar of the ladder pipe (Figure 9).

Figure 8

Figure 9

6.6.3 The halyard reels are placed on the ground (Figure 10) near the tip of the aerial. One ladder company member holds the ends of both halyards, using them to control the vertical movement of the ladder pipe stream. This member should stand on the same side of the aerial ladder as the ladder pipe handle (which is to the right of the ladder, when facing the tip from the turntable) (Figure 11). This will allow for smooth operation of the halyard. If operating the halyard near the aerial tip is not possible (or is a safety hazard), the halyard can also be operated from the area near the turntable.

Figure 10

Figure 11

6.6.4 After the ladder pipe is attached to the ladder, the Siamese connection is placed near the rear of the apparatus. Water supply to the ladder pipe is controlled using the single gate attached to the Siamese connection.

6.6.5 The Siamese connection is supplied with 3 ½" hose, which is stretched from an engine apparatus and connected near the rear of the aerial ladder. Two supply sources are recommended to prevent undue stress on the aerial ladder in the event a sudden loss of water occurs.

6.6.6 - 6.6.7 ***Redacted for PFS***

6.6.8 While the ladder pipe is in operation, the vertical movement of the stream is controlled using the halyard. The horizontal movement is controlled by moving the turntable. The halyard is most easily operated from a position near the tip of the aerial. However, depending on the position of the ladder, it may be necessary to operate from near the turntable to ensure a position of safety.

7. TOWER LADDERS

Figure 12

7.1 All tower ladder apparatus in the FDNY are equipped with a basket-based monitor capable of delivering a large caliber stream when supplied by an engine company (Figure 12).

7.2 The tower ladder monitor has 2 stacked tips (2", 1 ½"). A fog tip may also be attached to the monitor.

7.2.1 When the 1 ½" tip is used, it will flow roughly 660 GPM with 100 psi at the tip.

7.2.2 When the 2" tip is used, it will flow roughly 840 GPM with 50 psi at the tip.

7.2.3 The maximum solid stream flow of roughly 1,200 GPM is reached when the 2" tip is supplied with 100 psi.

7.2.4 When the Akron Turbomaster fog tip is used, the flow can be up to 1,250 GPM.

7.3 Suppling the Tower Ladder

7.3.1 Generally, only one source at the base of the tower ladder should be used.

A. A Satellite Water Unit is the best source of supply if available.
B. When supplied with 3 ½" hose, ensure the male end is stretched to the gated inlet.
C. 200 – 250 psi is the recommended pressure at the gated inlet.

7.3.2 Water flow is controlled by the supply pumper

A. The gated inlet at the TL should not be used to control water flow.
B. Water should always be shut down at the supply pumper.

7.3.3 Refer to *Tower Ladder Operations* for more information.

8. BLITZFIRE OSCILLATING MONITOR

Figure 13

8.1 The Blitzfire Oscillating Monitor is a compact portable monitor that is carried only by the following specialized units:

8.1.1 Satellite Engine Companies

8.1.2 Foam Tanker Engine Companies

8.1.3 Haz-Mat Technician Engine Companies

8.1.4 Haz-Mat Company 1

8.2 The inlet and the outlet of the Blitzfire are both equipped with 2 ½" threads. There is one 2 ½" supply inlet which should be supplied with only one 2 ½" hoseline.

8.3 The maximum pressure to be supplied to the Blitzfire is 175 psi.

8.4 The Blitzfire comes supplied with its own Max-Force Dual Pressure fog tip. This is the only tip that may be used on the Blitzfire for exterior water stream application.

8.5 The fog tip can flow approximately 500 GPM at its maximum pressure of 175 psi.

8.5.1 The fog pattern ranges from straight stream to a 120-degree fog pattern.

8.5.2 The fog tip may be switched from a standard mode of 100 psi to a low-pressure mode of 55 psi.

8.5.3 The fog tip may also be used to apply finished firefighting foam.

8.6 The Akron 500 GPM foam nozzle may also be used with the Blitzfire to apply foam.

8.7 The Blitzfire has the following range of motion:

8.7.1 The vertical range is approximately from 10 degrees to 45 degrees.

8.7.2 The horizontal range is 20 degrees from center in either direction.

8.7.3 It also has an oscillation feature providing an automatic horizontal sweep of either 20, 30, or 40 degrees.

8.7.4 A minimum flow of 175 gpm is required for proper oscillation.

8.7.5 The speed of oscillation is a function of the flow rate.

8.8 The Blitzfire has a flow control handle that can be used to control water flow and act as a safety shut-off feature. The handle is closed when pushed fully forward and open when pulled back. The flow control handle also has 6 flow positions, allowing the water flow (gpm) to be regulated at different positions.

8.9 The flow control handle also has a safety shut-off valve. The safety shut-off valve will automatically shut off the monitor's water flow if the monitor starts to move sideways. Once the safety shut-off is tripped, the flow control handle will automatically move to the fully closed position. To resume operations, push the handle fully forward to ensure the safety shut-off valve has been reset.

8.10 If the monitor is positioned on a sloped surface, the safety mechanism may activate preventing the flow control handle from remaining open. This can happen because it appears the monitoring is moving. If this occurs, the flow control handle will have to be manually held open by a firefighter. In these situations, it is dangerous to attempt to utilize utility rope, webbing or any other device to hold the flow control handle open.

8.11 When in operation, the Blitzfire should only be secured using the tie down strap. The loop end of the strap will be secured to an anchor point and the hook will be snapped into the hole at the front of the Blitzfire. This is the safest method to secure the monitor because if the monitor slides, its travel is limited by the length of the strap.

ENGINE COMPANY EMERGENCIES

1. ENGINE COMPANY EMERGENCIES

1.1 Engine companies can encounter a number of unique emergency situations on the fireground. Each presents a serious safety hazard and need to be decisively addressed to avoid catastrophic consequences.

1.2 Engine emergencies can be classified into three broad categories, based on the underlying threat presented by each specific situation:

1.2.1 Inability to secure a water source.

1.2.2 Loss of water in an operating hoseline.

1.2.3 Inability of hoseline to reach the seat of the fire.

1.3 The following sections will describe a number of emergency situations that engine companies may encounter at a fire operation. These sections will also discuss the proper reaction by engine company personnel, as well as potential solutions to the problems faced.

2. INABILITY TO SECURE A WATER SOURCE

2.1 The inability of the 1st due engine company to secure a positive water source is a serious situation that affects everyone on the fireground.

2.2 Anytime the 1st due engine company is unable to secure a positive water source, a signal 10-70 should be transmitted. This should be given by an URGENT handie-talkie transmission in accordance with *Communications Manual Chapter 9: Company Unit Communications*. The signal 10-70 should also be transmitted as an URGENT message over the department radio, which will alert incoming units of the situation. The second due engine company will be designated the "Water Resource Unit" and will be responsible for ensuring a water source is secured.

2.3 Inoperative hydrant

2.3.1 If the 1st due engine finds their hydrant to be inoperative (or frozen), the ECC should immediately notify their officer that their primary hydrant is inoperative and attempt to find a nearby operable hydrant that can supply water. If there are no nearby hydrants, and the second due engine is not on scene, the 1st ECC should transmit a 10-70, as described above.

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2.3.2 If there is another hydrant in the immediate area, the ECC should test it for operability. If the second nearby hydrant is inoperative or frozen, and the second due engine is not on scene, the 1st ECC should transmit a 10-70, as described above.

2.3.3 If there is no alternative hydrant in the immediate area and the 2nd due engine is on scene, the 1st ECC should contact the 2nd ECC to see if they have a working hydrant.

2.3.4 If the 2nd due company has a working hydrant, the 1st ECC must determine if they can hook up to that hydrant directly, either by repositioning their rig, or by stretching 3 ½" hose. If either option is available, the 10-70 signal is not required.

2.3.5 If the 1st ECC determines that they cannot directly hook up to the working hydrant, they will need to be supplied via a relay operation. If this is required, the 1st ECC should transmit a 10-70, as described above.

2.3.6 If the 2nd due engine does not have a working hydrant, both ECC's must continue searching for a working hydrant until a water source is obtained. In this situation, a 10-70 should be transmitted as described above.

2.4 Inoperative standpipe system

2.4.1 If the standpipe system fails to provide water at the floor outlet of a high-rise building, engine company members will not be able to stretch and operate a hoseline from the standpipe outlet, creating an emergency situation for operating units.

2.4.2 This will likely be discovered by the control firefighter at the standpipe outlet. If they are unable to use the standpipe system to supply the hoseline, they should transmit a signal 10-70 via an URGENT handie-talkie transmission as described above and inform the Incident Commander and engine officer of the situation.

2.4.3 Before initiating an emergency solution, it should be determined whether the standpipe system is completely inoperative. It may be possible to rectify the issue of inadequate water at the outlet by correcting a minor problem in the system, effectively making the system fully operational. As a first step, members should troubleshoot possible problems in the standpipe system by considering the following:

A. Confer with the supplying ECC to determine if they are flowing water as indicated on their flowmeter.

B. If they are flowing water, this indicates an opening (open floor outlet, ruptured piping, etc.) in the standpipe system.

C. In this case, members should attempt to find and close the opening.

D. Depending on the height of the building and the fire floor, the Incident Commander may have to assign several units to assist in this search.

E. The search for the opening should begin in the lowest level of the building and work towards the fire floor.

F. However, units already in place on upper floors may be assigned by the Incident Commander to assist in the search by working downwards from the upper floors.

G. If the ECC is not flowing any water as indicated on the flowmeter, this may indicate a blockage in the system.

H. This may be a closed riser or section valve or other obstruction. In this case, members should attempt to find the closed valve.

I. The search for the closed valve should begin in the lowest level of the building and work towards the fire floor.

J. In either case, the system should be augmented by a 2nd apparatus. This may be via a 2nd FDC or the 1st floor outlet.

2.4.4 If the standpipe system proves to be fully inoperative, engine companies must seek out an alternative method of supplying water to the fire floor. By the time the failure of the standpipe system is discovered, the 1st arriving engine will likely be positioned at the floor outlet on the floor below the fire, equipped with their standard complement of equipment, which includes 3 lengths of hose and a standpipe kit. Using this equipment, this emergency can be solved by performing either a “reverse stairway stretch” or an “exterior hose drop”.

2.4.5 A “reverse stairway stretch” involves members carrying 2 ½” roll-ups into the building and stretching down the stairway to the apparatus. Rather than beginning the stretch on the street level, the stretch begins on the floor below the fire and additional lengths are added as it continues down the designated stairway. This method will use gravity to facilitate a long and difficult stretch.

2.4.6 An “exterior hose drop” is similar to a rope stretch, but instead of using a rope to hoist hose up to a window, members will lower connected lengths of hose down from a window to the street below. While completing a rope stretch from a window on an upper floor might be possible, the extreme weight of the hose will make hoisting the required number of lengths prohibitively difficult.

2.4.7 In both scenarios, the key point is that 2 ½” roll-ups are carried to the fire area and stretched down towards the apparatus.

2.5 Reverse Stairway Stretch

2.5.1 The execution of a reverse stairway stretch must be approved by the IC and communicated to all units.

2.5.2 The engine officer will communicate with the Incident Commander and the ECC to identify the stairway to be used for the stretch. On the ground, the ECC (assisted by additional engine companies) will begin stretching 2 ½” hose up the designated stairway.

2.5.3 Beginning on the floor below the fire, members will connect their lengths of 2 ½” hose (roll-ups) and begin stretching down the designated stairway. As additional engine companies arrive, they will add their roll-ups to the stretch as it descends the stairway. Members should ensure the female end of the hose is being stretched downwards towards the street.

2.5.4 Depending on the length of the stretch, additional engine companies may be directed to report to a lower floor (equipped with their roll-ups) to meet the stretch as it descends the stairway. This operation will require significant coordination and clear communication to ensure sufficient hose is brought to the correct locations.

2.5.5 The stretch will continue down the designated stairway until it meets the hoseline being stretched up the stairway. At this point, the hoselines will be coupled and the stretch will be complete.

2.5.6 Once the stretch is complete, the engine officer in command of the nozzle team must be notified. Only the officer in command of the nozzle team can call for the hoseline to be charged.

2.5.7 The ECC should supply the line with pressures consistent with the street hydraulics calculations for a 2 ½” hoseline. The ECC must remain aware of any indication of insufficient pressure in the hoseline and be prepared to supply additional pressure if necessary.

2.6 Exterior Hose Drop (Figure 1)

Figure 1

2.6.1 The execution of an exterior hose drop must be approved by the IC and communicated to all units.

2.6.2 The engine officer will communicate with the Incident Commander and the ECC to coordinate the location from which the hoseline will be lowered. On the ground, the ECC will stretch a 2 ½" line to the point at which the lowered line will reach the ground.

2.6.3 On the floor below the fire, members of the first due engine will connect their lengths of hose and begin to lower it out the window. If there is a rope available, it can be tied as a safety precaution to the lead coupling being lowered, so as to allow the members waiting on the ground below to guide the hose as it's being lowered. Once the lead coupling reaches the ground, the ECC will couple it to the supply line stretched to that location.

2.6.4 After the hose has been lowered, members of the first due engine company must properly secure the hose. This is the most critical point of the evolution. If the hose is not properly secured, the weight of the charged hoseline will cause such severe kinking in the line such that sufficient water will not reach the fire floor. Once charged, the line will be too heavy to move and adjustments to eliminate the kinks will not be possible.

2.6.5 To properly secure the hoseline with the equipment available, a rolling hitch must be tied and secured directly below the first hose coupling that will be located outside the window (Figure 2). The knot must be tied and secured before the line is charged. If a different knot, such as a standard clove hitch, is used, the line will likely kink around the rope and severely limit water flow. The wide surface area of the rolling hitch (4 turns around the rope) will minimize this kinking effect. If the knot is tied away from the coupling, it will likely also kink severely; it requires the stability of the coupling to prevent kinking.

2.6.6 Once the rolling hitch is tied at the coupling, the knot must be lowered outside the window so the hose is oriented vertically (Figure 3). If the knot is kept inside the window when it is secured, the weight of the water will severely kink the line as it comes over the window sill. (*photos show hose lowered from a roof, but the evolution is the same from a window*)


Figure 2

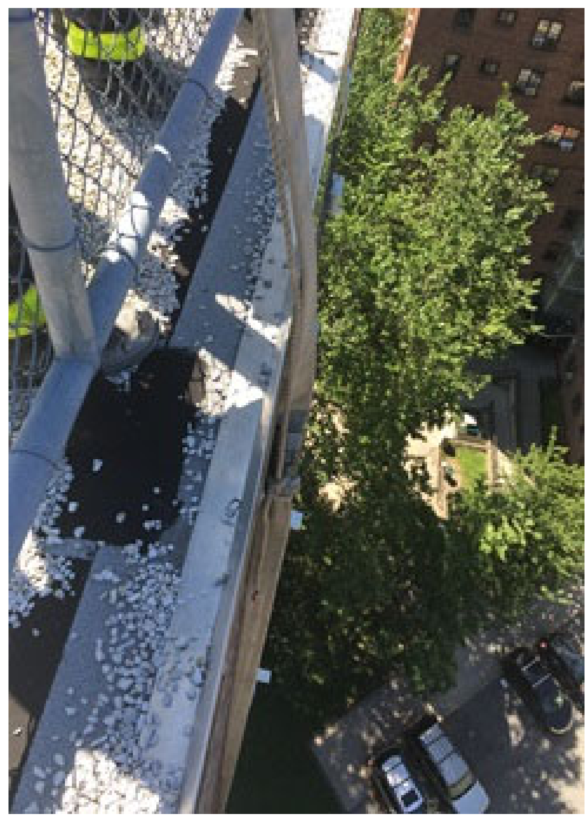
Figure 3

2.6.7 After the knot is lowered into place, the rope must be secured inside the window using a substantial object knot. The location of the substantial object knot will depend on the length of the rope being used. Any available rope may be used for this purpose.

2.6.8 When the rolling hitch is in position, the substantial object knot has been secured, and the nozzle is attached, the line is ready to be charged (Figure 4). When the officer calls for water, the ECC should charge the line slowly to minimize movement in the hose as the water fills the line.

2.6.9 Once the line is charged, there will likely be a significant kink at the window sill. This can be eliminated by lifting the line to create a bow, effectively "loading" the line onto the rolling hitch (Figure 5), which is supporting the hose at the first coupling located outside the window.

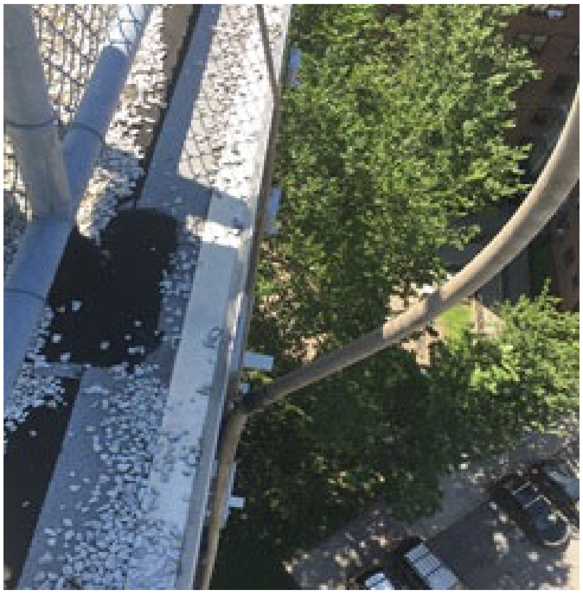
Figure 4


Figure 5

2.6.10 The ECC should supply the line with pressures consistent with the street hydraulics calculations for a standard 2 ½" line stretched. This calculation should include the lengths to be stretched inside the building from the floor below the fire to reach the fire area.

3. LOSS OF WATER IN AN OPERATING HOSELINE

3.1 When an engine company loses water in their hoseline while operating, the Engine Officer should transmit an URGENT message via handie-talkie, as outlined in Communications Chapter 9. This will alert the entire fireground of the emergency. In addition to this transmission, the Engine Officer must initiate action to remedy the situation.

3.2 It is important for the engine officer to coordinate with the ECC to identify the problem and correct it as soon as possible. Once the problem is accurately identified, there may be corrective action that can be taken that would not require the water supply to the hoseline to be shut down. Shutting the water supply to the hoseline should be avoided, if possible.

3.3 Burst length

3.3.1 When a burst length is severe enough to critically reduce the extinguishment capabilities of the hoseline, it should be treated as a loss of water in the hoseline and it must be addressed. An URGENT handie-talkie transmission must be made and the hoseline should be withdrawn to a safe location. The Incident Commander must ensure that all members that may be endangered on the fire floor or floors above are notified, and when necessary repositioned.

3.3.2 It is important to note that a leak in the hoseline does not necessarily constitute a burst length. If adequate water flow is still present at the nozzle, it is not a "water loss" emergency, even if water is leaking from the hoseline. If a significant leak is found in the hoseline, the engine officer should be notified, but the determination of a water loss should be made by the engine officer in charge of the hoseline.

3.3.3 The indications of a burst length include water loss at the nozzle, pressure loss in the lead length, an elevated water flow reading at the pump panel flowmeter (or standpipe outlet flowmeter) and the apparatus pump RPM increasing automatically. This indicates that water is leaving the pumper, but not reaching the nozzle. This diagnosis from the pump panel must be followed up with the confirmation of the location of the burst length itself.

3.3.4 This problem can be solved by locating and replacing the burst length. To do this, water to the hoseline will need to be shut down at the pumper (or standpipe outlet) and a replacement length of the same size hose will be brought to the location of the burst length. Once water is shut, the burst length is disconnected and replaced with the new length. Only the engine officer can order the hoseline shut down.

3.3.5 In certain situations, if enough hose is available and it is determined that the hoseline can safely operate with one less length, the burst length can simply be removed, and the couplings reattached from existing hose lengths.

3.3.6 Once the replacement length of hose is connected, the engine officer in command of the hoseline must be notified. The engine officer will then call for the line to be recharged.

3.4 Clogged nozzle

3.4.1 If there is a water loss at the nozzle, but no pressure loss in the lead length of hose, there may be an obstruction at the nozzle itself. In this case, the pump panel will indicate normal pressure, but no water flow.

3.4.2 To check for an obstruction at the nozzle, the shut-off handle to the nozzle should be closed and the MST is removed, allowing any obstruction to be removed. Water may not need to be shut down at the pumper.

3.4.3 Once the obstruction is removed, reattach the MST and open the nozzle to continue operations.

3.4.4 If the clog is suspected to be related to ice or slush in the hoseline, a possible solution may be to rapidly open and close the nozzle repeatedly. This may help break up the ice or slush in the line.

3.5 Kinks

3.5.1 Kinks are a common problem on the fireground, but they can escalate to an emergency situation if the kinking is severe enough to critically reduce the extinguishment capabilities of the hoseline. This would be the case if water flow is reduced at the nozzle to the degree that the engine officer determines that the hoseline cannot continue to advance.

3.5.2 If kinks are severe enough to critically reduce the extinguishment capabilities of the hoseline, they should be treated as a loss of water in the hoseline and they must be addressed. An URGENT handie-talkie transmission must be made. When deemed necessary, the hoseline may be withdrawn to a safe location. The Incident Commander must ensure that all members that may be endangered on the fire floor or floors above are notified, and when necessary repositioned.

3.5.3 In the case of kinking, the pump panel would indicate normal pressure, but there will be a reduced water flow reading at the pump panel flowmeter (or standpipe outlet flowmeter). There will also be a decrease in the engine RPM.

3.5.4 The problem can be solved by dispatching members to survey the path of the hoseline and manually remove any kinks in the line. Kinking should not be corrected by increasing the pressure in the hoseline.

3.5.5 Once the kinks are removed, full water flow should return to the nozzle. The engine officer should communicate the return of water to the line.

3.6 Hoseline charged under a door

3.6.1 If a hoseline becomes charged while it is under a door (or similar narrow opening), water flow and pressure at the nozzle may be completely lost. Additionally, the hoseline may not be able to advance as it is physically stuck in place under the door. This is a more serious situation than kinking and is not as easily resolved.

3.6.2 In this situation, the pressure reading at the pump panel will be normal, but there will be a reduced water flow reading at the pump panel flowmeter (or standpipe outlet flowmeter).

3.6.3 Upon the discovery of the charged hose under a door, the engine officer must be notified, and steps must be taken to remove the hose from the pinch point. The engine officer should transmit an URGENT handie-talkie message and withdraw the nozzle team to an area of safety.

3.6.4 If a charged hoseline is found under a door and critically reducing the extinguishment capabilities of the hoseline, this situation should be treated as a loss of water in the hoseline and must be addressed. An URGENT handie-talkie transmission must be made and the nozzle team should be withdrawn to a safe location. The Incident Commander must ensure that all members that may be endangered on the fire floor or floors above are notified, and when necessary repositioned.

3.6.5 The member that discovered the pinch point must work to remove the hose from the obstruction. This will likely require a halligan, hydra ram, or other hand tools. In the case of a hose stuck under a door, the quickest solution may be to remove the door from the hinge (if the door removal will not adversely impact fire conditions).

3.6.6 If the charged hose cannot be removed from the obstruction, it may become necessary to momentarily shut the water supply to the hoseline to allow members to free the hose. Once the water supply is shut, the ECC will need to relieve the pressure in the line by opening the appropriate drain valve on the apparatus. This order must be given by the engine officer and would have to be closely coordinated between the engine officer, ECC, and member removing the hose from the pinch point. Once removed, the engine officer will order the line recharged as soon as possible.

3.6.7 If this scenario occurs when a line is stretched from a standpipe outlet, there will not be an option to relieve the pressure in the hoseline by opening a drain valve on the apparatus. This is a more serious situation, as there will be no way to relieve the pressure in the line once it is charged from the standpipe outlet. The obstruction will need to be removed.

3.7 Failure of Apparatus pump

3.7.1 A serious emergency situation would be the failure of the apparatus pump while supplying a hoseline. This could cause the immediate loss of water in all hoselines supplied by that apparatus.

3.7.2 If the issue is first noticed at the nozzle, the engine officer would experience a loss of water and pressure in the line. An URGENT handie-talkie message should be given indicating the problem.

3.7.3 If the problem is first noticed by the ECC, they should transmit an URGENT handie-talkie message for a water loss. Since the problem is with the apparatus and not the water source, a signal 10-70 should not be transmitted. When a 10-70 is transmitted, resources are focused on securing a water source for the 1st due apparatus. In this case, the apparatus itself is not operational, so an URGENT transmission for water loss is more effective.

3.7.4 Following this transmission, the engine officer should withdraw the nozzle team to an area of safety and members in the street should provide whatever assistance necessary to solve the problem. The Incident Commander must ensure that all members that may be endangered on the fire floor or floors above are notified, and when necessary repositioned.

3.7.5 If the problem with the apparatus cannot be quickly solved, water supply can be restored to the hoseline by stretching 2 ½" hose from a nearby apparatus (that is connected to a hydrant) to the 1st due pumper. The hoseline is then disconnected from the 1st due apparatus outlet and connected to the new 2 ½" line. The hoseline can now be supplied by the new pumper.

3.7.6 An alternative solution may be to supply water from a 2nd apparatus to the apparatus with the failed pump. The pumping operation can then be controlled from the 2nd pumper, with the original apparatus essentially functioning as a large manifold. In this scenario, the pressure supply to the original apparatus will be limited to 150 psi, as the relief valve will dispel any additional pressure.

3.8 Failure of Pro Pressure Governor

3.8.1 If the PPG of the apparatus fails to operate properly, the ECC may not be able to supply sufficient pressure to operating hoselines.

3.8.2 As a solution, the ECC may be able to boost available pressure by switching the apparatus to Pressure Mode by using the apparatus transfer valve. An additional solution may be to receive a relay from another pumper.

4. INABILITY OF HOSELINE TO REACH FIRE AREA

4.1 At a fire operation, there are a number of reasons that a hoseline would not be able to access the fire area. While such a situation may not require an URGENT transmission, it should be treated as an emergency and all available resources should be used to facilitate the advance of the hoseline to the fire area.

4.2 If the hoseline is unable to reach the fire area, the engine officer must clearly communicate the situation to the IC and ensure all members operating in exposed positions (such as the floor above) are aware that extinguishment will be delayed. Depending on the situation, corrective action may be taken.

4.3 Short stretch

4.3.1 If there is not enough hose in the hoseline to reach the fire area, it is called a "short stretch". This problem can be prevented by ensuring an accurate estimation of the amount of hose needed in the stretch to reach the fire area.

4.3.2 The problem of a short stretch can be fixed by adding a length of hose to the stretch. Rolled up lengths of 1 ¾" hose (one with a nozzle attached) should be maintained in readiness on all engine apparatus for this purpose. If 2 ½" hose is needed, a length maintained as a roll-up can be used.

4.3.3 If the short stretch is recognized after the line is operating inside the fire area, the line will need to be withdrawn to a safe area in order to add the additional hose. This may occur when the hoseline cannot reach the fire room itself. In this case, the IC must be informed when the line is repositioned to a safe area.

4.3.4 The engine officer must decide where to add the additional length to the stretch. There are two options: the length can either be added to the front of the stretch at the nozzle, or it can be inserted at any point in the stretch itself.

4.3.5 When adding an extra length in the stretch behind the nozzle, the water supply to the hoseline will need to be shut. To minimize the amount of time without water, the extra length should be flaked and ready to be coupled at the desired location before the engine officer orders the water supply shut to the line. Once the new length is connected, the officer will order the line recharged.

4.3.6 To avoid shutting the water supply to the hoseline, the length can be added to the front of the stretch at the nozzle. To do this, the added length (with an additional nozzle attached) will be brought to the nozzle. With the hoseline remaining charged, the nozzle is closed and the MST is removed. The added hose is coupled directly to the shut-off of the nozzle. If the added length is 1 ¾" hose, no additional fittings are required and it is connected directly to the existing shut-off. If the added length is 2 ½" hose, an increaser will be needed to make this connection. The added length will now become the new lead length.

4.3.7 Once the new lead length is flaked out, the original shut-off will be opened and the lead length will be charged. The shut off must be maintained in an open position, which can be achieved by securing it with a hose strap. The hose strap is looped around the hose several feet behind the original shut-off and the clip of the hose strap is attached to the handle of the shut-off to maintain it in an open position. A member must also be positioned at the shut-off to ensure the shut-off remains open and the water supply is not interrupted.

4.3.8 If conditions prevent the new length from being added to the front of the stretch, it should be added as close to the front of the stretch as possible. This will minimize the hose that will need to be advanced after the addition of the extra length.

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4.3.9 If six lengths of 1 ¾" hose have already been stretched, it is permissible to add one extra length of 1 ¾" hose to the stretch in the emergency situation of a short stretch.

4.3.10 If the hoseline is stretched from a standpipe, it may have a lead length of 2" hose. In this case, the procedure is the same and the 1" MST can be removed to allow the connection of an additional length. The additional length can be either 2" hose or 2 ½" hose, so an increaser will be needed to make the connection. In this emergency situation, it is permissible to add a 2nd length of 2" hose (with 1" tip) to remedy a short stretch. It is also permissible to add a length of 2 ½" hose (with 1 1/8" tip) to a lead length of 2" hose.

4.4 Hose strap failure

4.4.1 When a hose strap is used in a well hole stretch, rope stretch, or fire escape stretch, it is supporting the weight of the charged hose that is hanging vertically. If the hose strap fails (either the strap breaks or the securing knot is ineffective), this hanging hose will begin to fall away from the fire floor.

4.4.2 Such a failure will have the effect of halting the forward progress of the hoseline and may even pull the operating hoseline out of the fire area. If this happens, the engine officer must be made aware of the situation and coordinate the restoration of the hoseline to the proper position.

4.4.3 The problem can be solved through a coordinated effort of members lifting the hose back to the fire area and properly securing it with another hose strap.

4.5 Blocked access to fire area

4.5.1 In a situation in which the 1st hoseline cannot gain access to the fire area, the engine officer must clearly communicate the problem and work to find a solution.

4.5.2 A common obstruction to a fire area can be the door to the fire area itself. If the door opens inward into the fire area, it can often block access for the hoseline when the door is chocked in the open position (Figure 6). This is especially difficult if the open door blocks the entire hallway behind it, as is common in a variety of multiple dwellings. In these situations, the presence of a hallway behind the door can be difficult to detect and units may have difficulty finding the fire.

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Figure 6

4.5.3 To resolve this, the engine needs to advance a sufficient amount of the charged lead length into the apartment and stage it in an area opposite the door. Once in position, the door needs to be closed (at least partially) to allow the engine to advance the hoseline and access the fire. Once water is on the fire, consideration can be given to removing the door from its hinges, if it will not negatively impact fire conditions. This will allow for unimpeded egress from the fire area.

4.5.4 In the case of a more significant obstruction that cannot be removed and hoseline access will be impossible or severely delayed, the engine officer must notify the IC and consideration should be given to finding alternative access with a 2nd hoseline. The 1st hoseline should remain in position to protect operating members and the building egress, but the operation of the two hoselines must be closely coordinated.

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FIREFIGHTING PROCEDURES
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April 10, 2014

LADDER COMPANY OPERATIONS: PORTABLE LADDERS

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GLOSSARY

Beam	The solid or trussed main structural side member of a ladder, supporting the rungs.
Bed ladder/Bed section	The lower section of an extension ladder into which the upper section retracts.
Butt	The bottom or base end of a ladder.
Butt plates / Cleats / Spikes / Spurs / Shoes	The steel spikes mounted on the butts to provide a more secure base for the ladder on hard surfaces such as concrete. They also serve as a protection against excessive wear on the ends of ladders.
Combination ladder	A versatile ladder that can serve as a straight ladder or be converted to an "A" type ladder: i.e., Metal Duo-Safety "A" Ladder.
Extension ladder	A ladder with two sections that can be nested for ease of handling and extended to provide the needed height.
Fly ladder/fly section	The extendable top section of an extension ladder.
Folding ladder	A ladder designed for use in inaccessible areas where ordinary ladders will not fit; the rungs fold completely into the beams when fully closed.
Guides/channels	Light wood strips or metal channels which guide the fly ladder while it is being raised.
Gusset plate	A flat metal plate used in truss constructed ladders, which connects the rails of the beams and supports the rungs.
Halyard	A rope used to elevate the fly section of an extension ladder.
Hook ladder/roof ladder	A ladder equipped with folding hooks at the top
Ladder locks	A locking mechanism that secures an extension ladder in the desired extended position by engaging the beams of the fly ladder to the rungs of the bed ladder. Also called dogs or pawls.
Latching device	A device used on combination ladders to lock the ladder in position. Consists of hinges/pins.

Pulley A grooved wheel attached to the bed ladder of an extension ladder, through which the halyard is drawn.

Rails The two lengthwise members of a trussed ladder beam, which are connected by the gusset plates.

Rungs The cross members between the beams of the ladder, used as footrests in climbing.

Safety shoe A swivel type butt plate consisting of rubber tread and a spike. It may be used with either the rubber or the spiked end on the ground.

Solid beam ladder A ladder with beams of solid construction (see trussed ladder).

Stops A limiting device on extension ladders to prevent fly ladder from over-extending out of the bed ladder.

Straight ladder A ladder with only one section.

Telescoping ladder A compact, lightweight ladder with multiple segmented beams that nest or "telescope" inside each other.

Tip or top The upper end of a ladder.

Trussed ladder A ladder with beams of open construction consisting of rails and gusset plates.

1. SIZES AND TYPES OF PORTABLE LADDERS IN USE

1.1

Extension Ladders	Closed Length	Approx. Weight
35'	20'	135 lbs.
24'	14'	80 lbs.

Straight Ladders	Approx. Weight
20'	55 lbs.
20'(Hook)	60 lbs.
12'(Hook)	35 lbs.

Special Ladders	Closed Length	Approx. Weight
14' 'A' Frame	7'	35 lbs.
10' Folding	11'	16 lbs.
12' Telescoping	32 in.	32 lbs.

Note: All weights and closed lengths of the extension ladders are approximate due to variation between manufacturers. Refer to Figure 1 for the various parts of a metal extension ladder.

SAMPLE METAL EXTENSION LADDER

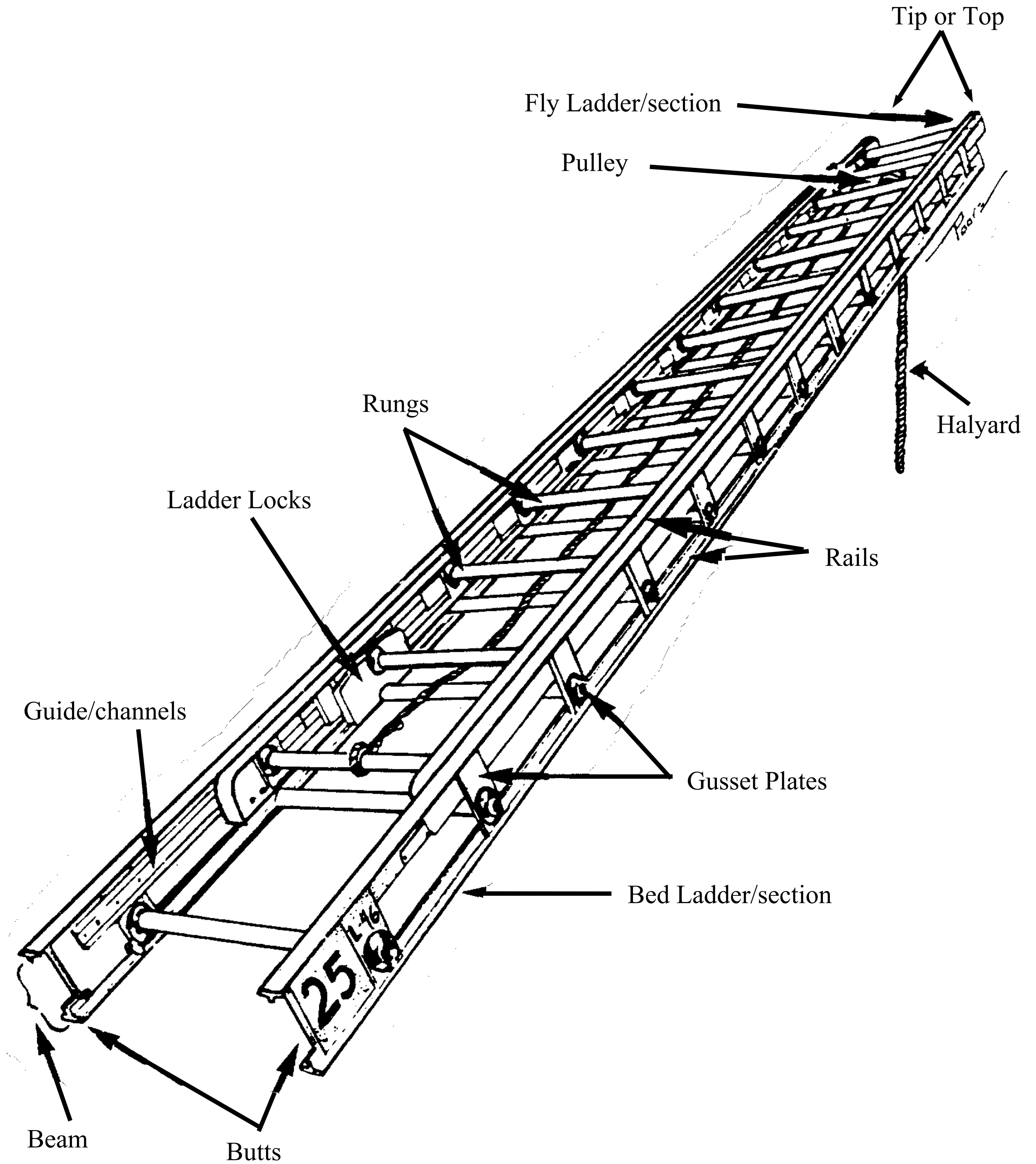


Figure 1

2. CONSTRUCTION OF PORTABLE ALUMINUM LADDERS

2.1 Aluminum ladders are divided into two basic types of construction: solid beam and truss.

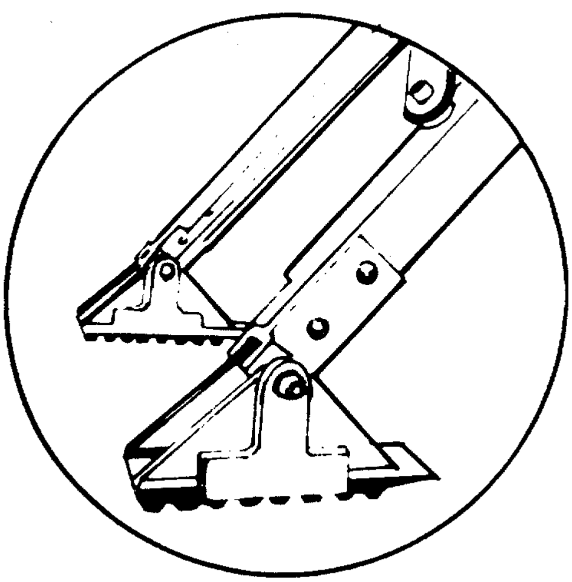
2.1.1 **Solid Beam Aluminum Construction** - This type of ladder has a solid side rail construction with aluminum rungs connecting with the side rails at fourteen inch intervals. The connection is generally either by a welded joint between rung and side rails, or by an expansion plug pinching the rung tightly to the side rails and internal backup plates. (Figure 2 A)

2.1.2 **Aluminum Truss Construction** - In the aluminum truss design, the top and bottom rails are connected to rung assemblies by rivets and gusset plates. The rungs are either welded or expansion plugged to the rung plate assemblies, which are supported by the top and bottom rails. (Figure 2B)

A. This construction allows greater side beam heights for greater carrying capacities without requiring massive solid beams that add to the overall weight of the ladder.

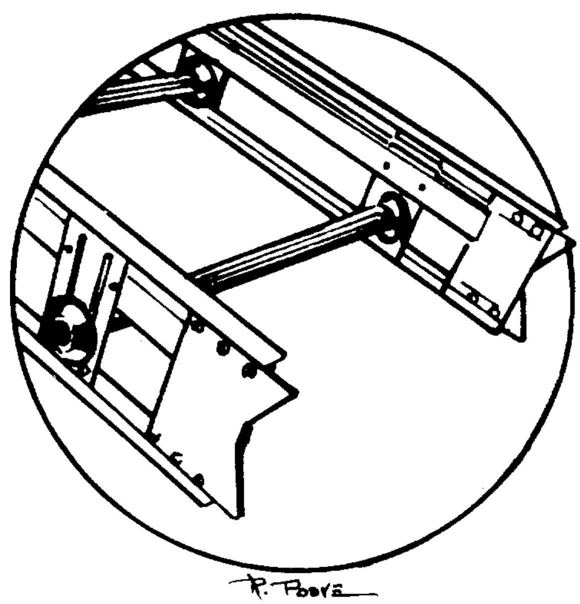
2.2 The base of the portable aluminum ladder is provided with either steel spikes or swiveling rubber safety shoes and aluminum spikes. For ladders equipped with the swiveling device, the rubber pads should be utilized when the ladder is to be raised and used on hard surfaces. (Figure 2A, 2B)

Figure 2A



Solid Beam Construction with Swivel Safety Shoes and Aluminum Spikes

Figure 2B



Truss Construction with Steel Spikes

3. ADVANTAGES OF ALUMINUM LADDERS

- Aluminum ladders are generally lighter in weight and stronger than wood ladders.
- They are made of a high tensile, heat treated aluminum alloy and can sustain daily wear and tear very well. The aluminum will not weaken with age. It has a long life expectancy.
- Aluminum ladders, in general, are tough. They will dent but will not chip or crack when subjected to severe impact, nor will they fail suddenly because of overloads. They will bend but not break, as wood does.
- No protective finish is required on aluminum ladders, as they will not dry out and weather with age or sunlight exposure. A slow oxidizing of the surface occurs, but it can be polished off.

4. DISADVANTAGES OF ALUMINUM LADDERS.

- Aluminum ladders readily conduct electricity.
- The ladders conduct heat very rapidly.
- If an aluminum ladder has been subjected to excessive heat exposure at a fire, even for a brief period, it may have lost its heat treatment. This may affect its load carrying capacity, even though the metal shows no signs of any change. A discoloration may indicate a loss of structural strength. In either of the above cases, the Fire Tools and Equipment Unit shall be notified.

5. Redacted for PFS

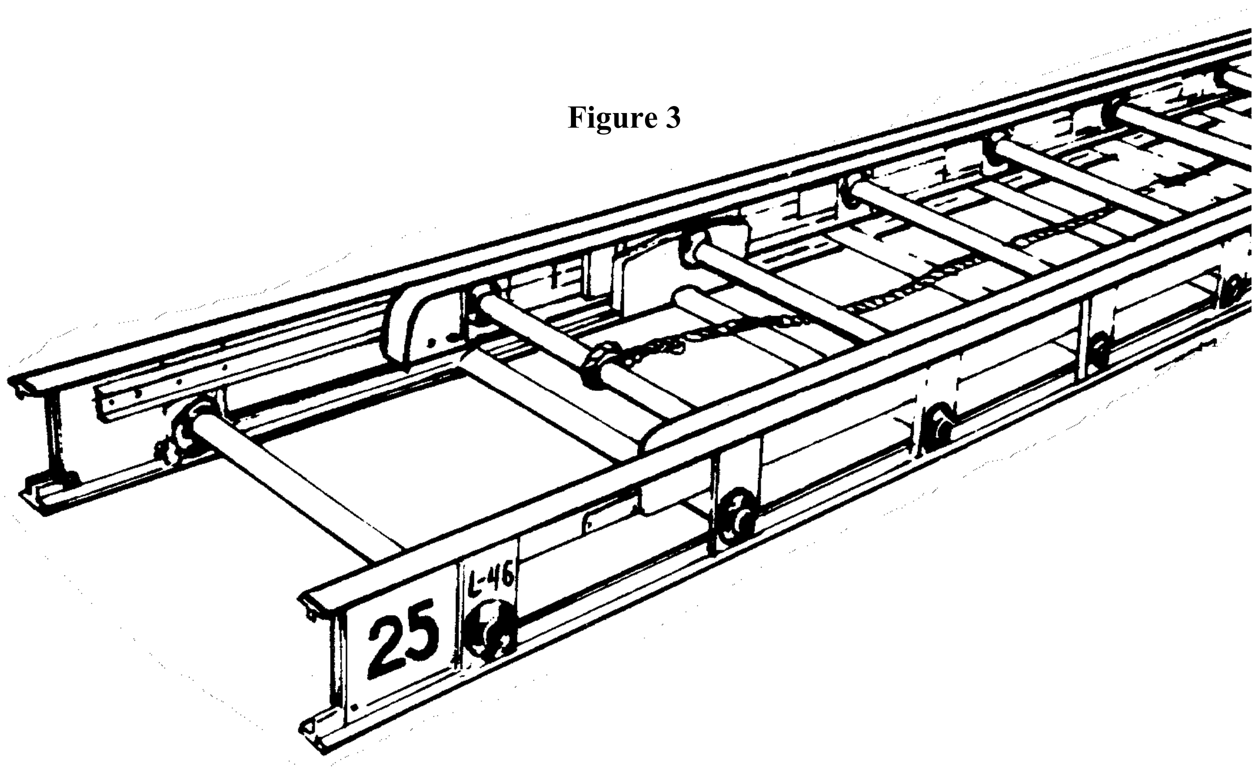
6. MARKING PORTABLE LADDERS

6.1 The numerical length of a ladder shall be marked on the side of the rails within 12 inches of the end of the ladder.

- Straight ladders - The ladder length shall be marked on each end of each rail.
- Extension ladders - The ladder length shall be marked at the butt end only of each rail of the bed ladder.
- Ladder length markings shall be visible when ladders are stored on the apparatus.

6.2 The unit designation shall be marked within 18 inches of each butt.

Figure 3



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7. PLACING PORTABLE LADDERS IN SERVICE - INITIAL OPERATIONS

7.1 Avoiding Obstructions to the Removal of Portable Ladders from Ladder Company Apparatus.

- 20 foot straight and/or 35 foot extension ladders are carried in the internal slide-in racks on ladder company apparatus. If another apparatus arriving at a fire or emergency is positioned closer than 20 feet to the rear of the ladder apparatus, the 20 foot straight or the 35 foot extension ladder cannot be removed from these racks due to insufficient clearance.

7.2 The advantage of an extension ladder is that its height can be adjusted for safe and accurate positioning. Choosing the precise ladder length is not as critical when using an extension ladder as it is when using a straight ladder which has a fixed length.

7.3 Ladder Climbing Angle - Climbing angle for a ground ladder is approximately 65-75 degrees.

- The 65-75 degree angle allows the ladder to provide its maximum strength and best service.
- An angle steeper than 75 degrees increases the chances of the climber falling off and sustaining injuries.
- Ladders angled less than 65 degrees require a reduction in maximum loading.
- A simple formula used to obtain a 75 degree angle is to place the base of the ladder at a distance from the vertical plane equal to 1/4 the total working length of the ladder. The working length is the distance from the base of the ladder to the top of its support. (Fig. 4A, 4B)

7.4 Ladder Placement - Proper placement of the tip of the portable ladder provides for easier and safer mounting and dismounting. It allows the user to maintain balance by providing a handhold.

- Placed at a window - Tip shall be level with window sill.
- Placed at a roof - Tip shall be at least 2 feet above the roof or parapet.
- Placed alongside a fire escape on a building wall - Tip shall be 1 to 3 feet above the fire escape railing.
- Placed against a fire escape - Tip shall be slightly above the fire escape railing.

Figure 4A

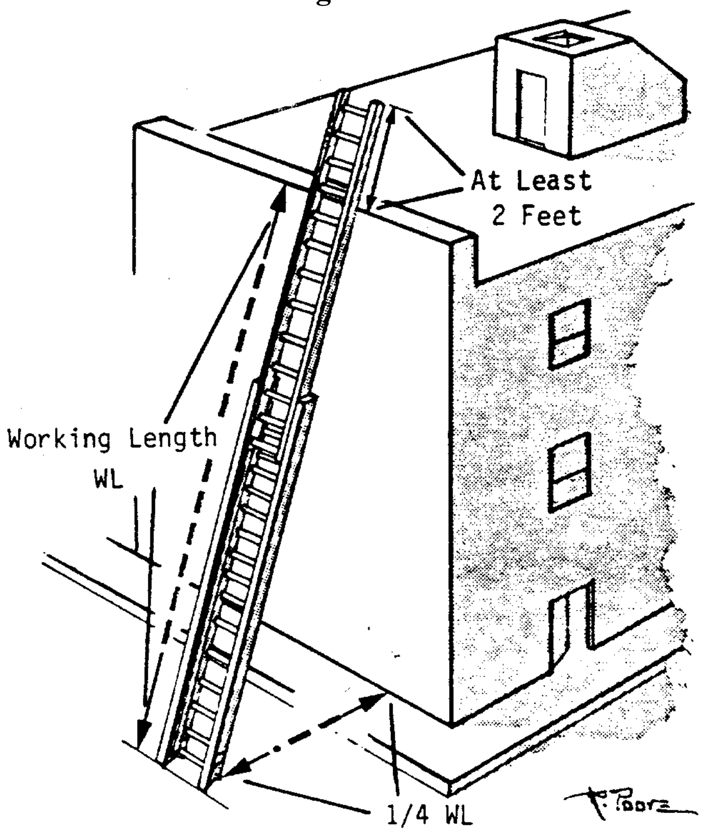
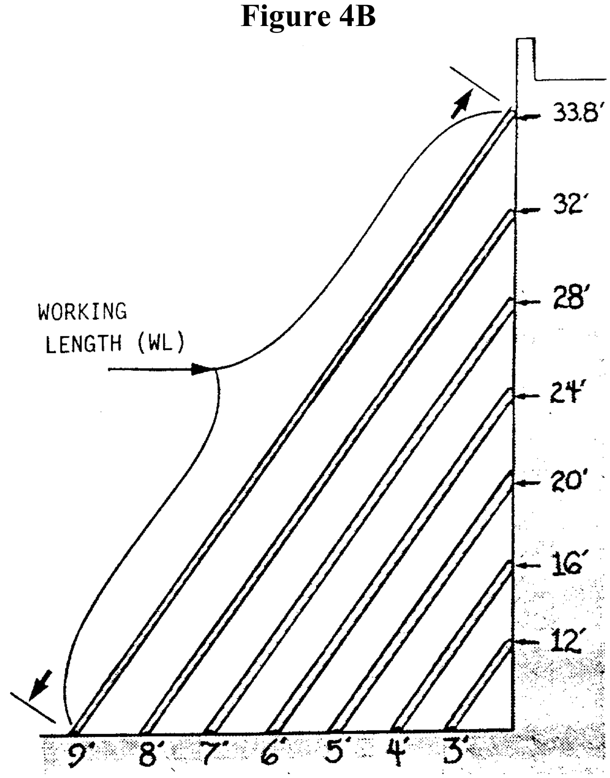


Figure 4B



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7.5 Butting and Securing the Portable Ladder.

7.5.1 In order to prevent slippage of the butt or movement of the top of a raised portable ladder, it is important that it be butted by a member. In any case for fire, emergency or rescue work, a butt firefighter shall be used to stabilize the ladder and prevent slipping.

- The butting member places their left foot in the center of the bottom rung of the ladder and maintains a downward pressure. Their right foot is positioned behind them at a comfortable distance to maintain balance and provide resistance against ladder movement.
- Both hands are placed against and grasp the ladder beams to aid in steadying the ladder.
- If a member is working off one side of the ladder, the butt firefighter moves their foot from the center of the bottom rung of the ladder to the side opposite the one from which the firefighter is working, and places their foot next to the beam. This will prevent the bottom of the beam from shifting due to the relocated weight of the member working on the ladder.

7.5.2 The butt firefighter must be aware of the force that causes the outward slippage of the butt of the ladder. This force is in direct proportion to the climbing member's weight, increasing as he/she ascends the ladder, and is greatest at the top of the ladder. Because of this, extra care must be exercised when a member receives a victim at the top of the ladder.

7.5.3 If the aluminum portable ladder is to be left unattended, it should be secured at the tip by the first member that climbs the ladder. This is to prevent the ladder from being dislodged from its position by the wind or by the impact of water from a hoseline or a large caliber stream.

8. CLIMBING AND OPERATING ON PORTABLE LADDERS

8.1 When the portable ladder has been raised and placed in position, one member butts the ladder as outlined in Section 7.5.1. The assigned member climbs the ladder in the following manner:

- Climb on the balls of the feet near the arch, left and right of the center line, up and down the ladder.
- The undersides of the beams are grasped with the hands.
- Climbing is done in a rhythmic, coordinated manner.
- During the climb, the eyes look up or forward.
- If a tool is carried, it should be balanced in the carrying hand, which holds onto the side of the beam. The free hand continues to grasp the underside of the beam.
- Do not carry the tool close to the body or inside the ladder over the rungs because of the danger to the butt member below should the tool be accidentally dropped.

- During freezing weather when ice forms on the ladder due to water spray, to ensure safe ascending and descending:
  - Position the rung of the ladder under the arch of the boot, next to the heel.
  - Position the feet on the rungs directly next to the beams with each step, to avoid slipping.
  - The hands remain on the undersides of the beams. Should a member slip while climbing, they should immediately pull themselves into the ladder and regain their footing.
  - Whenever a member operates on a ladder of any kind, they must have enough hand control to ensure their safety. This is an absolute necessity when on vertical ladders, such as fire escape drop ladders and gooseneck ladders to the roof. Greater physical effort is needed when using a completely vertical ladder, because a missed step or a slip of the hand will result in a vertical drop and a serious injury. A similar mishap on a ladder which is angled into an objective could result in the member falling toward the ladder, rather than straight down.

8.2 Duties that require the member to work from the ladder necessitate the use of a leg lock or personal harness for safety.

8.2.1 The Leg Lock:

- The leg performing the locking maneuver is opposite the working side. For example, if the member wants to lean to the right and vent a window, they will lock their left leg on the ladder.
- To perform the leg lock, the locking leg is placed over and under the rung that is two rungs above the one on which the member is standing.
- The instep of the locking leg is placed on the beam of the ladder opposite the member's working side. (See Figure 5).
- The arch of the foot on the rung is placed against the other beam.
- The butt firefighter must reposition their foot as in Section 7.5.1.

8.2.2 Using the Personal Harness:

- The snap hook of the personal harness hooks directly to the ladder rung.

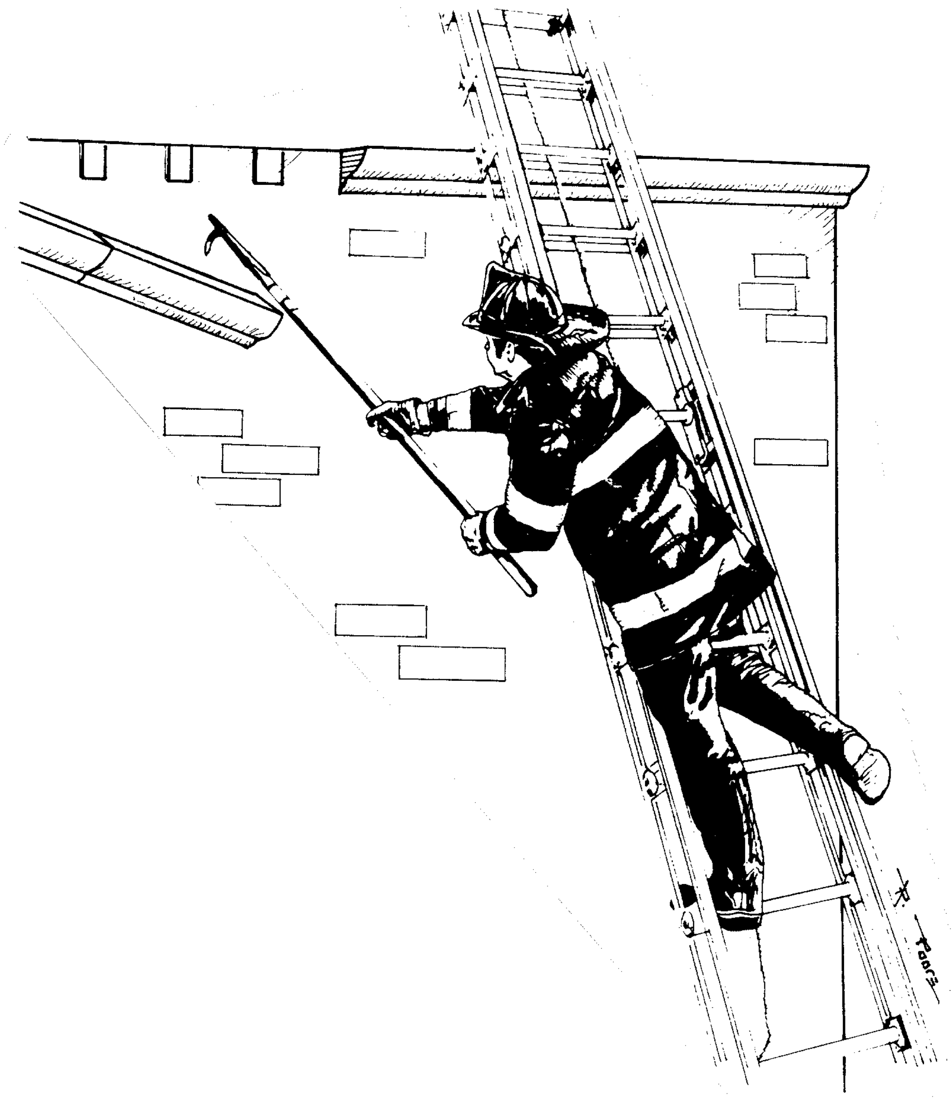

Figure 5

8.3 Checking Ladder Lock Assemblies:

8.3.1 The mechanical ladder lock assemblies on the extension ladders are positive action automatic spring loaded locks. If in good condition, they will work and lock in either the fly out or the fly in position. The advantage of the fly out position is that the fly ladder tends to tighten its hold on the bed ladder, when it is extended at the proper climbing angle. For this reason and for standardization, the FDNY has adopted the fly out position for the placement of extension ladders. (See Evolution 16)

The first member ascending the ladder should always check the ladder lock assemblies to ensure that they are completely engaged on the rung.

- Before dismounting from the ladder, the surface to be stepped on should be probed with a tool for stability, especially when visibility is poor.

8.4 Ladder Load Capacity:

8.4.1 The maximum load capacity imposed on a ladder includes the weight of the victims, members and their equipment, and any other weight such as a hoseline. The ladder must be positioned correctly as outlined in Section 7.4.

8.4.2 Portable Ladder Capacities are as follows:

- Special ladders: Folding, A-Frame and Telescoping - up to a 300 pound load.
- Roof, straight and extension ladders (26' or less) - up to a 500 pound load.
- Extension ladders **(**27' to 35') - up to a 600 pound load.

8.5 Telescoping Ladders:

Telescoping ladders are extremely compact and versatile and may be particularly useful in many non-fire emergencies.

Easily carried by 1 member the ladder can be transported through crowded, confined spaces such as elevator cars, narrow twisting hallways and revolving doors to where it is needed. Its length when nested is 32 inches and can be extended incrementally up to just over 12 feet. (See Figure 5A)

8.5.1 Due to the nature of the construction of telescoping ladders, they must **not** be:

- used for laddering a fire building due to lack of heat resistance.
- used horizontally as a bridge or plank.
- secured at the top and hung vertically (like a straight hook ladder). The mechanisms inside the beams will not support weight when deployed in this manner.

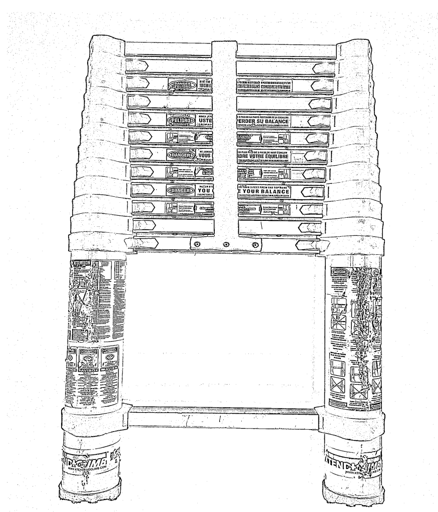

Figure 5A

9. OTHER USES OF PORTABLE LADDERS

9.1 Portable ladders may be used in many ways and with different tools to perform a variety of functions at fires and emergencies. The most innovative uses of ladders have resulted from quick responses to unusual situations.

9.2 Uses of portable ladders at fires or emergencies may include:

9.2.1 Used to Bridge a Fence - At times it's necessary to gain access to a particular area surrounded by a high fence with no immediately available entry way. If the situation does not require cutting the fence, entrance may be gained by using two short portable ladders and a short length of rope or hose strap. (Figure 6)

- One ladder is placed against the fence at the proper climbing angle and butted by a member.
- One member ascends the ladder to the point where the top of the fence is at about waist level.
- The butt end of the second ladder is passed to the member on the first ladder. He/she then places one beam of the second ladder on top of the fence. The second ladder is slid out a sufficient distance, pivoted downward from the fence top, and lowered to the ground.
- The second ladder is adjusted to provide a proper climbing angle.
- The adjacent beams of the two ladders are tied together securely where they intersect, to prevent ladder movement during use.

Figure 6

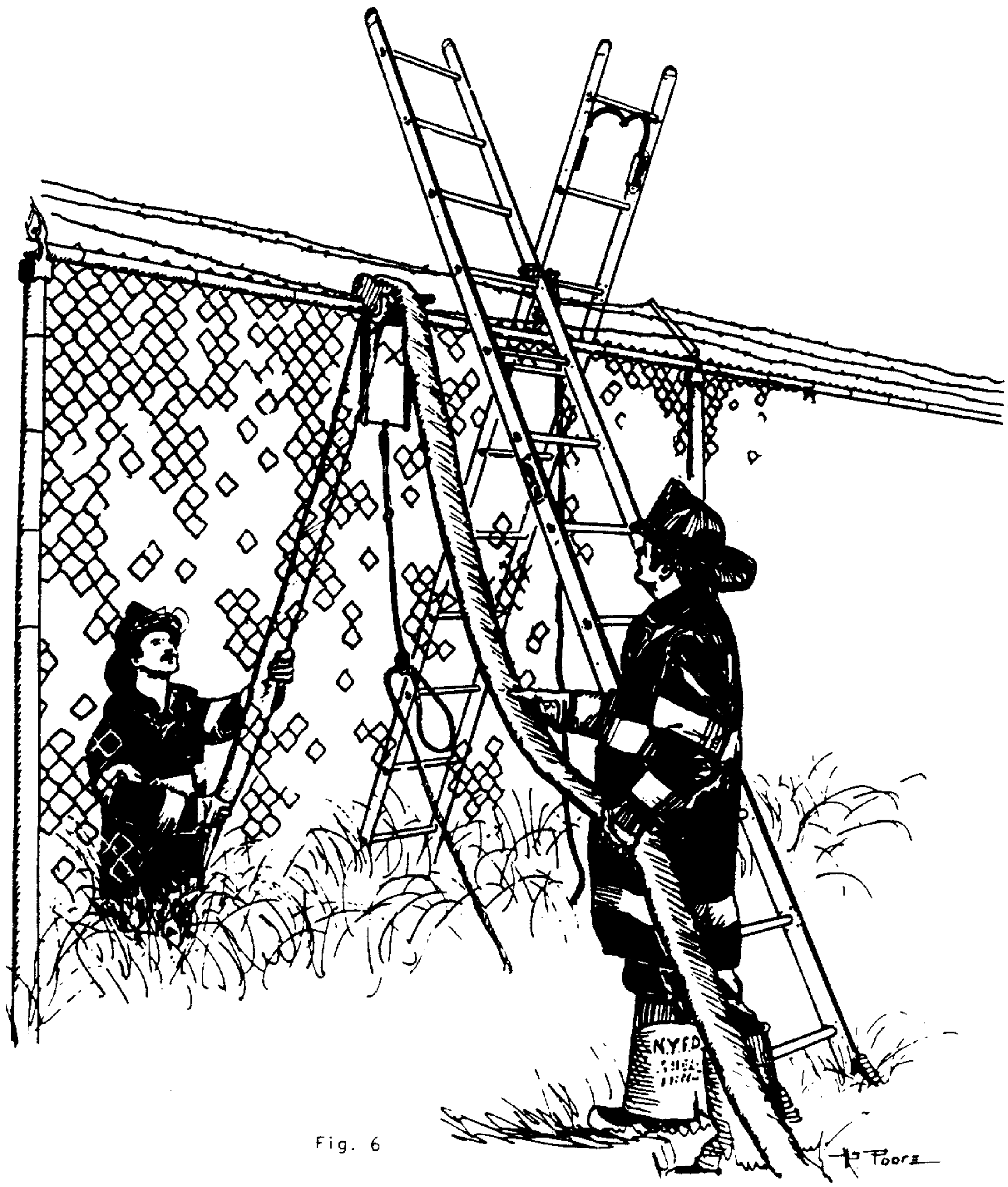

Fig. 6

9.2.2 Used as a Barrier - Portable ladders may be utilized as barriers to dangerous areas or conditions to protect members or civilians from injury.

- A portable ladder secured across a doorway in an area where operations are in progress will indicate that entrance to that section or room of the building is restricted.
- Portable ladders placed on one beam, elevated to the waist level on supports and properly secured, can act as a barrier to civilian pedestrian traffic near a hazardous condition or fire operation.
- Short ladders may be placed over holes in floors of buildings to prevent members from falling through during operations.
- During any operation where ladders are used as barriers and exposed to the public, care must be exercised to prevent theft.

9.2.3 ***Redacted for PFS***

9.2.4 Used to support opened overhead doors and in other instances where it is necessary to supply support.

9.2.5 Used on ice covered ponds, lakes, etc. for rescues.

9.2.6 Used in bridging caved-in excavations where a person is partially buried.

10. USES OF PORTABLE LADDERS AT FIRES

10.1 Tenements and Multiple Dwellings:

- Tenements without front fire escape. (Figures 8A, 8B, and 8C)
    - When the fire is in the cellar, 1st floor and/or 2nd floor, raise the portable ladders adjacent to and above the fire area, even if the aerial ladder will be required on the upper floors. A severe fire may render the interior stairs untenable and portable ladders will be required, even if the need is not obvious from the street.
- Tenements and multiple dwellings with front fire escapes. (Figure 9)
    - Fire escapes often become overcrowded when there is a fire anywhere within the building. Under these conditions, a portable ladder should be raised to the first balcony at a point opposite the drop ladder. If more relief for the fire escape is required, another portable ladder should be raised to the second balcony.
    - If panic conditions reign on the fire escape, attempt to keep the ladders out of reach of the people while raising and positioning them. If a panic stricken
    - victim interferes with the ladder raising procedure, members may lose control of the ladder and it may fall and cause injury.
    - Panicking victims on portable ladders are a danger not only to themselves, but to the rescuer as well.
    - If time and conditions permit, lash the ladders to the fire escape for safety.
    - When the overcrowding conditions have been alleviated, use the portable ladders for other duties if necessary.
    - Be cognizant of persons in rooms not served by fire escapes.

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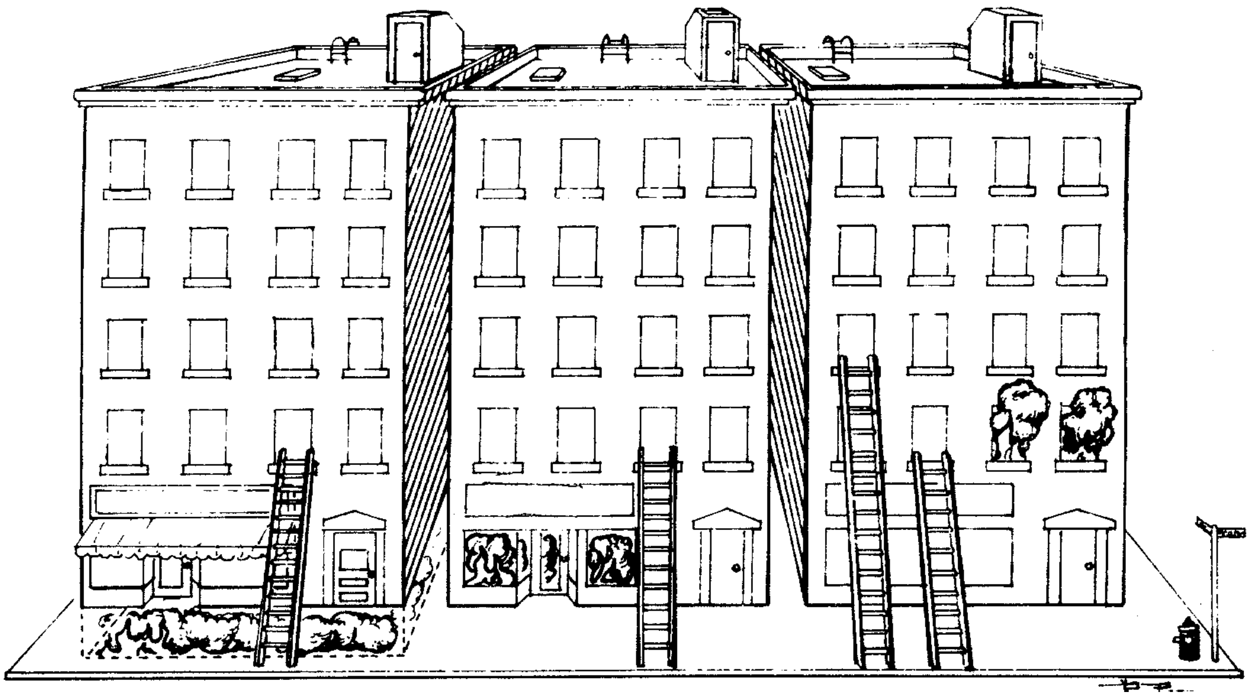
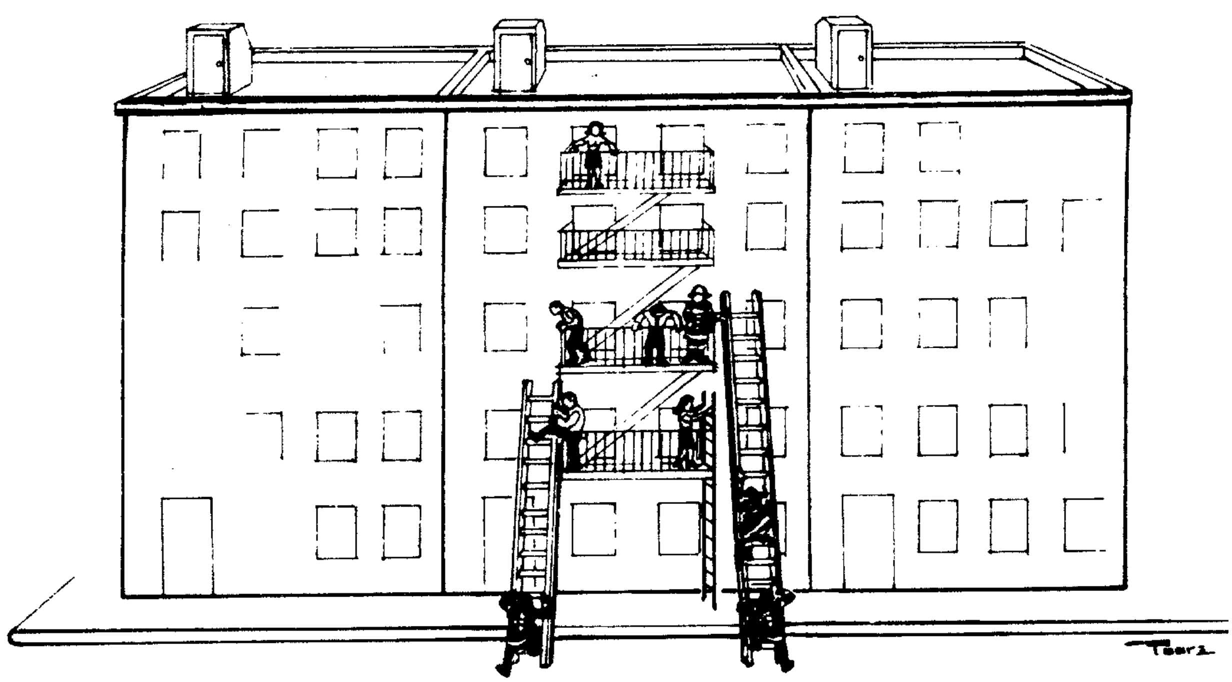
Figure 8



8A 8B 8C

Figure 9



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Tenements and multiple dwellings with rear fire escapes.

- Overcrowding on the fire escape in the rear may be relieved by members assisting occupants to the roof via the gooseneck ladder. (Figure 10)
- In the event of a fire in a building constructed with party wall balcony fire escapes where the fire has spread to the adjoining building, thereby eliminating it as a second means of egress, occupants may be trapped on the fire escapes (Figure 11).
- Portable ladders must, if possible, be taken through the 1st floor public hall, apartments or store to the rear yard to effect rescue.
- Because of its portability the 12' hook ladder may be used to gain access to the various balcony levels by the Roof or OV firefighters for search and rescue. The ladder may be brought to the rear yard as mentioned above, or brought to the roof via Aerial, Tower Ladder or utility rope and lowered to the top balcony.

Figure 10

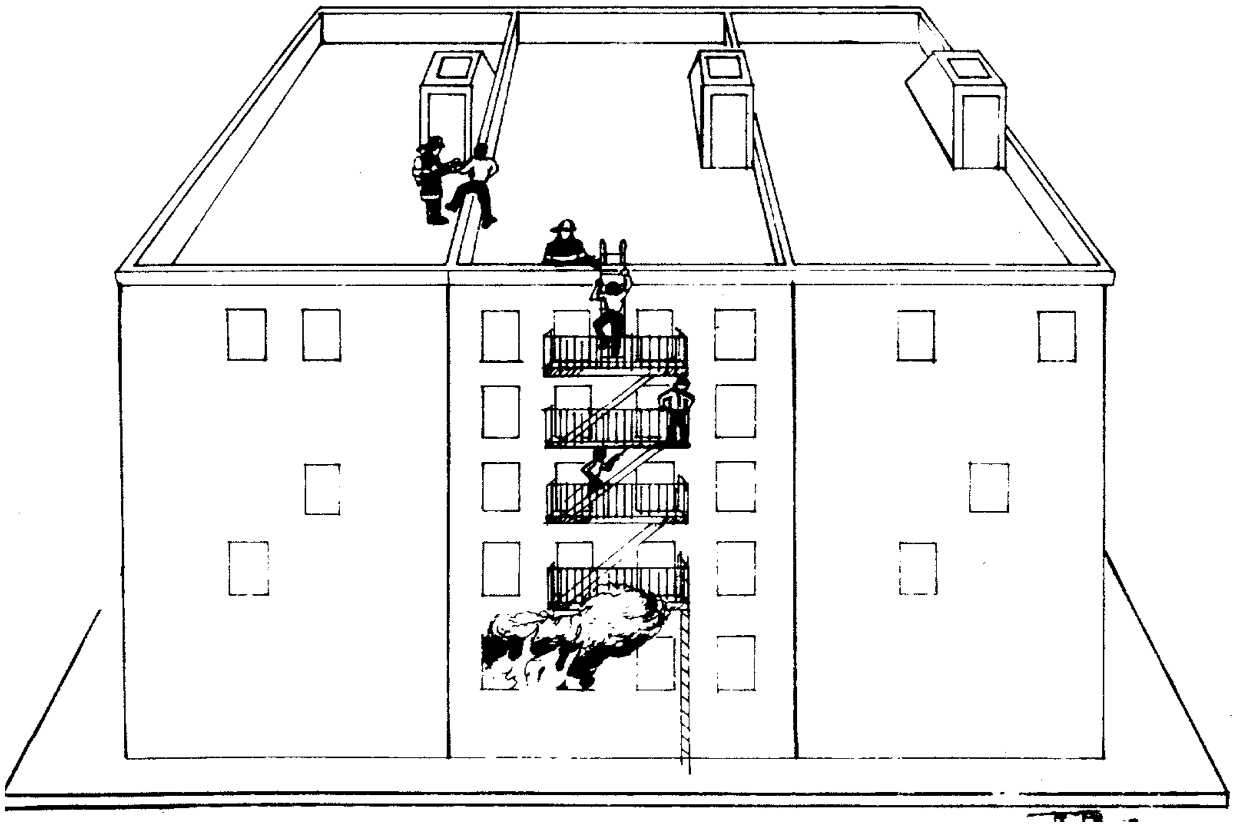
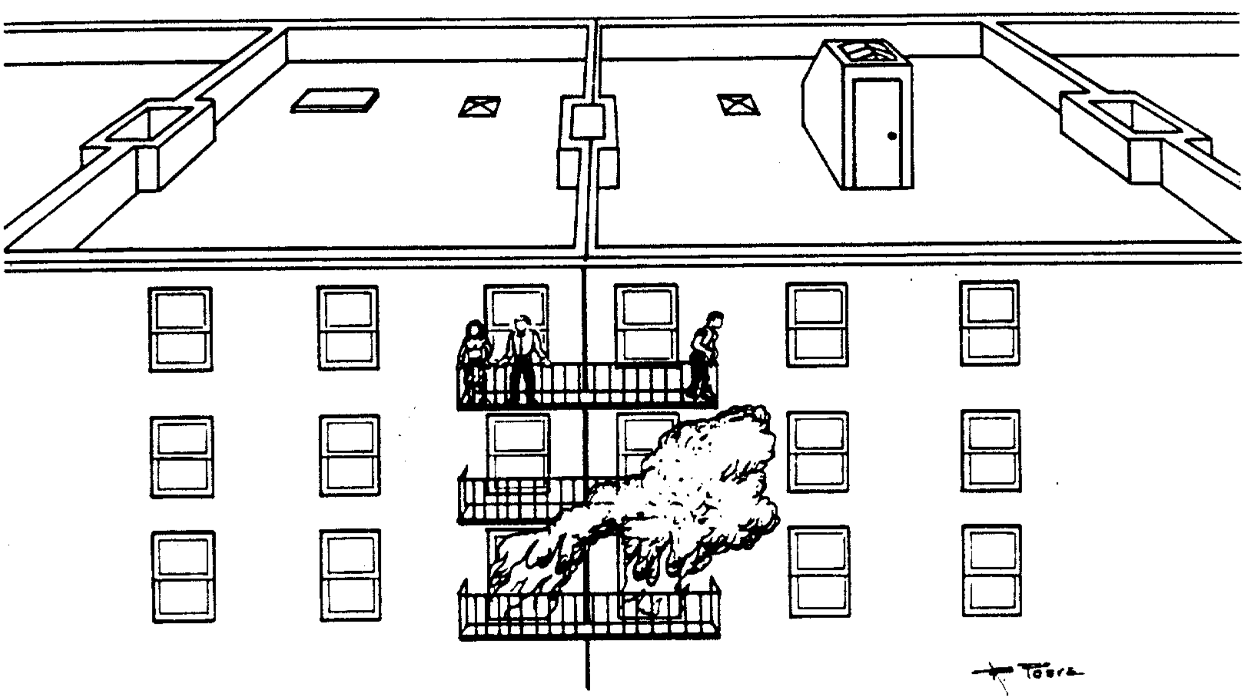


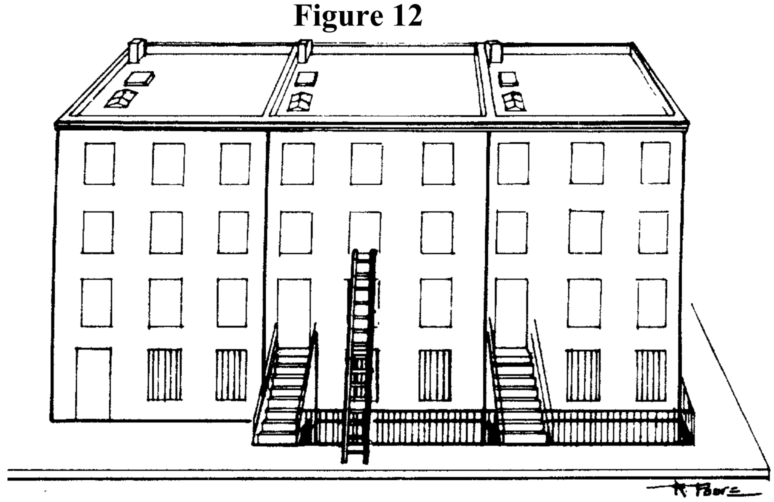
Figure 11



10.2 Brownstone Buildings:

- Brownstone buildings are usually either 3 or 4 stories (the basement level is counted as a story, with a cellar below the basement level). Most brownstones are similar in construction. However, their type of occupancy varies. Although originally designed as 1 or 2 family private dwellings, they often are used as public or commercial buildings, multiple dwellings (3 or more families), or Class 'B' rooming houses.
    - A serious life hazard is present in brownstone buildings due to the absence of fire escapes on many of the buildings, the number of occupants (often transients) resulting from single room occupancy, and the building's combustible construction. Ventilation, entry, isolation and search (VEIS) on the fire floor and above the fire may require the use of portable ladders. All horizontal ventilation tactics, whether Ventilation for Extinguishment or Ventilation for Search, require communication with, and coordination by, the Ladder Company Officer operating inside the fire area to be vented.
- Laddering the Front of the Building:
    - Placing a portable ladder at the window of the small room over the front entrance door will be difficult because of the long, high stoop, which may interfere with firefighting operations. Consider placing the ladder at the adjoining window to gain entrance to this small room. (Figure 12)
    - There may be 2 doors to the small room, one from the interior hall and one from a larger adjoining bedroom.
    - If there is no door leading into the small room from the large bedroom and hallway fire conditions prevent normal entry into the small room, access may be gained by breaking through the lath and plaster partition between the two rooms.
    - Additional laddering can be performed as outlined in Sec. 10.1.
    - Some brownstones have small elevated or depressed courts in the front of the building, adjacent to the stoop. They generally have a small wall or iron railing around them, creating additional obstacles.

Figure 12



Laddering the Rear of the Building:

- o The rear of the brownstone presents a severe life hazard if there is no fire escape. Portable ladders transported to the rear of the building and properly positioned are safer than a life saving rope rescue. They require less staffing and effort.
- o Due to operations in the fire building, barred windows at the basement level, and floor layout, movement of portable ladders to the rear may be difficult and time consuming.
- o In most cases, taking the ladder through the second floor (parlor floor) of an adjoining brownstone and passing it out the rear window to another member in the yard below is faster than using the fire building.

  Note: In a brownstone, it is important to take the ladder through with the butt facing the rear of the building. In a row frame, transporting a ladder through the interior of the building to the rear is generally less complicated because there are front and rear doors or window entries at ground level.
- o Fences constructed between the properties in the rear yard may be an obstacle for rapid ladder placement.
- o Most often, all floors in the rear of a brownstone can be reached with portable extension ladders. It is recommended that extension ladders be used in lieu of straight ladders because they are easier to transport due to the shorter nested length. Also, the ladder height can be adjusted, enabling one ladder to serve several floors.
- o Generally, floor and ladder working length are:

  4th floor - 35' extension ladder.

  3rd floor - 24' or 35' extension ladder.

  2nd floor - 24' extension ladder or 14' "A" Frame ladder.

10.3 Other Uses of Portable Ladders at Fires:

10.3.1 Forcible Entry - Straight ladders have been successfully used to force entry into stores and other occupancies having wood frame inward opening doors. This method will provide a margin of safety where conventional methods of forcible entry would place members in a hazardous position, e.g., when working in a return show window area of plate glass panels and heat or flame prevents close approach, or where the possibility of back draft exists.

- Ventilating Lexan Windows - Some occupancies have used Lexan panels instead of conventional glass in their windows. At times, the Lexan panel is protected by a wire screen on the exterior. These windows may be forced with a portable ladder if the window is at ground level:

  - Remove the exterior screen.
  - Place the butt of the ladder on the Lexan window in the corner adjacent to the window frame.
  - Three or four members apply a gradual leaning pressure against the window until it is forced inward.
  - If a section of window snaps off, continue forcing around the window perimeter until a sufficient opening has been made.

10.3.2 Ventilation of windows on upper floors may be accomplished by the use of portable ladders with or without a member on the ladder. In all cases, horizontal ventilation must be controlled, communicated and coordinated with the Ladder Company Officer inside the fire area:

- With a member on the ladder:
  - The ladder is placed upwind from the window to be ventilated. The placement should provide a margin of safety to the member if the fire extends out of the window.
  - The tip of the ladder, if possible, should be level with, or higher than the top of the window.
  - The member's eye shield shall be in the down position.
  - When the member is positioned on the ladder and prepares to use a tool to ventilate the window (a 6 foot hook is preferable), he/she should extend their arms upward and slant the tool downward and strike the glass. This will prevent the window glass from sliding down the tool handle and causing injury to the member.
  - Placing the ladder upwind from the window will allow the falling glass, to some degree, to be blown away from the member butting the ladder below.

- Without a member on the ladder:
  - The member using a portable ladder to ventilate a window must wear full firefighting clothing with eye shields down. This will help prevent injury if struck by falling glass.
  - The ladder should be positioned so that it will break the desired window glass area when dropped against the window.
  - When the ladder strikes the glass, there should be no contact between the member and the ladder. The reason for this is that there is a great probability that the window glass will slide down the ladder beams. By the member maintaining a 'no contact' position, this reduces the chances of personal injury. Care should also be taken to ensure that no other personnel are in the 'danger area'.

- As soon as the glass sections have fallen or are clear of the ladder, the member must stabilize the ladder to prevent its falling to the ground.

10.3.3 Hook ladders, in addition to their use as conventional straight ladders, may be used on sloping roofs to gain access to piers or bulkheads, or any other application where a hanging ladder may be required. To prevent slipping on peaked roofs, set hooks into roof by pulling down on ladder.

10.3.4 Portable ladders may be placed over weakened, damaged or burnt-out stairs in order to gain access to upper stories of a building. When necessary to utilize a portable ladder to bridge fire damaged stairs, a 24' extension ladder should be used (the 20' straight ladder may be too short). The shorter nested length of the 24' extension ladder may allow easier positioning. The butts shall be supported by the floor at the base of the stair, while both upper beams at the tip of the ladder should rest on the upper floor landing for proper support.

10.3.5 Portable ladders may be used to gain access to a higher or lower roof level from an adjoining roof.

10.3.6 When portable ladders are placed over holes in a floor or roof or over a shaft opening, they aid in preventing members from falling into these unprotected openings. Other objects placed on top of the ladder will identify the hazard and can provide additional coverage over the opening.

10.3.7 Portable ladders used in bridging operations can span courts, alleys, shafts and similar openings between floors and roofs. Extension ladders must be used only in the nested position when bridging.

10.3.8 Short ladders are used to support a bent cellar pipe during its operation, from exterior cellar stair or below grade openings. The ladders can also be placed across trench cuts, holes in a floor, or other openings to facilitate distributor use in cocklofts, cellars or wherever they are required.

10.3.9 In order to prevent electrically operated overhead doors from closing when power in the fire building is shut down or affected by fire, a short ladder may be used to chock the door in the open position.

10.3.10 All Unit Circular 200 states that, during winter months when snow conditions prevent or restrict approach of the apparatus close to the fire area, in transporting heavy equipment and rolled or folded hose, use of the ladder as a sleigh should be considered. The ladder should be covered lengthwise with a tarpaulin, wide planks or other materials to help support the hose or other equipment and prevent it failing through the ladder, dragging in the snow, or being lost.

10.3.11 When a ladder has been positioned and used by a member to gain entry to a fire building, there is the possibility that he/she will also need it as a means of retreat. The ladder is expected to be there. Therefore, do not move or reposition a ladder used in this manner except if it is necessary to use the ladder for rescue. Members operating in the area the ladder was used to access should be notified regarding its repositioning. The ladder should be returned to its original location or replaced with another ladder as soon as possible.

11. USES OF PORTABLE LADDERS - EMERGENCIES

11.1 To perform an emergency search, portable ladders may be used as a brace where there is partial collapse of a floor area. The ladders may be used singly or in groups depending upon the amount of stress to which the ladders will be subject. To ensure that the searching members' lives are not jeopardized, the collapse condition must not be underestimated. Therefore extreme care and judgment must be exercised.

11.2 Portable ladders may be used in an emergency to shore excavations, or reinforce weakened walls. The proper placement of ladders and planks can prevent refilling of areas that are being dug out.

11.3 During winter months, portable ladders may be used for the rescue of victims that have fallen through ice that has formed on bodies of water. Laid flat on the ice, the ladder distributes the weight of the rescuer and/or the victims over a larger area of ice. It thereby reduces the total weight concentrated at any one point.

- Members shall be secured with a life safety rope as a safety precaution.
- Members should follow procedures described in "Emergency Procedures, Water Rescue 2: Ice and Cold Water Rescue."

11.4 Elevator emergencies may at times necessitate the use of a portable ladder.

- The ladder may be used to remove occupants from a stalled elevator car stuck between the floors of a building. The occupants are first relocated to the roof of the car via a ladder and then to a landing or a breached wall by a portable ladder.
- The 10' Folding and 12' Telescoping Ladders are particularly well suited for this application.
- Victims sometimes fall through a shaft opening and into an elevator pit or onto the top of an elevator car. Portable ladders may be required to gain access to such victims.
- See Training Bulletin Elevator Operations for details.

12. SAFETY

12.1 General:

- Extension ladders in general are not made to be taken apart and used as single section ladders. The upper sections normally are not furnished with any type of safety foot. Therefore, they are prone to slip when used as a single ladder.
- Extension ladders and Telescoping ladders should never be used upside down, that is, with the round ends down. This will cause the ladder to slip on the ground. Also, the lock assemblies will not be able to function correctly.
- When an extension ladder is raised, the halyard shall be tied off to the lower section of the ladder as a safety measure and prevent the ladder locks from accidentally unlocking by a pull on the rope.
- Telescoping ladders have no heat resistance and must not be used for laddering in firefighting operations or any other situation where the ladder could be exposed to heat.
- Make sure the ladder is set on a firm foundation. Before climbing, take care to see that it does not wobble.
- Ladders should never be placed against window panes, window sashes, or loose boxes, barrels, or other surfaces that may break or collapse.
- Whenever a member operates on a ladder (Portable, Aerial, TL) while at fire operations, emergencies, drills, or performing routine tasks at quarters, the member must wear their helmet with chinstrap secured.
- Always face the ladder when ascending or descending.
- Do not climb higher than the third rung from the top on either straight or extension ladders.
- Resist the temptation to overreach. It is better to get down and move the ladder.
- When using a ladder for access to high places, it shall be securely lashed or otherwise fastened at the top to prevent slippage.
- Never maintain a defective ladder in service. When a defect in a ladder is found during an in-quarters inspection or damaged at a fire, remove the ladder from service and notify the Fire Tools and Equipment Unit for collection, repair or replacement.
- Hooks of roof ladders are used to secure the ladder over the peak of a house or to hang it from a wall edge or window opening. Be sure the bolts are secure on the roof hooks and that the hooks have not been accidentally bent open.
- Many pumper extension ladders, when in position in the ladder holding brackets on the side of the apparatus, protrude enough to create a potentially hazardous condition. Care should be exercised when mounting the back step of the pumper.

Electrical Hazards:

- Both metal and, under certain conditions, wooden portable ladders can conduct electricity. The fact that a metal ladder will conduct electricity is obvious. However, wet wooden ladders or the metal component parts such as tie rods, wire cables, ladder lock assemblies and the like, when in contact with electrical wires or equipment can conduct electricity.
- Whenever a portable ladder is to be raised and transported in a vertical position, special care must be exercised near overhead electrical wires.
- If a member becomes part of an electrical circuit, either by raising a ladder that touches a live wire or by the member touching a live wire while on a ladder, an electrical shock can result in a serious or fatal injury.
- Depending upon the voltage in overhead wires, the proximity of a metal ladder to them, and the quality of the grounds (ladder and electrical circuit), it may not be necessary to actually touch the wires to suffer an electrical shock. Electrical current can arc and jump the distance between the ladder and the wires and cause death to an unsuspecting member.

12.2 During Operations:

- After a portable extension ladder has been raised and placed into a position against a building, do not lower the ladder by pulling the butt end further away from the building.
  - Doing so will reduce the load capacity as the angle decreases.
  - There is a greater possibility that it will unlock the lock assemblies in the upper section.
  - Always lower the fly ladder below the desired level and re-raise to the proper height to ensure a safe, 65-75 degree climbing angle and proper locking action of the lock assemblies.
- When placing a metal portable ladder against a building with an aluminum siding exterior, the member should release the ladder before contact is made with the building. There have been occasions when the aluminum siding was energized due to a faulty electrical service connection, a faulty ground, or due to the service being damaged by fire conditions. If a member places a metal ladder on such a building, an electric shock can occur.
  - Position metal ladders away from electrical service wires entering buildings from utility poles. Injury to a member can be caused by the member brushing against wires having an outer insulation covering that is in a deteriorated condition.

- When operations are to be conducted at electrical generating stations or substations, under NO circumstances shall metal ladders or tools be brought inside the gates. Never place a ladder of any type, wood or metal, against what appears to be metal superstructure. It may turn out to be some form of electrical conductor.

13. MAINTENANCE OF PORTABLE ALUMINUM LADDERS

13.1 Aluminum ladders require considerably less maintenance than wood ladders and with a few simple precautions should provide long service.

13.2 General Maintenance:

- Aluminum ladders shall be maintained free of dirt and grime. They shall be washed when necessary with warm soapy water and rinsed thoroughly.

- Nicks or burrs that are found on the ladder shall be removed with a fine file in order to prevent injury to member's hand during ladder handling.

- A visual inspection of portable ladders shall be made weekly, and also after use, to determine their condition and serviceability. Company commanders shall cause a thorough inspection of portable ladders monthly. Examples of ladder defects are as follows:
  - Cracked welds
  - Loose rungs.
  - Bent rungs or beams.
  - Missing or loose rivets, nuts, or bolts.
  - Discoloration signaling excessive exposure to heat.
  - Broken mechanical lock assemblies on extension ladders.
- If aluminum ladders are stored in a horizontal position, they must be supported at a sufficient number of points to prevent sagging and permanent set.

13.3 Extension Ladders:

- Ladder slides and channels
  - Materials used to allow the ladder sections to slide easily on each other are candle wax, paraffin and grease.
  - Grease is normally used only for internally guided aluminum truss ladders. The grease shall be cleaned from the guiding grooves, and they shall be recoated each year, or when the grease has dried out and is no longer an effective aid to sliding.

- On all ladders, plain candle wax or paraffin shall be applied every three months to all contacting surfaces of multiple section ladders to ensure smooth operation. Apply the candle wax or paraffin where there is contact between rungs, guides or side rails.

  Note: Any wax thinner than candle wax or paraffin either spreads too thinly or rubs off almost immediately. The net result is no lubrication and the sections do not slide easily.

- If, after the application of candle wax or paraffin, the ladder sections do not move smoothly, or if they bind during use, check the ladder for damage and/or alignment problems.

- Pulleys
  - Pulleys are found on all extension ladders. These pulleys usually have a ball bearing center that requires 1 to 2 drops of oil once a year.

- Halyards
  - The halyards on the 24' extension ladders are generally made of manila rope. The halyards on the 35' extension ladders are made of a poly blend. When either rope becomes frayed or twisted from usage, it should be replaced.

- Mechanical Lock Assemblies
  - The mechanical lock assemblies are spring loaded devices. These springs have, at times, broken or rusted off thereby placing the ladder out of service. The assemblies shall be given careful scrutiny during inspections and kept clean and well oiled.

13.4 Hook Ladders:

- The hooks of the hook ladders are spring loaded and are covered assemblies to ensure operation even under freezing conditions. These assemblies, like the mechanical lock assemblies, must be carefully inspected, kept clean and well oiled to insure proper functioning.

13.5 Telescoping Ladders:

- If the ladder becomes very wet during use, it should be wiped down and allowed to dry before being stored. Do not use candle wax, paraffin or grease to lubricate a telescoping ladder. If lubrication is required use a silicone-based furniture polish (such as Pledge) on the beams of the ladder. Never use WD40 or similar oil-based lubricants, as this may clog the mechanisms inside the ladder.

BY ORDER OF THE FIRE COMMISSIONER AND CHIEF OF DEPARTMENT

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FIREFIGHTING PROCEDURES
VOLUME 3, BOOK 2
January 15, 2014

LADDER COMPANY OPERATIONS: USE OF AERIAL LADDERS

CONTENTS

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1. INTRODUCTION

1.1 Aerial ladders may be used to effect rescue, entry, search, and ventilation. They may also be used to stretch hoselines to upper floors or roof; bridge a gap; operate hoselines from the ladder; ladder pipe operations; and as observation posts to assess conditions. When their need is evident upon arrival, they should be raised immediately. When their need is anticipated for later use, the ladders shall be positioned and set up as described in this bulletin. The chauffeur shall remain in the vicinity of the turntable until it is evident that the aerial ladder will not be required.

1.2 Almost 60% of our ladder companies are equipped with metal aerial ladders; the remaining companies have tower ladders. For the placement and use of tower ladders refer to Fire Tactics and Procedures, Ladder Companies 6 (Tower Ladder Operations).

2. PLACEMENT OF AERIAL LADDERS (GENERAL)

2.1 ***Redacted for PFS***

2.2 The outside ventilation firefighter (OV) shall assist the chauffeur in proper placement of the apparatus before carrying out their other assigned duties. While operating at a fire or emergency, the apparatus shall not be backed up unless the chauffeur has the assistance of at least one guide person.

Note: OV indicates outside vent firefighter. This would be the tiller firefighter in a tractor-trailer company.

3-4. *Redacted for PFS*

5. OPERATIONS FOR REMOVAL OF VICTIM OR VICTIMS BY AERIAL LADDER

5.1 Position the apparatus as previously described.

5.2 The OV (tiller firefighter) sets chocks and stabilizers. An alternative method, when staffing is available, is to have one member assigned to the inboard stabilizer and chocks while the OV takes care of the outboard side. This would enable the OV to observe the building and be in a better position to ascend.

5.3 At night, use the apparatus spotlight to pinpoint and reassure the victim.

5.4 The OV must observe the building continuously while chauffeur is operating the ladder. Someone may appear at another window or the trapped person may move to another location.

5.5 Prepare for a rapid ascent as the trapped people may attempt to climb onto ladder without assistance. Climbing the ladder while it is being extended or retracted is prohibited.

5.6 The OV ascends the ladder followed by the chauffeur, climbs in window, assists victim out feet first to the chauffeur, closes the door to the fire area, and then searches the area. The victim may be unable to inform member about other occupants.

Note: The OV ascending first will keep chauffeur closer to the controls. (Only in an extreme emergency such as serious exposure to flame or high heat will the movement of the ladder with the firefighter and the victim on it be justified).

5.7 To descend with an ambulatory victim, place yourself one rung below the rung the victim is standing on. Descend in unison, i.e., right foot for right foot and left foot for left foot. Keep the victim between you and the ladder at all times and maintain physical contact with them. At steeper angles, have the victim grasp the rungs. This will facilitate your control. Talk to your victim; reassuring and praising their actions. Try to talk them into looking straight ahead or up and not down, as they might freeze on you. Those not familiar with ladders have a tendency to flatten themselves against the rungs and this will make your outside position easier.

5.8 If the victim panics, take control. Press them against the ladder with your body. Do not resume the descent until the victim is capable of continuing. If the descent is difficult or tiring, another firefighter should "back up" the member carrying or assisting persons down the ladder. The duties would be to support and prevent the first member from slipping or falling backwards. Once they reach a position on the ladder where no danger exists, there is no need to rush.

Note: When pressing a victim against the ladder, be firm. After they have regained control of themselves, resume your talking, coaxing and praising.

5.9 Removal is not considered complete until the victim has been assisted all the way to the ground. Do not leave them on the turntable.

5.10 If required, render first aid until relieved. Assist them to an ambulance if necessary. These actions shall not be taken if you are needed to assist in additional rescue operations.

5.11 When there are two victims to be removed, the order of removal is dependent on variables difficult to predetermine. In many instances, one of the people will have climbed out on the ladder before a member has reached this position and there will be no need to make a preferential determination as to removal. Occasionally one of the occupants will be aged, infirm, extremely heavy or hysterical and the other one ambulatory and less trouble to remove. The removal order should be based on the length of time needed to completely effect this rescue and the seriousness of the exposure to victims and members.

5.11.1 A serious fire in the front might cut off ladder descent in a short period of time. Both members assist the most helpless victim onto the ladder and the chauffeur assists the victim below the point of danger and then to the street. While the chauffeur is slowly descending, the OV climbs out onto the ladder and assists the more ambulatory person onto the ladder and complete descent is made.

Note: In this instance, time is the prime consideration in effecting a complete removal of victims below the danger point and preventing the possibility of retreat being cut off.

5.11.2 A serious fire in the rear, cutting off interior descent and no available front fire escape, presents another problem. Since the fire is not pushing out the front windows the time required to effect removal of victims is less critical. In this case, consideration can be given to the simple removal first and then concentrate on the difficult removal which will require two members.

5.12 When there are more than two people to be rescued, the officer should contact the second ladder company and inform them of the need for supportive assistance.

5.13 Always carry small children down ladders.

5.14 In any rescue effort, where the fire may endanger victims, members or the ladder, serious consideration should be given to protecting them by directing water between the fire and the ladder.

6. *Redacted for PFS*

7. CHAUFFEUR RESPONSIBILITIES AND SPECIAL INSTRUCTIONS

7.1-7.12 ***Redacted for PFS***

7.13 When placing the ladder to the roof, extend the ladder so that the tip is at least 5 feet above the point where the ladder comes in contact with the building. The reasons are twofold: first, the ladder is more readily found by members operating on the roof at night or under smoky conditions. The second reason is equally important. It is easier and safer for members to get on or off the aerial and this extra extension over the roof becomes even more critical when removing a civilian from this area.

7.14 Reasons for laddering the roof are:

7.14.1 The fire building is isolated and roof ventilation is required.

7.14.2 Other means of access to roof of fire building are unavailable or cut off and roof operations are evident whether for ventilation or rescue.

7.14.3 As a means of escape for operating force or civilian(s) guided by member(s).

7.14.4 Any other situation where its use would significantly improve operations.

Note: When fire conditions might endanger members, civilians, or the apparatus, consideration should be given to laddering the roof of an adjoining structure for access and egress.

7.15 Hand rails are generally used when climbing the ladder with a tool. However, at steep angles greater safety is achieved by using the rungs. This shifts the member's center of gravity closer to the ladder providing greater control and a safer ascent or descent.

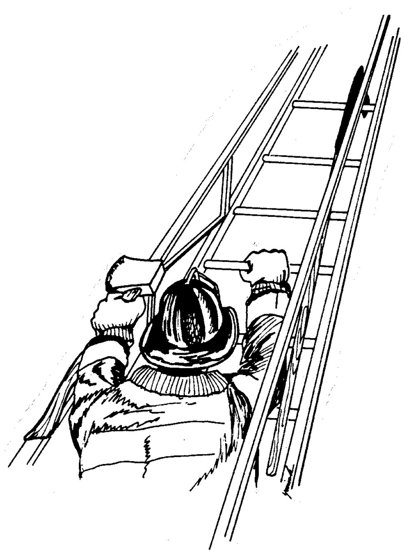
7.15.1 Frequently a member's assignment calls for two tools, one of which is the 6' hook. The hook is the only tool that need not be actually carried on aerial ladders portable ladders or fire escapes. The other tool (axe, halligan) is carried and the hook is extended arm's length overhead and hooked on a rung. It is not touched again until the member has climbed to a position where the top of the hook is about knee level. He/she then stops, holds on firmly, and again moves the hook to a position arm's length above his/her head and to the side of the rung. In the diagram (Fig. 8) the member is climbing an aerial that is positioned at a very steep angle. Ascending or descending, the hook should be placed on a rung of the ladder before the member steps on the aerial ladder.

7.15.2 If an aerial ladder has attachments for securing tools at the tip, these attachments may be used when tools are required at the roof level.

Note: Regardless of the method used to ascend the aerial ladder, always maintain enough hand control on the rails or rungs to ensure safety.

7.16-7.19 ***Redacted for PFS***

Ascending or descending
aerial ladder with tools



Addition for PFS

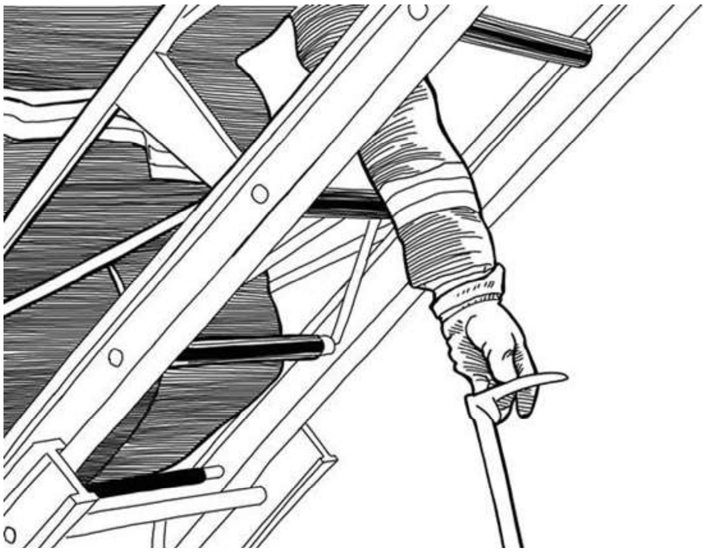
Aerial Ladder Climb with Roof Saw Removal and Dismount

Inspection of the sling for serviceability must be a normal part of saw maintenance. Check the sling for any damage (ex. tears, rips, fraying, fuel saturation, etc.). When a sling is deemed unserviceable it is to be placed "Out of Service" and a replacement obtained (by requisition) from the Fire Tools and Equipment Unit

- Each Roof saw is equipped with a carrying sling.
- When the saw is stored on apparatus, attach sling so that it is ready to be carried.
- Each member should adjust the saw to their own height, taking into account for the gear to be worn during practical applications. This sizing should be done when the member receives their positional assignment for the tour.

Addition for PFS

Dismounting Aerial ladder with Power Saw:

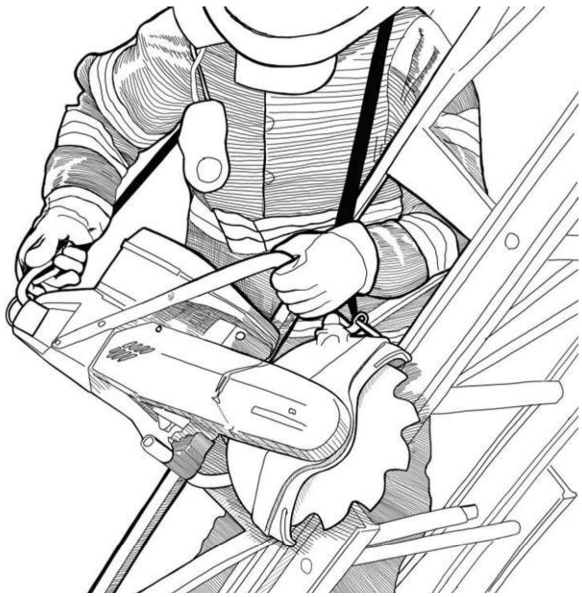


- After dropping hand tools on roof the Firefighter shifts body to the right side of the aerial ladder and lets the saw hang over the outside of the right rail

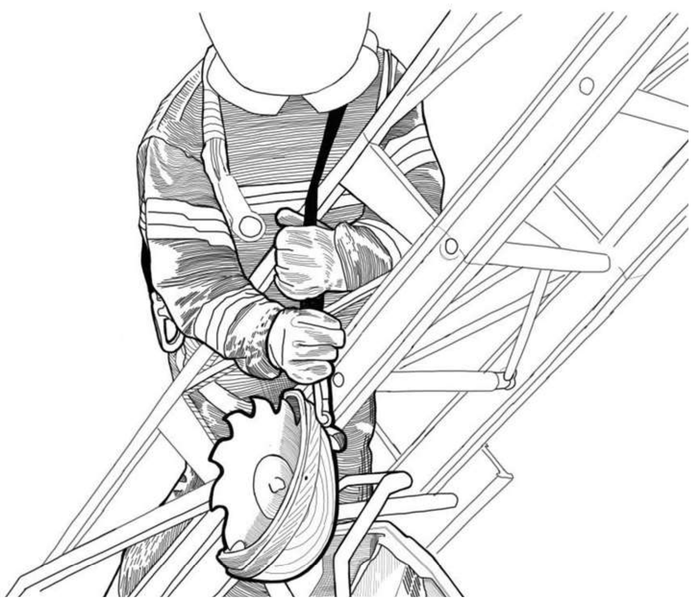
- The firefighter maintains grip of aerial ladder with the right hand and places the left arm through the right rail of the aerial ladder and grasps the portable power saw handle in an "arm lock".

Addition for PFS

- Once the left “arm Lock” has secured the firefighter and the saw the firefighter uses their hand to release the double action carabineer from the rear of the throttle grip handle of the saw.



- The firefighter returns their right hand to the portable power saw handle and grasps the saw sling with the left hand where it is attached to the saw on the blade guard and slowly lowers the saw to the roof by slowly passing the saw harness through both hands.



- Firefighter properly dismounts aerial ladder.

Addition for PFS

- While using this procedure the firefighter safely maintains contact with the aerial ladder at all times.

Additions for PFS

Note: The Sling Must Be Removed From The Saw Before Starting The Saw.

8. PRECAUTIONS

8.11 Use the Personal Harness when operating from the aerial ladder.

Note: Whenever a member operates on a ladder (Portable, Aerial, TL) while at fire operations, emergencies, drills, or performing routine tasks at quarters, the member must wear their helmet with chinstrap secured.

8.12-8.24 ***Redacted for PFS***

8.25 Members at the pedestal position shall ensure the following safeguards and actions are taken **BEFORE** placing aerial into operations:

- The area immediately around the turntable be designated a Danger Zone. (Turntable Platform)
- Danger Zone around turntable be clear of members, tools or any impediments before rotation of aerial.
- If a firefighter is to climb the aerial ladder at the start of an operation, he or she shall be in position on the turntable before the aerial ladder is to be raised and rotated.

BY ORDER OF THE FIRE COMMISSIONER AND CHIEF OF DEPARTMENT

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FIREFIGHTING PROCEDURES
VOLUME 3, BOOK 3
October 21, 2015

LADDER COMPANY OPERATIONS: TENEMENTS

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GLOSSARY

Air Shaft	A space between buildings or between rooms within a building, providing for the purpose of admitting air and light to rooms.
Auto-Exposure	The extension of fire via the exterior of a building from a fire originating in the same building.
Backdraft	When a fire takes place within a confined space and consumes most of the available oxygen, the heat within the space may continue to produce flammable gases which are heated above their ignition temperature. When a supply of oxygen is then introduced and mixes with the flammable gases, an explosive event (deflagration) can occur causing the gases to ignite with explosive force. Backdrafts are a rare event, but are potentially lethal to firefighters.
Beam	A horizontal supporting member in building construction.
Bearing Wall	A wall of a building that carries any load other than its own weight.
Bulkhead	A structure on the roof of a building which is built over or encloses a stairway, elevator, dumbwaiter or other building facility.
Cantilever Position	A projecting beam or other structure supported only at one end. E.g., the extended tip of an Aerial ladder unsupported from a structure. (not touching)
Carbon Monoxide	A colorless, odorless, poisonous gas formed when carbon burns with an insufficient supply of oxygen. The chief danger with most fire gases is that, although not the most toxic, carbon monoxide is almost always the most abundant.
Child Guard Gate	A fixed device that partially covers the lower part of a window to prevent a child from falling out.
Class "A" Multiple Dwelling	A building housing three or more families in which residency is permanent in nature.
Class "B" Multiple Dwelling	A multiple dwelling which is occupied transiently.
Coaming	A raised frame around a floor or roof opening or scuttle to keep water from running in.
Cockloft	A space between the roof and the top floor ceiling.
Coffin Cut	A cut made resembling a rectangle. Generally this cut is made perpendicular to the supporting beams below, to vent or expose as many bays as possible.
Column	A vertical structural member in building construction.

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Compactor A device for crushing garbage and trash into a small space prior to removal from the premises.

Drop Ladder A vertical ladder normally held in the "up" position at the second floor balcony of the fire escape by a hook. When this ladder is to be used, the hook is released and the drop ladder is lowered or dropped to the ground. Care must be exercised to make certain that no one is struck by this ladder when it is lowered or dropped to the ground.

Dumbwaiter A device for collecting garbage from apartments by means of a wooden car which is raised and lowered in a vertical shaft by means of a rope and a pulley. In most buildings these dumbwaiters are no longer used.

Energy Efficient Windows (EEW) A window designed to maintain an airtight insulation, and will contain more than one pane of glass with an air tight space in-between.

Exposures 1, 2, 3 & 4 A system of designating the areas or buildings which are adjacent to the fire building. When facing the main entrance to the fire building, exposure 1 is in front of the building, 2 is on the left, 3 is to the rear of the fire building and 4 is on the right.

Fire Escape An emergency means of egress from a building consisting of metal balconies on the outside of a building connected by ladders to each other and to the ground. Some fire escapes have a ladder from the top floor balcony to the roof.

Fire Stopping The closing of all concealed draft openings to form a barrier against the spread of fire with incombustible materials.

Flashover A transition in the development of a compartment fire when surfaces exposed to thermal radiation from fire gases in excess of 1100°F reach ignition temperature more or less simultaneously. This causes the fire to spread rapidly throughout the space, resulting in fire involvement of the entire compartment or enclosed space.

Goose Neck Ladder A vertical ladder where side rails are curved at the top. This type of ladder is sometimes used between the top floor balcony of a fire escape and the roof.

Handie-Talkie (HT) Portable radio used for communication between members on the fireground.

Hydra Ram A hydraulic forcible entry tool.

Incident Commander Highest ranking officer in charge of an Emergency or Fire operation.

Knock Down To have visible flame under control without complete extinguishment.

Lintel A horizontal building member, supporting the weight above an opening, such as a window or a door.

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Membrane Roof Roofing material in roll form, consisting of asphalt materials, (bituminous) polymers of plastics and synthetics for strength. Thickness can vary. Roofs covered with this type of materials are susceptible to ignition and rapid flame spread when exposed to flame.

Party Wall Balcony A structure built as an emergency means of egress from a building which will afford lateral access to an adjoining building or apartment separated by a fire wall. They do not have ladders to ascend or descend from floor to floor or the roof.

Raised Roof A roof which is raised above the roof beams and supported by 2"x 4"s. The extent to which it is raised varies, so as to provide proper drainage on the roof. The result is a large open cockloft where fire can spread easily. Also known as inverted roof.

Renovated Building Any alteration to the original structural components, major or minor, that may affect firefighting operations.

Return The interior surface of a scuttle or skylight between the roof and the top floor ceiling.

Riding List A list of members on duty. One copy is kept on the apparatus and one copy is carried by the officer on duty. This list also shows riding positions, tools assigned, masks assigned and group numbers for each member on the list.

Scuttle An opening in the roof fitted with a lid.

Single Room Occupancy A multiple dwelling which the apartments, which were formerly rented to families, are now rented as single rooms to unrelated people. These occupants use the kitchen and bathroom facilities in common.

Size-Up Is an ongoing evaluation of the problems confronted within a fire situation.

Unprotected Steel Steel structural components of a building which do not have any fire resistive covering such as concrete, brick, asbestos, etc.

Ventilation The controlled and coordinated removal of heat and smoke from a structure, replacing the escaping gases with fresh air. This exchange is bi-directional with heat and smoke exhausting at the top and air flowing in towards the fire at the bottom. The fire will pull the additional air flow into the building towards the fire which can intensify the fire conditions. This exchange can occur by opening doors, windows or roof structures. Coordinated and controlled ventilation will facilitate quicker extinguishment and limit fire spread.

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VEIS VEIS (Vent, Entry, Isolate, Search) is the approved tactic when entering a structure through an opening (door or window) to search an area for the location of the fire or to locate possible victims. The priority upon entering the area via a window is to close the door to that room or area in order to isolate that area being searched from the fire area. When entering a fire area via a doorway entrance, the door needs to be controlled until the fire area is further isolated or a charged hoseline is advancing on the fire. By isolating the area, the members are controlling the flow path of the fire, heat and smoke towards the ventilation point as well as controlling the air flow from the ventilation point towards the fire area.

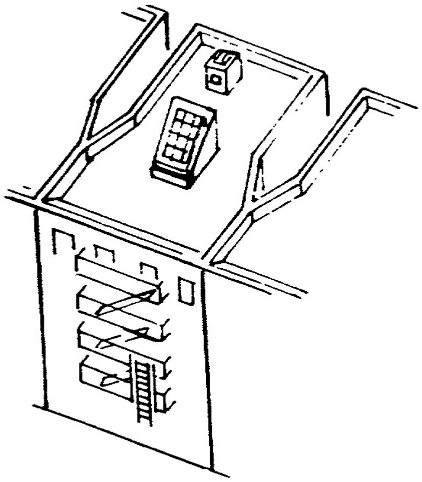
Ventilation Induced Flashover A flashover initiated by the introduction of oxygen into a pre-heated, fuel rich (smoke filled), oxygen deficient area. This phenomenon can occur with legacy content fires but has become prevalent with modern content fires. Modern content fires rapidly consume more of the available oxygen within the fire area creating conditions favorable to a possible ventilation induced flashover.

Ventilation Profile The appearance of the fire building's ventilation points showing the flow paths of heat and smoke out of the structure as well as any air movement into the structure.

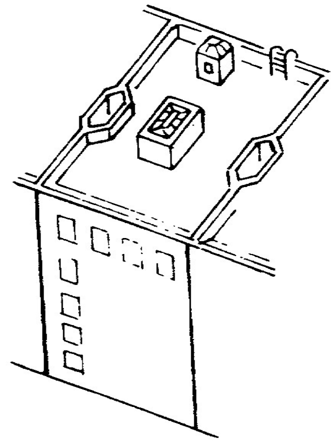
Walk Through Bulkhead A structure at the uppermost portion of interior stairs that may isolate the front section of the roof from the rear. One must walk through the bulkhead to reach the other section of the roof.

Window Gate A folding gate placed at a window to prevent intruders from entering. The type that is approved by the Board of Standards and Appeals does not have locks.

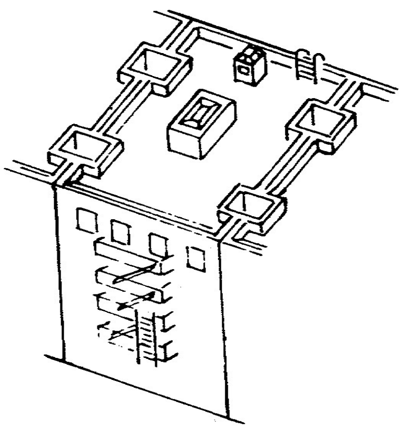
Figure 1



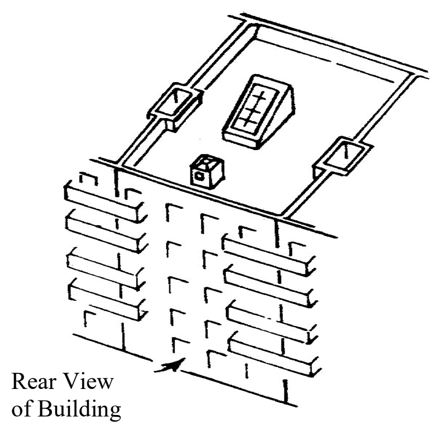
1**A**
FRONT
FIRE ESCAPE



1**B**
REAR
FIRE ESCAPE

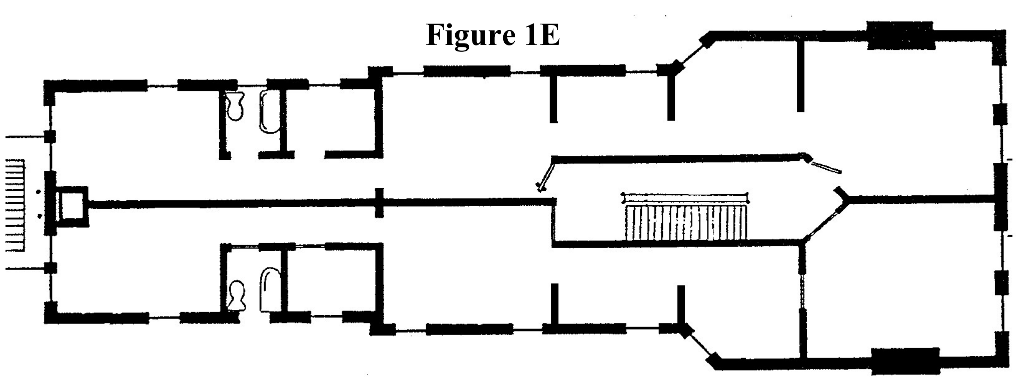


1**C**
FRONT & REAR FIRE ESCAPE



1**D**
PARTY WALL FIRE ESCAPE

Figure 1E



Typical railroad flat in O.L.T. 1 or 2 of these apartments on each floor.

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1. GENERAL

1.1 ***Redacted for PFS***

1.2 **DESCRIPTION OLD LAW TENEMENTS** (Figures 1A - 1E)

1.2.1 Three to seven stories.

1.2.2 20' to 25' wide.

1.2.3 50' to 85' deep.

1.2.4 Interior stairs to cellar (may have been removed if building has been renovated).

1.2.5 Some form of light/air shaft may be provided. (Figure 1) These shafts are open at the top. The term "enclosed" as used in this bulletin will mean "a shaft open at the top and bound by building walls on all sides." Figure 1-B, 1-C, and 1-D show examples of enclosed shafts.

1.2.6 Limited fire stopping.

1.2.7 Combustible contents and structural components result in a hot smoky fire.

1.2.8 The presence of Energy Efficient Windows (EEW) will further increase heat, gases and smoke conditions, possibly leading to a flashover or backdraft.

I. **NEW LAW TENEMENTS BUILT ON OR AFTER 4/12/1901 AND BEFORE 1916.** ***(Addition for PFS)***

a. Generally six or seven stories high.

b. 35' to 50' wide.

c. 85' in depth.

d. Five to six apartments per floor.

e. The first floor (cellar ceiling) is of fireproof construction and unpierced.

f. The entrance to the cellar is by way of exterior stairs.

g. The interior stairs are fireproof and enclosed in partitions of fireproof construction. Apartment doors are constructed of fire-resistant materials.

h. The second means of egress is either another stairway or an exterior fire escape. The fire escape is more generally found in these buildings.

i. All interior walls and furred partitions are required to be fire stopped at each story.

j. Steel "I" beams were introduced to carry floor joists which couldn't span the enlarged floor areas. These steel beams generally were supported by masonry walls.

1.3 GENERAL AREAS OF RESPONSIBILITY

1.3.1 First Ladder Company to Arrive:

A. Ladder company operations on fire floor.

B. Determine life hazard and rescue as required.

C. Roof ventilation and a visual check of rear and sides from this level.

D. Laddering as needed.

E. If second Ladder Company will not arrive within a reasonable time, make interior search and removal of endangered occupants above the fire.

1.3.2 Second Ladder Company to Arrive

A. *All floors above the fire floor* for search, removal, ventilation and to check for fire extension.

B. Confirm roof ventilation. (assist first unit)

C. Check rear and sides of buildings.

D. Reinforce laddering and removal operations when necessary.

1.4 SIZE-UP

Is an ongoing evaluation of the problems confronted within a fire situation. Size up starts with the receipt of the alarm and continues until the fire is under control. This process may be carried out many times and by many different individuals during a fire.

1.4.1 The factors which all members must consider in size-up are:

A. ***Time*** -Governs the life hazard. Night fires mean poor visibility, buildings locked effecting delay in access. A tenement fire is more serious at night than in daytime.

B. ***Life*** - The most serious factor at any fire. What is the location of the life hazard in relation to the fire. Life hazard to firefighters must also be considered.

C. ***Area*** - Building or occupancy area. Large areas to be searched requiring search lines. Large areas generate fires of great intensity, heavy volumes of smoke and severe heat.

D. ***Height*** - Building height will govern the use of the Aerial and/or Tower Ladder and portable ladders.

E. ***Construction*** - Non-fireproof, contains vertical voids that allows for extension. Alterations may have introduced larger voids, both vertical and horizontal. Wooden "I" beams, lightweight truss, *Energy Efficient Windows* and membrane roofs can affect the safety of operations within the structure. The presence of front or rear fire escapes or party balconies, will also have an effect on fireground operations.

F. ***Occupancy*** - This determines the severity of the life hazard and the intensity of the fire. (e.g., A commercial occupancy with an increased fire load on the first floor with apartments above).

G. ***Location and Extent of Fire*** - A fire in the cellar, shaft, or apartment on the top floor will determine access and areas to be searched. What is the ventilation profile of the fire building?

H. ***Water Supply*** - Hydrant availability, and the placement and readiness of hoselines.

I. ***Street Conditions*** - Effect apparatus access and the placement of Aerial/Tower ladders to the fire building.

J. ***Auxiliary Appliances*** - Standpipe/sprinkler systems, and the location of outlets, O S & Y, and/or check valves.

K. ***Weather*** - Snow and freezing conditions, wind velocity and direction are major factors in safety and fire operations.

L. ***Apparatus and Equipment*** - Be aware of the units on the scene. The arrival of those units assigned on the alarm, Engines and Ladders, first due, second due

M. ***Exposures*** - May be adjoining buildings or areas within the fire building itself (auto exposure) e.g., floor to floor via windows, and across shafts or adjoining apartments.

2. OPERATIONAL PLANS

2.1 An operational plan is necessary and has to be formed before the fire. The plan must be understood by all and continual training is required. This bulletin presents such a plan. However, as in any operational plan it must be flexible. For example, there may be only one ladder company at the scene or the second unit may not arrive in time to operate according to the plan. Some minor adjustments may be required.

2.2-2.4 ***Redacted for PFS***

2.5 The following operational plan while designed for Old Law Tenements is equally effective in and should be used for New Law Tenements (even those with five to eight apartments to a floor). To apply the plan, consider the vertical line of apartments in which the fire apartment is situated as if it were a similar section in an Old Law Tenement and operate the same way.

2.6 As some ladder companies are equipped with an apparatus that requires a tiller position, the term Outside Vent Position shall be interchangeable.

3. APARTMENT FIRE

Assumptions - There is a light to medium fire situation within the building with one or more rooms involved, and both ladder companies and required engine companies will arrive at the scene.

Light Fire Situation - a fire which can be extinguished with the operation of one handline and/or hand extinguishers or those that can be readily extinguished without resorting to extinguishing agents.

Medium Fire Situation - a fire which may be extinguished with the operation of two handlines.

3.1 INSIDE AND OUTSIDE TEAMS

See Multiple Dwellings Chapter 1 Pages 40-41 for Breakdown of Tool Assignments (PFS)

3.1.1 Ladder Companies will institute a two-team offense that will cover their area of assigned responsibility.

A. Inside Team

- Officer Position
- Forcible Entry Position
- Extinguisher Position

B. Outside Team

- Chauffeur Position
- Outside Vent (OV) Position
- Roof Position

3.2 FIRST LADDER COMPANY TO ARRIVE

INSIDE TEAM

3.2.1 ***Redacted for PFS***

POSITION: The door to the fire apartment reached via the interior stairs of the fire building.

3.2.2 Forcible Entry Position

TOOLS: Handie-Talkie
Flashlight
Axe/Halligan (Maul/Halligan)
Hydra Ram

DUTIES:

1. Forcible entry.
2. Under the direction of the Ladder Company Officer, locate, contain and isolate the fire.
3. Search and removal of victims.
4. Ventilate as ordered by the Ladder Company Officer.

3.2.3 Extinguisher Position

TOOLS: Handie-Talkie
Flashlight
6' Hook
Pressurized water extinguisher

DUTIES:

1. Assist in forcible entry.
2. Under the direction of the Ladder Company Officer, locate, contain and isolate the fire.
3. Use the extinguisher where it can be of any possible help.
4. Search and removal of victims.
5. Ventilate as ordered by the Ladder Company Officer.

OUTSIDE TEAM

3.2.4. Chauffeur Position -

TOOLS:

The chauffeur shall select the tools that they deems necessary to complete their assignment.

POSITION: The front of the fire building. ***Edited for PFS***

DUTIES:

1-3. ***Redacted for PFS***

4. Prior to conducting any horizontal ventilation tactics from the exterior, the chauffeur shall request permission from the Ladder Company Officer in order to coordinate ventilation tactics with interior operations.

5-6. ***Redacted for PFS***

7. The chauffeur and OV's duties are complementary when the fire apartment and fire escape are located in the front of the building. For purposes of efficiency, the OV and Chauffeur shall team up while keeping in mind the necessity to be available for the use of the aerial or portable ladders to assist members in distress.

8-9. ***Redacted for PFS***

3.2.5 Outside Vent Position

TOOLS:
- Handie-Talkie
- Flashlight
- Halligan tool
- 6' Hook - For top floor fires the saw is taken in place of the hook.

POSITION:

Except for assisting the chauffeur in front of the fire building when aerial or portable ladders are needed for rescue or removal, assignment is to ventilate the fire area from the exterior providing horizontal ventilation. Prior to conducting any horizontal ventilation tactics from the exterior, the OV shall request permission from the Ladder Company Officer to coordinate ventilation tactics with interior operations. This is generally done from the fire escape landing of the fire apartments. Access is via the front or rear fire escape. Some buildings have one or two apartments per floor with one fire escape. In this case, the OV's choice is eliminated and they use that fire escape. Other buildings have three or four apartments per floor and the building will have both front and rear fire escapes. In this case, the OV must choose the correct one to attain a position on the exterior of the fire floor. If the location of the fire apartment is not obvious from the exterior of the building, the OV should communicate with their officer. Once the location is verified, the OV can then reach the correct fire escape via a window from a lower or adjacent apartment, or from a drop ladder/portable ladder at ground level. (Figures 3A and 3B)

Figure 3A

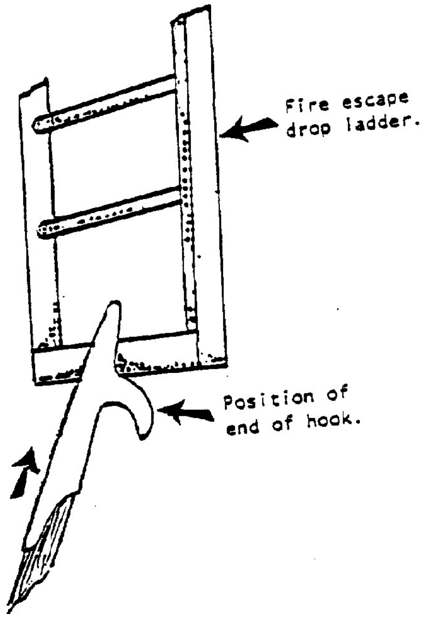
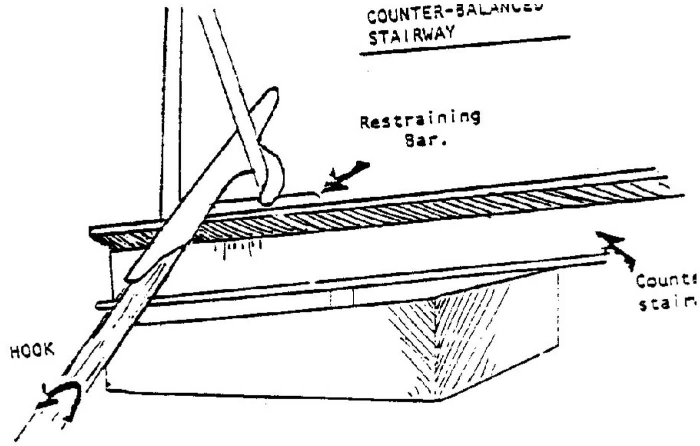


Figure 3B



2. There are occasions when the OV position is varied

   Store Fire - Ventilate the rear of the store from the exterior. Prior to conducting any horizontal ventilation tactics from the exterior, the OV shall request permission from the Ladder company Officer to coordinate the ventilation with interior operations. If this would expose people on a fire escape, ventilate immediately after they are out of danger. If a delay in ventilation is encountered and/or anticipated, notification should be made to their company officer.

   Top Floor Fire - Proceed to roof with saw and Halligan tool. If possible, descend fire escape and provide coordinated ventilation with interior operations. VEIS will be completed if the OV teams up with the second OV (or another available member). If unable to descend the fire escape notify the Ladder Company Officer, attempt coordinated ventilation of the fire apartment from roof level, and then assist the roof firefighter with roof vent.

DUTIES:

1. Assist in laddering for rescue work.

2. Lower fire escape drop ladder, or position a portable ladder.

3. **Ventilate for Extinguishment** – Ventilate fire floor from exterior. The OV has the responsibility of timing the exterior ventilation tactics with the Engine Company's extinguishment of the fire. Communication with the Ladder Company Officer must be maintained in order to coordinate the horizontal ventilation as the hoseline is applying water to extinguish the fire.

4. Venting for Search - Prior to venting from the fire escape, the OV must receive permission from the Ladder Company Officer via HT. The OV might not be aware of conditions in the apartment. With the exception of a known life hazard, the entry and search will be completed if they team up as follows:

- When there is only a rear fire escape (railroad apartments) OR the fire apartment is in the rear, the OV and Roof Firefighter (or another available member) shall team up and enter the fire apartment from that fire escape.
- When there is a front fire escape AND the fire apartment is in the front, the OV and Chauffeur (or another available member) shall team up and enter the fire apartment from that fire escape.

In both situations, they will affect the removal of any occupants but still consider fire severity or extinguishing operations which may endanger them. This task may prove difficult due to bars and gates.

3.2.6 Roof Position

TOOLS: Handie-Talkie
Flashlight
Halligan tool
6`Halligan Hook
Life Saving Rope

POSITION: Roof of the fire building.

ACCESS TO THE ROOF:

1. *Adjoining Building* - Generally, there are contiguous buildings making this the safest and most dependable method. Be aware of possible extension of fire to exposures.

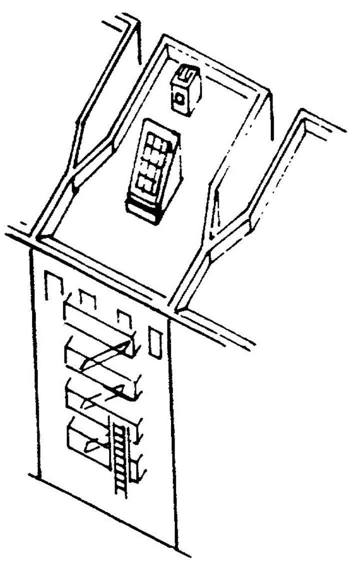
2. *Aerial Ladder* - The aerial ladder is used when the building is isolated or the roof cannot be reached, or accessed from the adjoining building, due to a difference in height or obstructions caused by security barriers, fences etc. Roof access from the aerial can be dangerous. The cornice slopes towards the roof and in some instances, there is a high front parapet wall. Use caution stepping off the aerial, especially when visibility is poor.

3. *Rear Fire Escape* - This access to roof is least desirable. It is only used when other means are not available and when the fire floor can be safely passed at this location. It is obviously dangerous to try to pass the fire floor when the fire is exposing the fire escape or is on the verge of venting itself in this direction. Rear fire escapes extend to the roof (Figures 3D and 3E) unless of the party wall balcony type (Figure 3F). Front fire escapes do not extend to the roof (Figures 3C and 3E).

NOTE: The interior stairs are ***NEVER*** used for the following reasons:

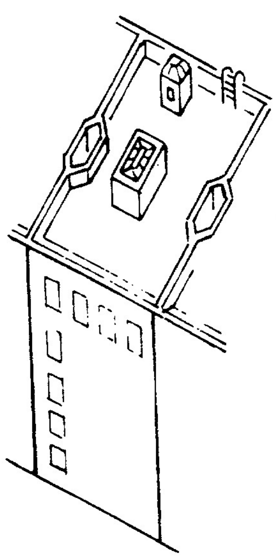
- Danger of being trapped above the fire.
- Banked heat and smoke may prevent member from reaching roof.
- Will lead to a delay in roof ventilation when it proves dangerous or impractical.

Figure 3C



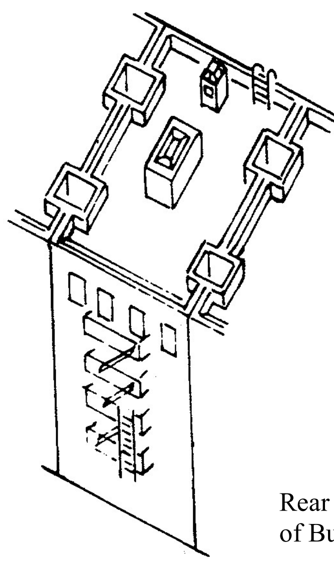
Front
Fire Escape

Figure 3D



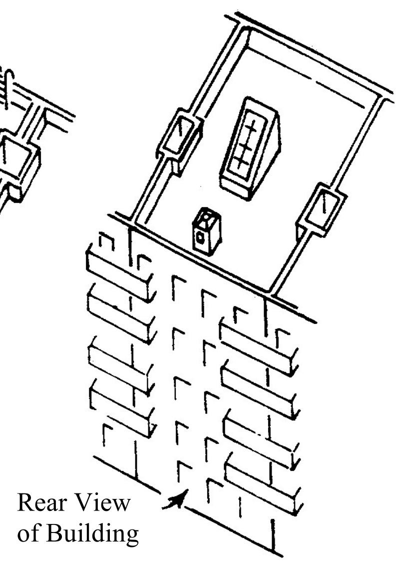
Rear
Fire Escape

Figure 3E



Front & Rear
Fire Escape

Figure 3F



Party Wall
Fire Escape

DUTIES: The duties of the Roof Firefighter demand an experienced, observant and determined member capable of decisive action. The responsibility of this position covers three broad areas: life, communication, and ventilation. *NOTHING SHALL DETER* the member assigned the roof position from carrying out the assigned duties. Whenever possible, the first and second Roof Firefighters should team up to safely complete roof duties. The Roof Firefighter should always confirm their way off the roof as soon as they reach the roof. The Roof Firefighter is responsible for the following: (Figure 3G)

1. Conduct a size-up of the roof for available vertical ventilation points including a visual survey of the exterior of the building. Look for any life hazard and reassess the ventilation profile of the fire conditions. Communicate findings to the Ladder Company Officer (such as life hazards, fire and smoke conditions).

2. The Roof Firefighter shall then perform initial vertical ventilation unless ordered to delay or withhold this action by the Ladder Company Officer operating inside the fire area.

Note: Initial vertical ventilation is the venting of bulkheads, scuttles or skylights over stairwells and hallways. When skylights are vented, members must recognize that this action is non-reversible.

- If the Ladder Officer **does not** want initial vertical ventilation performed; the Roof Firefighter will not perform vertical ventilation.

  However, in an attempt to reach potential victims who may be trapped inside the bulkhead as soon as possible, the Roof Firefighter will perform the following actions, which are not considered vertical ventilation. They will force open the bulkhead door, if conditions are tenable, the member should reach in and probe the immediate area of the bulkhead for potential victims and then immediately **close** and **control** the door until the Ladder Officer orders vertical ventilation.

  If the bulkhead door cannot be closed and controlled for any reason (e.g., victim removal, damaged door), immediately notify the Ladder Officer.

- If the Ladder Officer **does** want initial vertical ventilation performed, the Roof Firefighter will force open the bulkhead door, if conditions are tenable, the member should reach in and probe the immediate area of the bulkhead for potential victims, then continue to ventilate the bulkhead and take additional vertical ventilation tactics, as needed.

NOTE: Never attempt to climb onto or off a bulkhead or similar type structure at a spot near or next to an open shaft or near a building wall that faces on a shaft, areaway, courtyard or street.

3. When necessary, team up with the OV to VEIS the fire floor and, if not needed for search on that floor, proceed to VEIS the floors above the fire.

4. When necessary, team up with second Roof Firefighter to VEIS all floors above the fire.

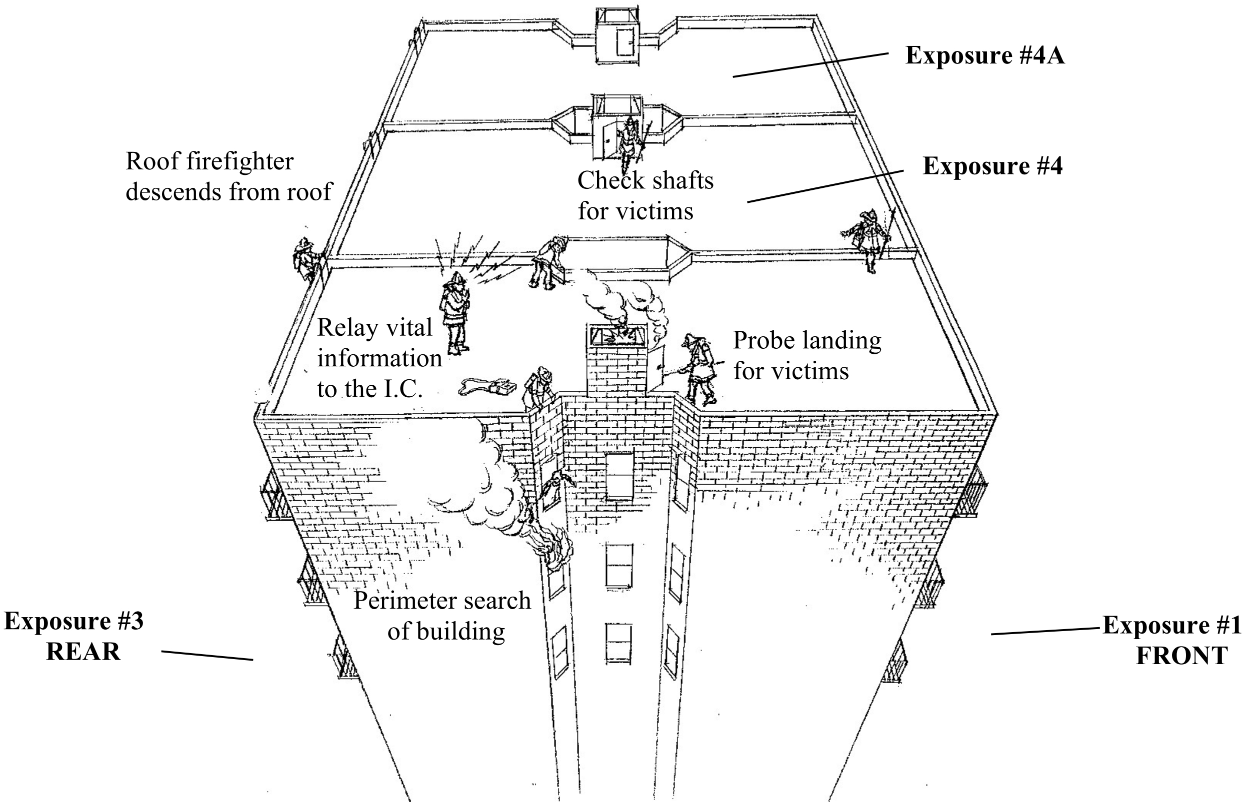
5. At top floor fires, ventilate top floor windows from roof level. Prior to conducting any horizontal ventilation tactics from the exterior, the Roof Firefighter shall request permission from the Ladder Company Officer in order to coordinate ventilation tactics with interior operations. Communication with the Ladder Company Officer must be maintained in order to coordinate the horizontal ventilation as the hoseline is applying water to extinguish the fire. The Roof Firefighter is also responsible for utilization of the saw to vent the cockloft and top floor when necessary, after completing initial duties.

6. Conveying information to second Ladder Company. Inform them of the extent of the search completed, so that all floors above the fire may receive a thorough search. Also inform the second Ladder Company when proper examination of exposed interior stairs and public hall has not been made due to other duties. The second Ladder Company shall complete the above-mentioned examinations.

7. Reports back to their Company Officer (generally located on the fire floor) when assignment is completed or when relieved by second Ladder Company and apprise them of all pertinent information.

NOTE: One of the greatest hazards is the possibility of fire cutting off the roof Firefighter's escape route. Conditions on the roof often change without warning, cutting off the initial access point. The Roof Firefighter must plan alternative routes, then continually monitor the fire and its effect on the alternatives for as long as they are on the roof

Figure 3G



8. *Roof Ventilation* - Building will have either a bulkhead with a skylight or a scuttle with a roof level skylight over the interior stairs.

- If building has a bulkhead, open the bulkhead door. These doors are almost always self closing. To keep the door open, either remove the upper hinge or block the door open (Figures 3H and 3I).

Figure 3H

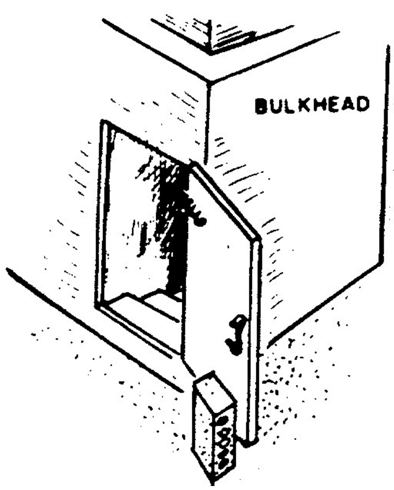
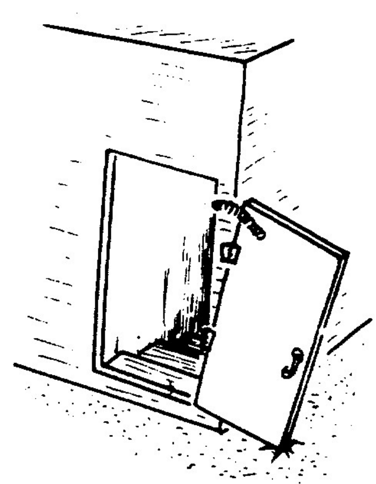
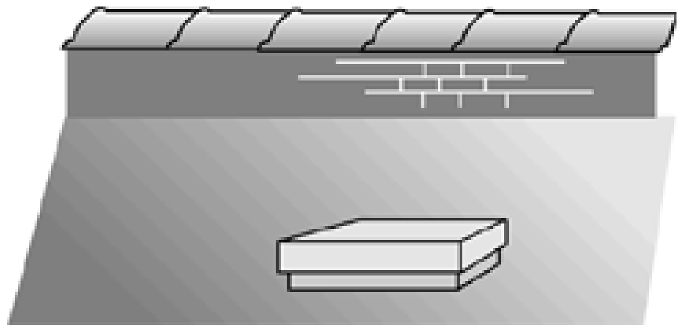


Figure 3I



- If building has a scuttle cover, remove scuttle cover (Figure 3J). This may be difficult because scuttle cover may be nailed down, have several coatings of tar at the seams and/or secured by hooks, chains, etc. on the underside of the cover.

Figure 3J



- Heavy smoke and high heat issuing from the bulkhead doorway or scuttle would obviously require further ventilation such as removal of the skylight. The absence of these indications does not necessarily mean that skylight ventilation is not required. Opening a bulkhead door or scuttle cover will not always give a true indication of interior fire conditions; the door to the fire apartment may not be open, either because it has not been forced or because it is being held in a closed position. Evaluate other factors (heavy smoke or fire showing from several windows, etc.) in determining the amount of ventilation that will be required when the door to the fire apartment is opened.
- Remove skylight over stair bulkhead (Figures 3K and 3L) or on roof level. (Figure 3M) If fire and smoke conditions are obviously heavy, immediate venting of the skylight prior to the removal of the scuttle cover to relieve the interior would be justified.

Figure 3K

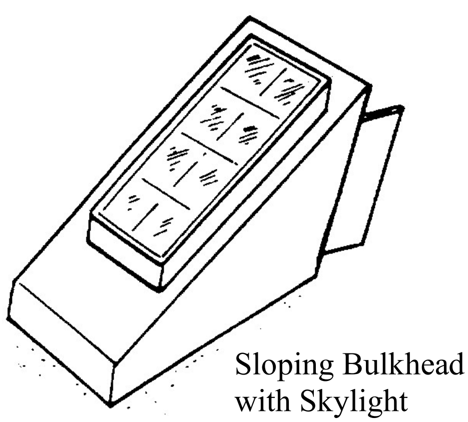


Figure 3L

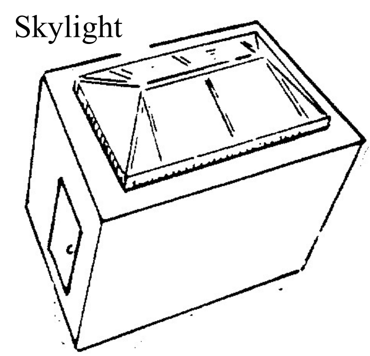
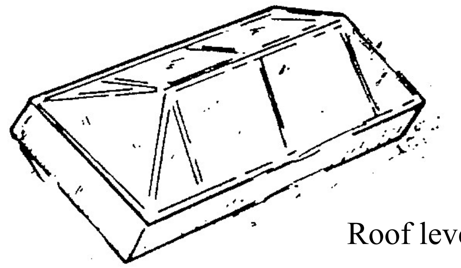


Figure 3M



- If difficulty is encountered opening the bulkhead door, vent the bulkhead skylight first. Units operating below shall be warned by HT prior to breaking glass. Pause after breaking the first pane, as this serves as a warning to members below and also allows the Roof Firefighter to determine the wind direction.

- Work with the wind at your back, when possible. When protective wire screens cover skylights, insert the tool beneath screen to remove glass.

NOTE: Skylights at roof level may have been removed and openings covered with roofing materials. It may be necessary to cut a hole over the stairs to vent stairway. The Incident Commander should be informed that a saw is needed to accomplish this.

- Remove skylights or coverings over all shafts if indicated by heavy heat and smoke conditions. This includes dumbwaiter shafts, light shafts, etc. (Figures 3N and 3O) To ensure an unobstructed outlet for shafts other than dumbwaiter shafts, probe with hook to detect possible presence of a glazed sash or other covering and remove it.

- After removing roof level skylight or scuttle cover, returns can be opened into cockloft to gain knowledge of conditions or to ventilate. (Figure 3P)

Figure 3N

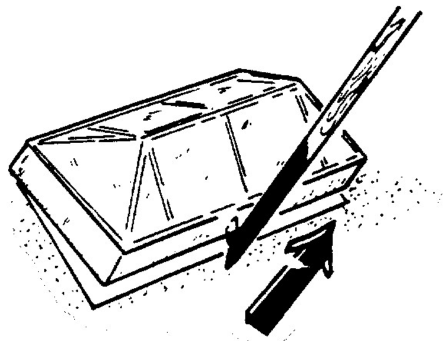
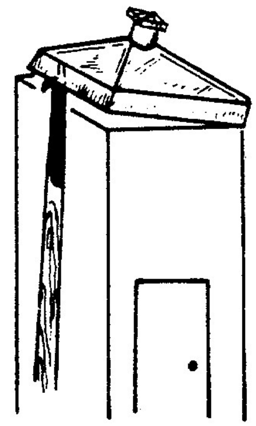
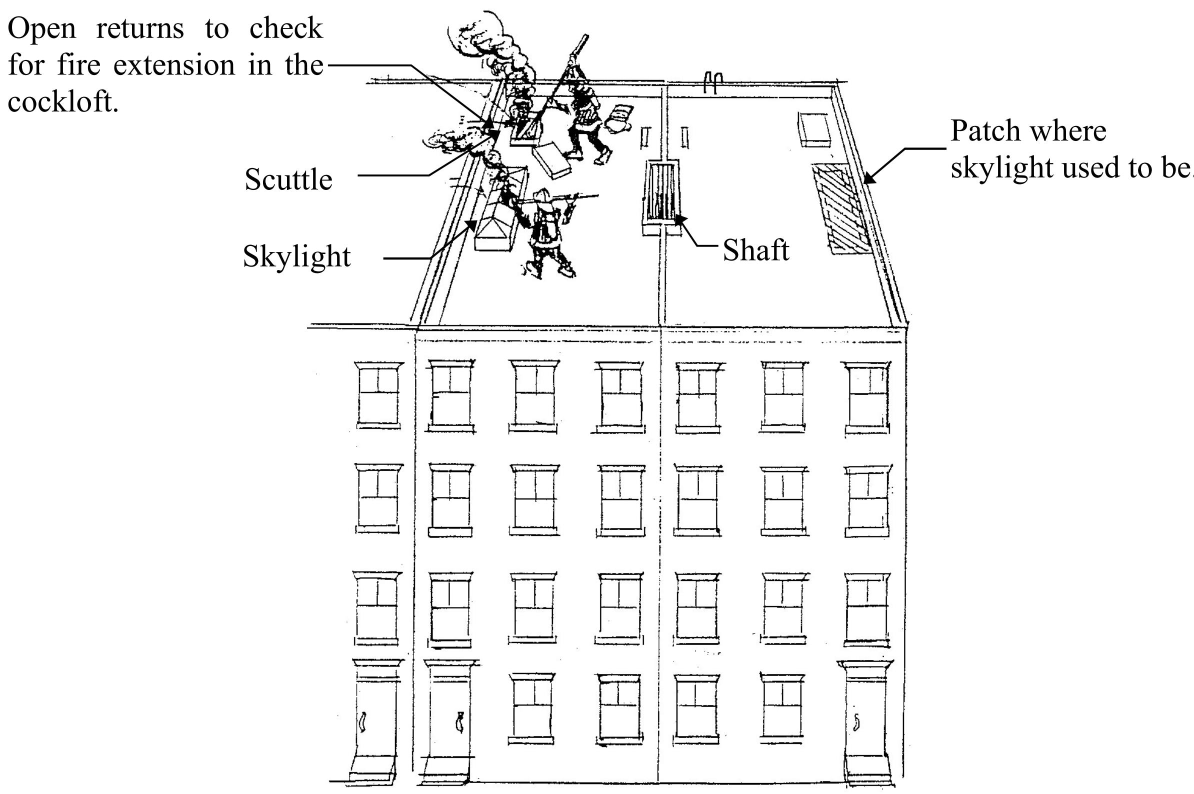


Figure 3O



Dumbwaiter Bulkhead

Figure 3P



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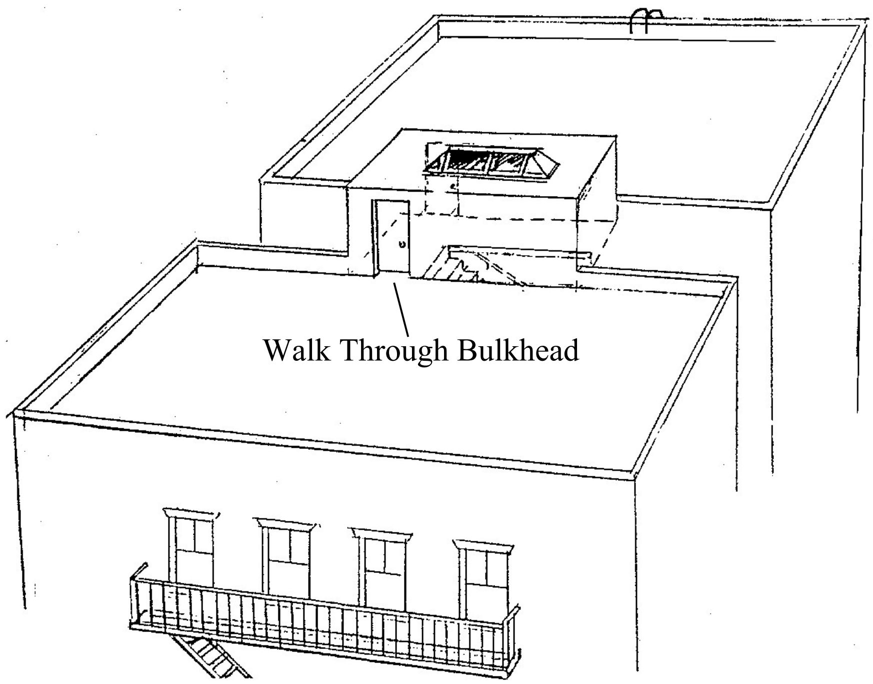
9. *Walk Through Bulkhead* - A structure at the uppermost portion of interior stairs that may isolate the front section of the roof from the rear. One must walk through the bulkhead to reach the other section of the roof (Figure 3Q).

Figure 3Q



10. Teaming up to vent and search

- After duties on the roof have been completed, the Roof Firefighter shall descend the rear fire escape to team up with the OV firefighter to VEIS.
- Where the fire is in the front of the building and there are three or four apartments on a floor, the OV and Chauffeur will be teamed up in the front of the building. In this situation, the Roof Firefighter can then team up with the second Roof Firefighter to VEIS the floors above the fire using the rear fire escape. Pay particular attention to the top floor, especially the public hallways. The public hall and stairs, including bulkhead landing are frequently severely exposed and require examination for victims as soon as possible. The Roof Firefighters can get from the rear apartment to the front apartment using the public hall, or if necessary, open the common wall between apartments. When searching the floor above the fire, assist in venting the fire apartment when approved by the Ladder Company Officer by venting windows below with a tool.
- In either case, the Ladder Company Officer shall be notified when and where the search will commence.

NOTE: Should a firefighter be caught in the public hall while moving from the rear to front apartment when the door to the fire apartment is opened below, they may be exposed to severe heat, smoke and flame, placing member in an extremely precarious position. In this event, drop to the floor and slide or roll to the nearest wall. This position places the member away from the rising column of heat and flame and increases the member's chance for survival. Following the initial release of heat and flame, the member may be able to move horizontally or vertically to a safer position or be assisted by members working below who have been alerted to their predicament. The less dangerous access may be breaching a wall between the front and rear apartments.

3.3 FIRST LADDER COMPANY TO ARRIVE (TOWER LADDER) - OLD LAW TENEMENT NO FRONT FIRE ESCAPE

3.3.1 Tower Ladders and Aerial Ladders shall operate the same **EXCEPT**:

3.3.2 Inside Team: Tools, Position, and Duties remain the same.

Outside Team

3.3.3 Chauffeur Position:

POSITION: Remain at pedestal for overall safety, control, and coordination.

3.3.4 Outside Vent Position:

POSITION: Operates as basket firefighter for ventilation.

3.3.5 Roof Position:

POSITION: Roof of fire building.

DUTIES: Roof operations remain the same as in 3.2.6. If necessary, the officer may request the Roof Firefighter to perform outside ventilation of the fire apartment from the fire escape after completion of preliminary roof ventilation (bulkhead, scuttle, skylight). The Roof Firefighter proceeds via the fire escape to the fire floor to perform ventilation. If VEIS is to be performed, they shall be teamed up with one of the following the second Roof firefighter or another available member.

NOTE: The second ladder must be aware when VEIS on the upper floors has not yet been performed.

3.4 SECOND LADDER COMPANY TO ARRIVE

3.4.1 Units responding to any fire should monitor both the Department radio and Handie-Talkies. This will provide members with vital information about conditions at the scene and make them aware of problems encountered by first arriving units, such as water supply problems, people trapped, location and severity of fire, heavy smoke condition, apparatus blocked out of street, etc.

INSIDE TEAM

3.4.2 Officer Position

TOOLS: Handie-Talkie
Hand light
Officer's tool
Thermal Imaging Camera

POSITION: The door of the apartment directly over the fire apartment as this is generally the most serious exposure. The second ladder inside team is assigned an extremely difficult position in the apartment over the fire.

DUTIES:

1. Gaining access to the floor above in many types of structure can be extremely difficult and can place members in a dangerous position. Initially, this may not always be attainable, but an attempt should be made while always keeping safety in mind. Company Officers must evaluate the risk of going above a fire without a protective hoseline and determine the benefits and consequences. A thorough size-up of the conditions on the fire floor shall be performed before going above the fire. When deciding whether to go above, consider the following:
   - What is the location of the fire?
   - Do they have control of the door to the fire area?
   - Do they have a charged hoseline on the fire floor?
   - Is the hoseline advancing into the fire area?
   - Are there water problems?
   - Is there a need for protection with a hoseline above the fire floor?

2. Prior to proceeding above the fire, the second arriving officer must ensure that the officers on the fire floor are made aware of this team's intention, so that members operating above can be warned of any situation necessitating withdrawal.

3. When operating on the floors above the fire, members should force one or more doors on each floor to provide an area of refuge.

4. Direct forcible entry and control the apartment door as per Training Bulletin Search 1.

5. Direct search for victims and fire extension. Be certain to check adjoining apartment on the floor above the fire apartment. This may be even more severely exposed than the apartment directly over the fire apartment due to the construction of Old Law Tenements.

6. Call for a line if needed.

7. Cause a thorough search on all floors above the fire.

8. Have subordinates verify that areas assigned for search have been completely covered.

9. Direct and control horizontal ventilation on all floors above the fire floor.

10. Ensure that the rear and sides of the building are checked.

11. Ensure safety of members.

12. Transmit necessary information to the Incident Commander.

3.4.3 Forcible Entry Position

TOOLS: Handie-Talkie
Hand light
Axe/Halligan (Maul/Halligan)
Hydra Ram

When operating on the floors above the fire, members should force one or more doors on each floor to provide an area of refuge.

DUTIES:

1. Forcible entry.

2. Immediately search for and remove victims.

3. Ventilate as ordered by the Ladder Company Officer.

4. Make detailed examination for extension of fire. Feel baseboards, walls, etc.

3.4.4 Extinguisher Position - Identification remains the same as for first ladder company for the sake of uniformity.

TOOLS: Handie-Talkie
Flashlight
6' Hook
Pressurized Water Extinguisher

NOTE: **For top floor fires**, they should take two 6` hooks in lieu of the pressurized water extinguisher.

DUTIES:

1. Assist forcible entry.

2. Immediately search for and remove victims.

3. Ventilate as ordered by the Ladder Company Officer.

4. Make detailed examination for extension of fire. Feel baseboards, walls, etc.

OUTSIDE TEAM

3.4.5 Chauffeur Position

TOOLS:

The chauffeur shall select the tools that they deem necessary to complete their assignment.

POSITION: The front of the fire building. If not needed here, then go above the fire if teamed with the second OV (or another available member).

DUTIES:

1-3. ***Redacted for PFS***

4. Ventilate and search if teamed up with the second OV (or another available member).

5. ***Redacted for PFS***

3.4.6 Outside Vent Position

TOOLS: Handie-Talkie
Flashlight
Halligan
6` Hook

POSITION: Above the fire unless needed for laddering, rescue, etc. Access is via fire escape, ladder, or adjoining building. Buildings equipped with party wall balconies, access is via ladder or adjoining building. All of this is determined by the physical characteristics of the building, location of the fire, extent and severity of the fire.

DUTIES:

1. Assist with laddering where necessary.

2. Search for victims and fire extension on all floors above the fire if teamed with another member.

3. Vent for Extinguishment - Prior to conducting any horizontal ventilation tactics from the exterior, the second OV shall request permission from their Ladder Company Officer in order to coordinate ventilation tactics with interior operations. The OV has the responsibility of timing the exterior ventilation tactics with the Engine Company's extinguishment of the fire. Communication with the Ladder Company Officer on the floor/s above must be maintained in order to coordinate the horizontal ventilation as the hoseline is advancing and applying water to extinguish the fire.

4. Ventilation for search - Prior to venting from the exterior, the second OV must receive permission from their Ladder Company Officer via HT. The second OV might not be aware of conditions in the apartment directly over the fire. With the exception of a known life hazard, the entry and search will be completed if they team up as follows:

   - When there is only a rear fire escape (railroad apartments) OR the fire apartment is in the rear, the second OV and second Roof Firefighter (or another available member) shall team up and enter the apartment directly over the fire from that fire escape.

   - When there is a front fire escape AND the fire apartment is in the front, the second OV and second Chauffeur (or another available member) shall team up and enter the apartment directly over the fire from that fire escape. (Section 3.2.4, Duties Section 7)

In both situations, they will affect the removal of any occupants but still consider fire severity or extinguishing operations which may endanger them. This task may prove difficult due to bars and gates.

5. When the second OV ventilates the apartment that their inside team is working in, they may speed up their search in this extremely exposed apartment by moving into it from the fire escape if teamed up with another available member and conditions permit.

3.4.7 Roof Position

TOOLS: Handie-Talkie
Flashlight
Halligan
6’ Halligan Hook
For top floor fires the saw and the 6’ Halligan Hook are taken.

POSITION: Roof of the fire building.

1. Make a size-up.

2. Contact the First Roof Firefighter to determine the following:

- Their method of access to the roof.
- Problems encountered if any.
- Need for assistance.
- Need to seek an alternative route.

DUTIES:

1. Assist and confirm all duties of the First Roof Firefighter have been completed. Must team up with another member for efficiency and safety. Whenever possible, the First and Second Roof Firefighters should team up to safely complete roof duties.

NOTE: Never attempt to climb onto or off a bulkhead or similar type structure at a spot near or next to an open shaft or near a building wall that faces on a shaft, areaway, courtyard or street.

2. When necessary, team up with the First Roof firefighter or second OV (or another available member) to search and ventilate all floors above the fire. Remove victims. Pay particular attention to top floor apartments, including the public hall.

3.5 SECOND LADDER COMPANY TO ARRIVE - OPERATIONAL VARIATIONS
(Fires Involving Top Floor and/or Cockloft)

3.5.1 DESCRIPTION In general, top floor fires involving the cockloft result in a heavy smoke condition in all apartments on the top floor, necessitating entry and search for victims and/or extension of fire. Five firefighters staffing in ladder companies requires that the First Ladder Company operates with 3 firefighters (Officer and F.E. team) on the fire floor initially. It is obvious that more help is required on the fire floor. The survival time of victims requires a quick search of all apartments and if the First Ladder Company experiences forcible entry problems at the fire apartment, (numerous locks, police locks, etc.) valuable time is lost.

3.5.2 OPERATIONS

Inside Team - Proceed to the top floor to assist first Ladder Company in entry and search of all top floor apartments. This permits deployment of 6 firefighters (2 officers and 4 firefighters) in a critical top floor area.

Outside Team

A. Roof Position - **proceed to roof with power saw**. Assist First Roof Firefighter on venting roof as ordered and commence opening with saw if required. Assist venting top floor windows from roof level as ordered.

B. OV Position - **vent the fire apartment from the fire escape.** Prior to conducting any horizontal ventilation tactics from the exterior, the second OV shall request permission from the First Ladder Company Officer in order to coordinate ventilation tactics with interior operations. If the first OV has already vented the fire apartment, then the second OV will vent the adjoining apartment as ordered. If entering any apartment to search, they shall team up with each other (or an available member). This position is reached via the fire escape from below.

C. Chauffeur Position - Front of fire building. If not needed here, proceeds to the roof.

1-3. ***Redacted for PFS***

NOTES

1. The critical need for additional members on the top floor is increased when the fire building is a New Law Tenement or other variation due to the large number of apartments and the possibility of extension into the adjoining wing.

2. Depending on severity of fire condition, if difficulty is experienced when venting windows from the roof level, it may be necessary to cut a ventilation hole in the roof before completion of horizontal ventilation.

3. When encountering membrane roofs, the Incident Commander must be notified because the volatility of this roof material may require a line to protect members operating on the roof.

4. SHAFT AND DUMBWAITER FIRES

4.1 GENERAL

4.1.1. Light and Air Shafts - Between Old Law Tenements, either the enclosed or open end type, present a severe exposure hazard to exposed buildings (Figures 4A - 4D). Light and air shafts can also be found within or between apartments, and can result in extension to one or more apartments on the fire floor or floors above.

Figure 4A

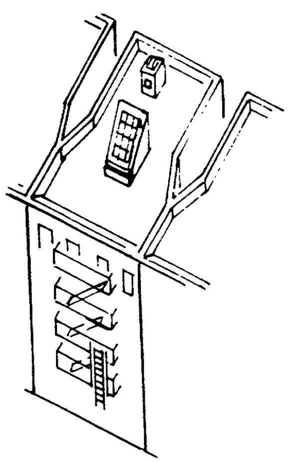


Figure 4B

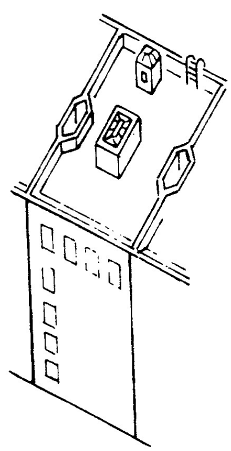


Figure 4C

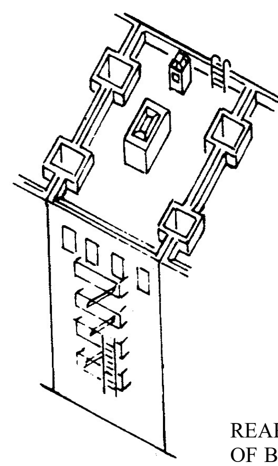
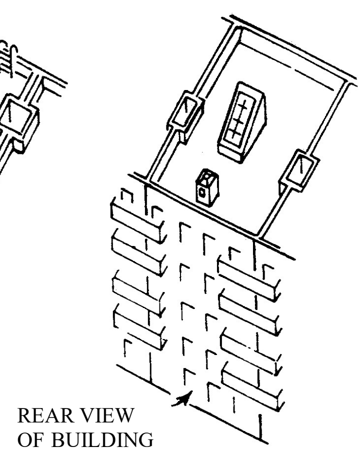
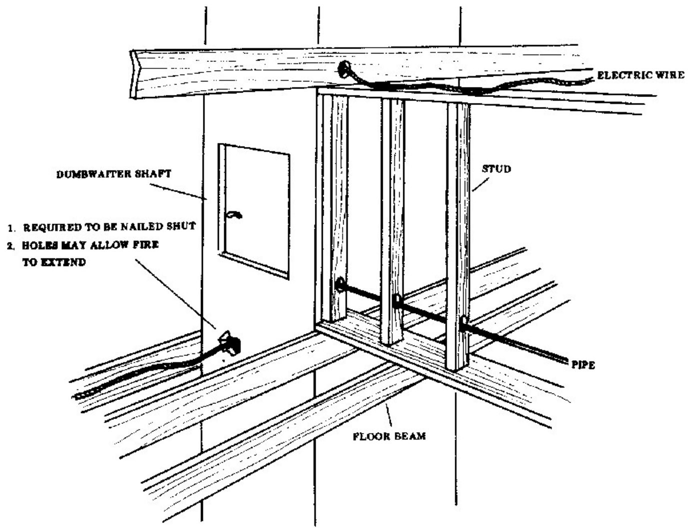


Figure 4D



4.1.2 Dumbwaiter Shafts - Although the use of dumbwaiters has been discontinued in most buildings, these shafts still exist and present a serious potential for vertical and lateral extension of fire. These shafts may extend from the basement to above the roof and may contain electrical wiring, plumbing, compactor chutes, pantry closets, etc. which may allow fire to extend both vertically and laterally. Since some shafts served more than one apartment per floor, each apartment needs to be checked for fire extension. When a cellar fire exposes a dumbwaiter, all floors above must be checked for fire extension.

Figure 4E



4.2-4.3 ***Redacted for PFS***

5. OPERATIONAL TECHNIQUES AND USE OF TOOLS

5.1 ROOF HAZARDS

- Open shafts
- Soil pipes
- Clotheslines
- Sloping cornices
- Walk Through Bulkhead (Figure 3Q)
- Fencing
- Dogs
- Roof level skylights covered with substandard material
- High free-standing walls around perimeter of building commonly found in renovated buildings
- Low or no parapet wall
- TV and radio antennas
- Sloping roofs
- High bulkheads
- Razor wire/barbed wire
- Membrane roof coverings
- Penthouse structures
- High cornices making access from aerial ladder dangerous
- Increased difficulties caused by rain, snow and ice.

5.2 MANEUVERING ON THE ROOF

Upon reaching the roof, your first question should be:

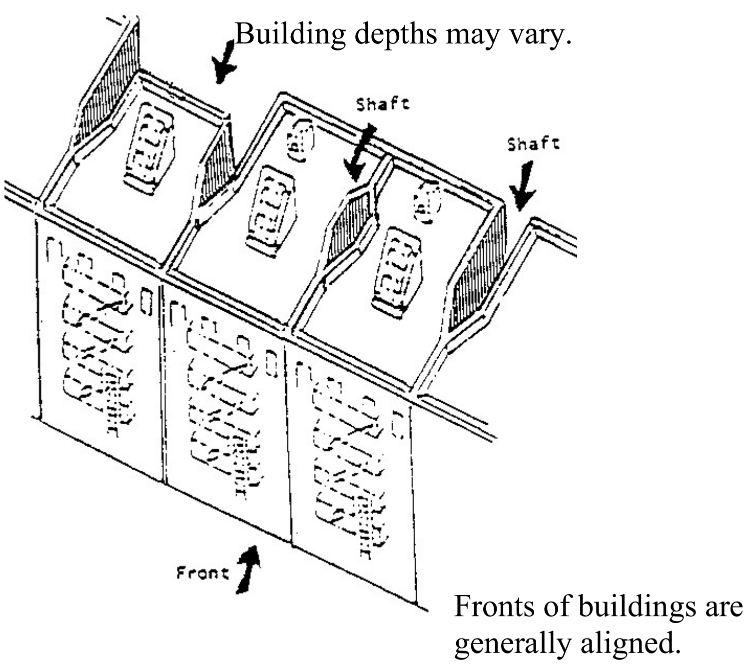
HOW CAN I MAINTAIN MY MEANS OF EGRESS

5.2.1 One of the greatest hazards is the possibility of fire cutting off the escape route. Conditions on the roof often change without warning, cutting off the initial access point. The roof firefighter must plan alternative routes, then continually monitor the fire and its effect on the alternatives for as long as the firefighter is on the roof.

5.2.2 The fronts of buildings are aligned, building depths may vary, and opened end shafts are generally located toward the rear. (Figure 5A) Therefore, if possible, the firefighter moves from one roof to another near the front wall always checking his/her footing as described below. In order to alert members to the presence of openings, roof level skylights and/or scuttle covers if removed, should be placed upside down on the roof. A firefighter encountering an inverted skylight or scuttle must anticipate the opening it previously covered.

5.2.3 Before walking or moving on a roof when visibility is poor, or a heavy smoke condition exists, firefighters should crouch to a kneeling position. Members should probe the roof surface by either swinging a tool or leg in the direction of movement. This is done to note the stability of the roof surface and to determine the presence of holes, shafts and other unobstructed openings. Members operating on the roof should not step over a parapet or wall without first feeling the adjoining surface with a tool. When momentarily blinded by smoke or darkness, and there is no immediate danger to the firefighter, it may be best for the member to remain in place until visibility is restored.

Figure 5A



5.3 TOOLS FOR THE ROOF - THE 6` HALLIGAN HOOK AND HALLIGAN TOOL

5.3.1 THE 6` HALLIGAN HOOK

Figure 5B

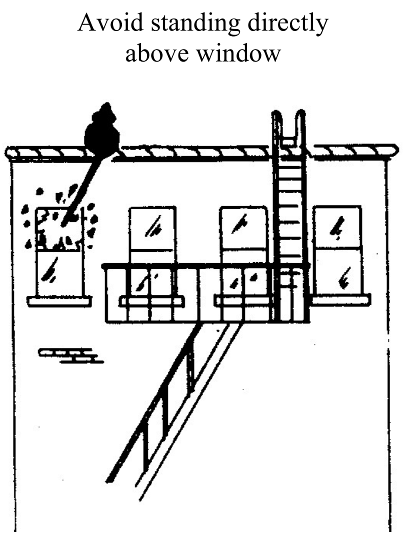
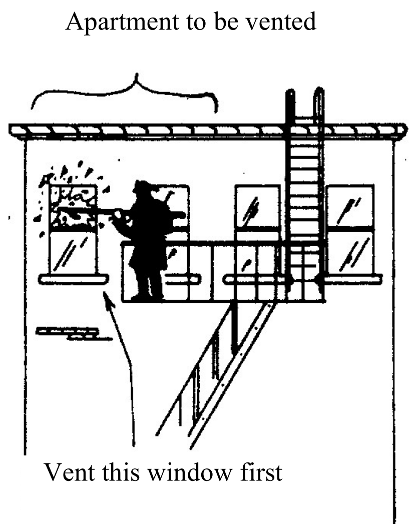


Figure 5C



NOTE: Horizontal ventilation tactics must be controlled, communicated and coordinated with the interior operations. Ventilate as directed by the Ladder Company Officer.

1. For ventilating or removing skylights and probing where necessary.
2. For ventilating windows from above. (Figure 5B)
3. For ventilating from a fire escape. (Figure 5C)

5.3.2 THE HALLIGAN TOOL

1. To loosen bulkhead door from the upper hinge, or to remove the door entirely. (Figures 5D and 5E)

    a. To loosen the door from the upper hinge, open the door slightly and put the fork end of the tool between the door and the door jamb. Close the door on the tool loosening hinge screws, or,

    b. Open the door slightly and put the adz end of the tool between the door and the door jamb. Apply pressure with the tool as shown in Figure 5E.

    c. To remove the door entirely, free both hinges and free the self-closing device.

d. In the foregoing, operate from the roof side of the door and use the door as a shield against heat from the interior.

2. To open windows to gain access from the fire escape. (Figure 5F)

3. To remove metal gates often found on fire escape windows. (Figure 5G)

a. These gates are always on the room side of the window and will first require opening or removing the window. Use either the fork or adz end of the tool to pull the gate loose at the side opposite the locking device. The gate is attached to the window frame with wood screws.

b. If severely exposed to heat or smoke at this side of the gate, removal may be accomplished at the lock side.

Figure 5D

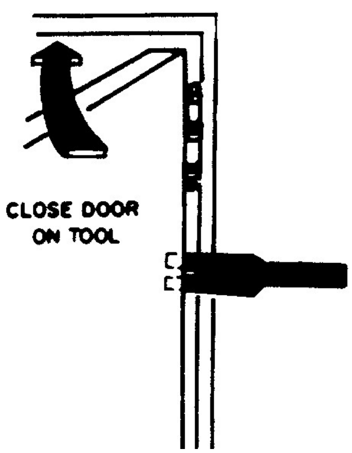


Figure 5E

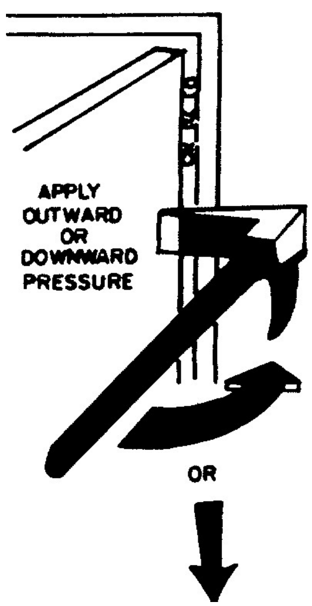


Figure 5F

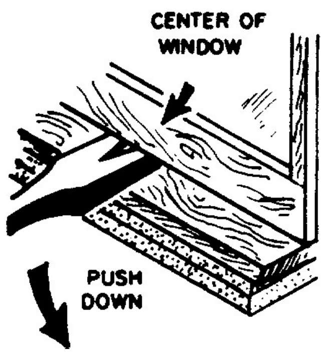
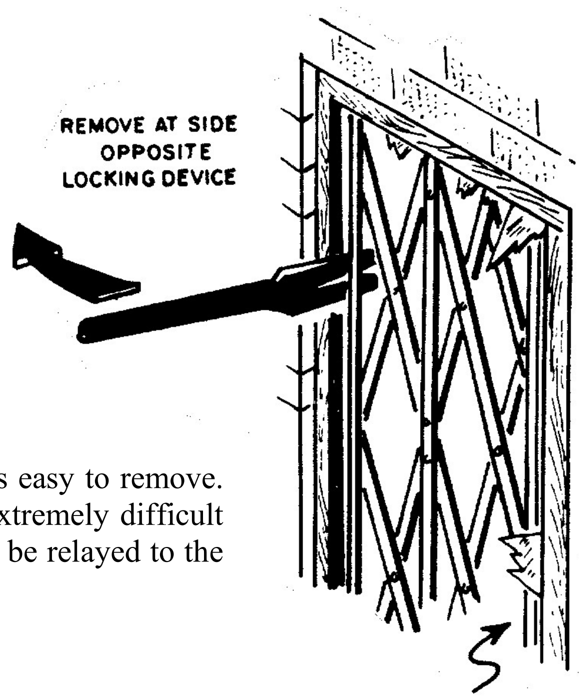


Figure 5G



NOTE: Newer style gates may not be as easy to remove. Formidable mounting may be extremely difficult to force. This information must be relayed to the inside team**.**

5.3.3 SPECIAL USES OF THESE TOOLS

A. Use both to assist climbing onto a high bulkhead when alone. (Figure 5H) The Halligan is placed with the fork end down and the adz end up. When coping is present remove a piece and hang the hook on the bulkhead`s edge. Using the 6' hook to support most of your weight, step on the adz end of the Halligan and pull yourself up. While climbing the hook, exert a downward pressure and do not push against the wall with your feet. This lateral pressure may cause the hook to slip off the bulkhead wall. The intent is to enable the roof firefighter to reach the top of the bulkhead with both hands. Once this is achieved, they should be able to work themselves up onto the bulkhead.

NOTE: Never attempt to climb onto or off a bulkhead or similar type structure at a spot near or next to an open shaft or near a building wall that faces on a shaft, areaway, courtyard or street. (Figure 5J)

B. Use removed door in conjunction with the Halligan to gain access to the roof of a bulkhead. Drive the hook of the Halligan into the roof. Then position the door against the bulkhead at an angle of 30 to 45 degrees with the roof. The Halligan serves as a stop and should be at a sufficient distance from the bulkhead to permit the proper angle. The door can be used as a ramp. The Halligan should be parallel to the bottom of the door for safety reasons. (Figure 5I)

Figure 5H

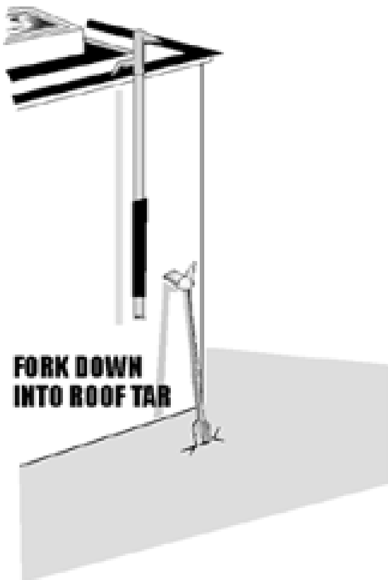
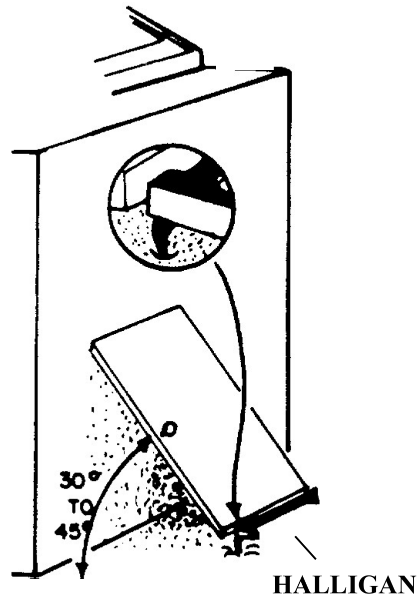


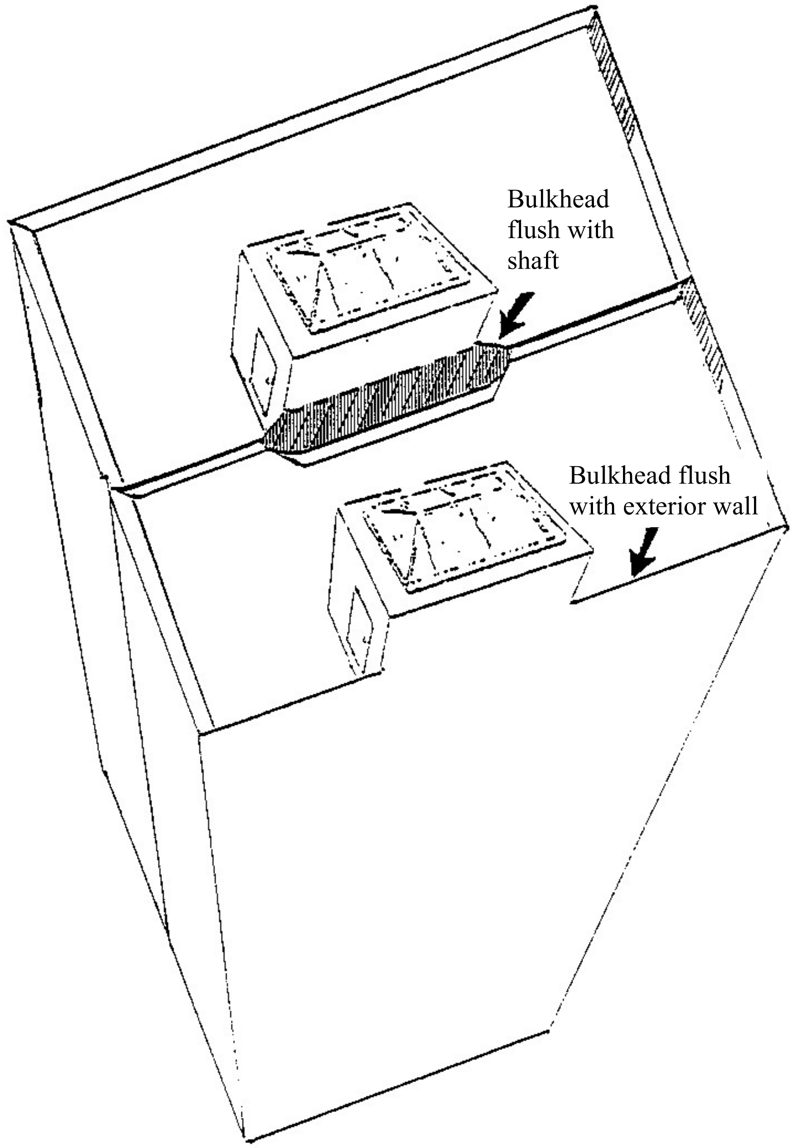
Figure 5I



C. After gaining access to and venting a high bulkhead, the roof firefighter should get off the same place where they gained access. This allows the firefighter to descend at a location that they are familiar with. Some bulkheads are erected flush with an exterior wall (i.e., one side of the bulkhead is a continuation of a building). This reduces the selection of an egress from the bulkhead. If in doubt the firefighter may drop an object (a tool if necessary) and listen for the sound of it hitting the roof surface. (Figure 5J)

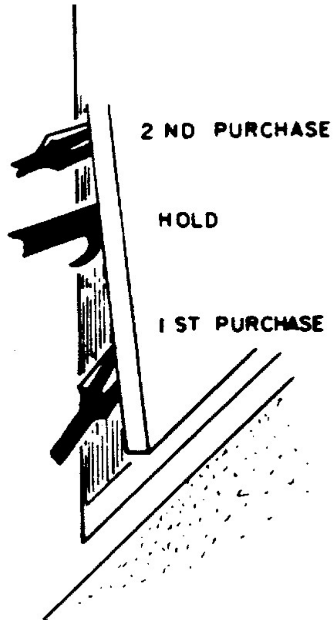
Figure 5J

Venting a Bulkhead



D. Difficult bulkhead doors that are fastened on the inside. - Even if these doors are tight against the door jamb there will usually be enough space between the bottom of the door and the sill to get a purchase. The bottom of the door is pulled outward. Alternately using the Halligan tool and the hook, the firefighter works upwards until the adz or fork end of the Halligan is near the fastening. Prying out will break or dislodge the fastening. In this operation the hook is not used for prying, but merely to hold the advantage obtained, enabling the Halligan tool to be shifted to a new position. (Figure 5K)

Figure 5K



Use Adz or
Fork End of
Halligan

E. When pushing down the ceiling from the roof, reverse the hook because BX wires may snag the hook end.

5.4 FEATURES AND CONDITIONS INFLUENCING OPERATIONS

5.4.1 SIZE UP EXTERNAL FEATURES - A quick visual check should be made by all ladder company personnel as they approach the fire building. No time is lost and the information so obtained will undoubtedly increase the efficiency of the unit. Take note of:

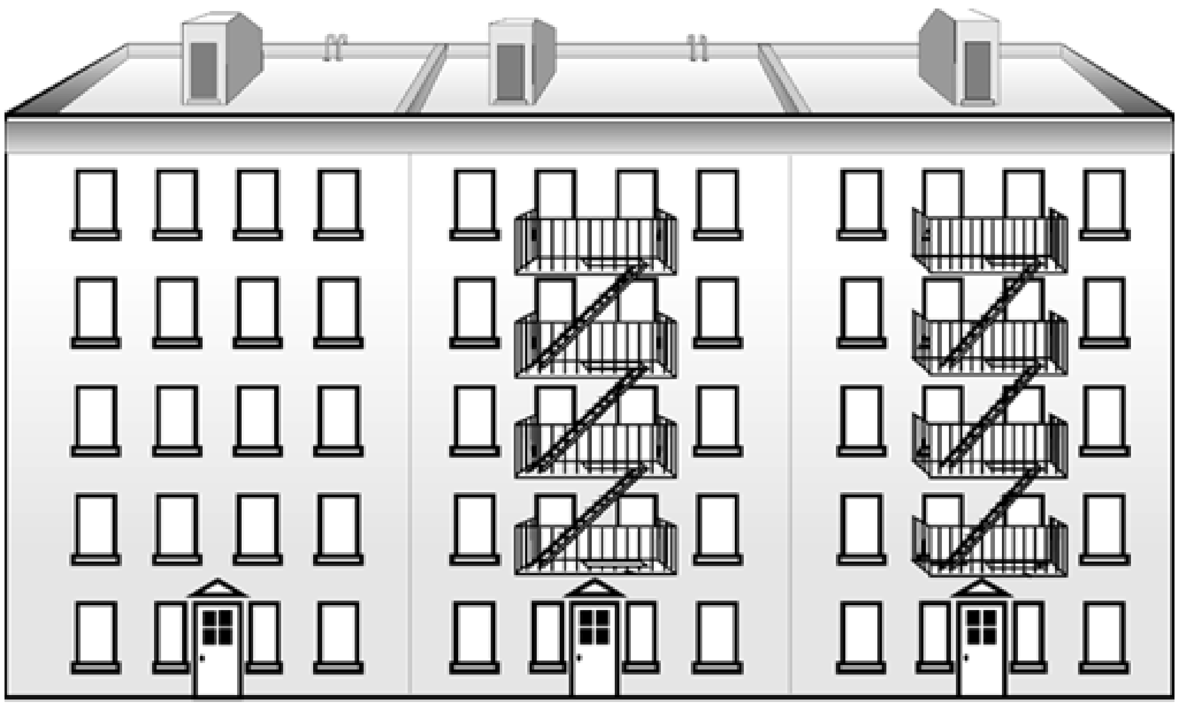
- Visible life hazard
- Height in stories
- Adjoining Buildings
- Location of fire floor and fire
- What is the ventilation profile of the fire building
- Number of windows on each floor in front of the building
- Party balconies
- Fire escapes

NOTE: Most OLT`s are over 100 years old. During this time the fire escapes have been constantly exposed to the elements. They shall be used with extreme caution.

A. When the building has four (4) windows per floor and no front fire escape, it indicates two (2) railroad flats (Old Law Tenement) with a rear fire escape. (Figure 5L) This does not necessarily apply to a corner building.

B. When the building has four (4) windows per floor and a front fire escape, it usually indicates three (3) or four (4) apartments per floor with another fire escape in the rear. (Figure 5M)

C. The ever-dangerous exception to this are those buildings with railroad flats whose secondary means of egress is a front fire escape. The absence of a rear fire escape is of major concern for the safety of the operating forces. This information should be relayed immediately. *(*Figure 5N*)*



5L **5M** **5N**

5.4.2 INTERIOR SIZE UP - Inside team will gain important operational information by observation. In addition to observing the fire escape situation described above, they can generally determine the number of apartments per floor by:

A. Counting the number of mail boxes on each wall of the building entrance hall. This can be done with a glance and no waste of time. *For example*: five mailboxes on each side in a five-story building would mean railroad flats. Likewise, ten on each side would mean four apartments per floor. A glance at both sides is necessary as occasionally all mailboxes will be on one wall.

B. The apartment numbering and lettering system is also an indicator. Apartments designated 1S and 1N or 1W and 1E on the first floor and 2S and 2N or 2W and 2E on the second floor, will generally mean two apartments per floor. Any other numbering or lettering system frequently indicates more than two apartments per floor.

C. Most Old Law Tenements have four doors on each floor, but this is not always an indication that there are four apartments. (When forcing entrance to an apartment with two doors, choose the door normally used for entrance.) Choosing the other door might result in a time delay because of furniture placement or the manner in which the door is secured (nailed, bolted etc.). Most railroad flats have the kitchen in the rear so that normal entrance doors will be the rear doors. On occasion the life hazard and/or location of the fire would dictate advancing the line through the other door; this situation would involve close coordination with the engine company.

5.4.3 ROOF LEVEL SIZE-UP

A. Smoke may be seen issuing from the cornice upon arrival. Without investigation this cannot be taken as positive evidence that there is actually fire in the cockloft. The tin facing is loose fitting and the smoke readily shows at these openings. The only valid conclusion that can be drawn is that smoke and heat are entering the cockloft. Under no conditions should the cornice be opened for smoke. If still doubtful about the existence of fire in the cornice or cockloft, it can be examined by opening the ceiling below, or opening the returns if present. This is a quicker and easier operation than opening the roof. Roof openings to relieve fire conditions in cockloft or top floor should be cut directly over the fire or as near as safety permits.

NOTE: To determine placement of opening:

- Soft spot or bubbles
- Melting snow or ice
- On a wet roof, steam rising or a dry spot
- Sense of touch at the base of soil or waste pipes
- Knowledge of fire location gathered on travel to the roof
- Looking over roof edge
- Handie-Talkie Communication

B. A rapidly rising column of smoke, with particles or embers ascending to higher levels, visible over the roof top of the building frequently is an indication that the fire is in an open shaft. Due to the shafts area and the heat created therein, the appearance of this heated column is readily distinguished from that rising from a chimney.

C. Large quantities of black smoke (burning tar) observed over the roof may be an indication of fire at or near the top of the building, namely, top floor fire, cockloft fire, stair bulkhead fire or a fire on the roof.

D. When encountering membrane roofs, the Incident Commander must be notified because the volatility of the roof material may require calling for a line to protect members operating on the roof.

5.5 SEARCH FOR LIFE

A search is an orderly and systematic examination of a building or area for the purpose of locating persons, or locating fire and extension of fire. It consists of a primary and secondary search.

5.5.1 **Primary Search** - Is an immediate search for life. This primary search is rapid but thorough and systematic.

5.5.2 **Secondary Search** - Is a thorough and painstakingly complete search, to ensure that no possible victims are overlooked, as children may hide in closets or under beds or in bathrooms. The secondary search must also include the entire perimeter of the building and all shafts, basements/cellars, etc.

Firefighters must be aware that removal of draperies or curtains and the moving of large objects, or furniture although frequently necessary, may hide a victim or seal off a closet or other area being used as refuge.

Another area that will frequently hide a victim is the entrance door. As a victim will usually try to reach a means of egress, they often can be found in the vicinity of or behind the entrance door.

Officers of units performing search shall be certain that the area in the vicinity of the entrance door, and behind the entrance door are searched for possible victims. After a quick check of this area the room or apartment search can begin.

Edited for PFS

5.5.3 The public hallway and the entire staircase up to the roof bulkhead door must be examined as soon as possible for those civilians who unsuccessfully attempted to use the interior stairs.

5.5.4 When searching or examining a number of apartments it may be quicker to enter from the related fire escape then to force numerous doors. This does not change normal forcible entry procedure for access to fire floor and the floor immediately above.

5.5.5 If for any reason a thorough search of an area has not been completed the firefighter's officer must be informed and a carefully executed follow-up search shall be initiated. Search for life shall not be confined to the structure alone. The perimeter of the building, shafts, courtyards, etc., must be checked for victims who may have jumped or fallen.

5.5.6 Since the first Ladder Company is responsible for the fire floor, it shall conduct an exacting primary search on this floor as soon as conditions permit. The second ladder company, which is responsible for the floors above the fire, should conduct a thorough primary search on all floors above the fire. Upon completion of the primary searches, the secondary searches shall be conducted as soon as conditions permit and shall be conducted by units other than those who conducted the primary search of these areas.

5.5.7 Fire Floor - After opening the door, the inside team may find conditions too severe to enter before the Engine Company has their line charged and are prepared to advance. In this instance they should probe the area with a hand or tool, then close the door, being careful that the door does not lock. When the Engine Company has water, immediately crawl in behind the engine company to search and ventilate all rooms.

The Officer of the inside team must be notified before venting is attempted by the OV. After venting, this firefighter shall team up with another available member prior to VEIS. If entry is not possible, this firefighter shall probe the immediate area with hand, foot, or tool. If the adjoining apartment is charged with heat and smoke, the officer of the inside team must be notified by the firefighter that their entry will be made into this adjoining apartment for VEIS when they have teamed up with another available member.

5.5.8 Floor Above - The second ladder inside team is assigned an extremely difficult position in the apartment over the fire. Prior to proceeding above the fire, the second arriving officer should ensure that the officers on the fire floor are made aware of his/her intentions so that those operating above can be warned of any situation necessitating withdrawal. Initially, they may not always be able to attain this objective, however, they should make an aggressive attempt to gain a foothold on this floor while keeping in mind a safe means of egress. Access to the apartment above the fire may be gained via:

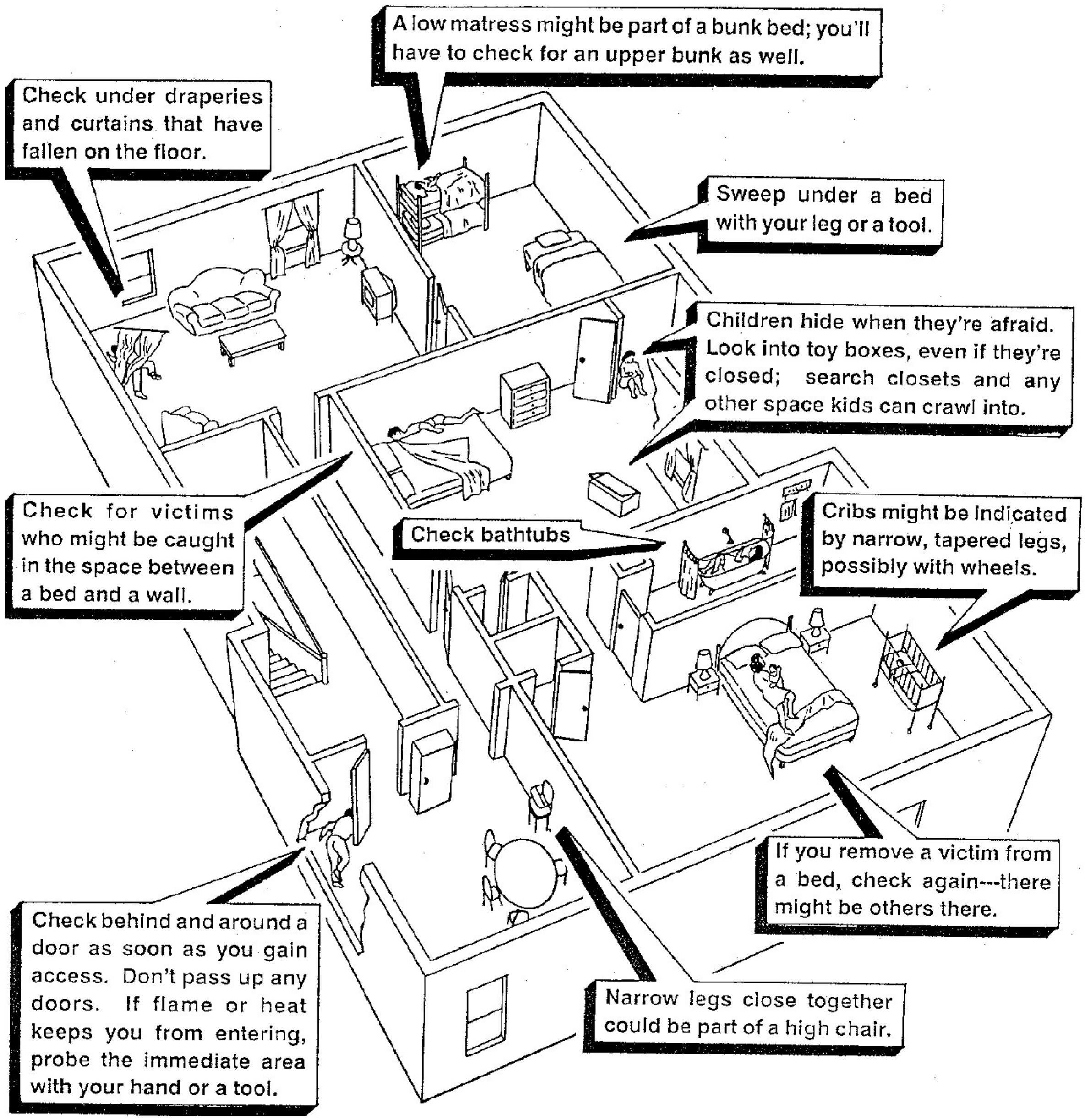
- Interior stairs
- Fire escapes
- Through a common partition wall
- By crawling across the public hall from a tenable apartment on the same floor if conditions permit
- Aerial/portable ladder

5.5.9 All members operating above the fire must be constantly alert to conditions on the floors below them. The existence of resources to control the fire situation on the fire floor does not guarantee that their position will remain tenable.When operating on the floors above the fire, members should force one or more doors on each floor to provide an area of refuge if they have to vacate the interior stairs. If you cannot gain entry into a safe area and the attack line is in position and ready to advance, you must immediately return to the fire floor, before the door to the fire area is opened. You must not delay the start of fire extinguishment.

NOTE: The engine and ladder company officers operating on the fire floor must make the units above aware of any conditions affecting their safety. These officers are responsible for the control of the door to the fire apartment.

5.5.10 PRIOR TO PROCEEDING TO THE FLOOR ABOVE, ALL OF THE FOLLOWING SHOULD BE CONSIDERED:

1. Life hazard. (known or suspected ?)
2. Status of line.(charged or uncharged ?)
3. Door to fire area.
    - Forcible entry complete ?
    - Integrity of door ?
    - Control of door ?
4. Location and volume of fire.
    - Fire in front or rear of apartment.
    - Light medium or heavy fire condition.
5. Has ventilation of fire apartment been effected ?
6. Is roof vented. (skylight, scuttle, bulkhead ?)
7. Type of occupancy. (OLT or NLT ?)
    - Number of apartments ?
    - Location of fire escapes ?
    - Interior stairs (combustible or non combustible ?)
    - Construction of apartment doors ?
    - Has building undergone renovations introducing many voids ?


A low matress might be part of a bunk bed; you'll have to check for an upper bunk as well.
Check under draperies and curtains that have fallen on the floor.
Sweep under a bed with your leg or a tool.
Children hide when they're afraid. Look into toy boxes, even if they're closed; search closets and any other space kids can crawl into.
Check for victims who might be caught in the space between a bed and a wall.
Check bathtubs
Cribs might be indicated by narrow, tapered legs, possibly with wheels.
If you remove a victim from a bed, check again---there might be others there.
Check behind and around a door as soon as you gain access. Don't pass up any doors. If flame or heat keeps you from entering, probe the immediate area with your hand or a tool.
Narrow legs close together could be part of a high chair.

5.6 VENTILATION

The controlled, communicated and coordinated removal of heat and smoke from a structure and the replacing of the escaping gases with fresh air to facilitate other fire fighting priorities.

5.6.1 ***Redacted for PFS***

5.6.2 Vertical Ventilation - Entails opening the bulkhead door, roof scuttle, skylight and cutting of the roof.

5.6.3 Horizontal Ventilation - Entails the opening or removal of the windows or the opening of the door leading to the fire apartment or area.

5.6.4-5.6.5 ***Redacted for PFS***

5.7 VENTILATION OPERATIONAL PROCEDURES

5.7.1 ***Redacted for PFS***

5.7.2 Ventilation for Extinguishment - Is the controlled and coordinated ventilation tactic which facilitates the Engine Company's extinguishment of the fire. This tactic must coincide with the application of water on the seat of the fire. Once a building is horizontally ventilated the time for effective extinguishment is limited since the fire will rapidly expand.

This ventilation tactic entails venting the window(s) of the immediate fire area as the Engine Company is extinguishing the fire. The member on the exterior may be in position prior to the hoseline placement and must coordinate their actions to prevent premature ventilation. Premature ventilation can precipitate fire extension, endangering occupants and firefighters.

Edited for PFS

5.7.3 Ventilation for Search - Is the horizontal ventilation tactic performed to facilitate the movement of a member into an area in order to conduct a search for a life hazard, which has the inherent risk of pulling fire towards the ventilation entry point. This action needs to be communicated to the Ladder Company Officer as the ventilation may also negatively impact the members operating in the interior.

Edited for PFS

When a fire progresses past the incipient stage the fire area is considered an IDLH atmosphere. Every member entering an IDLH atmosphere must be equipped with personal protective equipment and a self contained breathing apparatus. No member shall enter, leave or operate in an IDLH atmosphere unless the member teams-up with a least one other member and remains in visual or voice contact with that member. Each member of the search team shall know the company identity and assigned position of the other members of the search team. Handie-talkies or other electronic communication devices are not acceptable to replace visual or voice contact. At least one of the members must be able to contact a handie-talkie equipped member of the safety team outside of the IDLH atmosphere.

The only exception to this Federal mandated standard for the teaming of members, is when a known life hazard is found an immediate action could prevent the loss of life. This does not apply to standard search and rescue procedures.

A known life hazard is defined as follows:

- A victim can be seen by the rescuer
- A victim can be heard by the rescuer
- A member has information from a credible source or a person at the scene indicating the location of the life hazard

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5.7.4-5.7.5 ***Redacted for PFS***

5.8 VENTILATION TECHNIQUES

NOTE: All horizontal and initial vertical ventilation tactics must be controlled, communicated to and coordinated by the ladder company officer.

5.8.1 Venting from the fire escape - When venting the windows of the fire apartment from the fire escape first check them for heat.

- See if they show cracks from the heat.
- Look for discoloration of the glass (generally brownish) from the heat.

If above observations indicate extreme heat, the fire may momentarily vent itself or light up as you ventilate. To safely vent both windows, first break the window off the fire escape and then the window on the fire escape. (see figure 5R) If the fire escape window is vented first, fire or heat from this window may prevent venting the other window.

NOTE: EEWs may not give any of these indications; contact Ladder Company Officer before VEIS.

5.8.2 Venting from above - When venting the windows of the fire apartment from directly above by use of a 6` hook (Figure 5Q) and an intense fire is suspected, the possibility of fire rolling up the side of the building when air is admitted must be considered. For safety the firefighter should:

- Look down at the window to be removed.
- Measure the distance with the tool.
- Pull head back in the window and then swing the tool through the window below. The firefighter hand and arm will be protected by their clothing.

5.8.3 All members should carry a utility cord for use in operations, e.g., venting of windows on lower floors, guide line during search, raising or lowering tools or hose, etc.. (Figure 5S)

Figure 5Q

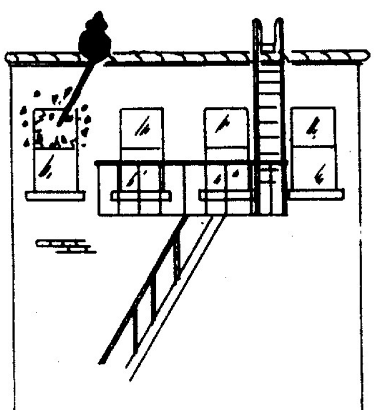


Figure 5R

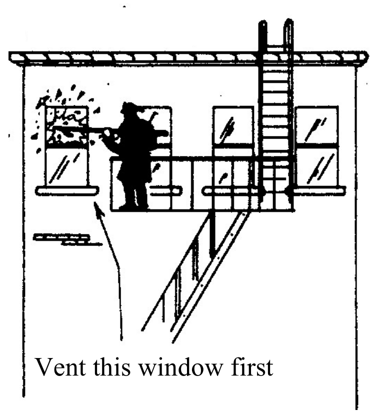


Figure 5S

NOTE: Utility cord is not to be used for life saving purposes.

5.9 CUTTING THE ROOF (TOP FLOOR FIRE)

To be successful, the roof operating forces must fully understand the following:

5.9.1 *WHY* - Prevent horizontal spread and ventilate top floor.

5.9.2 *WHEN* - After initial roof ventilation, (bulkhead, skylights, scuttles, windows, etc.) when a serious fire occurs on the top floor or in the cockloft. In all fires it is still of paramount importance to provide initial ventilation before getting involved in the slower work of cutting the roof.

Once the roof firefighter has performed any ventilation tactics they should communicate the impact on the ventilation profile of the fire. For example, "L-123 roof to L-123. Skylight is vented, we opened the roof about 20' from the rear wall on the exposure 2 side. We have heavy fire venting through the opening"

5.9.3 *WHERE* - If possible, directly over the fire. To determine this location, check for:

- soft spots
- melting snow or ice
- wet roof, steam or dry spot
- sense of touch-on the base of soil pipe or vent pipe
- knowledge of fire location gathered on travel to roof
- looking over roof edge
- Handie-Talkie communication

5.9.4 *HOW MUCH TO CUT* - Initially approximately a 3\`x6\` coffin cut is recommended:

- it is more manageable
- it can be quickly expanded to a larger hole

It avoids the problems associated with holes cut in a roof:

1. *Too large* - Too time consuming, causes delays.
2. *Too small* - Will not grant desired relief and once opened, smoke, fire, and heat might make it too difficult to open further.
3. *Too many holes* - Unsafe. One large expandable hole is more efficient and safer than many smaller holes.

5.9.5 The saw is designed that whenever possible; roof boards and coverings shall be cut in one operation. Sometimes the cut section can be lifted in one piece. When this cannot be accomplished, remove the roof covering first, then the roof boards. When many layers of roof covering are encountered, the saw blade may bind.

5.9.6 Sequence - The size and location of the opening will depend on fire conditions. A suggested method to make an expandable opening "COFFIN CUT" is as follows:

A. Assume wind is blowing in direction indicated. (Ideally at your back)

B. Cut #1 approximately 3 feet.

C. Cut #2 "knock out" corner cut for tool insertion.

D. Cut #3 approximately 6 feet.

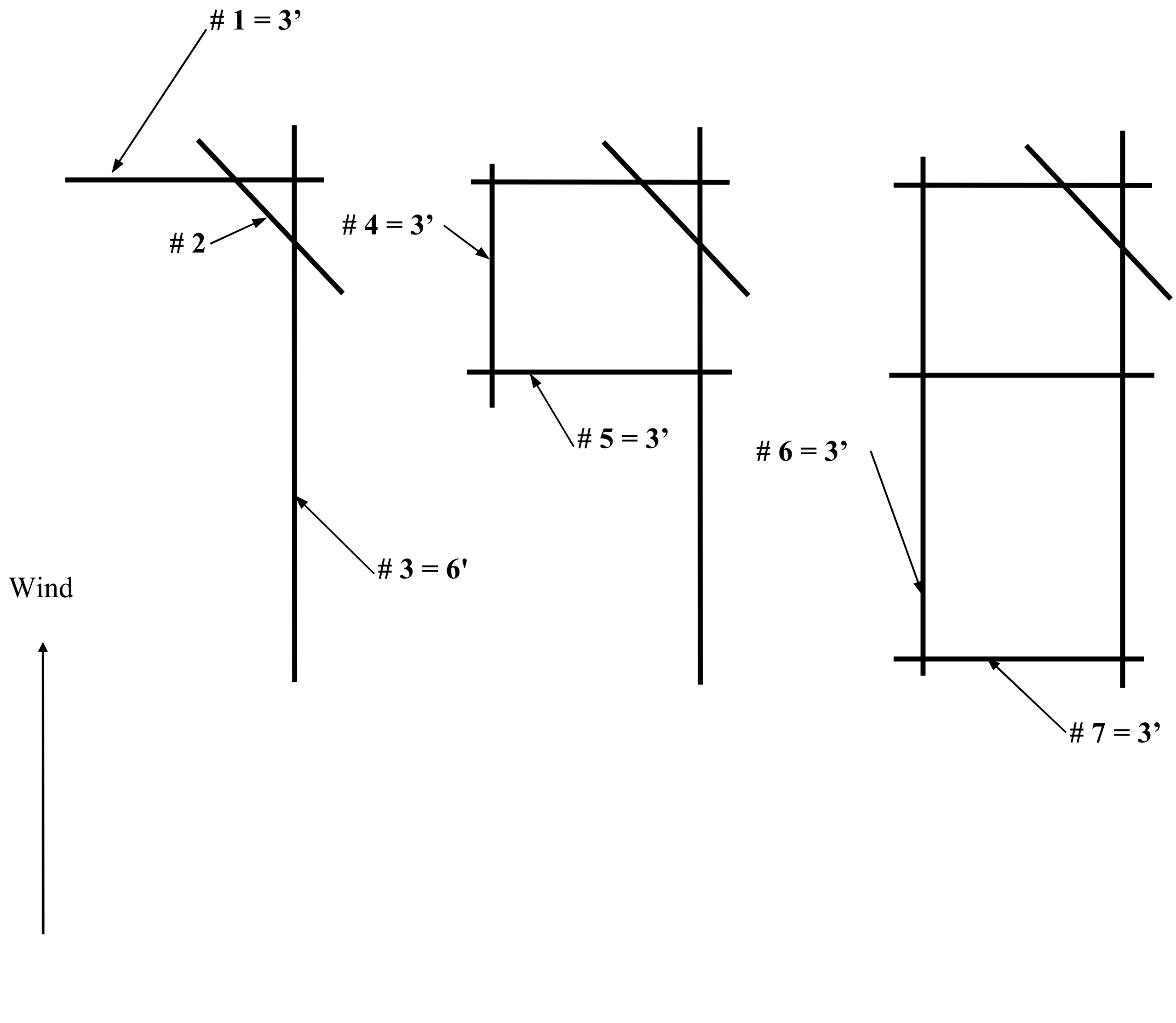
E. Cut #4 to #7 approximately 3 feet.

F. Leave removed pieces of roof section next to opening to warn operating forces.

G. If larger opening is needed, additional opening can be made in like manner. (Continuation of cut in desired direction)

H. Make sure that roof is not opened before cut is completed.

I. Push down ceiling to complete ventilation.



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NOTE: When a fire is burning in a top floor apartment, it is not efficient to wait until the fire is "knocked down" before examining the cockloft. An early inspection can be made by going to a room adjacent to the fire (in the same or adjoining apartment) and opening an observation hole in that ceiling. If fire can be seen burning in the cockloft, the observation hole should not be expanded until a charged hoseline has been positioned. It is a good practice while waiting for the charged hoseline to ventilate all windows in the apartment, because once the ceiling is opened the floor will quickly become filled with smoke. This is also the time to make sure that a roof ventilation hole is being cut directly above the fire.

5.9.7 ***Redacted for PFS***

5.9.8 OPERATIONAL NOTES:

A. When roof stability is in doubt, members must be removed and the incident commander immediately notified.

B. After cutting the roof the member must also push down the ceiling in order to relieve conditions on the top floor. Using the back of the hook is usually more efficient to push down the ceiling.

C. Members should always cut with the wind at their back to minimize personal exposure.

D. A hose line may be necessary on the roof to protect members from roofing surface fires. (Membrane)

NOTE: Effective roof ventilation at top floor fires that have extended to the cockloft will be adversely affected or nullified by the operations of streams into or immediately above these roof openings. This not only prevents or retards the vertical movement of heat, smoke and gases but frequently reverses this flow thereby contributing to lateral spread in the cockloft area while intensifying heat and smoke conditions on the top floor which will handicap or halt the interior attack.

5.9.9 SAFETY CONSIDERATIONS:

A. Try to avoid cutting holes outside bulkhead doors, gooseneck ladders, or other paths of travel.

B. Member cutting roof must **ALWAYS** be assured of a way of getting off the roof.

C. Members cutting hole should beware not to endanger other members operating on the roof.

6. ESCAPE

Escape Routes

Proper operation at an intense fire in an Old Law Tenement generally requires that a part of the operating forces be in severely exposed positions if we are to properly perform our search and or rescue mission. The fire condition also requires the ladder chauffeur to remain in front of the building with his/her apparatus anticipating the location of other members and be prepared to position the aerial ladder to provide egress for them when necessary. This, in addition to the member's other previously assigned duties. If early extinguishment is not accomplished, these members will have to withdraw by means of interior stairs, fire escapes or ladders. When these means of escape are cut off an emergency means will have to be considered, such as breaching a wall or partition to an uninvolved area or to a safe means of egress.

6.1 In Old Law Tenements, the infrequently used procedure, of going from front to rear apartments or vice versa through the common partition may also be used as an escape route. To accomplish this:

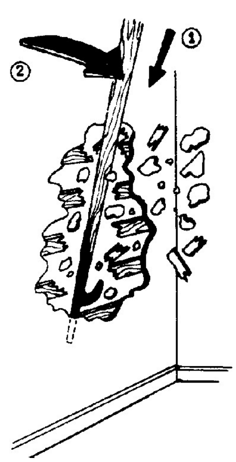
6.1.1 Use the halligan, hook or axe. This is the order of preference, but all can do the job.

6.1.2 Start low. Punch a hole slightly below waist level.

- This places hole under possible fire stopping between studs
- Work is less punishing at this level
- It is easier to push the opposite side of the wall off the studs

6.1.3 The tool is placed in a bay with the bottom anchored against the opposite side of the partition. The firefighter then pulls the tool towards themselves using short strokes to snap the lath off on their side. Best results are obtained when the opposite side is kept intact until near side is completely removed. (Figure 6A)

Figure 6A



6.1.4 With the sole of his/her boot, the member can kick the lath off the far side of the bay.

6.1.5 The member then uses the Swim Move or the Reduced Profile Maneuver (as per Training Bulletin-SCBA) and quickly moves through the opening.

7. *Redacted for PFS*

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TOWER LADDER OPERATIONS
VOLUME 3 BOOK 6
CHAPTER 1
October 1, 2019

THE TOWER LADDER

1. INTRODUCTION

Photo 1

- Tower Ladders were first introduced to the fire service several decades ago. Today, the FDNY currently utilizes 75' and 95' Tower Ladders strategically placed throughout the city. Working in a Tower Ladder unit requires focus on the concept of teamwork. Members should approach every challenge as an opportunity and strive to respond to a given situation rather than react to it.

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1.1 STABILIZER SUPPORTS

- The apparatus is equipped with four corner jacks and two hydraulically-extended outriggers (stabilizers). The outriggers, when fully extended, produce a solid foundation for the apparatus during operations involving the Tower Ladder bucket. All stabilizing components are equipped with locks (pins) that **must** be inserted manually in case of hydraulic failure.

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- Tower Ladders are not designed to operate with outriggers and jacks down on one side only. If the apparatus is not level, lower the jacks and outrigger on the low side first, followed by the jacks and outrigger on the high side until the green lights indicate that all stabilizers are properly deployed.

- ***Redacted for PFS***
- All members exiting the apparatus should alert the chauffeur of street conditions (manholes/hose lines/curbs/potholes) that may impact apparatus placement in addition to potential jack/outrigger clearance obstructions.
    - Stabilizers should not be lowered into deep sand or mud as these surfaces will not support the apparatus
- When encountering streets that are narrow and lined with parked cars, the apparatus may have to be positioned so that an outrigger can be placed between parked cars. (Photo 3) A Guide Firefighter, typically the Outside Vent Firefighter, should assist the chauffeur in positioning the apparatus so that the outriggers will clear parked cars and other obstructions such as hoselines, manholes, curbs, etc. The Guide Firefighter may obtain additional clearance by tilting the hinged outrigger pad. (Photo 4)
    - Using the "knuckle" at the bottom of the outrigger as an initial marker may help chauffeurs assess clearance between parked vehicles. (Photo 5)
    - Presetting apparatus side spotlights may provide an estimate of the final outrigger location at night.

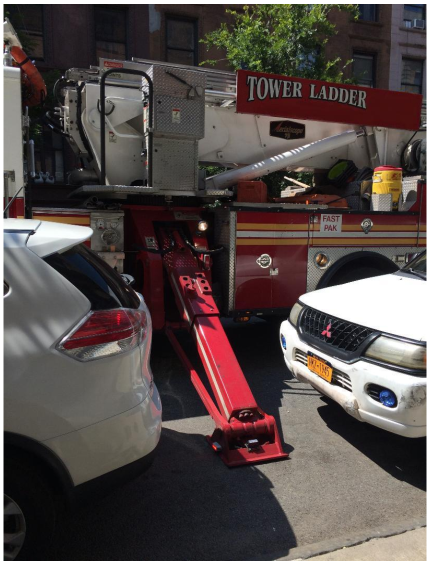

Photo 3 - Outrigger between Parked Cars

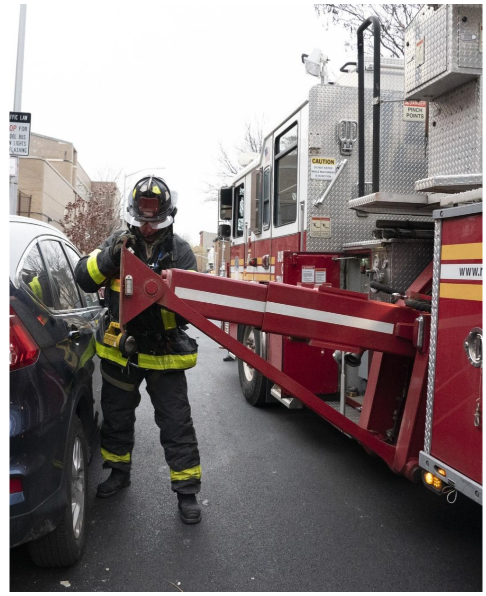

Photo 4 - Hinged Outrigger Pad

Photo 5

- The Guide Firefighter is to remain in position until the outrigger is fully lowered on the operator's blind side. Coordinating with the chauffeur at each response will serve to reinforce to the Guide Firefighter that he/she should remain with the apparatus until released for other firefighting duties.
- When operating with a 75' Tower Ladder, a 6' hook may be utilized as a gauge to determine if the outriggers will clear all obstructions. (Photo 6) When the apparatus is set on an angle, ensure that the measurement is taken from that part of the outrigger that is nearest to the obstruction. This method may not be used with a 95' Tower Ladder as the clearance needed for the outrigger to an obstruction is 6'8".

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Photo 6 - Measuring Clearance with a 6' Hook

- The preferred placement of manual pins for **outriggers** shall be at the **lowest** hole available once extended. (Photo 7) The preferred placement of manual pins for **jacks** shall be at the **highest** slot available once extended. (Photo 8)

Photo 7 - Outrigger Pin Positioning

Photo 8 - Jack Pin Positioning

- Tower Ladders have indentations in the turntable to accept outriggers. (Photo 9) This necessitates that:
    - Outriggers must be moved clear of the turntable before operating the boom.
    - The boom must be returned to its original position (turntable arrow markings aligned) **before** outriggers are bedded.

Photo 9 - Turntable Indentation

- If a member commences to set up a Tower Ladder apparatus for an operation and then decides to abort the operation, the member must return all outriggers and jacks to the pre-setup position.

1.2 PEDESTAL (TURNTABLE) CONTROLS AND BOOM ASSEMBLY

Note: For the purposes of this bulletin the terms “pedestal” and “turntable” are interchangeable.

- The turntable is located behind the crew cab and is capable of rotating 360 degrees. An audible alarm will sound when boom operations are in close proximity to the cab.
- Attached to the turntable is a four-section telescoping steel/aluminum boom assembly with a self-leveling bucket that is connected to the last boom section.

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- All jacks and outriggers must be fully lowered whenever the Tower Ladder bucket is to be used, and remain lowered until the boom is bedded. Members spotting placement of the apparatus must ensure jacks and outriggers are not positioned on hoselines.

- ***Redacted for PFS***

1.3 BUCKET

- The bucket is the primary work area of the Tower Ladder apparatus. Mounted inside is a single-handle joystick used to control movement from an elevated position. (Photo 13) The handle contains a trigger that must be depressed to activate the system and the engine throttle control. All three boom functions (raise/lower, rotate left/right, extend/retract) can be performed simultaneously. Using two hands when operating the bucket, one hand on the joystick and the other hand cupping the collar, will facilitate better control for precise movement. (Photo 14)


Photo 13 - Bucket Control


Photo 14 - Two-Hand Positioning

- Due to lack of space, the number of firefighters operating in the bucket should be limited to two.
    - Each member operating in a Tower Ladder bucket must personally verify the placement of both door latches in the locked position prior to movement (Photo 15) and ensure proper use of the installed safety belt (Photo 16) or life belt/personal harness secured to a substantial part of the bucket (one of the bucket posts or the waterway) prior to raising the boom from a bedded position.

      Note: Bucket railings are NOT a substantial part of the bucket and shall NOT be used as a substantial object when tying off.


Photo 15 - Swing Gate Latch

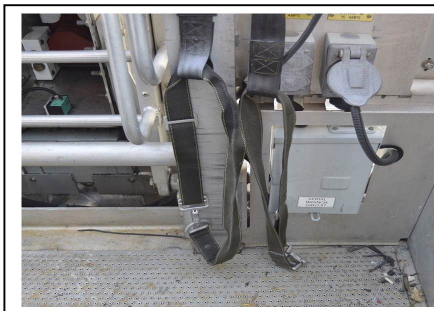
Photo 16 - Safety Belts

- Under normal conditions the member operating from an elevated position should control movement of the bucket. However, the member on the pedestal should take over when delicate maneuvers are required, as long as this member's line of sight is not obstructed.
- Feathering is a deliberate flying technique achieved by slight intermittent movements (or pauses) of the joystick from the "NEUTRAL" position facilitating smooth bucket operation.

  Feathering Technique:

    - With back to turntable, position body as close to joystick as possible.
    - Place right hand on joystick handle, allowing index finger to depress trigger.
    - Place left hand at collar base of joystick allowing for maximum control.
    - Pull up on the joystick, raising the bucket clear of the cradle, preparing for rotation.

- Once desired height is reached, ease the joystick to the “neutral” position.
- Slowly “feather” the joystick from the neutral position towards the direction of the objective.
- Using two hands (right hand on the joystick/left hand on the collar base) offers maximum control and is a proven method to help prevent sudden jerking (back and forth) movements.
- Allowing the joystick to return to the neutral position before releasing the trigger will also help prevent erratic swaying of the bucket.

1.4 WATER SYSTEM

- A Platform Monitor is permanently mounted to the front of the bucket. This positioning permits flexibility in water tower operations and boom rotation affords water system coverage of 360 degrees.
- The water system hook-up consists of a 3” x 3” gated inlet on the left side and a 4 ½” ungated inlet on the right side.

  Note: There are various model Tower Ladders in the field and units should refer to manufacturer’s manuals for information specific to their apparatus.

1.5 COMMUNICATIONS

- The Tower Ladder is provided with an intercom system that allows for bucket to pedestal communications. This should be the primary means of communication between the bucket and the pedestal as it is the most effective and will limit radio traffic on the HT tactical channel during operations.
- A test of the intercom system shall be made each tour and at the initial stages of placing the Tower Ladder into operation. If results are negative, members shall rely on the HT for communication between the bucket and pedestal.
- To alleviate the problem of misunderstood terminology, the following terms shall be used when transmitting orders between the bucket and pedestal.
  - "EXTEND" - reach out with boom
  - "RETRACT" - return outstretched boom
  - "RAISE" - increase angle of elevation
  - "LOWER" - decrease angle of elevation
  - "BOOM LEFT" - rotate boom to pedestal FF's left
  - "BOOM RIGHT" - rotate boom to pedestal FF's right

  Note: The reference point is always the pedestal; not the bucket position.

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BUCKET OPERATIONS

3. BUCKET OPERATIONS

- Personal Protective Equipment (PPE) shall be worn at all times while operating in the bucket. Personal Protective Equipment (PPE) shall be worn at all times while operating in the bucket. Whenever a member operates on a ladder (Portable, Aerial, TL) while at fire operations, emergencies, drills, or performing routine tasks at quarters, the member must wear their helmet with chinstrap secured.
- ***Redacted for PFS***
- Each member operating in a Tower Ladder bucket must personally verify the placement of both door latches and ensure proper use of the installed safety belt or life belt/personal harness secured to a substantial part of the bucket (one of the bucket posts or the waterway) prior to raising the boom from the bedded position.

  Note: Bucket railings are NOT a substantial part of the bucket and shall NOT be used as a substantial object when tying off.
- Prior to gaining entry by way of the bucket, members should clear the entire window. Setting the end of a 6' hook firmly into the corner of a window sill, and/or placing the bucket cord light into the window to be entered, may offer a reference point in the event a hasty retreat is required.
- When there is a need to search an adjoining area or room, it is sound practice to exit the IDLH and reposition the bucket to an appropriate window.
- The bucket has the potential to get caught on objects such as parapets, walls, tree limbs, etc. and release violently due to the design of the "L" bracket. Extreme caution should be exercised to prevent this situation.
- ***Redacted for PFS***

3.1 TACTICAL TWO-MEMBER APPROACH FROM THE BUCKET

- The ability of officers and chauffeurs to evaluate a problem and then make a sound decision to cope with it offers valuable flexibility and increases overall safety. A disciplined member in the bucket provides an added layer of safety from an elevated platform, offering greater efficiency and increased capability. Size-up indicating a need to employ a tactical two-member approach from the bucket is oftentimes a high stress situation. One member remaining in the bucket as a beacon to monitor, ventilate, probe, assist in rescue and removal, and establish a valuable communications link to the Incident Commander is a distinct safety and overall tactical advantage.

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- When a decision is made to operate in this manner, the Incident Commander shall immediately be notified. If a known life hazard is discovered and immediate action could prevent the loss of life, appropriate action (rescue activity) may be taken consistent with provisions stated in Firefighting Procedures, Volume 4, Book 1, Chapter 1, titled "Safety Team."

  Note: When permission is granted for VEIS, the priority action will be to isolate the area by closing a door. It is essential for the Bucket Firefighter to remain in voice contact with the member conducting a search. Both members must maintain heightened situational awareness.

- A member in the bucket maintaining his/her position at the entrance to the IDLH (window) has immediate access to the joystick/bucket controls in the event movement of the bucket becomes critical. (Photo 1)

Photo 1

3.2 WINDOW ACCESS

- Placing the bucket to a window on the fire floor and/or floor above will allow for VEIS and also serve as a means of egress should conditions deteriorate. When the bucket is properly positioned at a window, immediate HT notification to the company officer will alert members of the additional means of egress (e.g. "Ladder 58 Chauffeur to Ladder 58, the bucket is at the window if you need it.")

- When entering into an IDLH atmosphere from the bucket, members shall comply with the provisions of Firefighting Procedures, Volume 4, Book 1, Chapter 1 titled "Safety Team." Prior to entering a window from the bucket, ensure adequate access and egress is maintained (including removal of window panes and sash when necessary.)

- When a member enters a window from the bucket for VEIS, the bucket shall not be moved unless required for rescue purposes. When required to reposition the bucket for rescue, immediate notification to the member(s) who entered the window from the bucket shall be made and the bucket returned to the window (or replaced with another aerial/portable ladder) as soon as possible.

3.3 RESCUE AND REMOVAL

- The full capability of the Tower Ladder will be realized when there are many persons to be removed, and/or victims are unconscious, incapacitated or obese. Rescue via the bucket may be achieved in several ways:
    - Position the middle of the bucket at a level where a person can easily step into it without straddling the window sill or fire escape railing. (Photo 2)
    - Position the top bucket rail level with the window sill or top rail of the fire escape. This is the preferred position for unconscious, incapacitated or obese victims. (Photo 3)

Photo 2

Photo 3

- ***Redacted for PFS***

    - ***Redacted for PFS***

- When multiple trips of the bucket are required to remove a large number of occupants, removal directly to street level may not be necessary or practical. When time is critical, occupants may be removed to lower levels of the fire building, across the throat to an opposite wing in an "H"-Type, to an adjoining roof, fire escape (avoid overloading), or other safe area of refuge. When necessary, leave a member with the group of removed occupants to help prevent panic.

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3.4 ROOF ACCESS

- The presence, height, and integrity of parapets and cornices (or lack thereof) are factors that should be considered when placing the bucket to the roof. When placed to the roof for access, the preferred positioning is with the bucket over the roof, parapet or cornice and the gate parallel to the roofline. (Photo 4 & 5)

Photo 4 - Bucket Placed to Roof

Photo 5 - Bucket Placed to Roof

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- The importance of a properly positioned bucket to a fire apartment window or the floor above cannot be overstated. When utilized for roof access, once safe egress is confirmed (e.g. adjoining building or aerial ladder) prompt repositioning of the bucket to a fire apartment/floor above window provides a secondary means of egress for members operating on the interior. Notification shall be made to the Roof Firefighter prior to the bucket being repositioned.

- ***Redacted for PFS***

3.5 PEAKED ROOF CUTTING

- The power saw can be used effectively from the Tower Ladder bucket to open peaked roofs as follows:

  1. Position the bucket on the roof as close to the ridge pole as possible. Check the stability of the roof with a tool. The saw operator shall wear the installed safety belt which allows enough play to reach the edge of the platform and still have one foot on the roof.

     - If the safety belt is not used for any reason, the Life Saving Rope (LSR) shall be tied to a substantial part of the bucket (one of the bucket posts or the waterway) with a bowline. The loop of the bowline should be large enough to reach the edge of the bucket platform. The saw operator then hooks his/her personal harness to the loop in the LSR, and places one foot on the roof and the other in the bucket. The Guide Firefighter, also properly secured in the bucket, then takes a firm hold on the operator's personal harness or life belt.

Note: Bucket railings are NOT a substantial part of the bucket and shall NOT be used as a substantial object when tying off.2. Start the saw in the bucket and then hold it outside of the bucket. The saw shall be kept outside the bucket until it is shut off.

- The area beneath the bucket shall be kept clear to prevent injuries from falling objects and tools. As an added precaution, a utility cord shall be attached to the handle of the saw to prevent it from falling. The cord may be lashed to the bucket or held by the Guide Firefighter in the bucket.

3. Make the first cut parallel to the ridge pole and follow as shown in Figure 1. The size of the cut will depend on the reach of the operator. Never overextend; reposition the bucket if a larger opening is necessary.
4. Proceed to remove the cut roofing with 6' hooks, and push down any ceiling below.

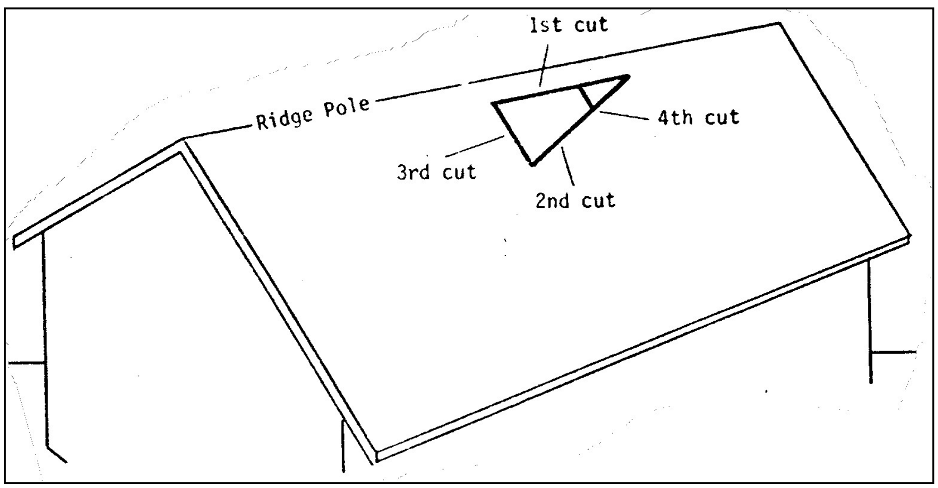

Figure 1 - Proper Sequence of Peaked Roof Cuts

3.6 BUCKET SAFETY

- Part of managing a high-stress situation begins with managing oneself. Having an individual plan and constantly rehearsing it builds resilience. Taking a moment to stop, breathe and think will enhance one's ability to take action in high-stress environments. Self-awareness enhances situational awareness.
- When no other option is available, members may escape from the bucket by means of the escape ladder in the hinged position. Prior to exiting the bucket, members shall ensure the apparatus remains in P.T.O., the engine is shut down and the escape ladder side rails are raised.
- If the bucket makes contact with a building, structure or other obstruction, a potentially dangerous condition may present itself. The likelihood of the bucket becoming wedged or stuck will dramatically increase and extreme caution must be exercised. Possible indicators that the bucket is wedged or stuck include:
    - Inoperable joystick
    - Stalled boom movement

Back to Main TOC

- Throttle increase (noise level)
- Torsional movement
- Flexing of boom
- Scraping noises
- Movement of pedestal controls without corresponding bucket movement

Should this occur members in the bucket shall:

❖ **VERIFY** all members are secured to a substantial part of the bucket using the installed safety belt, life belt or personal harness.

❖ **NOTIFY** the Incident Commander (transmitting an "**URGENT" message after depressing the EAB)** of the condition. **EXAMPLE:**

"URGENT-URGENT-URGENT…Ladder 99 OV to Command with an URGENT."

Upon acknowledgment, transmit:

"Ladder 99 OV URGENT… the bucket is wedged."

Pending correction of the condition, the Incident Commander should make a HT announcement notifying all members that the Tower Ladder is unavailable for use.

❖ **REMAIN LOW** in the bucket. All members should immediately crouch, sit or otherwise remain low in the bucket to lower their center of gravity in anticipation of possible sudden, violent movements.

- The Incident Commander shall immediately formulate a rescue plan for the member(s) to safely exit the bucket. The plan should take into consideration the safest way for the member(s) to be removed. In addition, the following should be adhered to:
  - P.T.O. should remain engaged and the apparatus shut down.
  - Assign a unit (Rescue or Squad, if available) to evaluate the structure and to assist in implementing the rescue plan.
  - Determine if any Ladder apparatus needs to be repositioned to ensure building coverage.

3.7 OVERHAULING

- The Tower Ladder provides an excellent platform for overhaul operations including cornice securing/removal and exterior wood sheathing, siding and cockloft overhaul. (Photo 8)
- A properly positioned bucket adhering to all safety guidelines provides a stable and secure area from which to work. The area below the bucket shall be kept clear and an announcement shall be made over the HT when overhaul will commence.
- The top of the bucket railing should be positioned slightly below the work area.

- When using a power saw from the Tower Ladder bucket it is preferable to have one member control the bucket while a second member operates the saw. (Photo 9) The power saw shall be lashed to the bucket as a safety measure
- The boom shall not be used:
  - To force timbers or cornices back into a building or onto a roof.
  - To pull or push objects.
  - As a derrick.

Photo 8

Photo 9

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LARGE CALIBER STREAM (LCS) OPERATIONS

4. LARGE CALIBER STREAM (LCS) OPERATIONS

- Forward-thinking officers and firefighters can dramatically impact operations. Apparatus positioning that takes into account the potential need for large caliber stream application will greatly improve tactical options for the Incident Commander.
- Large caliber outside streams generally should not be directed into occupied buildings; members must be warned and occupants should be removed before starting water. In some circumstances, however, fire conditions or a life hazard may demand such use.

  EXAMPLES:

  - Fire extending via the cockloft and the top floor is untenable.
  - Hand lines cannot advance due to fire conditions. (A rapid traverse of the stream from window to window into areas where many windows are accessible may facilitate a quick knockdown of the fire. This may then allow the Engine Company to move in for final extinguishment.)

4.1 WATER DELIVERY

- Generally only one supply source at the base of the Tower Ladder should be used. A Satellite Water Unit is the best source of supply if available; the largest diameter hose should be used. 200 - 250 psi is the recommended pressure at the gated inlet for an effective operation.
- The Tower Ladder may be supplied at either side of the apparatus. The location of the fire building and the ability of the Pedestal Firefighter to monitor the connection in the event corrective action is required are factors to consider.
  - When stretching a 3 ½" supply line to a Tower Ladder, ensure the male end is stretched to the gated inlet. Storing spanners and fittings in proximity to the gated inlet at the base of the Tower Ladder will increase unit efficiency when transitioning to a LCS operation.
  - Water flow to the Tower Ladder should be controlled at the supply source (e.g. Engine apparatus or Satellite manifold). Water should always be shut down at the supply pumper.
  - ***Redacted for PFS***

Back to Main TOC

4.2 DEPLOYMENT OF THE STREAM

- Members operating in the bucket should remain aware of the identity of the Engine Company supplying their apparatus.
- Prior to calling for water, members in the bucket are reminded to:
  - Verify use of the installed safety belt, life belt or personal harness secured to a substantial part of the bucket.
  - Ensure the presence of the stream shaper and correct stacked tips necessary for the task. The stream shaper should normally be left in place to ensure a good-quality stream with maximum reach.
  - Set and lock the monitor high into the air while awaiting water delivery.
  - Pull the safety pin on the waterway (Photo 1) if water will be applied below horizontal (e.g. junkyard fires, brush fires, etc.)

Photo 1 - Safety Pin on the Waterway

- The platform monitor should be in motion when applying water. Similar to a handline, the stream should be directed forward and upward with an aggressive side-to-side or clockwise rotation.
- When the fire building is heavily involved or there are multiple floors of fire, LCS delivery should generally start at the lowest level and work upward. This tactic will deliver a quick knockdown on the way up to the top floor and/or cockloft area as well as provide protection to the members operating in the bucket. Bucket and Pedestal Firefighters shall frequently assess conditions on lower floors previously passed. Stream operation into the lower floors may have to be repeated in order to protect members in the bucket while they continue operations at higher levels. Two exceptions to this tactic are as follows:
  - Advanced fire in a Row Frame - Begin stream application at the top floor and into the cockloft. This will allow water to cascade down (similar to a sprinkler head) which will halt, minimize and extinguish fire in the cockloft as water cascades down.
  - Common cockloft exposure protection - Commence LCS attack at the leading edge of the structure and traverse towards the middle to facilitate extinguishment.

- The Tower Ladder can be used to direct elevated streams directly into windows at close range, through wall openings, over roof parapets, at street level with wide lateral range (Photo 2), and even below grade. Members operating in the bucket shall always be aware of the collapse zone.
- The most effective method of applying a large caliber stream from the Tower Ladder bucket depends on many factors, including the type of occupancy.

EXAMPLES:

- o In many cases, it is beneficial to start low beneath the window sill and/or roof line, deflecting water off the underside of the ceiling/roof boards for best results. (Photo 3) Operating at this level facilitates maximum stream penetration and provides significant hydraulic overhaul capability. This tactic must be balanced with the need to keep the apparatus, including the bucket, out of the potential collapse zone.

Photo 2

Photo 3 - Stream Application Low in Window

- o At H-Types with fire showing out windows in the front, courtyard and throat, the Tower Ladder stream should be directed at the windows in the throat first, then advanced toward the front of the building, and finally operated into the front windows.
- o A street level attack at Taxpayer fires using a LCS to penetrate the ceiling and collapse it, thereby exposing fire in the cockloft, enables extinguishment of fire therein. Utilization of a Thermal Imaging Camera in heavy smoke conditions may be beneficial while directing the LCS at street level.
- o In extreme situations, the LCS directed through an attic window of a peaked frame dwelling can be used to ventilate by literally blowing off the roof.

- Openings made in exterior walls or cornices will often permit stream penetration to the seat of the fire. Power tools should be utilized as necessary. Be aware that time lost breaching walls to reach the cockloft may lead to extension in exposures.
- The application of a LCS downward into roof openings from an elevated position can be counterproductive. Operating the Tower Ladder stream into roof vent holes is generally ineffective and may result in a prolonged operation.
- The 1 ½" tip is preferable when deep penetration of the stream is necessary to hydraulically overhaul stock. Increasing nozzle pressure within allowable limits will often facilitate access into partitions and sidewalls.
- When conditions such as heavy clutter or doubtful floor stability exist, the Incident Commander may order all personnel removed from the bucket, lock the monitor in place, and extend the bucket into the building via a large window or other opening to achieve extinguishment and hydraulic overhaul.
- A large caliber stream may be used for the removal of shingles, siding, roofing, brickwork, and possible demolition when the building condition presents a serious hazard.

4.3 LCS SAFETY

- When the Incident Commander decides to discontinue an interior attack and institute an exterior attack, members shall comply with the provisions of Firefighting Procedures Volume 1, Book 11, Chapter 4, titled "Transitioning to an Exterior Attack."
- Collapse potential shall always be considered when positioning the bucket for LCS operations. The bucket should be positioned outside the vertical collapse zone while maintaining an effective stream. When collapse is feared, the height of the wall vertically above the bucket is the minimum distance horizontally that the bucket should be away from the wall. In certain situations where collapse may occur under pressure or with explosive force, the horizontal distance should be increased or a flanking position should be taken.

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- The Tower Ladder shall be positioned, and the boom maneuvered, in such a manner to protect members from the danger of collapse. When stability of the building is in doubt, the bucket shall be placed in a manner that negates the effect of falling walls, cornices, parapets, etc., even if it results in a penalty in terms of the effective reach of the stream
- During LCS operations, members in the bucket should monitor the building at all times for structural integrity and signs of collapse. The member operating the joystick should pre-plan bucket movement in the event of an imminent or actual collapse.
    - When operating at upper floors, this will generally be upwards.

- When operating near the edge of a building, this will generally be to one side.

- Care shall be taken to avoid the collapse of walls onto the bucket or boom. If fire has been burning for a considerable period of time and stability of the building is in doubt, the following guidelines are recommended:
  - Keep the entire bucket, boom and apparatus beyond the collapse area of the building.
  - Position the apparatus so the bucket can be placed at the edge of the building, thereby limiting exposure in the event of collapse. Using two Tower Ladders, one at each edge of the building if necessary, may help obtain full coverage of the building.

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FIREFIGHTING PROCEDURES (VOLUME 4)
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MANAGING MEMBERS IN DISTRESS
CHAPTER 1
October 15, 2012

SAFETY TEAM
(TWO-IN TWO-OUT)

1. POLICY

1.1 The United States Department of Labor Occupational Safety and Health Administration's (OSHA) revised standard regarding respiratory protection states: Where an employer does not know or cannot reasonably estimate the concentration of contaminants in the work environment, it is assumed that the atmosphere is Immediately Dangerous to Life and Health (IDLH).

1.2 When a fire progresses past the incipient stage, the fire area must be considered an IDLH atmosphere. Every member entering the IDLH atmosphere must be equipped with personal protective equipment and a self-contained breathing apparatus. No member shall enter, leave or operate in an IDLH atmosphere unless the member teams-up with at least one other member and remains within visual or voice contact with that member. Each member of the search team shall know the company identity and assigned position of the other members of the search team. Handie-talkies or other electronic communication devices are not acceptable to replace visual or voice contact. At least one of the members of the team within the IDLH must have a handie-talkie and must be able to contact a handie-talkie-equipped member of the Safety Team outside of the IDLH atmosphere.

1.3 At least two members must team up prior to entering an IDLH (Two-In) and there must be at least two other members outside the IDLH (Two-Out), who are designated as a Safety Team. The members of the Safety Team shall be available to assist the interior team(s) if the need arises. If a member leaves a contaminated area, another member using an SCBA must accompany this member to a safe area.

1.4 If a known life hazard is discovered and immediate action could prevent the loss of life, appropriate action (rescue activity) may be taken by an individual member. This applies only for a known life hazard, not for standard search and rescue activity. A known life hazard is defined as follows:

- A victim can be seen by the rescuer.
- A victim can be heard by the rescuer.
- A member has information from a credible source or a person at the scene indicating the location of the life hazard.

If such action is taken, the Incident Commander must be immediately notified and appropriate adjustments made.

Note: ***Redacted for PFS***

2. PROCEDURES

2.1 A Safety Team must be available at all times. The FAST Unit will serve as the Safety Team. Prior to the arrival of the Fast Unit, the following guidelines should be followed to establish the Safety Team:

2.1.1 The Safety Team shall normally be made up of the Backup and Control firefighters of the second arriving engine. However, there will be times when entry into an IDLH atmosphere is necessary prior to the arrival of the first two engine companies. The following guidelines shall be followed in these instances:

- One 4 Firefighter Engine on Scene:

  Based on the officer's size up the following options can be considered:

  1) The officer and one firefighter enter the IDLH for search without line advancement while two firefighters compose the Safety Team.
  2) Take a defensive position based on conditions encountered.

- One 5 Firefighter Engine on Scene:

  The Safety Team is composed of the Control firefighter and the Door firefighter.

- One Ladder on Scene:

  1) 5 FF Ladder-The Safety Team is composed of the LCC firefighter and the OV firefighter.
  2) 4 FF Ladder- The Safety Team is composed of the LCC firefighter and outside firefighter designated by the officer.

- One Engine and One Ladder on Scene:

  1) 5 FF Ladder-The Safety Team is composed of the Control firefighter and the LCC firefighter.
  2) 4 FF Ladder- The Safety Team is composed of the Control firefighter and the LCC firefighter.

When an "understaffed" Engine or Ladder Company (unit staffed with less than 4 firefighters) is the only unit on the scene, the company shall take a defensive position. However, if a known life hazard is discovered and immediate action could prevent the loss of life, appropriate action (rescue activity) may be taken by an individual member. This applies only for a known life hazard, not for standard search and rescue activity.

Examples of Defensive Positions, including but not limited to:

- Checking the serviceability of a hydrant
- Hooking up to a hydrant
- Charging the pumps
- Stretching a hoseline to outside the IDLH atmosphere

- Providing medical treatment to victims
- Positioning and raising a Tower/ Aerial/ Portable Ladder
- Conducting a size-up of the scene
- Transmitting the appropriate radio signals

2.2 The arrival of the 2nd Engine must be announced over the handie talkie.

2.3 Designated members of the Safety Team are to engage in their primary duties while assuming the duties of the Safety Team. Once firefighters enter the IDLH, one member of the Safety Team must account for firefighters inside the IDLH without performing other duties.

2.4 ***Redacted for PFS***

3. DUTIES OF THE SAFETY TEAM

3.1 The Safety Team shall be positioned outside the IDLH atmosphere and:

- ♦ Monitor handie-talkie transmissions for calls for assistance from members operating in an IDLH atmosphere, mayday, or urgent transmissions, and transmissions from interior teams that are not being acknowledged.
- ♦ Be prepared to enter the IDLH atmosphere to render assistance if required.
- ♦ Be prepared to transmit necessary mayday or urgent handie-talkie message if an interior team needs immediate assistance.
- ♦ Ensure that the Incident Commander is notified that the Safety Team is entering the IDLH atmosphere if necessary.

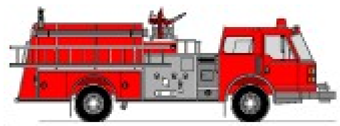
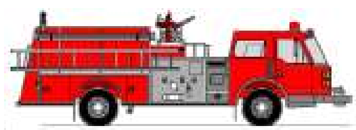
3.2 **The Incident Commander shall announce the FAST unit's arrival over the handie-talkie at the scene**. On receipt of this announcement, the members performing the duties of the Safety Team shall return to their original assignments.

4. TEAMING UP

4.1 When members are teamed up, they must contact their company officer before entering an IDLH atmosphere and advise such officer of their status at frequent intervals, especially when attempting tasks not normally associated with their assignments.

4.2 In unusual situations where members assigned to team up are unable to do so, the Incident Commander shall be notified prior to entry into the IDLH atmosphere and the Incident Commander shall make necessary adjustments in the teaming up of members.

5. REFERENCE CHART

1 Engine Company on the scene 	**<u>5 FF</u>** **Control** **&** **Door FF**	**<u>4 FF</u>** **Two FFs designated by the Officer**
1 Ladder Company on the scene 	**<u>5 FF</u>** **LCC** **&** **OV FF**	**<u>4 FF</u>** **LCC** **&** **Outside FF designated by the Officer**
1 Engine Company & 1 Ladder Company on the scene  	**<u>5 FF Ladder</u>** **Control** **&** **LCC**	**<u>4 FF Ladder</u>** **Control** **&** **LCC**
2 Engine Companies on the scene  	**Backup & Control FFs of 2nd Arriving Engine**	
FAST Unit on the scene 	**Entire Unit Assumes Duties of the Safety Team**	

BY ORDER OF THE FIRE COMMISSIONER AND CHIEF OF DEPARTMENT

MANAGING MEMBERS IN DISTRESS
CHAPTER 2
November 1, 2011
FIREFIGHTER ASSIST AND SEARCH TEAM – FAST UNIT

1. PURPOSE

The purpose of the Firefighter Assist and Search Team (FAST) is to be immediately available to assist a member who becomes trapped, distressed or involved in other serious life threatening situations. The FAST Unit must be ready to act immediately and decisively when called upon.

2. *Redacted for PFS*

3. POSITION

3.1 The FAST Unit shall report to and stage near the Incident Command Post (ICP), within verbal contact, at a position from which they can be readily deployed. An Electronic Fireground Accountability System (EFAS) trained member of the FAST Unit shall report to a Battalion vehicle on scene to monitor the EFAS and the FAST Radio.

However, the IC may assign the FAST Unit to stage at a location other than the ICP, based on the type of building units are operating, e.g. High Rise Office Building. Units shall operate in accordance with established guidelines on FAST Unit staging at different building types.

3.2 At large-scale, high-rise or unusual operations, additional FAST Units may be positioned at other locations as determined by the IC.

4. OFFICER RESPONSIBILITIES

4.1-4.2 ***Redacted for PFS***

4.3 When communicating to other units, the FAST officer and member's radio designation shall include the word FAST after the unit designation. Ex: "L-157-FAST to Command"

4.4 Communication between FAST Unit members does not require the use of the word FAST after the unit designation. Ex: "Ladder 157 CAN to Ladder 157"

4.5-4.9 ***Redacted for PFS***

5. FAST UNIT RESPONSIBILITIES

All members of the FAST Unit should be fully prepared to operate upon arrival. The FAST Unit must be ready for immediate deployment as directed by the IC.

5.1 The FAST Unit is responsible to know what additional equipment they are required to bring to the ICP, in addition to their regularly assigned tools.

The following assignments must be given out at roll call:

- A member assigned the FAST Pak. Member is responsible to manage the air supply of the distressed member, if needed.
- An EFAS trained member assigned to monitor EFAS and the FAST Radio.

  If the member **is** EFAS trained, upon arrival, report to the Battalion vehicle being used to monitor EFAS. This FAST Unit member shall **remain in the Battalion vehicle** and monitor both EFAS and the Battalion's FAST Radio for the duration of the incident, **even if the FAST Unit is given an assignment**.

  If the member is **not** EFAS trained, upon arrival, report to a Battalion vehicle on scene to monitor the FAST Radio Board. The member assigned the FAST Radio shall **remain in the Battalion vehicle** and monitor the FAST Radio for the duration of the incident, **even if the FAST Unit is given an assignment**.

  Note: **Whether EFAS trained or not,** the FAST Unit member assigned to monitor EFAS and/or the FAST Radio shall **remain in the Battalion vehicle, even if the FAST Unit is given an assignment**, until relieved.

5.2 A survey of the fire building should be done to determine the following:

- Access for portable ladders.
- Presence of fire escapes and party wall balconies.
- Building built on a grade, setbacks and the depth of the building.
- Type and location of stairs and elevators.
- Determine if any remote or alternate access points are available.
- Obstructions that would hinder access to any side of the structure.

5.3 While staged, the FAST Unit should develop a plan of action. This plan of action should include:

- Information gathered from the survey.
- Progress of fire operations and location of operating units.
- Expected paths of fire travel.
- Hazards posed by the type of construction, occupancy and type of incident.

5.4 Determine the availability and location of aerial, tower and portable ladders, in the event there is a need to use and/or place into operation.

5.5 Determine the availability of an Engine company to stretch a hoseline for protection.

5.6 Monitor the handie-talkies for any emergency transmissions.

5.7 Note the location of EMS personnel at the scene.

Back to Main TOC

6. SIZE UP

All firefighting operations should begin with a proper size-up. This is particularly important in FAST Unit operations as well. The focus of a FAST Unit's size-up will be slightly different than normal since the FAST Unit will be performing a size-up for potential distress duties, not just for fighting the fire. The 13-point size-up mentioned below must be evaluated continually, along with anticipation of possible problems by the FAST Unit.

6.1 Construction

- As related to fire spread and collapse potential.

6.2 Occupancy

- Indicates what kind of fire spread can be anticipated and what kind of search may have to be employed (search ropes, team search).

6.3 Area/Access

- Large areas will make for a more difficult search, unconfined fire and flashover hazard that may not be apparent.
- What access routes are available to upper floors, cellars and roofs?
- Will there be a need for search ropes?

6.4 Life

- Consider the area where members are operating.
- Have they all been accounted for?
- What was their last known location/assignment?

6.5 Weather

- Will extremes in the weather affect the readiness of the FAST Unit and will it hamper the rescue efforts?

6.6 Auxiliary Appliances

- Is a sprinkler system operating?
- Is the sprinkler system hampering the rescue effort due to the large amounts of smoke associated with an operating sprinkler system?
- Will the sprinkler system hold the fire in check while the FAST Unit operates?
- Can the sprinkler system be shut down to prevent a drowning danger?
- Who is supplying the sprinkler system?
- Is there a serviceable standpipe system?

- Can the standpipe system be used to help gain access to the trapped firefighters or protect the rescue effort?

6.7 Street Conditions

- Does an aerial or tower ladder have access to the front of the fire building?
- Can the FAST Unit get close to the fire building with their apparatus?

6.8 Water Supply

- Are the first alarm engine companies continuing their attack on the fire?
- Is an engine company with a charged hoseline needed at our location?
- Are there any water source problems?

6.9 Exposures

- Can the exposures provide access to the fire area such by breaching walls?
- Do the exposures provide both access and egress from the roof?
- Is fire extending to the exposures that could endanger firefighters?
- Could the exposures become a secondary collapse hazard in the event of a collapse of the fire building?

6.10 Apparatus/Equipment

- Is all of the required equipment at the ready?
- Are the first alarm ladder company's apparatus in position for use?
- Is there a chauffeur at the turntable?
- Are the members of the FAST Unit familiar with the operation of the apparatus of the first alarm units?
- Are portable ladders available?
- What other equipment may be needed and is it available.

6.11 Location

- What is the last known location of the trapped or distressed firefighter?
- Is the location of the fire known?
- Is the fire showing signs of extending to other floors, cockloft or exposures?

6.12 Time

- How long has the fire been burning? The longer the fire is burning:
    - The greater the structural damage and chance of collapse.
    - The more fire gases are being pumped into the building.

- Greater possibility of members suffering heat exhaustion.
- Greater chance of auto exposure and extension to exposures.

6.13 Height of Building

- Will portable ladders be able to reach all windows?
- Is an aerial ladder needed to reach certain areas?

7. OPERATIONS

When the FAST Unit is deployed for a distressed member, the fire conditions in the immediate area of the rescue are likely to be severe. It is vital for the FAST Officer, along with the FAST Unit to consider alternate access points to reach the trapped firefighter

7.1 The FAST Unit may be involved in any of the following:

- Searching for a member.
- Removing a member.
- Assisting in the removal of a member.

7.2 When the FAST Unit operation requires the use of a ladder, avoid repositioning ladders already in place against a fire building unless it is a life threatening situation and a notification is made to the members operating in that area. Ladders in place may be providing a means of egress for operating firefighters.

7.3 Operational considerations for the FAST Unit:

- Search team – make entry to locate, package and remove the member if possible.
- Removal/Resource team – will stage at the entrance and be available to assist. This assistance could be to relieve, augment or supply additional equipment to the search team.
- Use of a two sided approach where the search team makes access via the interior and the removal team makes access via the exterior of the building.
- Attempting a rescue from the outside of the fire building.
- Use of a life saving rope rescue.

7.4 The FAST Unit shall remain intact and not split up when dealing with large commercial or complex buildings.

7.5 When FAST Unit is deployed at an operation for a member in distress:

- Determine the location of the member based on alarm assignment, order of arrival and riding position.

- Use information received from Incident Commander, operating unit or distressed member, to help determine their location.
- Determine the best access to the distressed member and any alternate access points based on pre-determined plan of action.

7.6 When the FAST Unit arrives at the location of the distressed member, the transmitting member of the FAST Unit shall:

- Depress the Emergency Alert button (EAB) on their handie-talkie. This will identify the member of the FAST Unit transmitting the emergency message on EFAS and the FAST Radio. This will also ensure the message is transmitted at the maximum wattage.
- After the Emergency Alert activation, provide the IC or FAST Group Supervisor with the information required for the emergency transmission as outlined in Communications Manual Chapter 9. After all required information is given; the transmitting member shall reset their handie-talkie Emergency Alert by depressing and holding the Emergency Alert button for approximately 2 seconds.
- Assess **Fire**, **Air, Immediate medical care, Removal** (FAIR).
- Provide additional air supply as needed.
- Confirm positive identification.
- If possible, depress the EAB of the member in distress. The activation of the distressed member's EAB will identify them on EFAS. Notify the IC via handie-talkie prior to EAB activation of the distressed member.

  If unable to activate the distressed member's EAB, key the mic on the distressed member's handie-talkie to obtain their identity on EFAS.
- The distressed member's Emergency Alert shall remain activated until determined it is no longer required.
- Package the member for removal.

8. TOOLS/EQUIPMENT

In addition to normally assigned ladder company tools, the FAST Unit shall report to the ICP with the following equipment:

- FAST Pak
- Search Rope
- Stokes Basket with long backboard
- 2:1 Rope
- Pak-Tracker

Note: A member other than the member monitoring EFAS will monitor the Pak-Tracker.

8.1 As part of the size-up, determine what other tools/equipment may be needed for the various rescue possibilities such as:

- Rebar cutter
- Life Saving Rope/Life Belt
- Saws
- Elevator keys for buildings with elevators
- Flotation devices for operations on or near bodies of water

9. TRAINING

Timely removal is imperative. The rescue will not only be difficult, but it will be one that is emotionally charged. The way to overcome these obstacles is through constant training in rescue procedures.

9.1 All units need to be proficient in proper search and radio procedures as well as the use of the Thermal Imaging Camera, search rope, webbing and both power and hand tools.

9.2 Practicing packaging and removal techniques will greatly enhance a company's ability to rescue a distressed firefighter. To assist units in practicing these techniques, each Battalion has been issued an Emergency Removal Training Kit.

BY ORDER OF THE FIRE COMMISSIONER AND CHIEF OF DEPARTMENT

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MANAGING MEMBERS IN DISTRESS
CHAPTER 3
November 1, 2011

FIREFIGHTER REMOVAL

1. INTRODUCTION

1.1 When a MayDay is transmitted for a firefighter that is lost, missing, trapped or in distress, time will not be on your side. There will usually be a time lag between the trapped firefighter recognizing that they are in danger and the transmission of a MayDay. Studies have shown that once the firefighter realizes that they are in danger they will most likely try to remove themselves before transmitting a MayDay.

1.2 The situations encountered where a firefighter may need assistance, can take many forms and will involve both conscious and unconscious members. It can be as simple as finding a disorientated member and leading them to safety or as complicated as a trapped, unconscious member requiring extrication.

1.3 Depending on the member's location, fire conditions and the cause of injury, various drags or carries may be appropriate. Removal of the distressed firefighter to a tenable atmosphere usually involves little danger from spinal injury if there was not a fall or other injury involved. At times, fire conditions may be so severe that immediate removal of the distressed firefighter is critical, even with a spinal injury. In all cases a member should be positioned at the downed members head.

1.4 The removal methods outlined in this bulletin can be used for members that are either conscious or unconscious. Once the member is out of immediate danger, immediately begin to assess their "ABC" status (airway, breathing, circulation) and treat as necessary. At this point the member should be secured to a backboard or stokes basket prior to moving them any further, especially if there is any indication that a spinal injury is present.

1.5 The removal methods described are intended to be used only under difficult fireground conditions. They require the use of minimal equipment and set up time. They are intended for use as lifesaving steps under extreme circumstances. They are not intended for use at removal situations, where time and equipment concerns allow the use of more suitable, sophisticated hauling and patient handling systems.

2. OPERATING UNIT RESPONSIBILITIES

2.1 It is important to emphasize that the operating units continue to fight the fire when a MayDay/Urgent is transmitted for a distressed firefighter. The abandonment of Engine or Ladder company operations to assist in a rescue where resources have been deployed to handle the situation, places the trapped member and the rescuing firefighters in severe danger. During this highly emotional time members must realize, that if they are not assigned to the removal effort, they must continue with their assigned operation. Company Officers must prevent members of their unit from leaving their area of responsibility.

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3. ***Redacted for PFS***

4. STEPS TO FOLLOW WHEN MEMBER IS LOCATED

4.1 When the member has been located, the appropriate radio transmission must be made. Whether or not the removal involves a conscious or unconscious member, the priorities will be:

- **F**ire/Environment.
- **A**ir.
- **I**mmediate medical care, if required and possible.
- **R**emoval.

Additional considerations are:

- Identification of member.
- Packaging, if required.

5. EMERGENCY COMMUNICATIONS

5.1 If possible, the member transmitting the MAYDAY/URGENT shall begin, by pressing the Emergency Alert Button, ensuring the message gets transmitted at maximum wattage. Whenever the Emergency Alert Button is activated and/or a MAYDAY/URGENT transmitted, all handie- talkie communication on that frequency are to cease, except those between the member initiating the MAYDAY/URGENT and the IC.

5.2 The term MAYDAY or URGENT shall be repeated three times followed by the Company designation and position of the member initiating the emergency transmission to the IC. See Communications Manual, Chapter 9 for the proper format.

5.3 It is important to transmit a clear and concise message with the appropriate information. An unclear message will only cause confusion and delays. When wearing the facepiece, the microphone must be placed directly on the voicemitter.

5.4 All members must be aware that a message not acknowledged is a message not received. The emergency transmission MUST be acknowledged by the IC.

6. FIRE/ENVIRONMENT

6.1 Consider the environment that you are operating in. The conditions in the area of the distressed member will dictate the sequence of events. If your safety is in question, move to an area of refuge.

- Can you operate safely in the area?
- What is the structural stability?
- Is a hoseline needed for protection?

7. AIR SUPPLY

7.1 The air supply of the member needs to be assessed whether the member is conscious or unconscious. Removing the member from the IDLH is critical for survival. Assuring that the distressed member has an adequate supply of air is the next priority. A member will suffer brain damage without air in four to six minutes. In six to ten minutes a member will move towards clinical death. Removing the member without first addressing the air supply greatly diminishes a member's chance of survival.

7.2 Once the member is located, a FAST Pak must be called for immediately, regardless of whether the member has air or not. Every emergency situation is unique. The rescuer must be trained to assess each situation and decide which re-supply method via the FAST Pak is best. This decision can vary depending on several factors:

- Condition of the distressed member's SCBA.
- Position of the distressed member.
- Accessibility for the various air supply methods.

7.3 There are two ways to supply air to the distressed member:

- High Pressure.
- Low Pressure.

7.4 The high pressure air system permits emergency air replenishment of an SCBA from an air supply source while still in use through the Universal Air Coupling (UAC). The UAC is for emergency use only when a member is low or out of air within an IDLH. If the condition of the distressed member's SCBA is in doubt **DO NOT** provide air via the high pressure system.

7.5 Air may be supplied to the member through the use of the low pressure system by one of the following methods:

- FAST Pak regulator with the member's facepiece.
- Hansen Fitting of the low pressure hose.
- FAST Pak facepiece and regulator.

7.5.1 The member assigned to monitor the air supply of the FAST Pak must protect the low pressure hose, e.g., high heat, hot embers, sharp objects and entanglement.

7.6 If unable to determine if an unconscious member has air or not, supply the member with air. There are three ways to determine whether the member has air:

- Turn the purge valve. If there is air, the flow will be heard.
- If the facepiece is on, break the seal between the member's face and facepiece and listen for air escaping.
- Look at the remote gauge of the downed member.

7.7 Use the downed member's facepiece, unless it is damaged or missing, instead of the facepiece with the FAST Pak. The member might require a special size facepiece, and using their personal facepiece will provide a better seal.

7.8 Once the member is supplied with air and packaged, if required, remove them from the IDLH as soon as possible.

- If the FAST Pak is **NOT** at your location, **START** the removal procedure. Communicate with the member assigned the FAST Pak to determine a suitable location to meet.

7.9 Once an unconscious member is supplied with air, turn the purge valve half way to allow a constant flow of air.

Note: Members in distress should not remove their facepiece. If the air supply is depleted remove the regulator and leave the facepiece on for protection. Having the facepiece on will aid in re-establishing the air supply in the event the member becomes unconscious.

8. IMMEDIATE MEDICAL CARE

8.1 Once clear of the IDLH environment, stop and assess the medical needs of the distressed member. Treatment should be in accordance with CFR protocols driven by patient condition. Address situations that are immediately life threatening such as:

- No pulse or not breathing.
- Major bleeding.

8.2 Be prepared to assist with and transfer medical care to EMS.

9. REMOVAL

9.1 There are a number of scenarios that can trap or disable firefighters. The method used to remove the distressed member will be based on the conditions and the ability of the member to assist in their own removal. Innovation and adaptation may be required to complete the rescue.

9.2 The removal of a conscious member will most often involve assisting them in exiting the area. If the member is unable to assist in their own removal, a determination will have to be made as to whether to wait for assistance or leave the area immediately.

9.3 There are two basic types of removals that will be encountered:

- Horizontal
- Vertical

Additional considerations for determining what method to use for the removal would be:

- Location and distance to an exit.
- If stairs or ladders are involved.

- Condition of the operating environment.
- Presence and extent of injuries.

10. IDENTIFICATION

10.1 There are a number of ways a member can be identified. Once the member is located and the proper radio transmission has been made, the member needs to be properly identified to ensure it is the member originally reported in distress.

10.1.1 **Conscious Member**

Ascertain the following information:

- Name.
- Unit working in that tour.
- Assignment.

10.1.2 **Unconscious Member**

a. If possible, depress the EAB of the member in distress. The activation of the distressed member's EAB will identify them on the Electronic Fireground Accountability Sytem (EFAS). Notify the IC via handie-talkie prior to EAB activation of the distressed member.

If unable to activate the distressed member's EAB, key the mic on the distressed member's handie-talkie to obtain their identity on EFAS

b. Positioning them on their right side (Photo 1) will provide access to the following:

- Member's name on back of the bunker coat.
- PRA identification number which will provide the unit and position. This method will work as long as the SCBA is not a spare.
- Helmet frontpiece of the distressed member which may not be the unit the member is working in.
- The engraved identification number on the side of the handie-talkie.

Photo 1

c. The unconscious member's tools may indicate member's assigned position.

10.2 To accurately identify the distressed member by the use of the Pak-Tracker and EFAS, it is **imperative** that all members ensure that both the SCBA and the handie-talkie coincide with their assigned position.

11. PACKAGING

11.1 Statistics will show that most often the distressed member will be found by a member or members of an operating unit. Our main concern is the timely removal of the member from the IDLH. If the member is unconscious or unable to assist in their own removal, the member(s) who first found the firefighter must start the packaging process. There are a number of methods that may be used to package a member. Listed below are the most common methods that may be used for packaging:

- Use of the SCBA straps and personal harness.
- Nylon Tubular Webbing.
- Stokes basket/backboard.
- SKED Stretcher.

11.2 Packaging a conscious member is not always required for removal. In most situations, packaging an unconscious member will be required for removal. The method used to package the member will be determined by the type and the degree of difficulty involved in the removal.

11.3 When an unconscious firefighter is found, it is more effective to take the time to package the member prior to attempting removal. Attempting removal before packaging will delay the removal, and may pull the member out of their SCBA harness and bunker gear.

11.4 If possible, position the member so that their back is facing toward the direction of removal prior to starting the packaging process.

11.5 An operating member/unit that locates and starts the packaging process of the distressed member will most likely will be fatigued and have a diminished air supply. Turning the operation over to the dedicated FAST Unit upon their arrival will facilitate the timely removal of the distressed member. Standardized firefighter packaging procedures will allow the rapid transition from the operating unit to the FAST unit.

12. TRAINING

12.1 All members should be well versed in Emergency handie-talkie transmissions. Upon discovery of a distressed member, the appropriate MayDay/Urgent message shall be transmitted over the handie-talkie.

12.2 Many firefighter removal scenarios require extensive assistance. A FAST Unit is on the scene of every working fire or emergency and is dedicated to assist distressed members. Members should be familiar with the proper packaging techniques and basic removal methods. These methods should be practiced with full PPE including gloves.

13. CONCLUSION

13.1 When an MAYDAY/URGENT transmission is made for a member in distress, a series of events will be set into motion. Decisive actions need to be taken in order to successfully remove the member from the IDLH.

13.2 Once the member is located, the appropriate MAYDAY/URGENT transmission shall be made. We need to address the fire/environment, air supply, immediate medical care and determine the method of removal. If packaging of the member is required, determine the best method based on the complexity of the removal. The distressed member needs to be properly identified to ensure it is the member originally reported in distress.

13.3 ***Redacted for PFS***

The removal of trapped firefighters is greatly facilitated by the use of the personal harness. All equipment issued and used by operating members must be worn properly including the waist strap of the SCBA. This will greatly enhance your effectiveness as a rescuer. These items will also help rescuers rescue you in the event ***you*** become the unconscious firefighter!

13.4 The Department has pioneered the concept of the FAST Unit. These procedures are presented with the hope that they will greatly assist a FAST Unit in the difficult task of assisting and removing distressed members from hazardous situations. The rapid deployment of the FAST Unit is imperative because time will not be on our side when a firefighter needs assistance. In order to be proficient in these procedures, they must be practiced.

BY ORDER OF THE FIRE COMMISSIONER AND CHIEF OF DEPARTMENT

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MANAGING MEMBERS IN DISTRESS
CHAPTER 3, ADDENDUM 1
November 1, 2011
CONVERTING THE SCBA INTO A HARNESS

1. THROUGH THE LEG METHOD

1.1 Locate the waist strap of the SCBA.

1.2 Fully loosen both halves of the waist belt.

1.3 Unbuckle the waist belt.

1.4 Lift up one of the distressed members legs and place it on your shoulder.

1.5 Take one half of the waist belt and put it behind the distressed member's leg and bring it up between their legs.

1.6 Take the other half of the waist belt and bring it in front of the distressed member's leg and reconnect the waist strap. (Photo 1)

Photo 1

1.7 Take the rappel hook from the personal harness of the distressed member and pull sharply to release the hook from the belt.

1.8 Loosen the SCBA shoulder straps of the distressed member.

1.9 Open the gate of the hook of the members personal harness and place the open hook through both of the distressed members SCBA shoulder straps starting with the left strap first and then the right strap The rescuer is moving the hook from their right to the left. The hook is attached in this manner so as to prevent twisting of the handle of the member's personal harness. (Photo 2)

Photo 2

1.10 Once both of the distressed member's SCBA shoulder straps are positioned inside the hook of their personal harness hook, release the gate of the hook.

1.11 Prior to tightening the distressed member's SCBA straps, webbing should be placed through the top end of the shoulder straps to make a girth hitch.

1.11.1 Place one end of the webbing through both shoulder straps. (Photo 3)

Photo 3

1.11.2 Take the other end of the webbing and place it through the center of the webbing that was put through the shoulder straps. (Photo 4)

Photo 4

1.11.3 Tighten up on the webbing by pulling on the end placed through the center creating a girth hitch on the members SCBA shoulder straps. (Photo 5)

Photo 5

1.12 If time permits or additional securing is required, half hitches may be tied into both the shoulder and the waist straps of the distressed member's SCBA. When tying the half hitches, start with the waist straps first. Pull one side of the waist straps tight to allow enough excess in the strap to tie the half hitch. After the half hitch is completed, tighten the other waist strap. The excess can be wrapped underneath itself to keep it from slipping. Repeat the procedure for the shoulder straps by doing one side then the other. Depending on the size of the member, the shoulder straps can be tied across their chest.

The benefits the knots provide will help to keep the distressed member's SCBA as tight as possible to the member's back. This will help prevent the mask from getting hung up on furniture, or when turning corners. More importantly, when carrying a member up a flight of stairs, these knots prevent the mask harness from riding up and possibly dislodging the member's facepiece.

1.13 Packaging the member in this manner will allow for both a vertical or horizontal removal.

2. USE OF THE PERSONAL HARNESS LEG STRAPS

2.1 Prior to converting the member's SCBA into a harness, move the firefighter to a sitting position providing we do not suspect any type of spinal injury. Once in a sitting position, rotate the member, if possible, so that their back is facing toward the direction of removal. The benefits of moving the firefighter to a sitting position are:

- It reduces the member's size in half, which will be beneficial in tight locations.
- It will allow full control over the distressed member. This will help prevent members not assigned to the removal process from moving the distressed member prior to the completion of the packaging.
- It will be easier to locate the Universal Air Connection.
- Allows easier access to the SCBA low pressure hose, facepiece and both shoulder and waist straps.

2.2 Rescuer 1 shall be positioned behind the distressed member. This firefighter places their knee under the rubber bumper of the distressed member's SCBA cylinder, allowing slack in the distressed members SCBA shoulder straps. (Photo 6)

2.3 Rescuer # 2 shall be positioned in front facing the member.

Photo 6

2.4 Rescuer 2 pulls on the yellow leg straps of the distressed member's personal harness creating a loop. This will allow rescuer 2 room when ready to feed the SCBA waist buckle straps through the loops of the distressed member's personal harness leg straps and connect. (Photo 7)

Photo 7

2.5 Rescuer 1 works their hands down the SCBA cylinder to the waist straps and depresses the alligator clips that tighten the waist straps. (Photo 8)

Photo 8

2.6 Rescuer 2 grabs the connected SCBA waist buckle and fully extends the waist straps. (Photo 9)

Photo 9

2.7 Rescuer 2 disconnects the waist buckle and feeds the ends of the SCBA waist straps through the loops created in the distressed member's leg straps of their personal harness and reconnects the waist straps. Do not tighten the waist straps at this time. (Photo 10)

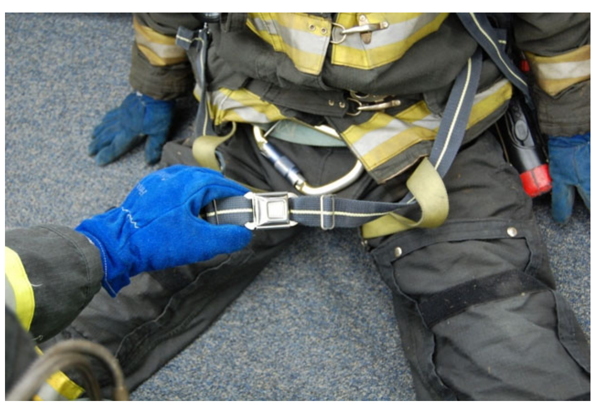

Photo 10

2.8 Rescuer 1 maintains the distressed member's SCBA cylinder as high as possible creating slack in all of the straps.

2.9 Rescuer 2 grabs the rappel hook from the personal harness of the distressed member and pulls sharply to release the hook from the belt and opens the gate of the hook.

2.10 Rescuer 1 loosens the SCBA shoulder straps of the distressed member and brings them both forward to allow Rescuer 2 to attach the distressed member's personal harness hook.

2.11 Rescuer 2 places the open hook from the distressed member's personal harness through both of the member's SCBA shoulder straps starting with the left strap first and then the right strap. The rescuer is moving the hook from their right to the left. The hook is attached in this manner so as to prevent twisting of the handle of the distressed member's personal harness. (Photo 11)

Photo 11

2.12 Once both of the distressed member's SCBA shoulder straps are positioned inside the hook of the personal harness hook, Rescuer 2 releases the gate of the hook. (Photo 12)

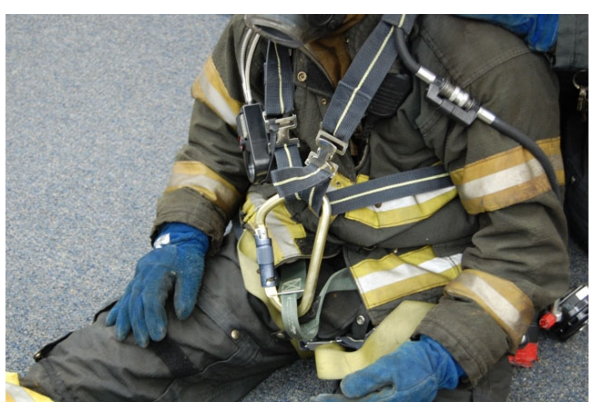

Photo 12

2.13 Prior to tightening all of the distressed member's SCBA straps, webbing should be placed through the top end of the shoulder straps to make a girth hitch.

Note: Girth hitch procedures are outlined in sections 1.11.1, 1.11.2, 1.11.3 and 1.12.

2.14 Packaging the member in this manner (Photo 13) will allow for both a vertical or horizontal removal.

(Photo 13)

BY ORDER OF THE FIRE COMMISSIONER AND CHIEF OF DEPARTMENT

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DRAG RESCUE DEVICE

1. DESCRIPTION

1.1 The Drag Rescue Device (DRD) is designed to assist in the horizontal removal of a non-ambulatory injured or unconscious member. The DRD has been integrated within the bunker coat to comply with NFPA Standard 1971.

1.2 The DRD handle is located just under the collar on the back of the bunker coat and is protected by a flap held in place by Velcro and two snaps. (Photo 1) There is a reflective activation tab to assist in locating the DRD handle. (Photo 2)

Photo 1

Photo 2

2. OPERATION

2.1 The DRD can be deployed to assist in the horizontal removal of a non-ambulatory injured or unconscious member. The DRD is designed for **horizontal drag only. No other application shall be attempted!**

To Deploy:

- Locate and pull reflective activation tab which is connected to the DRD handle. (Photo 3) This will deploy the DRD handle from underneath the protective flap. (Photo 4)

Photo 3

Photo 4

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- Grasp and pull the DRD handle. When the DRD handle is pulled, the device is designed to tighten around the member's shoulders and chest, securing the member in their bunker coat.
- The injured or unconscious member can now be securely dragged horizontally and will not slip out of bunker coat.

NOTE: Any attempt to use the device for other than a horizontal drag could result in the member slipping out of their bunker coat. In addition, serious injury could occur to member's upper torso. Members should not be dragged up stairs utilizing the DRD.

BY ORDER OF THE FIRE COMMISSIONER AND CHIEF OF DEPARTMENT

NYLON TUBULAR WEBBING

(Also Found in Volume 1)

Relocated for PFS

1. **SPECIFICATIONS**

- 1" nylon tubular webbing in 20' lengths
- Breaking Strength 4000 lbs
- Knotted breaking strength 3000 lbs

2. PREPARATION FOR USE

2.1 Before the webbing can be used in the field it must be made into a continuous loop by using a water knot (see Illustration).

3. PURPOSE

3.1 To be used to assist in the removal of an unconscious member or civilian from a hazardous environment.

3.2 Spinal immobilization may not be possible due to the need for immediate removal of the member from an imminently dangerous situation.

3.3 To enhance simple maneuvers through the use of knots attached to an individual firefighter's body or SCBA. This will improve leverage and allow additional individuals to assist in the removal. In the event that a firefighter should become unconscious during an incident, members in close proximity will be able to quickly conduct a removal.

3.4 Webbing shall only be used for **dragging** victims; no vertical lifts should be attempted.

4. DISTRIBUTION

4.1 Each Officer and member will be issued a length of webbing, which will become part of the member's personal equipment.

5. REPLACEMENT

5.1 ***Redacted for PFS***

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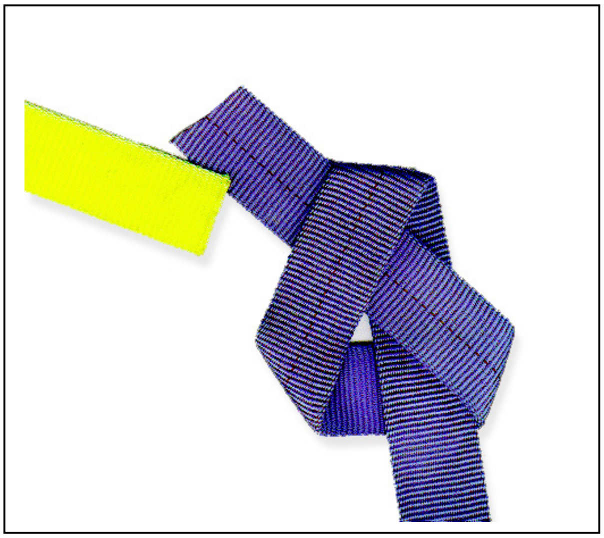
6. CARE AND MAINTENANCE

6.1 The webbing can be cleaned with mild soap and water. It should be allowed to dry naturally, avoiding direct sunlight.

6.2 The webbing should be inspected monthly and after each use.

ILLUSTRATION



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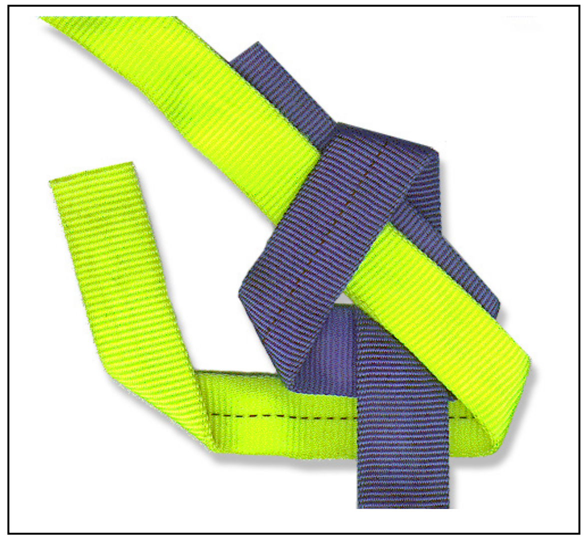

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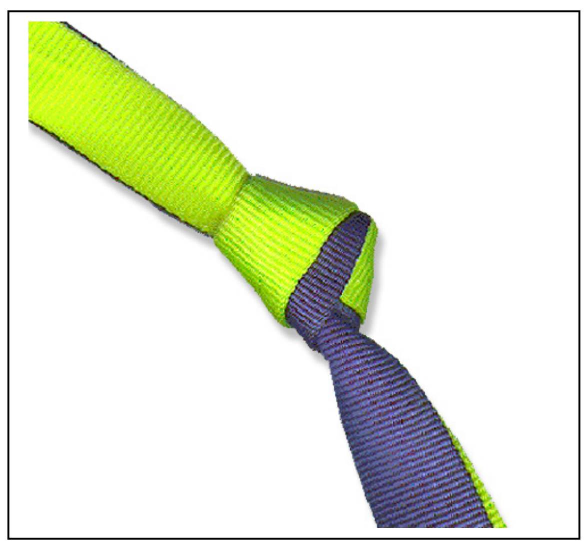

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BY ORDER OF THE FIRE COMMISSIONER AND THE CHIEF OF DEPARTMENT

MANAGING MEMBERS IN DISTRESS
CHAPTER 3, ADDENDUM 4
May 2, 2016

FIREFIGHTER REMOVAL USING LARGE D-RING

1. INTRODUCTION

1.1 The distressed member packaging evolution is an efficient way to prepare a member for a rapid removal. Packaging is accomplished by utilizing the members SCBA, personal harness, the large D-ring of their Bunker coat, and their Drag Rescue Device (DRD).

2. PACKAGING

2.1 Place the distressed member in a sitting position and rotate them so that their back is facing toward the direction of the removal prior to packaging.

Rescuer #1:

Rescuer #1 shall take a position behind the distressed member and place them in a sitting position. **(**Photo 1**)**

Rescuer #2:

Rescuer #2 shall be positioned in front of and facing the distressed member, and ensure that the waist strap of the members SCBA is engaged. Rescuer #2 then grabs the rappel hook from the personal harness of the distressed member and pulls sharply to release the hook from the belt and opens the gate of the hook. (Photo 1)

Photo 1

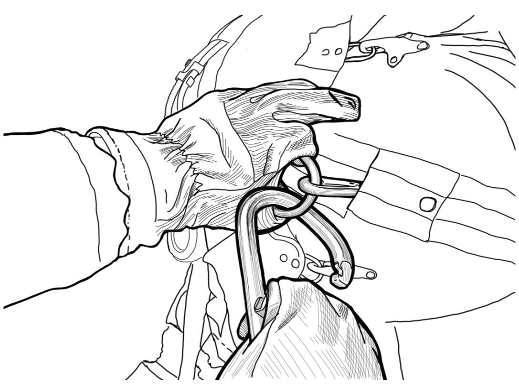

Photo 2

Rescuer #2:

Rescuer #2 places the open hook through the *large D-ring* on the distressed members bunker coat. (Photo 2) The *large D-ring* is the second coat buckle from the top and is connected to the DRD.

Note: At no time shall items be carried on the large D-ring of the bunker coat (e.g. carabineers, keys). These items will interfere with this connection.

Rescuer #1:

Rescuer #1 locates and fully deploys the distressed members DRD, which is located on the back of the member's turnout coat. (Photo 3)

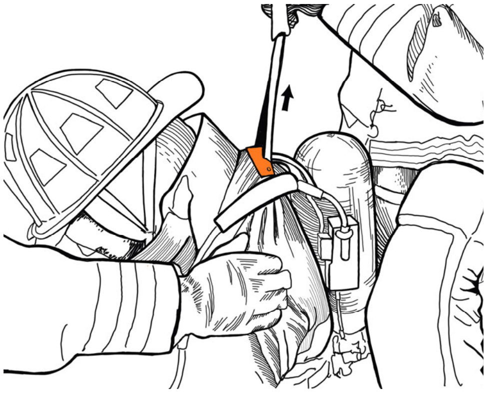

Photo 3

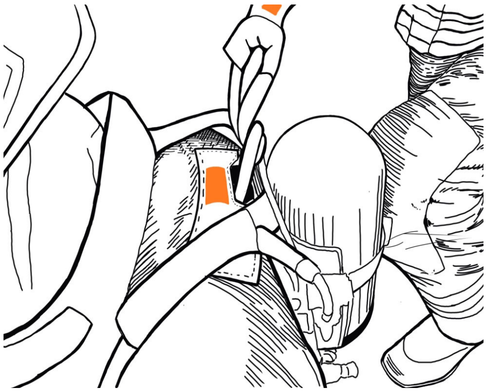

Photo 4

Rescuer #1:

Rescuer #1 wraps the DRD once around the right shoulder strap (over and under) of the distressed members SCBA. (Photo 4)

2.2 When the DRD handle is pulled, the device is designed to tighten around the member's shoulders and chest, securing the member in their bunker coat.

2.3 The distressed member can now be securely dragged horizontally and will not slip out of the bunker coat or SCBA. This method can also be used to remove a member up or down stairs.

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3. MOVING

3.1 Once packaged, the distressed member can be securely moved in a number of ways:

A. Dragged horizontally by grasping the DRD only.

B. Dragged horizontally by grasping the DRD with one hand and the distressed members left shoulder strap with the other hand.

C. Carried horizontally, or up or down stairs with one rescuer grasping the DRD only and a second rescuer grasping the leg-straps of the distressed member.

D. Carried horizontally, or up or down stairs with one rescuer grasping the DRD with one hand and the distressed member's left shoulder strap with the other, while a second rescuer assists by grasping both leg straps of the distressed member (Photo 6).

Photo 6

Note: It is essential that the DRD is wrapped once around the right shoulder strap (over and under) of the distressed members SCBA before using any of these removal methods. Failure to do so could result in the member slipping out of their bunker coat or suffering serious injury to their upper torso.

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EVOLUTIONS
TABLE OF CONTENTS

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EVOLUTION 16
July 20, 2022

MANEUVERING PORTABLE LADDERS

EQUIPMENT:

- **Portable Ladders**
  - **A. Portable Straight Ladders**
  - **B. 24-foot or 35-foot Portable Extension Ladders**

OBJECTIVE:

To describe methods for transporting, raising, extending, placing, carrying, securing and lowering portable ladders.

NOTE:

ALL firefighters must check for, and be aware of, any overhead obstructions throughout the raising and lowering process of any portable ladder.

EVOLUTIONS:

- Transporting portable ladders
- "Beam Raise" for Straight and 24-foot Extension Ladders
- "Beam Raise" for 35-foot Extension Ladders
- Moving a portable ladder in the vertical position
- Securing a portable ladder in the vertical position
- "Flat Raise" for 24-foot Extension Ladders with one Firefighter
- "Flat Raise" for 35-foot Extension Ladders with two Firefighters

Figure 1

1. TRANSPORTING PORTABLE LADDERS: Transport ladders from apparatus or other locations to the point of operation (Figure 1).

1.1 Two firefighters, positioned on the same side of the portable ladder, one at each end (Butt Firefighter and Tip Firefighter), grasp the upper beam of the ladder (If transporting an extension ladder, place fly section facing out).
1.2 Butt Firefighter gives command "Ready, Lift".
1.3 Utilize proper lifting techniques, bend your knees and lift with the legs.
1.4 Both firefighters then raise ladder to shoulder in unison, placing the underside of upper beam resting upon the members shoulder.
1.5 Butt Firefighter places arm through last 2 rungs and grasps the 3rd rung from the butt.
1.6 Tip Firefighter places arm through the 2nd and 3rd rungs from the tip and grasps 1st rung.
1.7 Butt Firefighter gives command: "Ready, Transport" and both firefighters move toward objective.
1.8 Butt Firefighter gives command "Ready, Halt" upon reaching objective.
1.9 Butt Firefighter gives command "Ready, Lower" and both firefighters in unison lower ladder to the ground, butt of the ladder placed under objective.

NOTE: 35-Foot Extension Ladder:
When the 35-foot Extension Ladder is to be transported, 3 firefighters may be utilized with the additional firefighter positioning themselves on the same side and at the approximate mid-point. Carry ladder to objective utilizing commands stated above (Figure 2).

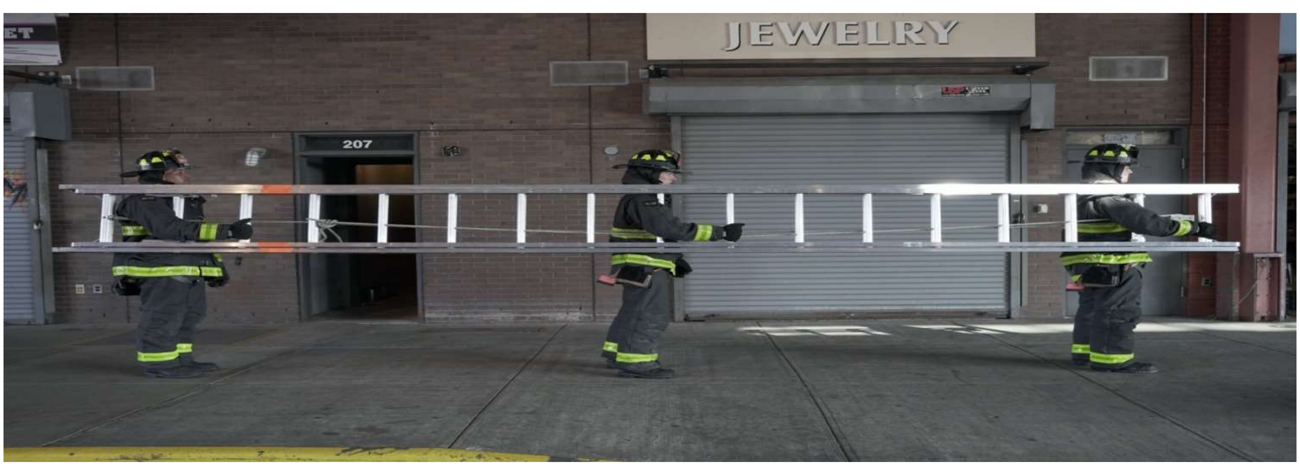

Figure 2

ALTERNATE METHOD: Hand carry for short distances (Figure 3)

Straight Ladders and 24-foot Extension Ladders: Two firefighters, positioned on the same side of the portable ladder, one at each end (Butt Firefighter and Tip Firefighter), grasp the upper beam of the ladder (if transporting an extension ladder place fly section facing out). Utilizing the commands in section 1, transport the portable ladder by holding the upper beam (carry like a suitcase). Utilize proper lifting techniques, bend your knees and lift with your legs.

Figure 3

35-Foot Extension Ladder:

When the 35-Foot Extension Ladder is to be transported, 3 firefighters may be utilized with the additional firefighter positioning themselves on the same side and at the approximate mid-point of the ladder. Utilize the commands in section 1 (Figure 4).

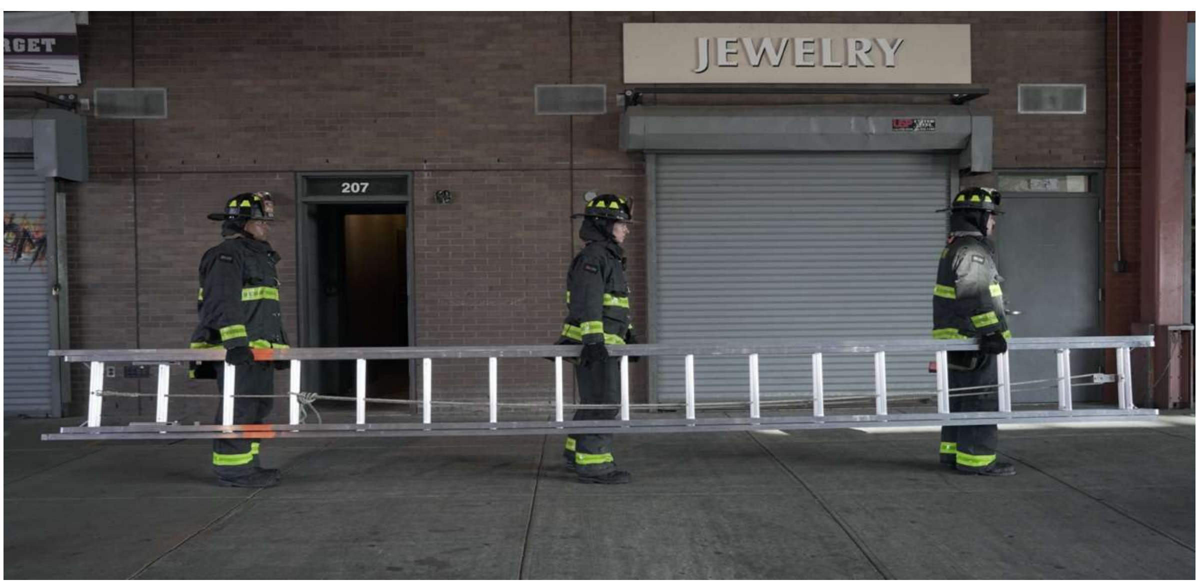

Figure 4

NOTE: When hand carrying the 24-foot or 35-foot Extension Ladder, grasp and lift the upper beam of the fly section. This should prevent lower beam from striking members leg while in transport.

BEAM RAISE: STRAIGHT AND 24-FOOT EXTENSION LADDERS:

2. RAISING THE LADDER (Figures 5 – 8)

This evolution utilizes two Firefighters (1 Butt Firefighter, 1 Tip Firefighter).

2.1 The beam of the portable ladder is positioned on the ground, parallel to building, the butt directly below the objective (when beam raising the 24-foot extension ladder, ensure the fly section is facing away from the building).

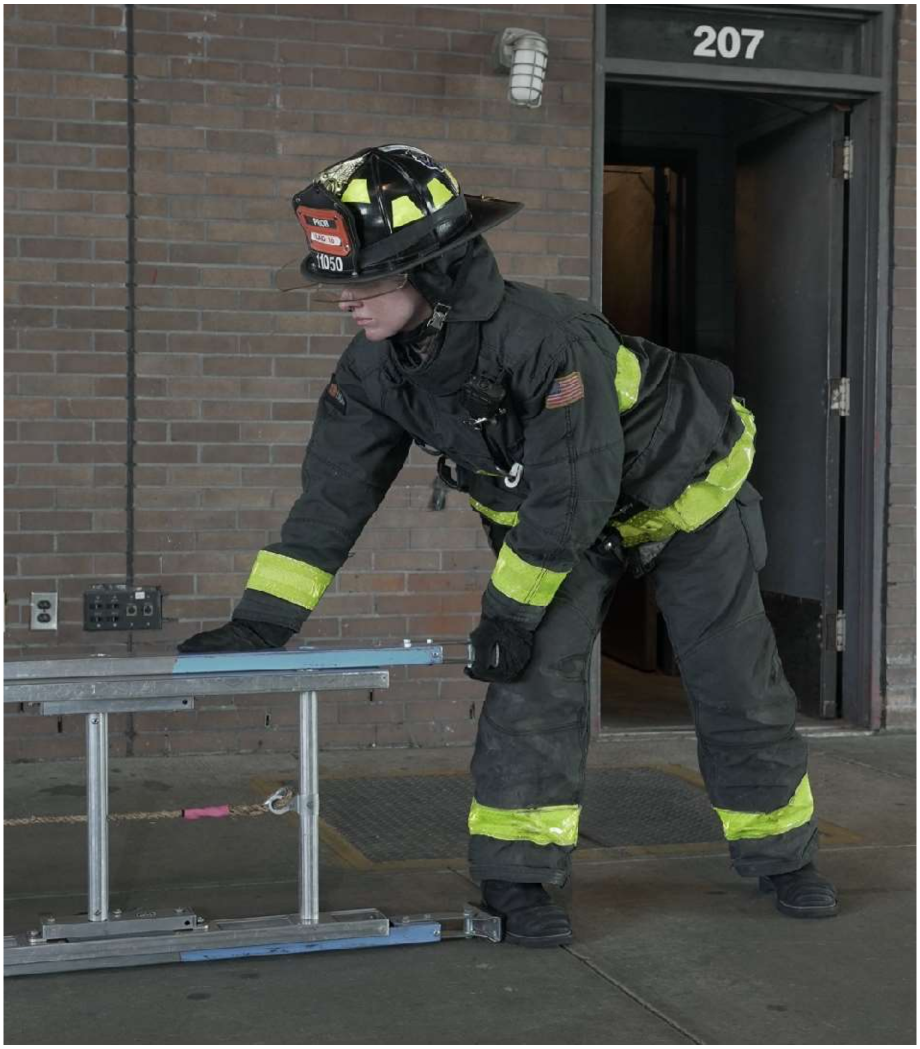

Figure 5

2.2 The Butt Firefighter takes position with back to the building. The **foot nearest to the tip** butts the ladder, with foot placed snubbing the lower ladder beams shoe/spike. The members other leg is extended for leverage. The **hand nearest the tip** grasps underside of the upper beam near the 2nd rung, with the palm facing up. Butt Firefighter's other hand grasps upper beam shoe/spike, palm down (Figure 5).

Figure 6

2.3 Tip firefighter takes position street side of the ladder, one-third from the tip, facing the tip hands on upper beam of ladder. (Figure 6)

2.4 **Butt Firefighter checks overhead for any obstructions.**

2.5 Butt Firefighter gives command "Prepare to raise"

2.6 Tip Firefighter does a partial knee bend with leg that is closest to the ladder, and grasps the top of the upper beam with both hands (Figure 6A)

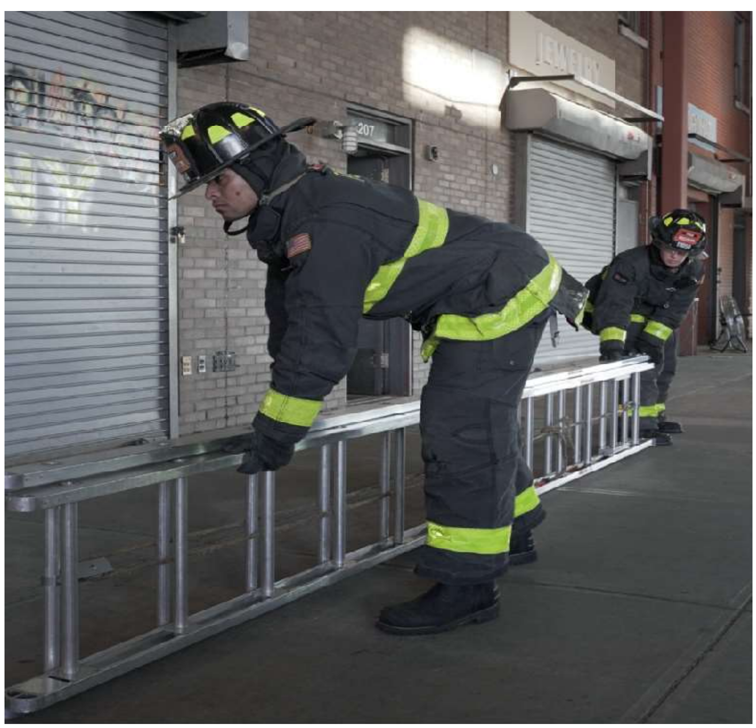

Figure 6A

2.7 With back remaining to the building, Butt Firefighter gives command "Raise".

2.8 Butt Firefighter stabilizes ladder during the raise with hands positioned on upper beam. With back to building, the foot butting ladder **remains snubbing the ladder shoe/spike and DOES NOT MOVE** until ladder is vertical and stabilized. The Butt Firefighters other leg is extended for leverage as ladder is raised.

2.9 On the command "Raise," the Tip Firefighter lifts ladder to approximately head height, then pivots 180 degrees, placing themselves under the lower beam of the ladder, now facing the Butt Firefighter (Figure 7).

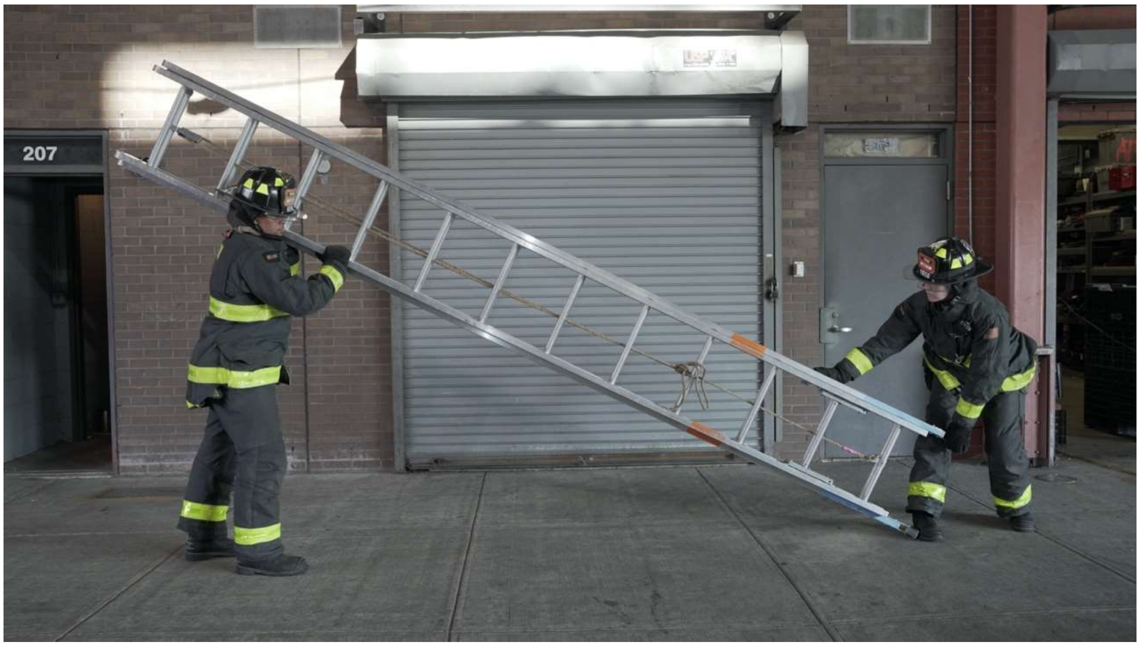

Figure 7

2.10 Then the Tip Firefighter, using a hand under hand motion along lower beam, raises ladder to a vertical position (Figure 7A).

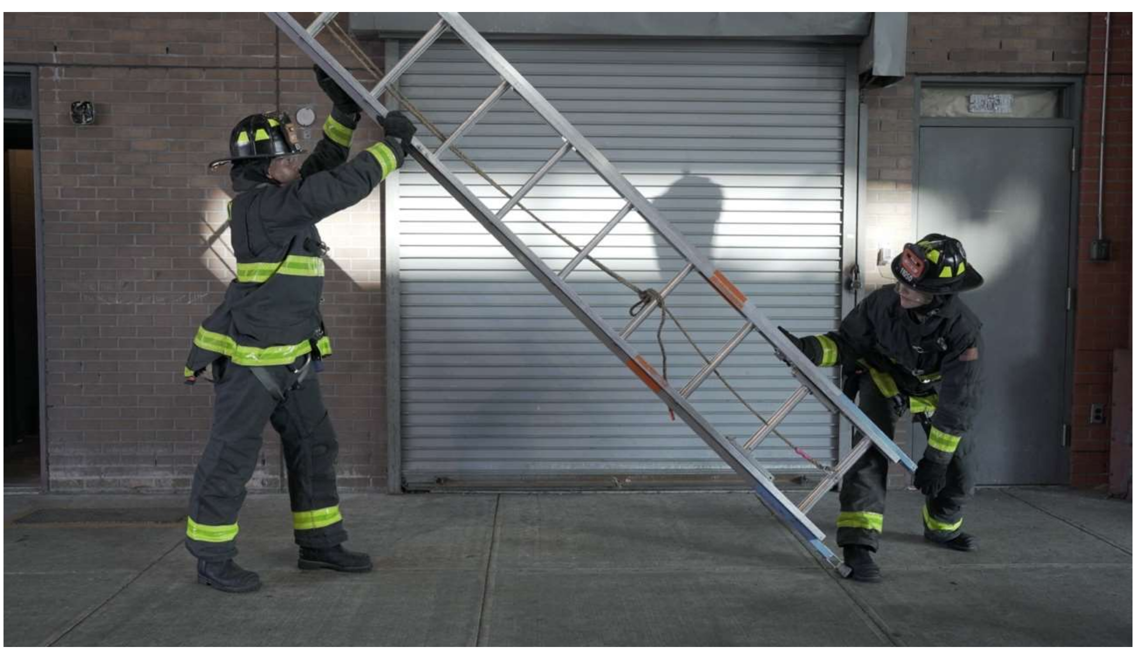

Figure 7A

2.11 With the ladder in the vertical position, the Butt Firefighter remains on the building side of the ladder and the Tip Firefighter remains on the street side of the ladder. Both firefighters shall have their hands on the beams, facing the rungs.

2.12 Once ladder is stabilized, the Butt Firefighter **snubs** left beam with left toe while Tip Firefighter takes a boxer stance placing their left foot forward, dead center between the beams, grasping beams of the bed section with their hands shoulder high, in preparation for the Butt Firefighter to extend the fly section, if applicable (Figure 8, 8A).

Figure 8

Figure 8A

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3. EXTENDING THE FLY SECTION: 24-FOOT EXTENSION LADDER

3.1 While snubbing left beam, Butt Firefighter ensures that the Tip Firefighter has control of the ladder and gives command "Prepare to Extend".

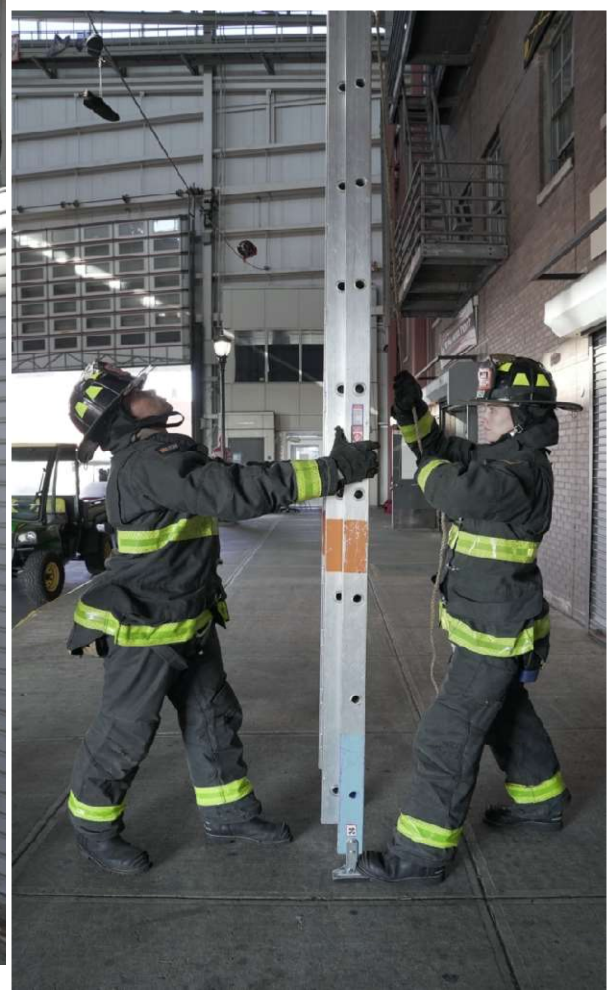
3.2 Butt Firefighter then unties knot, grasps halyard with palms facing away and thumbs pointing down, extends fly with a hand over hand motion to desired height and ensures fly section is locked in position. Butt Firefighter shall pull halyard straight down, keeping hands close to ladder rungs for increased stability while extending. (Figure 9 & 9A)

3.3 Tip Firefighter maintains control of the ladder with hands on the beams and looks up, assisting with estimating the desired height.

3.4 Once the fly section is properly locked on a bed section rung, the Butt Firefighter places hands back on the beams about head high.

Figure 9

Figure 9A



4. ENGAGING THE BUILDING: STRAIGHT AND 24-FOOT EXTENSION LADDERS

4.1 Looking forward, with hands on beam head high, Butt Firefighter controls the ladder.

4.2 Once **control of the ladder has been ensured,** the Butt Firefighter gives command: "Prepare to Engage the Building."

4.3 On the command "Prepare to Engage the Building", the Tip Firefighter places left foot on center of bottom rung, and grasps rung at shoulder level with both hands palms down, looking up towards the tip.

4.4 Butt Firefighter looking forward, not looking up, gives command "Engage the building". Butt Firefighter steps backward, lowering ladder into building. Tip Firefighter, looking up, guides ladder into building (Figure 10).

4.5 Tip placement and climbing angle should be checked and adjusted at this time. If necessary, disengage building (see section 6) to extend or retract fly section to gain proper tip placement/climbing angle and then reengage (if extension ladder).

4.6 Once proper climbing angle of 65-75 degrees is obtained (See Section 5), the Butt Firefighter secures the halyard by tying a clove hitch and binder on the taut part of the rope, above the 3rd rung.

Figure 10

5. PROPER CLIMBING ANGLE: STRAIGHT, 24-FOOT AND35-FOOT EXTENSION LADDERS

5.1 The proper climbing angle for portable ladder operation is 65-75 degrees.

5.2 Determining proper climbing angle: face building with toes of boots against the shoes/butts of the ladder. Without leaning your body forward, stand up straight and raise arms to a perpendicular position to your body, towards the ladder rails. If hands contact the beams anywhere from your fingertips to your palms, you are within that 65-75 degree range (Figure 11).

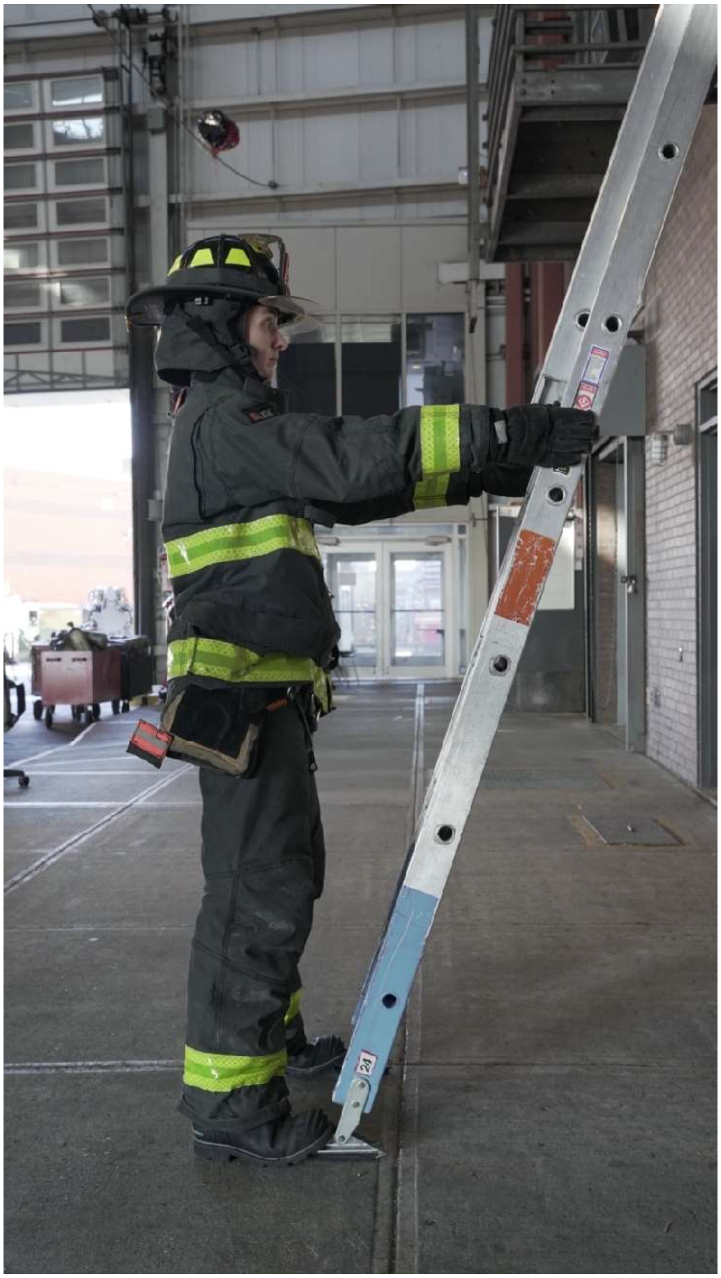


Figure 11

6. DISENGAGING THE BUILDING: STRAIGHT AND 24-FOOT EXTENSION LADDERS

6.1 **Prior to disengaging building, firefighters check overhead for any obstructions.**
6.2 Butt Firefighter unties halyard **PRIOR TO** disengaging building (if extension ladder).
6.3 Butt Firefighter, hands on beams head high, gives command "Prepare to Disengage".
6.4 Tip Firefighter places left foot center of bottom rung, and grasps rung at shoulder level with both hands, palms down, looking up towards the tip (Figure 10).
6.5 On Butt Firefighter's command "Disengage," Butt Firefighter pushes and Tip Firefighter pulls ladder to vertical position.
6.6 Butt Firefighter returns to snubbing the left beam once ladder is the vertical position and stable.
6.7 Tip Firefighter returns to boxer stance with hands on beams.

7. RETRACTING THE FLY SECTION: 24-FOOT EXTENSION LADDER

7.1 Butt Firefighter, snubbing left beam and controlling the ladder with hands on the beams, gives command: "Prepare to Retract".
7.2 Tip Firefighter places hands on beams of bed section shoulder high, feet in boxer stance left foot forward, dead center of the beams.
7.3 Butt Firefighter ensures Tip Firefighter has control of the ladder with thumbs clear of the fly section and gives Command "Retracting". Butt Firefighter retracts the fly section using a hand under hand motion on the halyard, keeping hands close to ladder rungs for increased stability while retracting. Once fly section is fully retracted, lock fly into the fully bedded position.
7.4 Butt Firefighter then secures halyard above the 3rd rung with a clove hitch and a binder on the taut part of the rope

8. LOWERING: STRAIGHT AND 24-FOOT EXTENSION LADDERS

8.1 Butt Firefighter, hands on beams shoulder high, gives the command "Prepare to lower"
8.2 Tip Firefighter places hands head high, on the beam that is in the direction the ladder is being lowered.
8.3 **Butt Firefighter checks overhead for any obstructions and a clear path of ladder decent.**
8.4 Butt Firefighter moves hands to beam opposite tip firefighter and gives command "Lower ladder."
8.5 The Butt Firefighter remains with back to building. The **foot nearest the direction the ladder is being lowered,** butts the ladder, with the foot snubbing the inside of lower ladder beams butt/shoe. The foot butting ladder **remains snubbing the ladder shoe/spike and DOES NOT MOVE** until ladder lowered to ground. The members other leg is extended for leverage.
8.6 Butt Firefighters **hand nearest the tip** grasps underside of the upper beam with the palm facing up, other hand grasps upper beam palm down. Butt Firefighter uses hands on upper beam to stabilize ladder during the lowering (Figure 12).

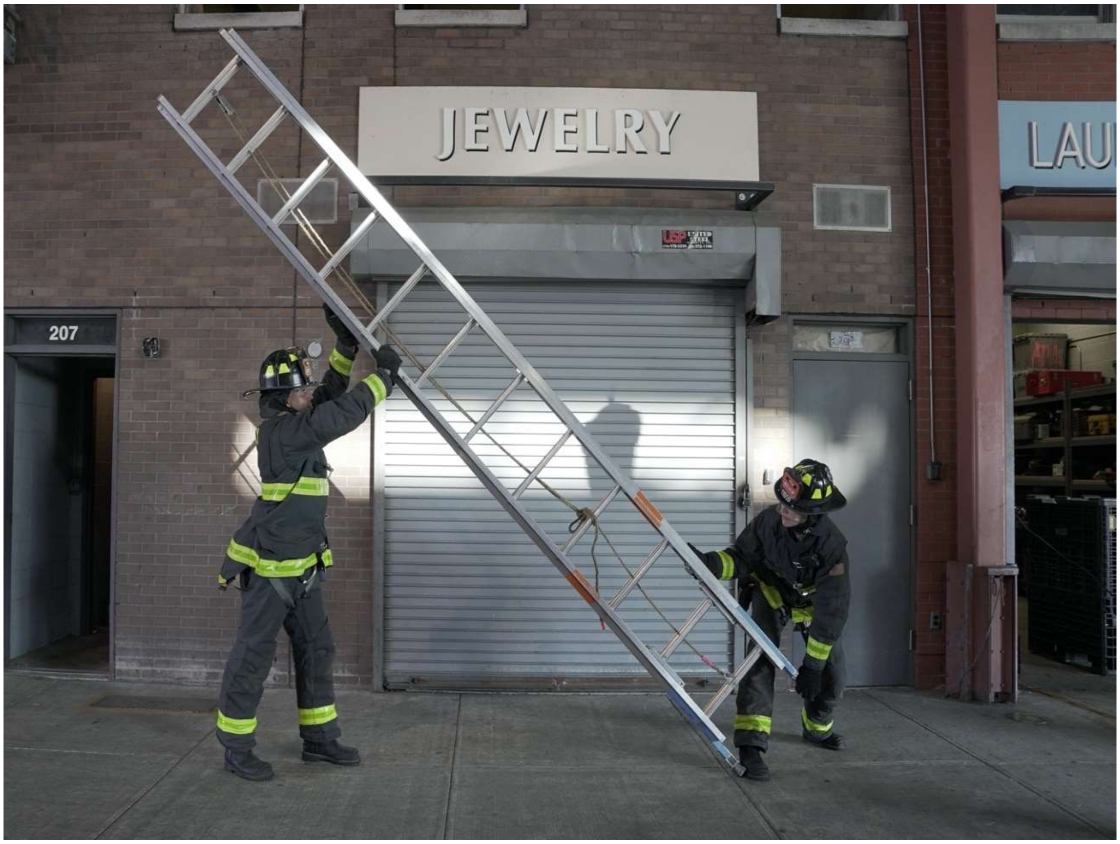


Figure 12

8.7 Tip Firefighter walks backwards, facing the Butt Firefighter, keeping arms extended and lowers ladder in a hand over hand motion along the ladders lower beam (Figure 12)

8.8 Butt firefighter gives command "Prepare to step out" when Tip Firefighter **approaches** 1/3 from the tip. Tip Firefighter keeps moving awaiting next command.

8.9 Butt Firefighter then gives command "Step out" when Tip Firefighter **reaches** 1/3 the distance from the tip of the ladder.

8.10 Tip Firefighter "steps out" from under the lower beam to the street side of the ladder, reversing their body position to now face the ladders tip. Then, reaching over the top of the ladder, grasp the upper beam, and lower the ladder fully to the ground (Figure 13, 13A).

Figure 13

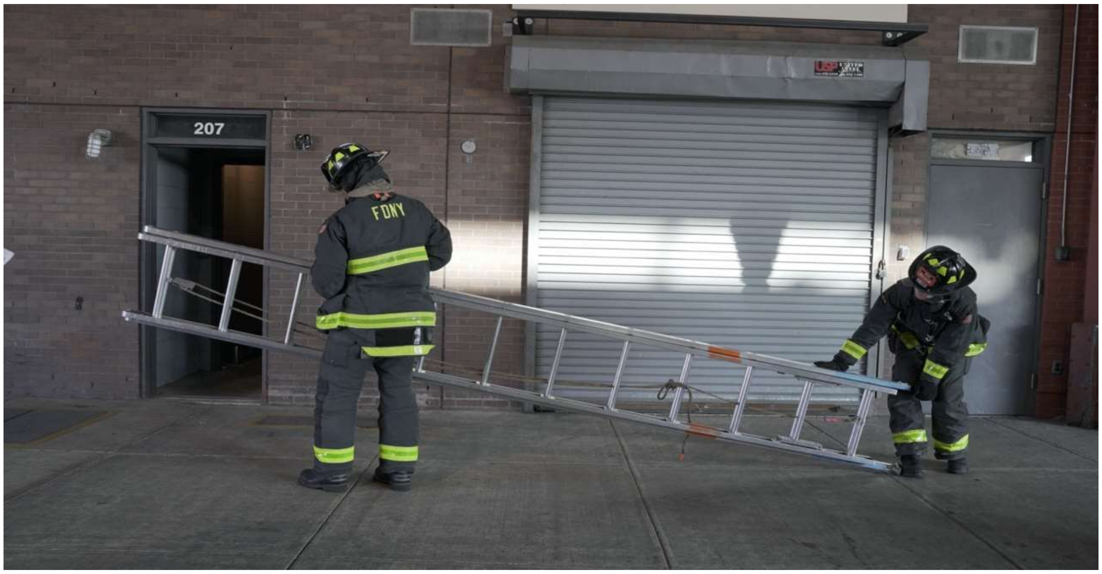


Figure 13A

BEAM RAISE: 35-FOOT EXTENSION LADDER:

9. RAISING THE 35-FOOT EXTENSION LADDER:

This evolution utilizes three firefighters (1 Butt Firefighter, 2 Tip Firefighters)

9.1 The beam of the portable ladder is positioned on the ground, parallel to building, the butt directly below the objective, fly section is facing away from building.

9.2 The Butt Firefighter takes position with back to the building. The **foot nearest the tip** butts the ladder, with foot placed snubbing the lower ladder beams steel spike. The members other leg is extended for leverage. The **hand nearest the tip** grasps underside of the upper beam near the 2nd rung, with the palm facing up. The members other hand grasps upper beam shoe, palm down.

9.3 Tip firefighters take position street side of the ladder, one third from the tip, facing the tip. Taller firefighter should be closest to the tip

9.4 **Butt Firefighter checks overhead for any obstructions.**

9.5 Butt Firefighter gives command "Prepare to raise".

9.6 Tip Firefighters do a partial knee bend with leg that is closest to the ladder, and grasps the top of the upper beam with both hands. (figure 14).

9.7 With back remaining to the building, Butt Firefighter gives command "Raise".

9.8 Butt Firefighter stabilizes ladder during raise with hands positioned on upper beam. Foot butting ladder remains snubbing the ladder shoe/spike and **DOES NOT MOVE** until ladder is vertical and stabilized. The Butt Firefighter's other leg is extended for leverage as ladder is raised.

Figure 14

9.9 On the command "Raise", Tip Firefighters lift ladder to approximately head height, then pivot 180 degrees, placing themselves under the lower beam of the ladder, now facing the Butt Firefighter.

9.10 Tip Firefighters, using a hand under hand motion along lower beam, raise ladder to a vertical position. As ladder is nearing the vertical position, the Tip Firefighter that is closest to the Butt Firefighter moves across the front of the ladder to the other beam and assists bringing the ladder to the vertical position. (figure 15)

9.11 Once ladder is stabilized, the Butt Firefighter remains on the building side of the ladder with left toe snubbing the left beam, and both hands on the beams.

9.12 Tip Firefighters should be facing each other. One member on each beam with left hand high, right hand low on the bed section of the beam, in preparation for the Butt Firefighter to extend the fly section (if applicable).

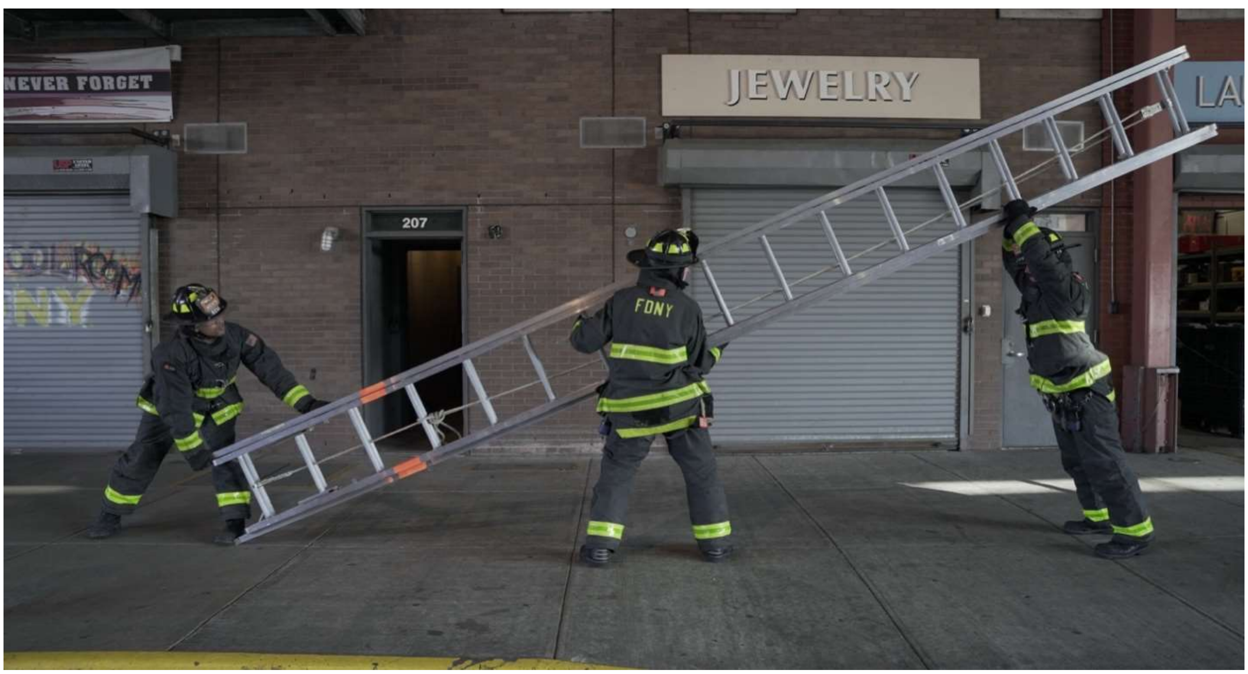


Figure 15

10. EXTENDING THE FLY SECTION - 35-FOOT EXTENSION LADDER:

10.1 While snubbing left beam and both hands grasping beams, Butt Firefighter gives command "Prepare to Extend". Tip Firefighters remain holding the beam of the bed section, left hand high and right hand low on the beam, slight downward pressure on the ladder. Tip Firefighters place their feet about two feet apart, looking upward toward the tip. (Figure 16)

10.2 Butt Firefighter then unties knot, grasps halyard with palms facing away and thumbs pointing down, extends fly section with a hand over hand motion to desired height and ensures fly section is locked in position. Butt Firefighter shall pull halyard straight down, keeping hands close to ladder rungs for increased stability while extending.

10.3 Once the fly section is properly locked on a bed section rung, the Butt Firefighter places hands back on the beams, about head high.

Figure 16

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11. ENGAGING THE BUILDING: 35-FOOT EXTENSION LADDER

11.1 Looking forward, with hands on beams head high, the Butt Firefighter controls the ladder.
11.2 Once **control of the ladder has been ensured**, the Butt Firefighter gives the command: "Prepare to Engage the Building".
11.3 On the command "Prepare to Engage the Building" each Tip Firefighter, **one at a time**, moves to the street side of the ladder. Tip firefighters grasp beam with outside hand, inside hand placed on a rung palms down, approximately shoulder high. Inside foot of each Tip Firefighter is placed on the ladders bottom rung.
11.4 Butt Firefighter, while looking forward, gives command "Engage the building." Butt Firefighter steps backward, lowering ladder into building. Tip firefighters, looking up guide ladder into building (Figure 17).

Figure 17

11.5 Tip placement and climbing angle should be checked and adjusted at this time. If necessary, disengage building (see section 5) to extended or retract fly section to gain proper tip placement/climbing angle and then reengage.
11.6 Once the proper climbing angle of 65-75 degrees is obtained, the Butt Firefighter secures halyard by tying a clove hitch and binder on the taut part of the rope, above the 3rd rung.

12. PROPER CLIMBING ANGLE:

12.1 Proper angle for portable ladder operation is 65-75 degrees.
12.2 Check for proper climbing angle (see Section 5).

13. DISENGAGING THE BUILDING: 35-FOOT EXTENSION LADDER

13.1 **Prior to disengaging building firefighters should check overhead for any obstructions.**
13.2 Butt Firefighter unties halyard **PRIOR TO** disengaging building.
13.3 Butt Firefighter, looking straight ahead, hands on beams head high, gives command "Prepare to Disengage".
13.4 Facing the building, Tip Firefighters place both hands on a rung approximately shoulder high, palms down with their inside foot in the center of bottom rung (figure 17).
13.5 On Butt Firefighter's command "Disengage", Butt Firefighter pushes and Tip Firefighters pull ladder to vertical position. Tip firefighters look upward, as ladder moves to vertical position.
13.6 Butt Firefighter returns to snubbing the left beam once ladder is vertical and stable.

14. RETRACTING THE FLY SECTION: 35-FOOT EXTENSION LADDER

14.1 Butt Firefighter, snubbing the beam and controlling ladder with hands on the beams, then gives command "Prepare to Retract."
14.2 Butt Firefighter then instructs each Tip Firefighter, **one at a time**, to move to the beams. Tip firefighters move and grasp the back side of the bed sections beam with their left hand high, and their right hand low, slight downward pressure on beam.
14.3 Tip Firefighters place their feet about two feet apart, looking upward toward the tip.
14.4 Butt Firefighter retracts fly section using a hand under hand motion on the halyard until fully retracted.
14.5 Once fly section is fully retracted, lock into the fully bedded position.
14.6 Butt firefighter then secures halyard with a clove hitch and a binder on the taut part of the rope, above the 3rd rung.

15. LOWERING THE LADDER: 35-FOOT EXTENSION LADDER

15.1 With hands on the beams shoulder high, Butt Firefighter gives command "Prepare to lower"
15.2 The taller Tip Firefighter moves to the beam in the direction the ladder will be lowered and places his/her hands about head high. Shorter Tip Firefighter moves to the street side of the ladder next to other Tip Firefighter.
15.3 The Butt Firefighter remains with back to building. The **foot nearest the direction the ladder is being lowered,** butts the ladder, with the foot placed snubbing the inside of the lower ladder beams shoe. The foot butting ladder **remains on the ladder steel spike and DOES NOT MOVE** until ladder lowered to ground. The members other leg is extended for leverage.
15.4 Butt Firefighter puts **hand nearest the tip** grasps underside of the upper beam with the palm facing up. The members other hand grasps upper beam, palm down
15.5 **Butt Firefighter checks overhead for any obstructions and a clear path of ladder decent.**
15.6 Butt Firefighter gives command "lower ladder."

15.7 Butt Firefighter uses hands on upper beam to stabilize ladder during the lowering.

15.8 Taller Tip Firefighter walks backwards, keeping arms extended and lowers ladder in a hand over hand motion along lower beam. Shorter tip firefighter steps in under beam as soon as there is room and assists in lowering while keeping the beam over their shoulder. (Figure 18).

15.9 Butt Firefighter gives command "Prepare to step out" when Tip Firefighters **approach** 1/3 from the tip. Tip Firefighters keep moving awaiting next command.

15.10 Butt Firefighter gives command "Step out" when Tip Firefighters **reach** 1/3 from the tip.

15.11 Tip Firefighters "step out" from under the lower beam to the street side of the ladder, reversing their body position to now face the ladders tip. Then reaching over the top of the ladder, members grasp the upper beam, and lower the ladder fully to the ground.

Figure 18

16. CARRYING THE 24-FOOT EXTENSION LADDER IN THE VERTICAL POSITION:

OBJECTIVE: Carrying vertical ladder for operational repositioning.

16.1 Each member positions themselves along a ladder beam
16.2 Each members takes their left hand and grasps a beam head high
16.3 Each member takes their right hand and grasps the 3rd rung from the butt, palm up (Figure 19).
16.4 Firefighter facing the direction of travel gives command “Ready, lift”.
16.5 Firefighters lift the ladder a few inches off the ground and set themselves to carry.
16.6 Firefighter facing direction of travel then gives command “Ready, Carry”
16.7 Firefighter facing direction of travel looks alternately at ladder tip and direction of travel to avoid obstructions.
16.8 Firefighter facing direction of travel gives command “Ready, halt” when at objective. Both members halt and place butts of the ladder on the ground.

Figure 19

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17. CARRYING THE 35 FOOT LADDER IN THE VERTICAL POSITION:

OBJECTIVE: Carrying vertical ladder for operational repositioning.

17.1 The Butt Firefighter uses the hand opposite the direction of travel to grasp the rung above their head, palm down. Butt Firefighter's other hand grasps 2nd rung from the bottom, palm up.
17.2 Tip Firefighters face beams
17.3 Tip Firefighters left hands grasp beams head high.
17.4 Tip Firefighters right hands grasp 2nd rung from bottom, palm up.

Note: 3rd rung from bottom may be more comfortable for taller firefighters as long as **both** firefighters grasp the same rung (Figure 20).

17.5 Butt Firefighter gives command "Ready, Lift" Tip firefighters lift ladder and keep eyes on the tip to avoid obstructions and maintain control.
17.6 Butt Firefighter gives command "Ready, Carry" and alternates looking at ladder tip and direction of travel as ladder is carried.
17.7 All Firefighters carry ladder to objective.
17.8 Butt Firefighter gives command "Ready, Halt". All firefighters halt and place butts of ladder on the ground.

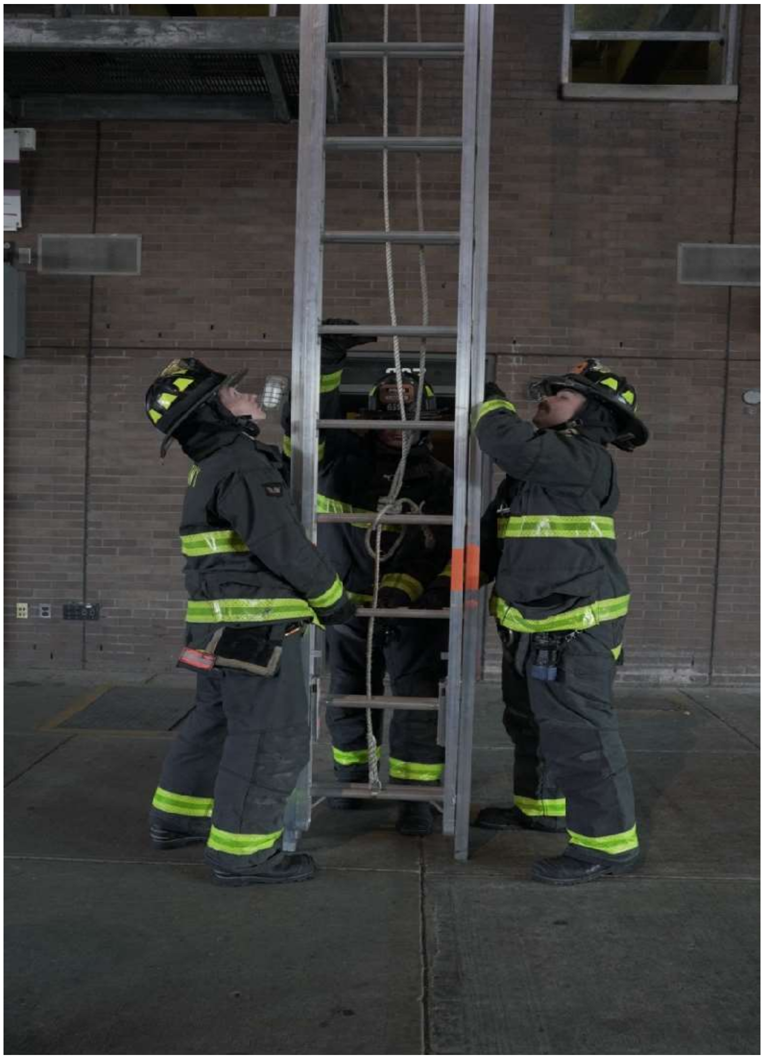

Figure 20

18. SECURE LADDER: 24-FOOT EXTENSION LADDER

OBJECTIVE: To secure portable ladder in the vertical position, between commands, or if ladder starts to get out of control.

18.1 If both Firefighters are facing rungs:

18.1.1. At command "Secure ladder" each Firefighter grasps **BOTH** beams shoulder high and simultaneously places the ball of their left foot on bottom rung with the side of their left foot against their respective left beam. Each Firefighters right foot is used to stabilize. Both firefighters exert downward pressure with feet and hands. (Figure 21)

18.2 If both Firefighters are facing beams:

18.2.1. At command "Secure Ladder" each Firefighter grasps the beam in front of them with both hands at shoulder level, exerts downward pressure and then quickly pivoting to their left now facing ladder rungs, and assume positions in section above (18.1.1)

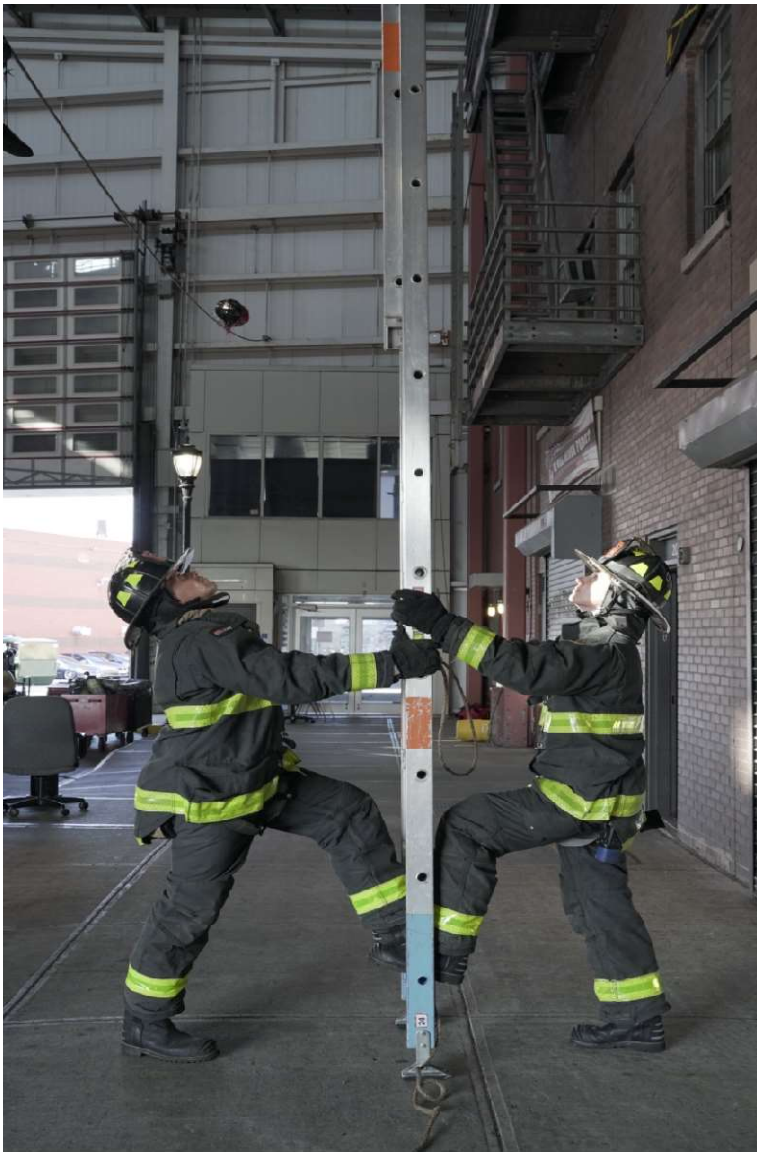

Figure 21

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19. SECURE LADDER: 35-FOOT EXTENSION LADDER

19.1 If all Firefighters are facing rungs:

19.1.1 Butt firefighter grasps each beam about shoulder high with left foot on the center of the bottom rung.

19.1.2 Each Tip Firefighter grasps the beam nearest them with left hand at head level and right hand about 12” below the left hand. Each Tip Firefighter places the ball of their inside foot on the bottom rung against the beam in front of them.

19.1.3 All firefighters exert downward pressure with hands and feet (Figure 22)

19.2 Butt Firefighter facing rungs, Tip Firefighters facing beams:

19.2.1 Butt firefighter grasps each beam about shoulder high with left foot on the center of the bottom rung.

19.2.2 Each Tip Firefighter grasps the beam nearest them with left hand at head level and right hand about 12” below the left hand. Each Tip Firefighter moves to face rungs and places the ball of their inside foot on the bottom rung against the beam in front of them.

19.2.3 All firefighters exert downward pressure with hands and feet (Figure 22)

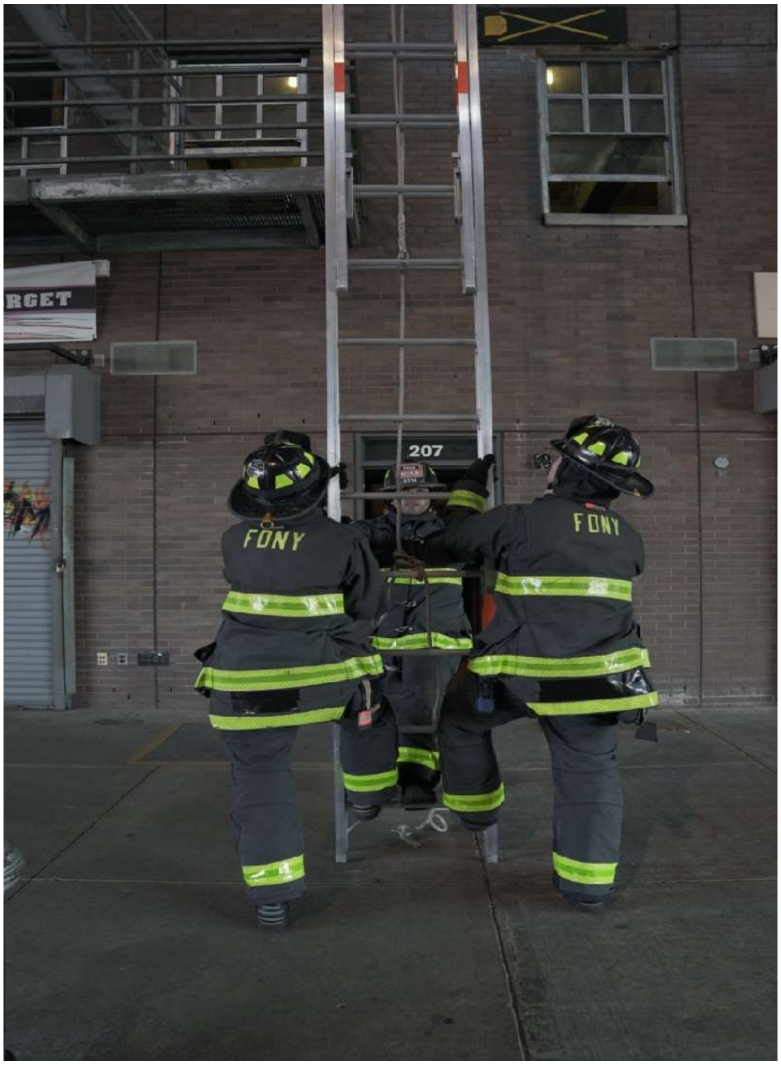

Figure 22

20. ONE FIREFIGHTER 24-FOOT LADDER FLAT RAISE AND TWO FIREFIGHTER 35-FOOT LADDER FLAT RAISE:

OBJECTIVE: To position portable ladders for operations utilizing the building.

20.1 Place ladder flat on ground, with the **fly section facing up,** perpendicular to the building, the butts of the ladder against the building. (Figure 23)

Figure 23

20.2 Firefighter(s) stand at tip of ladder, facing building and grasp top rung of ladder.
20.3 Firefighter(s) lift tip of ladder and step in under ladder rungs, placing hands on the beams.

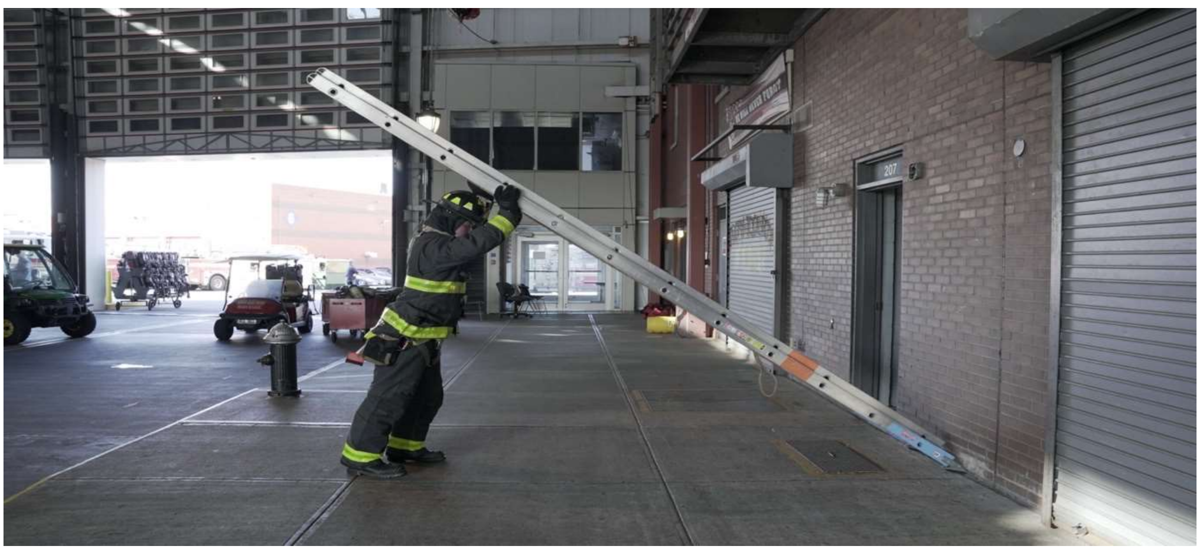

Figure 24

20.4 One firefighter 24 flat raise:

20.4.1 Member places hands on beams and while moving toward building, raising ladder vertical with a hand under hand motion along the beams until ladder is in vertical position against the building, the fly section will be facing the building. (Figure 24)

Figure 25

20.5 Two firefighter 35' Flat raise:

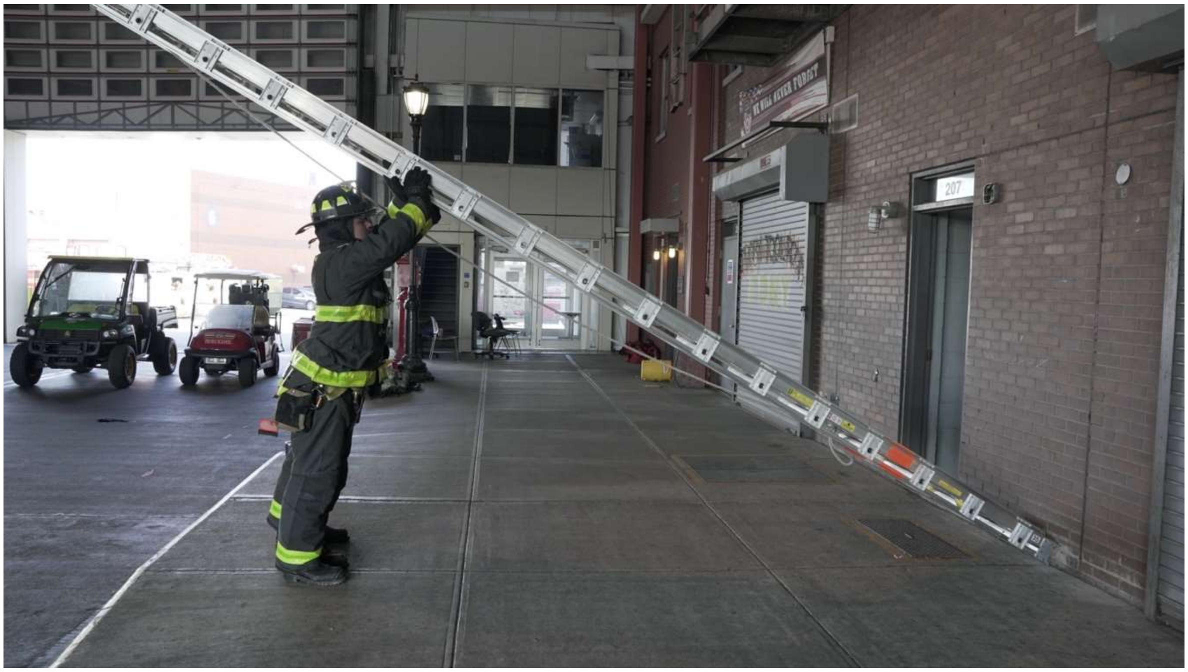

Figure 25

20.5.1 Firefighters move toward building in unison, raising ladder in a hand under hand motion, one member on each beam, until ladder is in vertical position, the fly section will be facing the building (Figure 25)

20.6 Pull butts of ladder out 2'-3' from building for the 24-foot extension ladder and 4'-5' for the 35-foot extension ladder. (Figure 26, 26A)

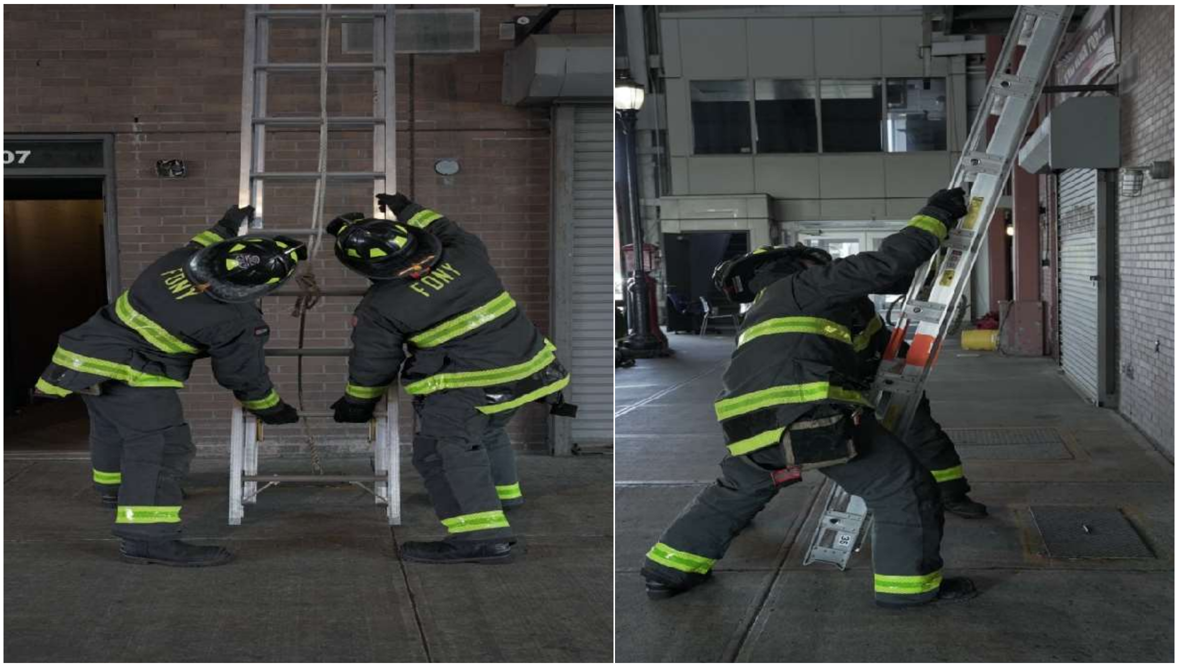

Figure 26, 26A

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20.7 The Firefighter extending the ladder places their left foot snubbing the butt of the left beam. The Firefighter then unties the halyard, and extends the fly section along building wall to desired height utilizing a hand over hand method with their thumbs pointed down. This member ensures the fly section is properly locked on the rung of the bed section (Figure 27). The additional Firefighter ensures the ladder remains stable with hands placed on the beams.

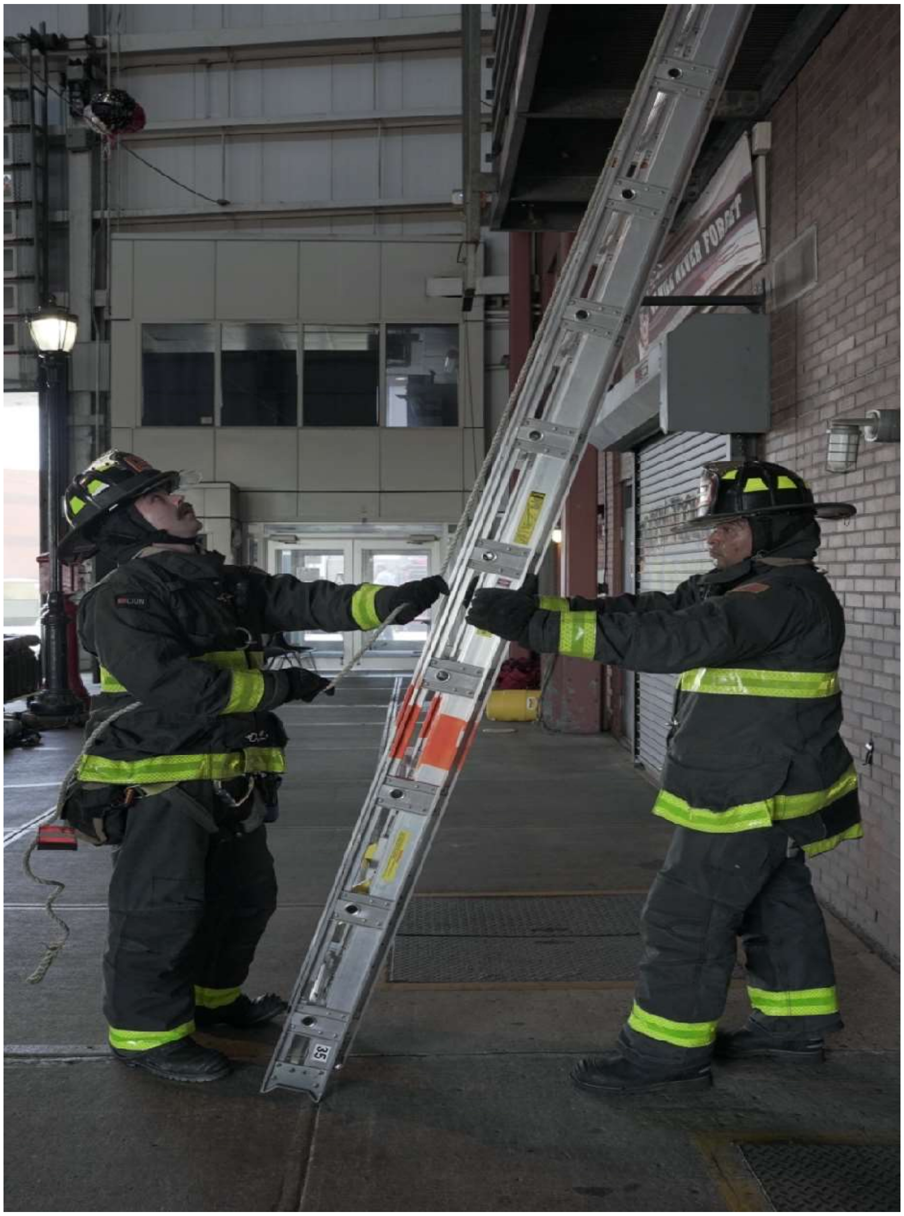

Figure 27

*NOTE: Extending the portable ladder tip 1 rung past your objective can aid for proper final tip placement.

20.8 Tie off halyard and roll ladder into position, check for proper climbing angle of 65-75%.
20.9 Adjust placement and angle if required and reverse steps to bring ladder back to the ground

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EVOLUTION 23
October 1, 2007

EXIT WINDOW USING PERSONAL SAFETY SYSTEM (PSS) WITH REMOTE ANCHOR

1. EQUIPMENT

- Personal Harness and Personal Safety System.

2. OBJECTIVE

- To enable a firefighter to remove themselves from an untenable position above grade.

3. USING THE PERSONAL SAFETY SYSTEM

- This system should **ONLY** be used after all other means of self-rescue have been exhausted.
- When a member has decided to deploy the Personal Safety System, a **Mayday** transmission for a trapped member must be transmitted.
  - In addition to all other required information relayed for a trapped member, include that you are in the process of deploying the Personal Safety System.
  - When a point of safety is reached after using your Personal Safety System, the Incident Commander must be notified.
- If conditions permit, tying off to a substantial object is the **preferred** method of anchoring the personal safety system.
- Locate and clear a window suitable for exit.
- Select a suitable substantial object, e.g., steam riser, radiator, two wall studs, door frame, etc.

3.1 ACCESSING THE SYSTEM FROM THE STORAGE BAG

- Locate the storage bag with the right hand. Fully open the flap closure ensuring the two side securing tabs are released from the flap closure. (Figure 1)

Figure 1

- Grasp anchor hook with right hand sliding it up and out of storage bag. (Figure 2)

Figure 2

- Grasp anchor hook with both hands in front of your body.
- With both hands on the hook, pull forward sharply.
- This motion will deploy the EXO from the storage bag, disengage the handle support strap and allow the PSS "D" ring to slide forward. (Figure 3)

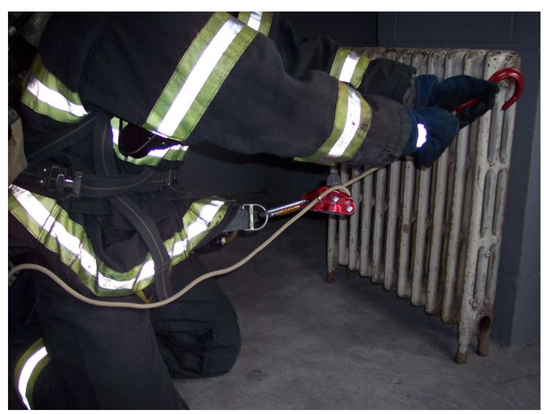


Figure 3

- Once the harness handle is fully deployed, leave the hook in the left hand and slide the right hand down to the EXO.
- Depress the cam with your right thumb and extend your left arm allowing the rope to pass through the EXO.
- Maintain harness handle fully deployed by keeping right hand extended away from the body. (Figure 4)

Figure 4

Note: **Introduce enough rope between the hook and EXO to pass the rope around the substantial object and tie the anchor knot. Introducing more rope than what is necessary for the EXO to clear the window sill may cause the system to be shock loaded when exiting the window.**

3.2 ANCHORING

- Pass the hook around the substantial object. Allow enough slack to tie the anchor knot.
- Tie the Anchor Knot.
- With palms facing up, place the anchor hook on top of the rope. (Figure 5)
- Make a half hitch with right hand.

Figure 5

- Place the half hitch over point of anchor hook and pull taut. (Figure 6)

Figure 6

- Make a second half hitch in the same manner as the first half hitch. (Figure 7)

Figure 7

- Place the second half hitch over the point of the anchor hook and pull taut. (Figure 8)

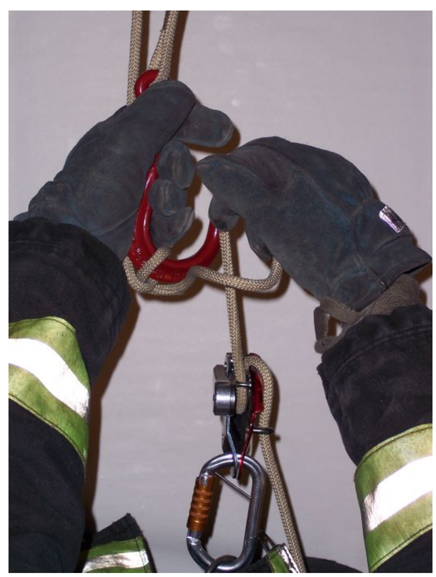


Figure 8

Back to Main TOC

- Completed Anchor Knot.
  (Figure 9)

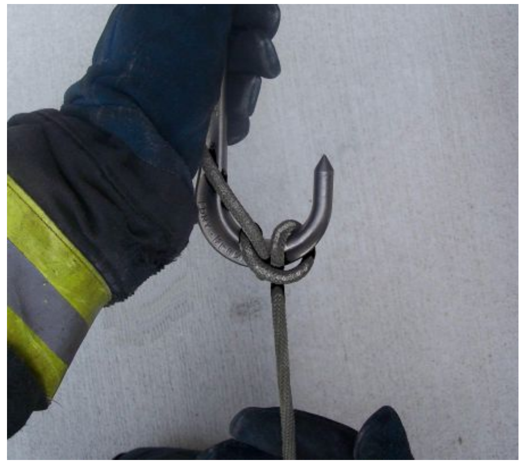


Figure 9

Examples of alternate methods of the anchor hook used on a remote anchor with saddle and tip. (Figures 10 through 13)

Figure 10

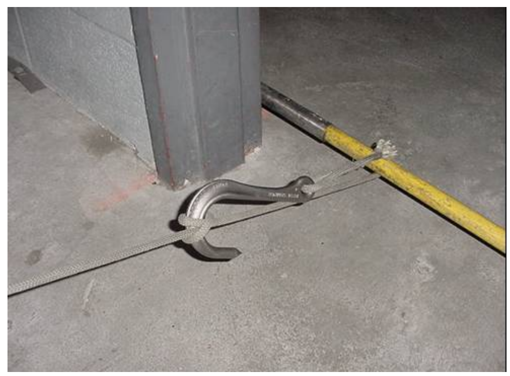


Figure 11

Figure 12

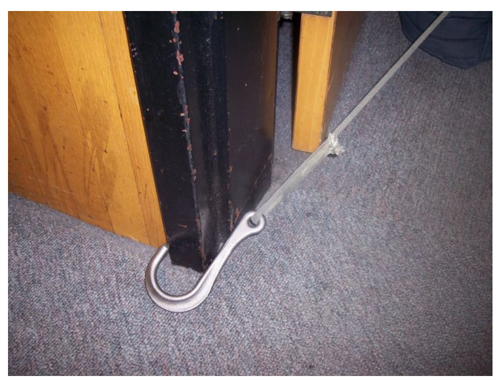


Figure 13

Note: When using the anchor hook as pictured in figure 12 and 13, place the anchor hook as low as possible keeping tension. This will help prevent the anchor hook from coming off of the anchor point.

3.3 LOADING THE SYSTEM

- Move backwards from anchor point until rope and EXO are under tension.
- Lean back sharply using body weight to pull against anchor to:
  - Test the substantial object,
  - Insure full harness handle deployment with PSS "D" ring and EXO at top of harness handle,
  - Expose the EXO allowing for easy access by member.

4. PAYING OUT FROM ANCHOR POINT TO EXIT POINT

4.1 Facing anchor, grasp the EXO with left hand. With palm facing up, use heel of hand to depress cam, keeping all fingers away from rope (eliminating excess friction during payout). (Figure 14)

Note: You will not be able to slide the EXO along the rope unless cam is depressed.

- With right hand, grasp the rope between the EXO and storage bag with palm facing down.

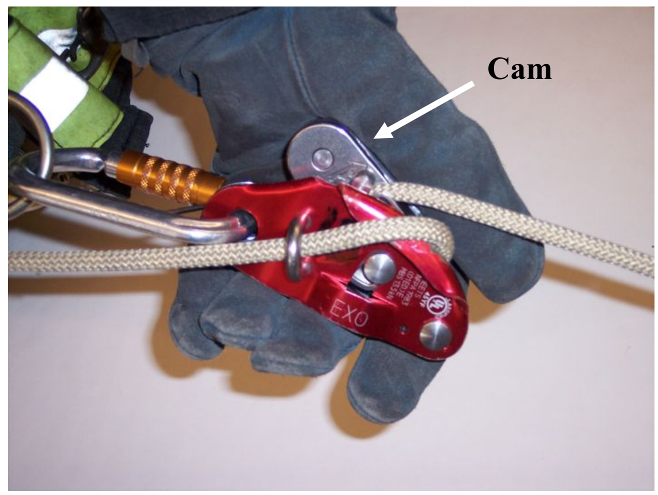


Figure 14

- Turn slightly to the right. Right shoulder points to the exit window.
- Keep rope in right hand while moving across room.
- Continue pulling rope from the storage bag, maintaining a small amount of slack between right hand and the EXO to eliminate friction while moving towards window.

Note: Leading with your right hand will be the most effective way to exit room.

- With EXO in left hand, maintain tension on rope between EXO and substantial object. (Figure 15)

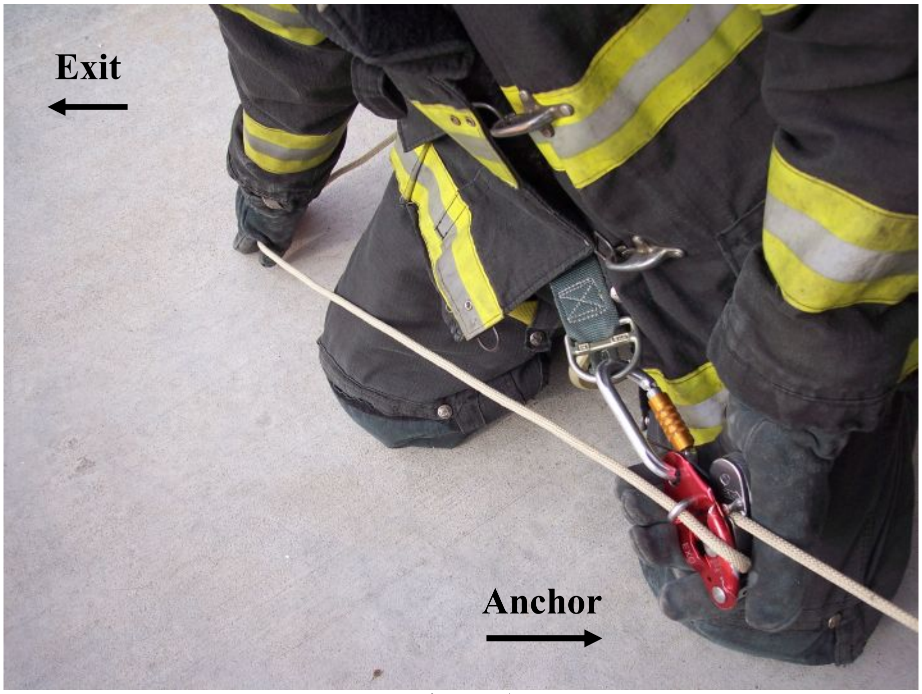


Figure 15

5. PREPARING TO EXIT WINDOW

- Upon reaching the window, the EXO **<u>must</u>** be brought to a point beyond the outermost edge of the windowsill.
- Extend the device in the left hand beyond the sill, maintaining slack with the right hand to allow the EXO to payout with less resistance. (Figure 16)

Note: It is absolutely necessary that the EXO be brought beyond the sill.

Figure 16

Back to Main TOC

6. EXITING WINDOW

- After EXO is beyond outermost edge of the sill, let go of the EXO.
- With left hand, grasp inner edge of the interior wall, making sure hand is not under rope.
- Right hand, still holding rope, should now pull rope taut.
- Place right fist outside, against wall, below window sill. (Figure 17)

Note: Holding the EXO while exiting may prevent engagement of the locking cam and result in a free fall.

Figure 17

- Maintain left hand position inside of window.
- Roll forward in a head first manner until upper torso and right leg are outside of window. (Figure 18)

Note: This maneuver eliminates the need to straddle the window and keeps member in lower portion of the window below high heat.

Figure 18

Back to Main TOC

- Lock left leg on interior wall. (Figure 19)
- Maintain position of left hand on the interior wall opposite the left leg.

Note: This maneuver allows for a controlled exit, positioning your body below the window and evenly loading the system.

Figure 19

- Maintain grasp of rope with right hand.
- Release left leg from interior wall.
- Maintain left hand position to allow the body to pivot to an upright position. (Figure 20)
- Release left hand from interior wall.

Note: Left hand <u>must</u> maintain its grasp on the interior wall until the body is in an upright position.

Figure 20

- Place toes against the wall, with feet shoulder width apart. (Figure 21)
- While grasping rope with the right hand, slide hand out so rope is at a 90 degree angle to the EXO.
- Bring left hand to left side of the EXO and access operating handle.
- Slowly pull the operating handle towards you to disengage cam and begin descent.
- Maintain position of the right hand at a 90 degree angle to the EXO during the descent.
- Continue descending until reaching the ground or lower floor.
- Disconnect carabiner from the PSS "D" ring and move to an area of safety.

Figure 21

Note: If conditions permit, member shall descend to ground level.

7. PROPER USE OF OPERATING HANDLE

- Operating handle is controlled with the left hand.
- To descend, pull operating handle towards the body.
- Speed of descent will be controlled by the operating handle and the proper positioning of the right hand.
- Releasing the operating handle will immediately stop the descent.

Note: Pulling the operating handle too far will cause over speeding and an uncontrolled descent. If member begins to over speed, release lever with left hand and maintain firm grasp of rope with right hand to stop your descent. It is essential that the right hand always stays in contact with the rope to help prevent a rapid descent.

EVOLUTION 24
October 1, 2007

EXIT WINDOW USING PERSONAL SAFETY SYSTEM (PSS) WITH ANCHOR HOOK AT WINDOW

NOTE FOR PFS: EVOLUTIONS 23 AND 24 ARE IDENTICAL WITH THE EXCEPTION OF THE FOLLOWING VARIATIONS

1-2. ***REDACTED FOR PFS***

3. USING THE PERSONAL SAFETY SYSTEM

3.1 ***REDACTED FOR PFS***

3.2 ANCHORING AT WINDOW

Figure 5A

Figure 5B

- A quick assessment of window must be made to determine which offers the best location for anchor hook, the window sill or interior side wall. (Figures 5A and 5B)

- Place anchor hook in palm of left hand. (Figure 6)

- Grasp rope between EXO and storage bag with right hand.

Figure 6

Back to Main TOC

3.3 PREPARING TO EXIT WINDOW

- Maintain left hand on hook and right hand on rope.
- Place head and upper torso into window opening. (Figure 7)
- Place hook into selected anchor position with left hand.

Figure 7

- Hold hook in place with **palm** of left hand. Do not wrap fingers around anchor hook or rope.
- Left hand maintains anchor hook position **inside** of window. (Figure 8)

Figure 8

3.4 EXITING WINDOW

- Pull rope taut with right hand. This will enable EXO to clear window sill.
- Place right fist outside, against wall, below window sill. (Figure 9)
- Make sure anchor hook is set and that no portion of left hand will be trapped under the hook or rope.

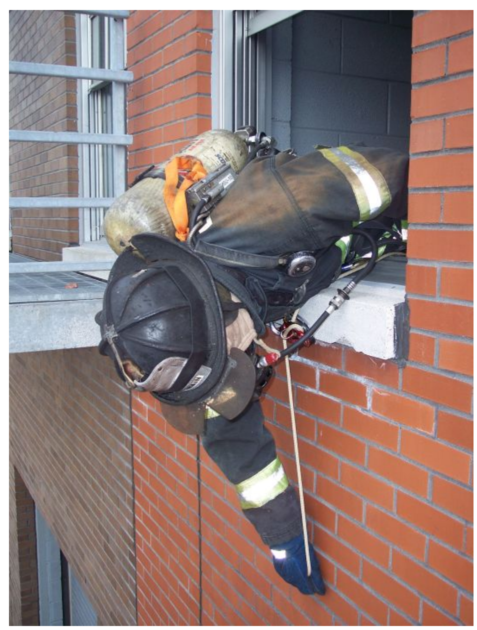


Figure 9

- Maintain left hand position on the hook inside of window.
- Roll forward in a head first manner until upper torso and right leg are outside of window. (Figure 10)

Note: This maneuver eliminates the need to straddle the window and keeps member in lower portion of the window below high heat.

Figure 10

- Lock left leg on interior wall. (Figure 11)
- Maintain position of left hand on the anchor hook.

Note: This maneuver allows for a controlled exit, positioning your body below the window, evenly loading the system and ensures proper position of the anchor hook.

Figure 11

- Maintain grasp of rope with right hand.
- Release left leg from interior wall.
- Maintain left hand position to allow the body to pivot to an upright position. (Figure 12)
- Release left hand from anchor hook.

Note: Left hand <u>must</u> maintain its grasp on the anchor hook until the body is in an upright position.

Figure 12

- Place toes against the wall, with feet shoulder width apart. (Figure 13)

- While grasping rope with the right hand, slide hand out so rope is at a 90 degree angle to the EXO.

- Bring left hand to left side of the EXO and access operating handle.

- Slowly pull the operating handle towards you to disengage cam and begin descent.

- Maintain position of the right hand at a 90 degree angle to the EXO during the descent.

- Continue descending until reaching the ground or lower floor.

- Disconnect carabiner from the PSS "D" ring and move to an area of safety.

Figure 13

Note: If conditions permit, member shall descend to ground level.

3.5 PROPER USE OF OPERATING HANDLE

- Operating handle is controlled with the left hand

- To descend, pull operating handle towards the body.

- Speed of descent will be controlled by the operating handle and the proper positioning of the right hand.

- Releasing the operating handle will immediately stop the descent.

Note: Pulling the operating handle too far will cause over speeding and an uncontrolled descent. If member begins to over speed, release lever with left hand and maintain firm grasp of rope with right hand to stop your descent. It is essential that the right hand always stays in contact with the rope to help prevent a rapid descent.

EVOLUTION 26
October 1, 2007

LOWER PERSON USING LIFE SAVING ROPE AND ATLAS LIFE BELT WITH RAPPEL HOOK AND TRIPLE ACTION GATE (*EDITED FOR PFS)*

1. EQUIPMENT:

1.1 One nylon life saving rope with attached anti-chafing device in a back pack carrying case.

1.2 One life belt.

2. OBJECTIVE:

2.1 To lower a Firefighter or another person from a roof or upper floor to a position of safety.

2.2 To lower a Firefighter from a roof or upper floor to enable the Firefighter to remove another person from an untenable position to one of safety.

3. PREPARATION FOR LOWERING

(This section applies to operations on roofs WITH or WITHOUT parapets)

Member # 1 (Lowering Member)	Member # 2 (Member to be Lowered)
3.1 Don the life belt with the hook on the right side.	
3.2 Facing the roof's edge, place the carrying case on the roof with the snaps facing the substantial object. The case must be placed midway between the roof's edge and a substantial object.	
3.3 Facing the front of the case, open the top flap. Hand Member #2 the pre-tied bowline-on-a-bight. Allow the anti-chafing device to slide along the rope.	
3.4 With both hands, grasp the sides of the case and hold the flap against the back of the case with your fingers.	

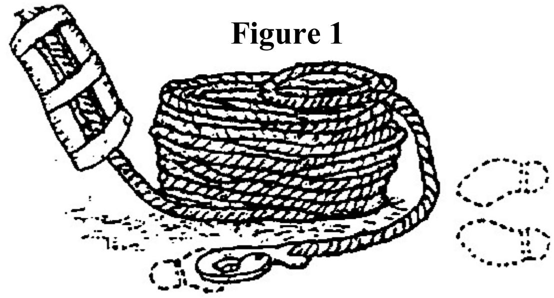
Member # 1 (Lowering Member)

3.5 Invert the carrying case and lift it clear of the rope. Place the empty case to the side, clear of the operation.

3.6 Grasp the snap hook from the top of the coil and place it on the roof to the left, adjacent to the coiled rope. (Fig. 1)

Member # 2 (Member to be Lowered)

Figure 1



Member 2 Member 1

3.7 Maintain position of the hook adjacent to the coiled rope by placing one foot on the snap hook, as Member #1 pays out additional rope to the substantial object. (Fig. 2)

3.8 Pay out rope from the top of the coil to the substantial object and tie a clove hitch and binder on the taut part of the rope. (Fig. 2 and 3)

Figure 2

Member 2 Member 1

Figure 3

Member # 1 (Lowering Member)

3.9 Return to the coiled rope and pick up the snap hook that was maintained by member #2 and attach it hook down behind the pin on the solid side of the hook. (Fig. 4). Snap portion of hook should face down.

3.11 Tie the slippery hitch in the prescribed manner on Member #2 and slide the anti-chafing device up to the completed slippery hitch.

3.12 Walk toward the lowering point to remove all slack in the rope between the substantial object and yourself.

Member # 2 (Member to be Lowered)

Figure 4

3.10 Step into the leg loops and hold the knot snugly against your stomach to assist Member #1 in tying the slippery hitch.

3.13 Hold the anti-chafing device in the right hand.

Figure 8A

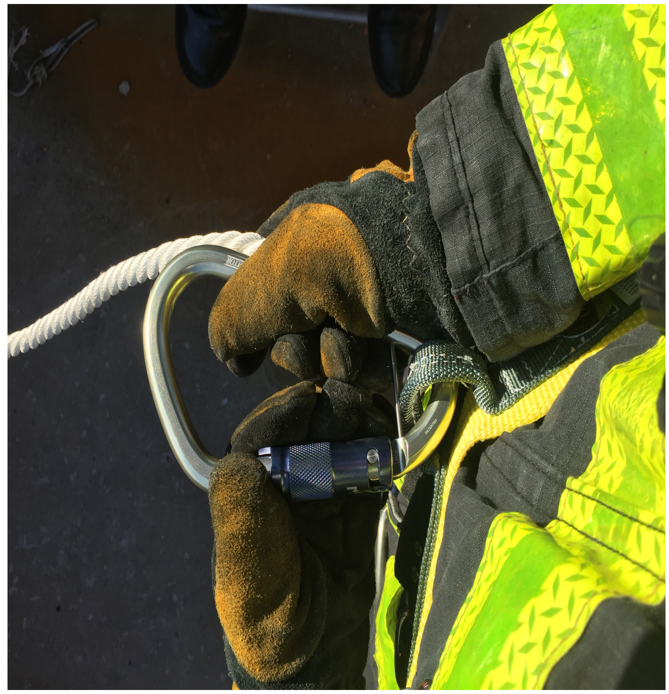


Figure 8B

Figure 8C

Figure 8D

Member # 1 (Lowering Member)

3.14 Facing Member #2 grasp the section of rope leading to the anti-chafing device with the right hand and bring this hand back along the rope to the right hip.

3.15 Using this point on the rope, bring the rope forward and lay the solid part of the life belt hook (gate to the left) on top of the rope. (Figure 7)

3.16 The following procedures are in sequence:

A. Pull down the gate (Figure 8A) with left hand. And take a ¼ turn to the left (Figure 8B). This will unlock the gate.

B. With the left hand, push gate over to the solid side of hook (Figure 8C). As gate reaches solid side of hook, grab hook, rope and gate together with right hand (Figure 8D)

Note: **Member #1 is now ready to proceed to take four (4) turns around hook.**

Member # 2 (Member to be Lowered)

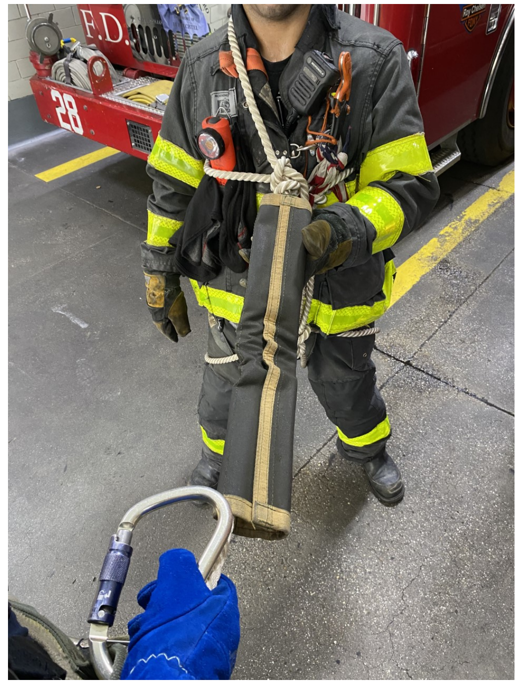


Figure 7

3.17 Holding the life belt hook with the left hand, PALM DOWN, slide the right hand back along the rope to the right buttock (Fig. 9D). Allow enough rope to pay out through the right hand and through the life belt hook to permit Member #2 to approach parapet or roof's edge. At the same time, Member #1 moves forward as far as possible to take slack out of the rope between substantial object knot and snap hook. Member #1 now takes boxer stance for balance and comfort.

Figure 9A

Figure 9B

Figure 9C

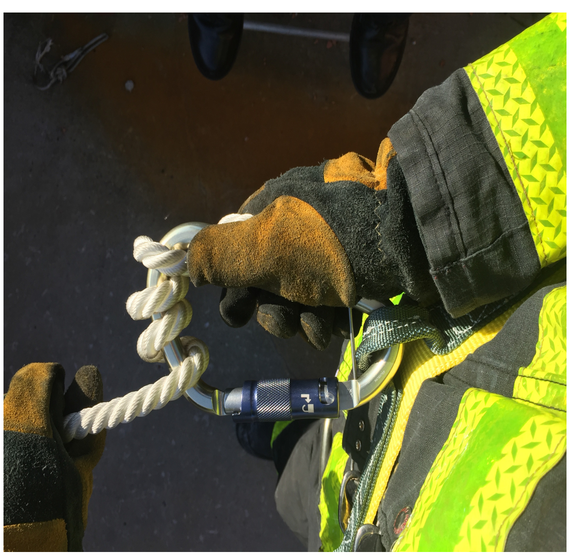


Figure 9D

4. LOWERING OPERATION FROM A BUILDING ***WITH A PARAPET***.

Member # 1 (Lowering Member)

Member # 2 (Member to be Lowered)

4.1 Holding the anti- chafing device in the left hand, turn to the right and straddle the parapet with the right leg to the outside.

4.2 Allow enough slack in the rope to place the anti-chafing device flat on the parapet with approximately 5" of the device draped over the outer edge.

4.3 Still holding the life belt hook with the left hand, PALM DOWN, firmly grasp the rope in the right hand positioned at the right buttock. Give the command "DISMOUNT" to Member #2 to dismount the parapet (See Fig. 9E).

Figure 9E

Member # 1 (Lowering Member)

Figure 10

Member # 2 (Member to be Lowered)

4.4 Both gloved hands grip the inner edge of the parapet with a hand on either side of the anti- chafing device. (Fig. 10).

Note: To maintain the position of the anti-chafing device, place the thumb of the right hand on top of the device while the fingers grasp the inner edge of the parapet.

4.5 Slide the buttocks to the outer edge of the parapet until the left knee is at the inner edge of the parapet and make sure that the rope is in the channel of the anti- chafing device.

4.6 Roll off the parapet into a vertical position and place feet approximately 12” apart against the wall, toes up, and give the command "DOWN" to be lowered.

4.7 At the command “DOWN”, lower member #2. Control the rope as it slides through your gloved right hand.

NOTE: **If a third member is available that member should be at the roof's edge for control and to relay commands.**

This completes the section on the lowering operation from a building *WITH A PARAPET.*

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5. LOWERING OPERATION FROM A BUILDING ***WITHOUT A PARAPET***

Member # 1 (Lowering Member)

Note: The instructions of Sections 3.1 through 3.20 and Section 4.7 apply here

(Sections 4.1 to 4.6 are for parapet operations and do not apply.)

Member # 2 (Member to be Lowered)

5.1 Holding the anti-chafing device in the left hand, walk to the roof's edge and sit with the legs over the edge, the rope and anti- chafing device to the left. (Fig. 11A).

5.2 Allowing enough slack in the rope, place the anti- chafing device flat on the roof's edge with approximately 5" of the device draped over the edge of the roof. (Fig. 11B).

Figure 11A

Figure 11B

Member # 1 (Lowering Member)

5.3 Still holding the life belt hook with the left hand, PALM DOWN, firmly grasp the rope in the right hand positioned at the right buttock. Give the command "DISMOUNT" to member #2 to dismount the roof (See Fig. 9E).

Member # 2 (Member to be Lowered)

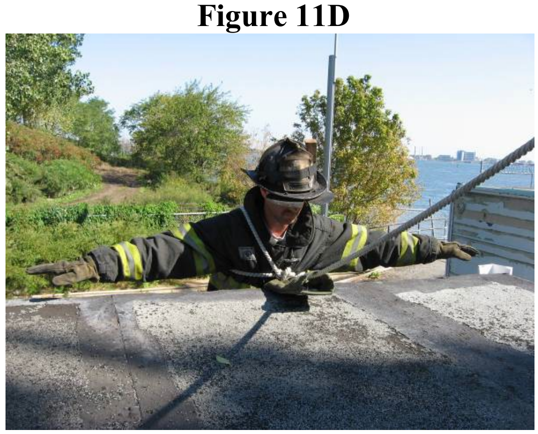
5.4 Place the left hand between the anti-chafing device and your left leg. Using the hand as a pivot, roll the body to the left, into a pushup position and make sure that the rope is in the channel of the anti- chafing device. (Fig. 11C).

5.5 Lower the body into a vertical position (Fig. 11D).

Note: As a vertical position is attained, the slack in the rope between the slippery hitch and the anti- chafing device will cause the member to drop slightly until the slack is eliminated.

Figure 11C

Figure 11D



5.6 Place feet approximately 12" apart against the wall, toes up, and give the command "DOWN" to be lowered.

5.7 At the command "DOWN", lower Member #2. Control the rope as it slides through your gloved right hand.

NOTE: **If a third member is available that member should be at the roof's edge for control and to relay commands.**

1. MEMBER BEING LOWERED RESCUES A VICTIM AT A LOWER LEVEL

Member # 2 (Member to be Lowere

6.1 Continue being lowered until you reach the proper level to rescue the victim. Give the command "STOP" to halt the lowering. A Guide Member at roof can relay the command if necessary.

6.2 In order for the Guide Member or Member #1 to hear verbal commands, will be necessary to look up toward the roof when giving these commands.

Member # 1 (Lowering Member)

6.3 On the command "STOP", halt lowering operation by closing the right hand firmly on the rope. Await the completion of the pick-up.

Figure 12

Member # 2 (Member to be Lowere

6.4 Member #2: Instruct the victim to place both arms around your neck, legs around your waist, and maintain firm hold.

6.5 Member #2: Place your arms around the victim's upper torso, under the armpits, and lock hands behind the victi back.(See Fig. 12).

Note: Signal to lower must be given verbally by the member being lowered. Member must look up in order to be heard by the Guide Member or Member #1.

6.6 Member #2: Continue descent until an area of safety is reached.

NOTES:

1. The nylon life saving rope shall be used for life saving purposes only. It shall not be used for any other purpose.

2. Communication is essential in all rope rescue operations. The Officer in Command at the fire or emergency shall be notified when any rope rescue operation is to be undertaken. This will enable the O.I.C. to arrange for any assistance needed at the location of the operation, e.g.; Guide Member at roof level and/or a member in the street for safety.

3. Before a rope rescue operation begins, check that there are no obstructions in line with the planned descent, such as signs, wire, etc.

4. Every effort shall be made to lower an individual between the line of windows. This will provide a smoother, easier descent and reduce exposure of the rope in case fire should show at a window.

5. Members must be alert to look for a reliable substantial object on the roof, such as bulkhead (Fig. 13A), aerial ladder (Fig. 13B), around a chimney or cut a hole, and tie the rope around an exposed beam. (Fig. 13C).

Note: Plumbing vent pipes, sheet metal housings for roof vents, T.V. masts, newel posts or banisters are not reliable substantial objects.

6. To increase the safety of any lowering operation, whether a parapet is present or not, will require that the lowering point be midway between the roof's edge and the substantial object. This is to prevent the Lowering Member being drawn beyond the roof's edge, after hooking up. (See Sec. 3.9 and 3.20).

Figure 13A

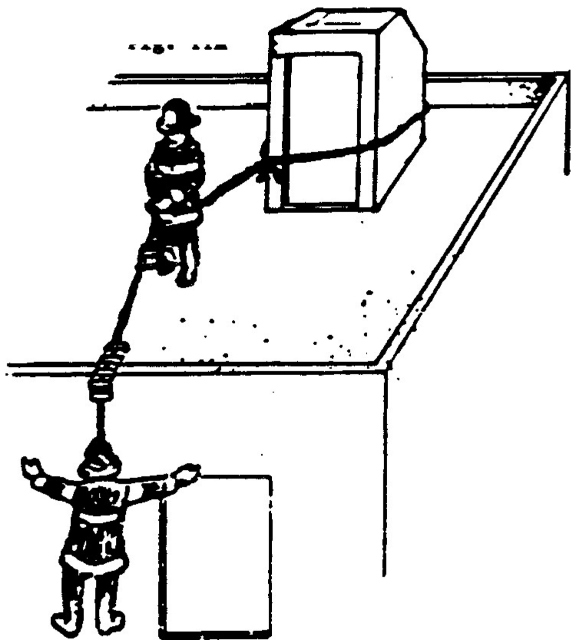


Figure 13B

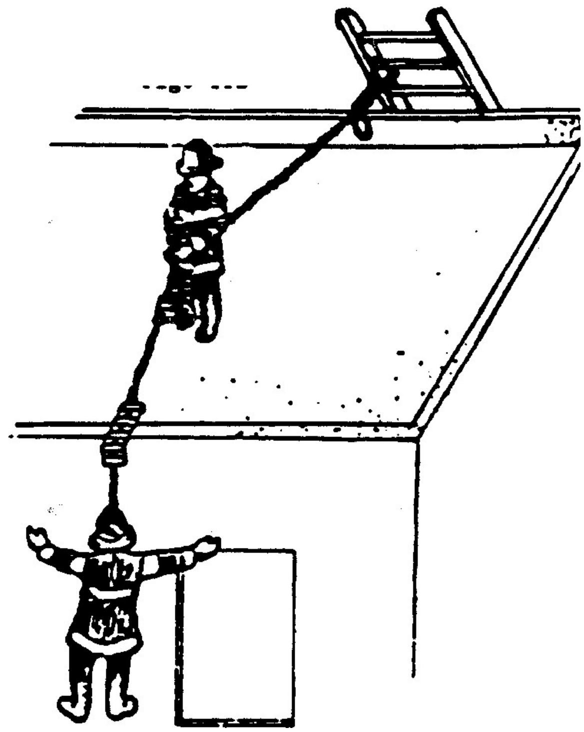
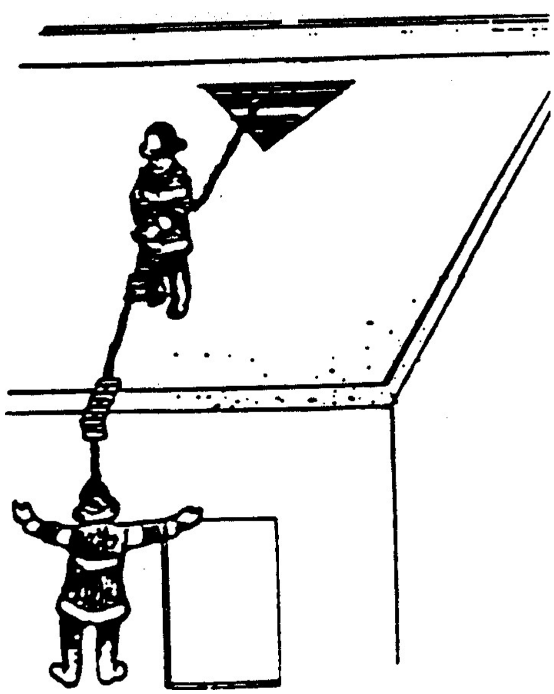


Figure 13C



7. When performing any lowering operation, the life saving rope, must be perpendicular as possible to the roof's edge at the point where the member descends.

    7.1 If the angle of the rope from the substantial object to the roof's edge is too acute, the weight of the person being lowered will cause the rope to slide along the roof edge. This should be avoided. (Fig. 14).

    7.2 Additionally, if the angle of the rope is too acute the Lowering Member will be pulled uncontrollably by the rope, and the line of descent will also be drastically affected as shown in (Fig. 14). This should be avoided.

8. When members are being lowered to perform a rescue pick-up, they must:

    8.1 Give the command "STOP" to halt the lowering operation while out of reach of the victim. This is to alert the guide member and/or the lowering member that the member being lowered is approaching the victim.

    8.2 Before this operation is completed in the safest possible manner, victims tend to jump onto their rescuers. In this situation a victim could easily fall to the ground.

    8.3 The rescuer will give instructions to the victim at this point in the strongest and most forceful language necessary in order to complete the operation successfully.

    8.4 Next, give the commands "DOWN, STOP, DOWN, STOP", as necessary, until member being lowered is shoulder to shoulder with the victim. Regardless of the victim's position in the window the rescuer will be in the best position to make the pick up.

    8.5 Rescuer pulls himself/herself to the victim by using the window frame. Never use the victim to help.

9. When a Guide Member is at roof level and visibility is good, hand signals can be used to control a lowering operation.

    9.1 Signals shall be as follows:

LOWER -------------- Point downward with index fingers

STOP ------------------ Clenched fists

10. The fact that a member has been lowered to a window does not commit them to rope rescue. If conditions do not demand the removal of the victim, good judgment dictates that the member enter the area and take the necessary action to reassure, protect, and confine the victim until the danger has passed.

    10.1 If conditions demand removal, the member shall remain connected to the rope, which would serve as lifeline. However, before continuing a lowering operation, it is essential to remove all slack from the rope at roof level.

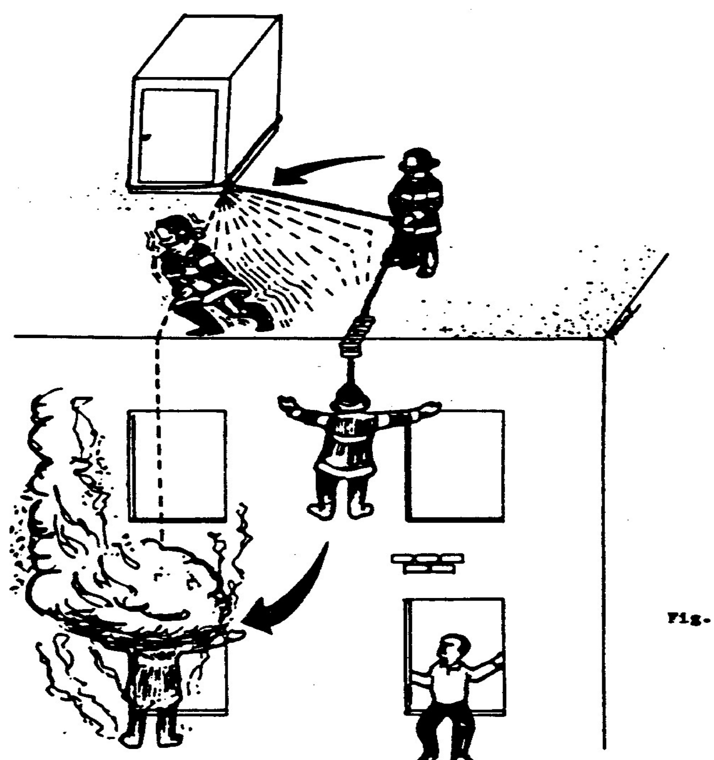
11. If a rope rescue is necessary, the goal is to reach a point of safety. A descent of one story may be all that is necessary.

12. When an unconscious victim is encountered and removing the victim requires the use of the rope, the bowline-on-a-bight and slippery hitch must be tied on the victim.

13. Members should be aware that the actual length of our life saving rope might be less than the nominal length of 150 feet due to natural shrinkage after several years in the field. Over a period of time some ropes have shrunk as much as 8 to 10 feet. This fact should be considered when planning to use the life saving rope.

FIGURE 14

AVOID THIS



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EVOLUTION 27
October 1, 2007

LOWER MEMBER USING LIFE SAVING ROPE AND PERSONAL HARNESS

CONTENTS

1. EQUIPMENT:

1.1 One nylon life saving rope with attached anti-chafing device in the carrying case. The pre-tied bowline-on-a-bight is not necessary for this operation. However the life saving rope must have this knot attached, therefore it must be untied at the start of this operation.

1.2 Two personal harnesses.

2. OBJECTIVE:

2.1 To lower a firefighter from a roof or upper floor to a position of safety.

2.2 To lower a firefighter from a roof or upper floor, in order to enable the firefighter to remove another person from an untenable position to one of safety.

3. PREPARATION FOR LOWERING:

This section applies to operations on roofs WITH and WITHOUT parapets.

3.1 Both members adjust their harness leg straps for proper fit. Both members open bottom snap of coat for access hook support strap. Member #1 (Lowering Member) release hook from support strap.

Member #1 (Lowering Member)	**Member #2 (Member to be Lowered)**
3.2 Facing the point of descent, place the carrying case on the roof with the back of the case facing the roof's edge. The case must be placed midway between the point of descent and a substantial object.	
3.3 Facing the front of the case, open the top flap. Hand member #2 the rope's snap hook. Allow the anti-chafing device to slide along the rope.	
Note: If there is a bowline-on-a-bight knot, it must be untied.	
3.4 With both hands, grasp the sides of the case, holding the flap against the back of the case with the fingers.	
3.5 Invert the carrying case and lift the case clear of the rope, using care not to disrupt the coil of the rope. Place the empty case to the side, clear of the operation.	
3.6 Grasp the snap hook at the top of the coil and place it on the roof, to the left, adjacent to the coiled rope. (Figure 1)	

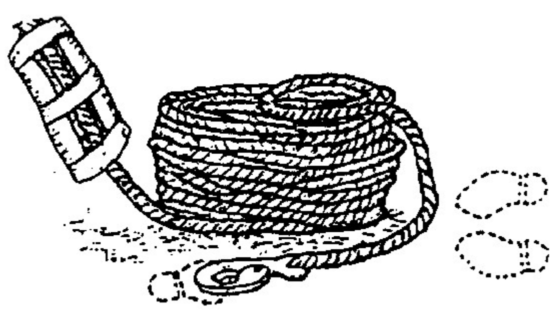

Figure 1

Member 2 Member 1

Member #1 (Lowering Member)

Member #2 (Member to be Lowered)

3.7 Maintain position of the hook adjacent to the coiled rope by placing one foot on the snap hook, as member #1 pays out additional rope to the substantial object. (Figure 2)

3.8 Pay out rope from the top of the coil to the substantial object. Pull the rope taut and take a turn around the substantial object. Tie a clove hitch and binder on the taut part of the rope. (Figures 2 and 3)

Figure 2

Member 2

Member 1

Figure 2

Member #1 (Lowering Member) **Figure 3** **Member #2 (Member to be Lowered)**

3.9 Pull the harness handle from beneath your bunker coat and attach the snap hook of the rope to the harness handle as shown in Figure 4 keeping the hook secured. This is the end of the rope with the anti-chafing device on it. Hold the anti-chafing device in your left hand.

Figure 4

3.10 Return to the coiled rope and pick up the snap hook that was maintained by member #2 and attach it to the bottom part of the hook of your harness. (Figure 5) This is the end of the rope that is tied to a substantial object. (Figure 2) The snap hook should face down.

3.11 Make sure that the snap hook is attached in the prescribed manner to member #2 and slide the anti-chafing device up to the snap hook.

3.12 Walk toward the point of descent to remove all slack in the rope between the substantial object and you.

Figure 5

Member #1 (Lowering Member)

3.13 Facing member #2, grasp the section of rope leading to the anti-chafing device with your right hand and bring this hand back along the rope to your right hip.

3.14 Using this point on the rope, bring the rope forward and lay the solid part of the harness hook (gate to the left) on top of the rope. Grasp both the rope and the hook in the right hand.

3.15 With left hand, pull down gate and take a ¼ turn to the left. Gate is now able to open freely.

3.16 With left hand, push gate over to solid side of hook. As gate reaches solid part of hook, grab hook, rope and gate together with right hand. (Figure 6)

Figure 6

Figure 7A

Figure 7B

3.17 With your left hand, make four turns, under and over the harness hook with the rope leading to member #2. (Figures 7A and 7B)

3.18 Let the gate close and then grasp the harness hook at the gate with the left hand, PALM DOWN (Figure 7C).

3.19 Slide your right hand back along the rope to your right buttock. Allow enough rope to pay out through the hook to permit member #2 to approach the point of descent.

Figure 7C
Addition for PFS

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4. LOWERING OPERATION FROM A BUILDING WITH A PARAPET

Member #1 (Lowering Member)	Member #2 (Member to be Lowered)
	4.1 Holding the anti-chafing device in the left hand, turn to the right and straddle the parapet with the right leg to the outside.
	4.2 Allow enough slack in the rope to place the anti-chafing device flat on the parapet with approximately 5" of the device draped over the outer edge. (Figure 8)
4.3 Still holding the harness hook with the left hand, PALM DOWN, firmly grasp the rope in the right hand positioned at your right buttock. Give the command "DISMOUNT" to Member #2 to dismount the parapet. (Figure 7C)	
	4.4 Both gloved hands, grip the inner edge of the parapet, with a hand on either side of the anti-chafing device. (Figure 8)
	Note: To maintain the position of the anti-chafing device, place the thumb of the right hand on top of the device while the fingers grasp the inner edge of the parapet.
	4.5 Slide your buttocks to the outer edge of the parapet until your left knee is at the inner edge of the parapet, and make sure that the rope is in the channel of the anti-chafing device.
	4.6 Roll off the parapet into a vertical position and place feet approximately 12" apart against the wall, toes up and give the command "DOWN" to be lowered.
4.7 At the command "DOWN," lower member #2. Control the rope as it slides through your gloved right hand.	**Note: Both hands remain on parapet until you are in a vertical position**.

Figure 8

Note: If a third member is available they should be at the roof's edge for control and to relay commands.

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5. LOWERING OPERATION FROM A BUILDING WITHOUT A PARAPET

Member #1 (Lowering Member)

Note: The instructions in Section 3 apply here, instructions in Section 4 are for parapet operations and do not apply here.

Member #2 (Member to be Lowered)

5.1 Holding the anti-chafing device in the left hand, walk to point of descent and sit with your legs over the roof's edge, the rope and anti-chafing device to your left. (Figure 9)

Note: Under smoky or unsure conditions it may be better to crawl to the roof's edge.

5.2 Allow enough slack in the rope to place the anti-chafing device flat on the roof's edge with approximately 5" of the device draped over the edge of the roof. (Figure 10)

Note: Harness hook is at the end of the anti-chafing device and must clear the edge of the roof.

Figure 9

Figure 10

Member #1 (Lowering Member)

5.3 Still holding the harness hook with the left hand, PALM DOWN, firmly grasp the rope in the right hand positioned at your right buttock. Give the command "DISMOUNT" to Member #2 to dismount the roof.

Figure 11

5.7 At the command "DOWN," lower member #2. Control the rope as it slides through your gloved right hand.

Member #2 (Member to be Lowered)

5.4 Place the left hand between the anti-chafing device and your left leg. Using the hand as a pivot, roll the body to the left, into a pushup position and make sure the rope is in the channel of the anti- chafing device. (Figure 11)

5.5 Lower the body into a vertical position (Figure 12)

Note: As the vertical position is attained, the slack in the rope between the harness handle and the anti-chafing device will cause the member to drop slightly until the slack is eliminated.

Figure 12

5.6 Place feet approximately 12" apart against the wall, toes up, and give the command "DOWN" to be lowered.

Note: If a third member is available that member should be at the roof's edge for control and to relay commands.

6. MEMBER BEING LOWERED RESCUES A VICTIM AT LOWER LEVEL

Member #1 (Lowering Member)

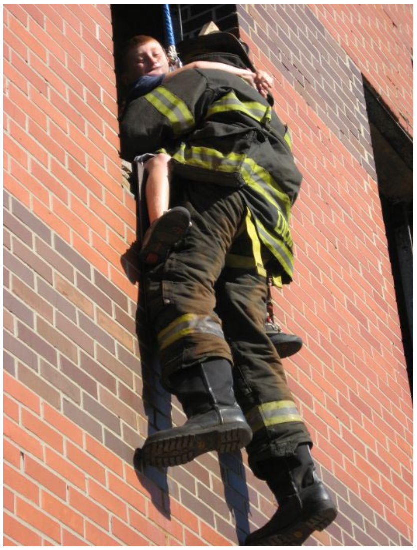

Figure 13

6.3 On the command "Stop," halt lowering operation by closing the right hand firmly on the rope. Await the completion of the pick-up.

Figure 14

Member #2 (Member to be Lowered)

6.1 Continue being lowered until you reach the proper level to rescue the victim. Give the command "STOP" to halt the lowering. A Guide Member at roof level can relay the command if necessary.

Note: Descent should not be in line with windows.

6.2 In order for the Guide Member or Member #1 to hear your verbal commands, it will be necessary for you to look up toward the roof when giving them.

6.4 Instruct the victim to place both arms around your neck, both legs around your waist, and maintain a firm hold (Figure 13)

6.5 Place your arms around the victim's upper torso, under the armpits, and lock your hands behind the victim's back. (Figure 14)

Note: Signal to lower must be given verbally by the member being lowered. Member must look up in order to be heard by the Guide Member or Member #1.

6.6 Continue descent until an area of safety is reached.

NOTES

1. The nylon life saving rope shall be used for life saving purposes only. It shall not be used for any other purpose.

2. Communication is essential in all rope rescue operations. The Incident Commander shall be notified when any rope rescue operation is to be undertaken. This will enable the IC to arrange for any assistance needed at the location of the operation, e.g.; Guide Member at roof level and/or a member in the street for safety.

3. Before a rope rescue operation begins, check that there are no obstructions in line with the planned descent, such as signs, wire, etc.

4. Every effort shall be made to lower an individual between the line of windows. This will provide a smoother, easier descent and reduce exposure of the rope in case fire should show at a window.

5. Members must be alert to look for a reliable substantial object on the roof, such as bulkhead, aerial ladder, around a chimney or cut a hole, and tie the rope around an exposed beam. Plumbing vent pipes, sheet metal housings for roof vents, T.V. masts, newel posts or banisters are not reliable substantial objects.

6. To increase the safety of any lowering operation, whether a parapet is present or not, will require that the lowering point be midway between the roof's edge and the substantial object. This is to prevent the Lowering Member being drawn beyond the roof's edge, after attaching the hook down behind the pin on the solid side of the hook.

7. When performing any lowering operation, the life saving rope must be as perpendicular as possible to the roof's edge at the point where the member descends.

   7.1 If the angle of the rope from the substantial object to the roof's edge is too acute, the weight of the person being lowered will cause the rope to slide along the roof edge. This should be avoided.

   7.2 Additionally, if the angle of the rope is too acute the Lowering Member will be pulled uncontrollably by the rope, and the line of descent will also be drastically affected. This should be avoided.

8. When members are being lowered to perform a rescue pick-up, they must:

   8.1 Give the command "STOP" to halt the lowering operation while out of reach of the victim. This is to alert the guide member and/or the lowering member that the member being lowered is approaching the victim.

   8.2 Before this operation is completed in the safest possible manner, victims tend to jump onto their rescuers. In this situation a victim could easily fall to the ground.

8.3 The rescuer will give instructions to the victim at this point in the strongest and most forceful language necessary in order to complete the operation successfully.

8.4 Next, give the commands "DOWN, STOP, DOWN, STOP," as necessary, until member being lowered is shoulder to shoulder with the victim. Regardless of the victim's position in the window the rescuer will be in the best position to make the pick up.

8.5 Rescuer pulls himself/herself to the victim by using the window frame. Never use the victim to help.

9. When a Guide Member is at roof level and visibility is good, hand signals can be used to control a lowering operation.

9.1 Signals shall be as follows:

LOWER -------------- Point downward with index fingers

STOP ------------------ Clenched fists

10. The fact that a member has been lowered to a window does not commit them to rope rescue. If conditions do not demand the removal of the victim, good judgment dictates that the member enter the area and take the necessary action to reassure, protect, and confine the victim until the danger has passed.

10.1 If conditions demand removal, the member shall remain connected to the rope, which would serve as lifeline. However, before continuing a lowering operation, it is essential to remove all slack from the rope at roof level.

11. If a rope rescue is necessary, the goal is to reach a point of safety. A descent of one story may be all that is necessary.

12. When an unconscious victim is encountered and removing the victim requires the use of the rope, the bowline-on-a-bight and slippery hitch must be tied on the victim.

13. Members should be aware that the actual length of our life saving rope might be less than the nominal length of 150 feet due to natural shrinkage after several years in the field. Over a period of time some ropes have shrunk as much as 8 to 10 feet. This fact should be considered when planning to use the life saving rope.

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EVOLUTION 29
October 1, 2007

SINGLE SLIDE FROM BUILDING WITH / WITHOUT A PARAPET USING LIFE SAVING ROPE AND ATLAS LIFE BELT WITH RAPPEL HOOK & TRIPLE ACTION GATE

CONTENTS

1. EQUIPMENT

1.1 One nylon life saving rope attached anti-chaffing device in the carrying case. The pre-tied bowline-on-a-bight is not necessary for this operation. However, the rope shall be carried with this knot attached.

1.2 One life belt.

2. OBJECTIVE

2.1 To enable a firefighter to remove themselves from an untenable position above grade.

NOTE: This slide may only be used as a last resort when circumstances are such that alternative methods of removing oneself are denied.

THE SINGLE SLIDE SHALL NOT BE USED TO MAKE RESCUE PICKUP.

3. PREPARATION FOR SINGLE SLIDE

3.1 Place the carrying case on the roof near the substantial object you plan to use.

3.2 Remove the snap hook from the pocket of the case. Grasp the anti-chaffing device and pull it through the window of the case. Be sure the bowline-on-a-bight is also pulled through.

3.3 Secure the life saving rope by taking a turn around a substantial object and tie a clove hitch and binder on the taut part of the rope.

NOTE: Use sufficient rope between the bowline-on-a-bight and the anti-chaffing device and make a bend in the rope to make knot.

3.4 Grasp the anti-chaffing device with one hand and pick up the carrying case with the other hand.

3.5 Walk to the planned point of descent, sliding the anti-chaffing device along the rope and deploy the rope by tossing the carrying case to the street.

3.6 Locate the point to grasp the rope and the hook.

3.6.1 For a Roof with a Parapet - Place the anti-chaffing device on the parapet. Standing to the right of the rope, place the left elbow on the outer edge of the parapet and reach down and grasp the rope with the left hand.

3.6.2 For a Roof without a Parapet - Place the anti-chaffing device on the roof near the edge. Standing to the right of the rope, kneel down and grasp the rope at the roof's edge with the left hand.

3.7 Turn to the left. The slider's back will now be to the point of descent.

3.8 With the right hand, lay the solid part of the life belt hook (gate to the left) on top of the rope at the point of the left hand. Grasp the rope and hook together in the right hand.

3.9 The following procedures are in sequence:

3.9.1 Pull down the gate (Figure 1A) with left hand. Take a ¼ turn to the left (Figure 6B). This will unlock the gate.

Figure 1A

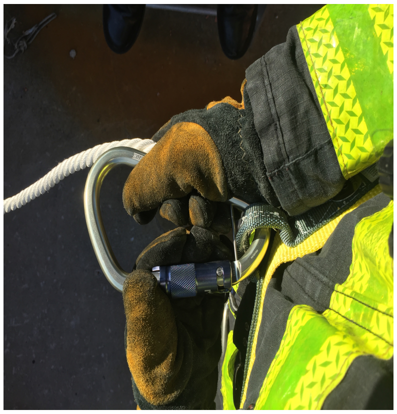

Figure 1B

3.9.2 With left hand, push gate over to solid side of hook (Figure 1C). As gate reaches solid part of hook, grab hook, rope, and gate together with right hand. (Figure 1D)

Figure 1C

Figure 1D

NOTE: Member is now ready to proceed to take four (4) turns around the hook.

3.10 Using the left hand, make four (4) turns under and over the life belt hook (Figure 2A)

3.11 Release gate to locked position. Gate will lock by itself (Figure 2B).

Figure 2A

Figure 2B

SINGLE SLIDE FROM A BUILDING WITH A PARAPET

4. DISMOUNTING THE PARAPET

4.1 Slide the right hand back along the rope approximately six (6") inches and grasp the rope firmly.

4.2 Pick up and slide the anti-chaffing device up to the hook with the left hand, turn to the right and straddle the parapet with the right leg to the outside.

4.3 Position the anti-chaffing device on the parapet allowing enough slack in the rope between the hook and the anti-chaffing device to lie flat with approximately five (5") inches draped over the outer edge.

4.4 Place the left arm over the anti-chaffing device and rope and grasp the inner edge of the parapet with the left hand. (Figure 3)

NOTE: To maintain the position of the anti-chaffing device, the heel of the left hand is placed on the device.

4.5 Check the slack on the rope to assure that the hook of the life belt will clear the outer edge of the parapet and that the anti-chaffing device is not being lifted from its proper position.

4.6 Move the gloved right hand along the rope while stretching the right arm out a full arm's distance. (Figure 3) Grasp the rope firmly at this point.

4.7 Slide the buttocks to the outer edge of the parapet until the left knee is at the inner edge of the parapet. With the right arm rigid press the inside of the right fist firmly against the wall. The rope is between the fist and the wall. (Figure 3)

4.8 Using the rigid right arm for leverage, lean out over the parapet and make sure that the rope is in the channel of the anti-chaffing device. Also, the hook of the life belt must clear the outer edge of the parapet.

4.9 Swing the body off the parapet into a vertical position then bring the right hand, gripping the rope, to the right buttock and maintain a firm grip on the rope.

4.10 Place feet against the wall, toes up, approximately twelve (12") inches apart.

4.11 Bring the left hand from the parapet and clear clothing, Handi-Talkie wire, etc., from the area of the hook.

4.12 When ready to slide, grasp the hook of the life belt to the gate, with the left hand, PALM DOWN.

5. SLIDING

5.1 Sliding is controlled by allowing the rope to pass through the gloved right hand. The hand must be in position against the right buttock at all times. This position affords absolute control of the slide.

5.2 Look down to avoid any obstructions not noted or present when the rope was deployed. Continue slide to area of safety.

Figure 3

This completes the section on the sliding operation from a building <u>WITH</u> a parapet.

SINGLE SLIDE FROM A BUILDING WITHOUT A PARAPET

6. DISMOUNTING THE ROOF

6.1 Grasp the anti-chaffing device with the left hand. Slide the right hand along the rope to the right buttock, grasp the rope firmly and turn to the right, facing the roof's edge. Walk to the roof's edge paying out slack through the hook.

6.2 Sit at the roof's edge, legs over edge, with the rope and anti-chaffing device to the left. Maintain a firm grip on the rope with the right hand at the right buttock.

6.3 Position the anti-chaffing device at the roof's edge allowing enough slack in the rope, between the hook and the anti-chaffing device, to permit the device to lie flat with approximately five (5") inches draped over the edge.

6.4 To maintain the position of the anti-chaffing device, place the heel of the left hand on the device. Now, slide the body forward so that only the buttocks are on the roof. (Figure 4)

Figure 4

6.5 Maintaining the position of the right hand (Figure 4), roll to the left while pushing off smartly with the left hand, keeping the body clear of the roof's edge. A drop of approximately one and one half (1½ ') feet will be experienced.

6.6 Now in a vertical position, place the feet against wall, toes up, approximately twelve (12") inches apart.

6.7 Using the left hand, clear clothing, Handie-Talkie wire, etc., from the area of the hook.

6.8 When ready to slide, grasp the hook of the life belt at the gate, with the left hand, PALM DOWN.

7. SLIDING

7.1 Sliding is controlled by allowing the rope to pass through the gloved right hand. The hand must be in position against the right buttock at all times. This position affords absolute control of the slide.

7.2 Look down to avoid any obstructions not noted or present when the rope was deployed. Continue slide to area of safety.

This completes the section on the sliding operation from a building <u>WITHOUT</u> a parapet.

NOTES

1. The imaginary line from the substantial object to the planned point of descent should be as close to perpendicular as possible to the roof's edge. This will avoid an acute angle of the rope, which will result in the rope sliding along the roof's edge when the weight is placed on the rope.

2. The substantial object must be carefully selected. There are many objects of questionable integrity which should never be used; e.g., soil pipe vents, TV antenna masts, etc. Any chimney or other object chosen should be quickly examined for soundness and any sharp edges.

   2.1 When using a vertical object, such as a chimney, allow the rope to drop to the base, close to the roof. The object should be at optimum strength at this point.

3. After making the required turns around the hook of the life belt, do not release the right hand from the rope for any reason. Should you slip or fall from the parapet or roof while preparing to dismount, you will still have control and will not "free fall."

4. Members should be aware that the actual length of our life saving rope may be less than the nominal length of 150 feet due to natural shrinkage after several years in the field. Over a period of time some ropes have shrunk as much as 8 to 10 feet. This fact should be considered when planning to use the life saving rope.

EVOLUTION 30
October 1, 2007

SINGLE SLIDE FROM BUILDING WITH / WITHOUT A PARAPET USING LIFE SAVING ROPE AND PERSONAL HARNESS

CONTENTS

1. EQUIPMENT

1.1 One nylon life saving rope with attached anti-chaffing device in the carrying case. The pre-tied bowline-on-a-bight is not necessary for this operation. However, the rope shall be carried with this knot attached.

1.2 Personal harness.

2. OBJECTIVE

2.1 To enable a firefighter to remove themselves from an untenable position above grade.

NOTE: This slide may only be used as a last resort when circumstances are such that alternative methods of removing oneself are denied.

THE SINGLE SLIDE SHALL NOT BE USED TO MAKE RESCUE PICKUP.

3. PREPARATION FOR SINGLE SLIDE

3.1 Adjust harness leg straps for proper fit. Open bottom snap of coat for access to hook. Release hook from harness hook strap.

3.2 Place the carrying case on the roof near a substantial object you plan to use.

3.3 Remove the snap hook from the pocket of the case. Grasp the anti-chaffing device and pull it through the window of the case.

3.4 Secure the life saving rope by taking a turn around the substantial object and tie a clove hitch and binder on the taut part of the rope.

3.5 Grasp the anti-chaffing device with one hand and pick-up the carrying case with the other hand.

3.6 Walk to the planned point of descent, sliding the anti-chaffing device along the rope, and deploy the rope by tossing the carrying case to the street. Use caution when approaching point of decent due to building depth, open shafts, etc.

3.7 Locate the point to grasp the rope and the hook

3.7.1 For a Roof with a Parapet - Place the anti-chaffing device on the parapet. Standing to the right of the rope, place the left elbow on the outer edge of the parapet and reach down and grasp the rope with the left hand.

3.7.2 For a Roof without a Parapet - Place the anti-chaffing device on the roof near the edge. Standing to the right of the rope, kneel down and grasp the rope at the roof's edge with the left hand.

3.8 Turn to the left. The slider's back will now be to the point of descent.

3.9 With the right hand, lay the solid part of the harness hook (gate to the left) on top of the rope at the point of the left hand. Grasp the rope and hook together in the right hand. (Fig. 1A)

3.10 The following procedures are in sequence;

3.10.1 With left hand, rotate the locking screw collar to left until collar is all the way down. Gate will now open. (Fig. 1B)

3.10.2 With left hand, push gate over to solid side of hook (Fig. 1C). As gate reaches end of motion, grab hook, rope, and gate together with the right hand. (Fig. 1D)

NOTE: Member is now ready to proceed to take four (4) turns of the rope around the hook.

Figure 1A

Figure 1B

Figure 1C

Figure 1D

3.11 Using the left hand, make four (4) turns of the rope under and over the harness hook. (Fig. 2A)

3.12 Release gate to closed position. (Fig. 2B)

Figure 2A

Figure 2B

SINGLE SLIDE FROM A BUILDING WITH A PARAPET

4. DISMOUNTING THE PARAPET

4.1 Slide the right hand back along the rope approximately six inches (6") and grasp the rope firmly.

4.2 Pick up and slide the anti-chaffing device up to the harness hook with the left hand, turn to the right and straddle the parapet with the right leg to the outside.

4.3 Position the anti-chaffing device on the parapet. The device lies flat with approximately five inches (5") draped over the outer edge. (Figure 3)

NOTE: Harness hook should be at end of anti-chaffing device, and clear parapet.

4.4 Place the left arm over the anti-chaffing device and rope and grasp the inner edge of the parapet with the left hand. (Figure 3)

NOTE: To maintain the position of the anti-chaffing device, the heel of the left hand is placed on the device.

4.5 Check the slack in the rope to assure that the hook of the harness belt has cleared the outer edge of the parapet and that the anti-chaffing device is not being lifted from its proper position.

4.6 Move the gloved right hand along the rope while stretching the right arm out a full arm's distance. (Figure 3) Grasp the rope firmly at this point.

4.7 Slide the buttocks to the outer edge of the parapet until the left knee is at the inner edge of the parapet. With the right arm rigid, press the inside of the right fist firmly against the wall. The rope is between the fist and the wall. (Figure 3)

4.8 Using the rigid right arm for leverage, lean out over the parapet and make sure the rope is in the channel of the anti-chaffing device. The hook of the harness belt must clear the outer edge of the parapet.

4.9 Swing the body off the parapet into a vertical position then brings the right hand, gripping the rope, to the right buttock and maintains a firm grip on the rope.

4.10 Place feet against the wall, toes up, approximately twelve inches (12") apart.

4.11 Bring the left hand from the parapet and clear clothing, Handie-Talkie wire, etc., from the area of the hook.

4.12 When ready to slide, grasp the hook of the life belt at the gate, with the left hand, PALM DOWN.

5. SLIDING

5.1 Sliding is controlled by allowing the rope to pass through the gloved right hand. The hand must be in position against the right buttock at all times. This position affords absolute control of the slide.

5.2 Look down to avoid any obstructions not noted or not present when the rope was deployed. Continue slide to area of safety.

Figure 3

5.3 The line of descent should be between the rows of windows.

SINGLE SLIDE FROM A BUILDING WITHOUT A PARAPET

6. DISMOUNTING THE ROOF

6.1 Grasp the anti-chaffing device with the left hand. Slide anti-chaffing device up to personal harness hook, slide the right hand along the rope to the right buttock, grasp the rope firmly and turn to the right, facing the roof's edge. Walk to the roof's edge paying out slack through the hook. Use caution when approaching point of decent due to building depth, open shafts, etc.

6.2 Sit at the roof's edge, legs over edge, with the rope and anti-chaffing device to the left. Maintain a firm grip on the rope with the right hand at the right buttock. (Fig. 4)

6.3 Position the anti-chaffing device at the roof's edge allowing the device to lie flat with approximately five inches (5") draped over the edge. (Figure 4)

NOTE: The personal harness hook should be at the end of the anti-chaffing device, and clear the roof's edge. (Figure 4)

Figure 4

6.4 To maintain the position of the anti-chaffing device, place the heel of the left hand on the device. Now, slide the body forward so that only the buttocks are on the roof. (Fig 4)

6.5 Maintaining the position of the right hand. (Figure 4), roll to the left while pushing off smartly with the left hand, keeping the body clear of the roof's edge. A drop of approximately one and a half feet (1½') will be experienced.

6.6 Now in a vertical position, place the feet against wall, toes up, approximately twelve inches (12") apart.

6.7 Using the left hand, clear clothing, Handie-Talkie wire, etc., from the area of the hook.

6.8 When ready to slide, grasp the hook of the harness at the gate, with the left hand, PALM DOWN.

7. SLIDING

7.1 Sliding is controlled by allowing the rope to pass through the gloved right hand. The hand must be in position against the right buttock at all times. This position affords absolute control of the slide.

7.2 Look down to avoid any obstruction not noted or not present when the rope was deployed. Continue slide to area of safety.

7.3 The line of descent should be between the rows of windows.

NOTES

1. The imaginary line from the substantial object to the planned point of descent should be as close to perpendicular as possible to the roof's edge. This will avoid an acute angle of the rope, which would result in the rope sliding along the roof's edge when weight is placed on it.

2. The substantial object must be carefully selected. There are many objects of questionable integrity that should never be used; e.g., soil pipe vents, TV antenna masts, etc. Any chimney or other object chosen should be quickly examined for soundness and any sharp edges.

   2.1 When using a vertical object, such as a chimney, allow the rope to drop to the base, close to the roof. The object should be at optimum strength at this point.

3. After making the required turns of rope around the hook of the harness, do not release the right hand from the rope for any reason. Should you slip or fall from a parapet or roof while preparing to dismount, you will still have control and will not "free fall."

4. Under smoky or unsure conditions it is safer to crawl to the roof's edge.

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EVOLUTION 32
October 1, 2007

IMPLEMENTATION OF EMERGENCY LIFE SAVING ROPE OPERATIONS

1. INTRODUCTION

1.1 This evolution will only be implemented under the direction of a Command Chief. Activation will be transmitted via signal 65-2 by voice alarm, Department radio, ATSP and MDT. This evolution will be implemented on a citywide basis when a large number of personal harnesses and/or personal safety systems have been placed out-of-service and immediate replacement is not available. The intention of this procedure is to provide a measure of safety to members operating without personal harnesses and/or personal safety systems. It will remain in effect until further orders. When the equipment has been replaced and all on-duty members have been properly equipped, the Command Chief will rescind the implementation of this evolution.

2. PROCEDURES

2.1 Members assigned the Roof position in the first and second ladder companies at structure fires involving non-fireproof buildings that are 3 stories in height or greater shall bring their Life Saving Rope to the roof of the building. Additionally, members assigned the Roof position in the first and second Ladder companies at fireproof residential-type structures including apartment houses, nursing homes, senior citizen housing, dormitories, etc., shall bring the Life Saving Rope to their position on the floor above.

2.2 The 1st Roof firefighter shall carry the Life Saving Rope to their position and then perform assigned duties on arrival at the roof level (or floor above in fireproof residential buildings).

2.3 The 2nd Roof firefighter shall carry the Life Saving Rope to their position. Immediately after reaching their position, identify possible substantial objects for use in tying off the Life Saving Rope and position the Life Saving Rope at that location for possible use. This member will also position the Life Saving Rope of the first ladder company at a substantial object, using a different one if available. This action will readily identify the location of a designated substantial object for Life Saving Rope deployment. After completing this initial duty, the 2nd Roof firefighter shall then perform assigned duties at the roof level (or floor above in fireproof residential buildings), remaining alert to any condition that might require immediate use.

NOTE: The Life Saving Rope shall **not** be removed from the carrying case except for actual rescue and removal operations.

2.4 These two Roof firefighters shall maintain their position at the roof level (or floor above in fireproof residential buildings) until the Incident Commander declares the operation "Probably Will Hold," or the Incident Commander informs the members to either evacuate the roof or that their services on the roof are no longer required. When leaving the roof position, Roof firefighters shall take the Life Saving Ropes with them. The Incident Commander shall also announce on the handie-talkie that this roof level team is no longer in place when they are removed from the roof (or floor above in fireproof residential buildings). The Incident Commander must ensure that the duties (searches) previously performed by the Roof firefighters are assigned to other members or units.

2.5 Both Roof firefighters shall monitor the handie-talkie for deteriorating conditions that might require deployment of the Life Saving Rope, such as an interrupted or delayed application of water on the fire. This may require one or both members to move to a location remote from operating saws or other ambient noise.

2.6 The preferred method for removal of distressed members wearing a personal harness is for them to remove themselves from danger via a single slide utilizing a Life Saving Rope that has been deployed from above.

2.7 The preferred method for removal of distressed members not wearing a personal harness from danger is for the two roof members to perform Evolution 25, 26 or 27 to remove the distressed member from danger.

IT MUST BE EMPHASIZED THAT THIS IS A LAST RESORT PROCEDURE. THE SINGLE SLIDE SHALL NOT BE USED TO MAKE RESCUE PICKUP.

3. COMMUNICATIONS

3.1 Members operating inside buildings should be alert to changing conditions to alert the roof level team of any possible need for deployment of the Life Saving Rope (remember the inherent time delay for Life Saving Rope deployment). Be as specific as possible when indicating the location where the rope is needed.

4. DISTRESSED MEMBER ACTIONS

A. Transmit a MAYDAY on the handie-talkie when realizing **possible** need.
B. Identify Unit and position.
C. Specify location for rope deployment.
D. While awaiting the LSR from above, fully clear the window of all obstructions.

5. SUBSTANTIAL OBJECT

5.1 The substantial object must be carefully selected. There are many objects of questionable integrity that should never be used; e.g., soil pipe vents, TV antenna masts, etc. Any chimney or other object chosen should be quickly examined for soundness and any sharp edges. When using a vertical object, such as a chimney or dumbwaiter bulkhead, allow the rope to drop to the base, close to the roof. The object should be at optimum strength at this point.

EVOLUTION 34
December 7, 2010

KO CURTAIN DEPLOYMENT

1. **Redacted for PFS**

2. **TERMINOLOGY**

Deployment Window:	Window that the KO Curtain is being deployed from.
Target Window:	Window selected to be covered by the KO Curtain.
Receiving Window:	Window on the floor below the Target Window.
Deployment Firefighter:	Member responsible for deploying the KO Curtain.
Receiving Firefighter:	Member responsible for securing bottom ropes of the KO Curtain.
Spotter:	Member located outside the building designated to communicate and direct the proper positioning of the KO Curtain.

3. SIZE-UP

3.1. Exterior Size-Up:

3.1.1 In addition to general size-up considerations, members assigned outside survey responsibilities shall note the following:

- Wind conditions
- Visible smoke and fire
- Location of any windows that have failed and are self venting
- Is fire and/or smoke venting out of the failed windows steadily or intermittently?
- Is fire visible through the failed window?
- Is the wind affecting the fire and smoke?
- Can a single KO Curtain cover the target window(s) or will additional KO Curtains or Fire Window Blankets be required?
- Presence of oversized windows or balconies which may prevent the deployment of a Fire Window Blanket or KO Curtain. These conditions may require the use of an exterior stream or wall breaching.
- Is the fire floor within reach of Aerial, Tower or Portable Ladders?
- Access for Aerial or Tower Ladders?

3.2 Floor Above Size-Up:

3.2.1 The firefighters assigned to the floor above will be in a position to provide an accurate description of the effect the wind may have when the door to the fire apartment is opened. These firefighters shall:

- Force entry to the apartment above the fire.
- Chock open the entrance door to the apartment above.
- Survey and size-up the layout of the apartment above and communicate this information to the officers in the fire apartment.
- Check for any fire venting from the fire apartment and auto-exposing the apartment above.
- A pressurized water extinguisher may be required at the place of deployment in the case of auto exposure. A handline may be required for severe auto exposure.
- If auto exposure is not a problem, open the apartment window in the room over the fire room. Evaluate the wind condition and relay this information to the officers on the fire floor and the IC.
- Prepare the KO Curtain for deployment, and remove any window gates, child guards, blinds, curtains or other obstructions.

- Do not remove or break the deployment window unless absolutely necessary. An intact window will provide protection from auto-exposure, which may occur due to shifting or gusty winds, allowing fire to intermittently vent from the fire apartment. Once the KO Curtain is deployed, members can expect that fire will vent from the target window and auto expose the deployment window via the space between the KO Curtain and the building wall.

4. TOOLS AND POSITIONS

4.1 Deployment Firefighter

Tools: KO Curtain, Hydra-ram, Halligan.

Duties: Deploy the KO Curtain from a window in the apartment on the floor above, two floors above, or if the fire is on the top floor, then from the roof.

4.2 Receiving Firefighter

Tools: Hydra-ram, Halligan, Halligan hook.

Duties: Positioned below the target window, in the apartment below the fire apartment. Secure the lower ropes of the KO Curtain and coordinate positioning over the target window.

5. DEPLOYMENT PROCEDURE

5.1 Depending on conditions encountered, the IC may have to deploy an available radio equipped member as a spotter located outside the building. This member must obtain the binoculars from the Battalion Chiefs vehicle and be in a position to see the target window. This location will enable the spotter to confirm that the Deployment and Receiving firefighters are in position at the correct windows. Once the KO Curtain is deployed, the spotter will be able to provide the deploying and receiving firefighters with direction to ensure the KO Curtain is properly positioned covering the target window. The spotter can observe the effects the KO Curtain has on the ventilation profile and report the results including any changes in fire conditions to the IC.

5.2 The Deployment firefighter must have their facepiece on and full PPE donned when deploying the KO Curtain. This will protect the Deployment firefighter from unexpected auto-exposure which will subject them to fire, smoke and superheated gases.

5.3 The Deployment Firefighter, located above the fire, chooses the Deployment Window which must be directly above the Target Window. If the fire is on the top floor, the Deployment firefighter will be on the roof. Some situations will require deployment from two floors above the fire apartment (e.g., duplex apartments).

5.4 Remove the KO Curtain from the case, place on the floor below the Deployment Window. The KO Curtain shall **NEVER** be deployed in the horizontal position. The KO Curtain is designed and shall be deployed **ONLY** in the vertical position.

5.5 Open the Deployment Window without removing/breaking the glass, and remove any child guards or window gates. Do not remove the glass unless absolutely necessary. This window will need to be closed if auto-exposure becomes a problem.

5.6 Communicate with the Receiving Firefighter assigned to the floor below at the Receiving Window, and determine if he/she is in position and ready to assist with deployment.

5.7 Estimate how much rope will span from the Deployment Window sill to the top of the Target Window. When the receiving and deploying firefighters are in position and ready, notify the 2nd arriving ladder company officer that the KO Curtain is position and ready to be deployed.

5.8 When deploying the KO Curtain, the firefighter shall grasp the ropes, place and hold the KO Curtain outside the open window. Press the hand holding the ropes under the sill and lock the ropes with hand against the wall. Allow the KO Curtain to drop (do not throw) and cover the Target Window. Receiving member will gather KO Curtain ropes at Receiving Window.

5.9 Deployment firefighter and Receiving firefighter must communicate and make sure the Target Window is completely covered by the KO Curtain. If in position, the spotter may be able to assist with this step.

5.10 When assured that the Target window is completely covered, the Deploying and Receiving firefighters will maintain control of their respective ropes. The ropes shall not be tied off. The deployment window shall be closed to prevent auto-exposure.

5.11 The IC and the ladder company officer on the fire floor will be notified when the KO Curtain is in position fully covering the target window.

5.12 ***Redacted for PFS***

5.13 Both the Deploying firefighter and the Receiving firefighter will remain in position until otherwise ordered by the Incident Commander.

5.14 ***Redacted for PFS***

BY ORDER OF THE FIRE COMMISSIONER AND CHIEF OF DEPARTMENT

EVOLUTION 35
July 30, 2021

LOWERING MEMBER USING KLSR AND PERSONAL HARNESS

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1. EQUIPMENT

1.1 One Kernmantle Lifesaving Rope System in carrying case.

1.2 One personal harness per member.

2. OBJECTIVE

2.1 To lower a firefighter(s) from a roof or upper floor to a position of safety.

2.2 To lower a firefighter from a roof or upper floor in order to enable the firefighter to remove another person from an untenable position to one of safety.

2.3 To lower a victim(s) from untenable position to one of safety.

3. PREPARATIONS FOR LOWERING

This section applies to operations on roof WITH or WITHOUT parapets and lowering a member from a window.

3.1 Member(s) to be lowered adjust their harness leg straps for proper fit. Member(s) to be lowered open bottom snap of coat to access hook support strap.

	Member # 1 (Lowering Member)	**Member # 2 (Member to be Lowered)**
3.2	Facing substantial object, place carrying case approximately 10' from the parapet/window with the Red Anchor flap facing towards substantial object. Green flap faces towards point of descent.	
Note:	If obstructions exist or roof footing is unstable, the carry case can be placed closer to substantial object. See Note # 6	

Member # 1 (Lowering Member)

Member # 2 (Member to be Lowered)

3.3 Open all three (3) orange securing tabs. The Descent Control Device (DCD), Anti-Chafing Device and Green carabineer remain on top of the case. (Figure 1)

Figure 1

3.4 Grab Red Anchor carabineer from the pocket on Red Anchor flap. Proceed to substantial object allowing the rope to pay out from the anchor end of the case. (Figure 2)

Figure 2

Member # 1 (Lowering Member)

Member # 2 (Member to be Lowered)

3.5 Tie a Tensionless Hitch on the substantial object. (Figure 3)

Note: There is no set amount of wraps for a tensionless hitch. The size, shape, surface texture, number of angles, etc., must all be taken into account when tying this hitch. A properly tied tensionless hitch will not allow any movement of the carabineer when a load is applied to the working end of the rope. Member can test for a properly tied tensionless hitch by applying as much force as possible on the rope to simulate the weight of two people. If the carabineer does not move, member can be assured a proper tensionless hitch has been tied.

Figure 3

Member # 1 (Lowering Member)

Member # 2 (Member to be Lowered)

3.6 Grab rope with right gloved hand, with the rope at right hip, keeping tension, walk back to the Carrying Case, sliding right hand along the rope. (Figure 4)

Figure 4

3.7 Approximately 10' from parapet/window tie Figure Eight knot on rope creating 10"-12" loop. (Figure 5)

Note: If obstructions exist or roof footing is unstable, Figure Eight knot can be tied closer to the substantial object.
See Note# 6

Figure 5

Member # 1 (Lowering Member)

Member # 2 (Member to be Lowered)

3.8 Pull harness handle from beneath bunker coat by releasing Handle Support Strap. Attach green carabineer on the rope to harness handle, **carabineer gate facing up (gate towards body),** keeping the carabineer secured. (Figure 6)

Figure 6

Member # 1 (Lowering Member)

Member # 2 (Member to be Lowered)

3.9 Open Red DCD carabineer and place on the 10"-12" loop held by Lowering Member. The gate can face up or down, both methods are acceptable.

(Figure 7 shown with gate up)

Figure 7

3.10 Perform functional test of DCD auto-lock, with hands off the device, load system by walking backward toward parapet/window. (Figure 8)

Figure 8

Member # 1 (Lowering Member)

3.11 With DCD on right side of body, pay out rope. Place left hand on lever, right hand on rope. With left hand on lever, pull back gently opening cam slowly. Rope in right hand comes forward and parallel to rope being payed out to member to be lowered. Give command to Member# 2 "PREPARE TO MOUNT". (Figure 9)

Note: It is possible to operate the DCD on the left side of body.

Figure 9

Member # 2 (Member to be Lowered)

3.12 Slide the anti-chafing device up to the harness handle. Reach out with both hands and grab the rope paying out from the DCD on the far side of the anti-chafing device. Pull hard and steady, turn to the right, and proceed to the parapet/window. (Figure 10)

Figure 10

Member # 1 (Lowering Member)

3.14 Pay out rope until Member# 2 has enough slack so that both hands reach the inner edge of the parapet/ windowsill. Take left hand off lever, clear of DCD. (Figure 11)

Figure 11

3.15 Give the command to Member # 2: “Mount the parapet/windowsill.”

Note: Right hand will ALWAYS remain in contact with the rope. Speed of the descent is controlled by right hand.

Member # 2 (Member to be Lowered)

3.13 Pull enough slack so that both hands reach the inner edge of the parapet/windowsill.

4. LOWERING OPERATION FROM A PARAPET/WINDOW

Member # 1 (Lowering Member)

Member # 2 (Member to be Lowered)

4.1 Left hand holding anti-chafing device, mount parapet/windowsill with right leg over. Allow enough slack in the rope to place anti-chafing device flat on parapet/windowsill with approximately 5" of the device draped over the outer edge. The anti-slip surface must be placed down. Seam of anti-chafing device, hook & loop (Velcro), faces up. (Figure 12)

Note: Harness handle/green carabineer is at the end of the anti-chafing device and must clear the edge of the roof.

Figure 12

Member # 1 (Lowering Member) | **Member # 2 (Member to be Lowered)**

4.2 Take up any excess slack by moving right hand forward and parallel to rope. Pull hard with right hand taking up slack through DCD. (Figure 13)

Figure 13 & 23& 42

4.3 Place the rope in Friction Cleat and right hand forward, parallel to rope. (Figure 14)

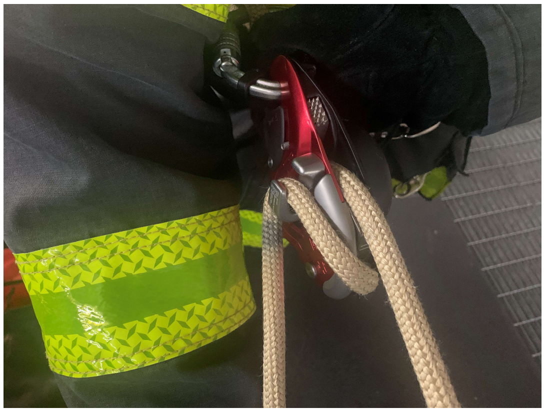

Figure 14 & 24

Member # 1 (Lowering Member)

Member # 2 (Member to be Lowered)

4.4 Left hand releases lever of DCD allowing lever to seat in locked position. (Figure 15)

Figure 15

4.5 Raise left hand high and off the DCD. Right hand continues to hold rope forward and parallel to the working end of rope. This signals that the lowering member is Ready. (Figures 16 & 26)

Figure 16

Member # 1 (Lowering Member)

Member # 2 (Member to be Lowered)

4.6 Confirm that Lowering Member #1 has removed slack from the DCD, has placed rope into Friction Cleat, DCD lever is in the locked position, and left hand raised high and off the DCD.

4.7 Give the command "DISMOUNT" to Member# 2 to dismount the parapet/ windowsill.

4.8 Both gloved hands grip the inner edge of the parapet/windowsill, with a hand on either side of the anti-chafing device. (Figure 17)

Note: To maintain the position of the anti-chafing device, place the thumb of the right hand on top of the device while the fingers grasp the inner edge of the parapet/windowsill.

Figure 17

Member # 1 (Lowering Member)

Member # 2 (Member to be Lowered)

4.9 Slide your buttocks to the outer edge of the parapet/windowsill until your left knee is at the inner edge of the parapet/windowsill. Make sure that the rope is in the channel of the anti-chafing device.

4.10 Roll off the parapet/windowsill into a vertical position and place feet approximately 12" apart against the wall, toes up, and give the command "DOWN" to be lowered.

Note: Both hands remain on the parapet/windowsill until you are in a vertical position. (Figure 18)

Figure 18

Member # 1 (Lowering Member)

4.11 At the command "DOWN", lower Member# 2. Control the descent, left hand on lever, pull back gently opening cam slowly. Right hand controls speed of descent by creating friction around the Friction Cleat. (Figure 19)

Figure 19

Member # 2 (Member to be Lowered)

4.12 When a Guide Member is at roof/window level and visibility is good, hand signals can be used to control a lowering operation. (Figure 20)

Figure 20

Note: If a third member is available, they should be at the roof's edge for control and to relay commands.

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5. LOWERING OPERATION FROM A BUILDING WITHOUT A PARAPET

Member # 1 (Lowering Member)

Note: The instructions in Section 3 and Section 4 apply here

Member # 2 (Member to be Lowered)

Note: Section 3.8-3.10 apply here.

5.1 With both hands on rope on the far side of the anti-chafing device closest to the DCD, pull hard and steady, turn to your right and proceed to edge of roof, the rope and anti-chafing device on your left.

Note: Under smoky or unsure conditions it may be better to crawl to roof's edge. (Figure 21)

5.2 Sit at roof's edge, legs over edge, with the rope and anti-chafing device to the left.

Figure 21

Member # 1 (Lowering Member)

Member # 2 (Member to be Lowered)

5.3 Allow enough slack in the rope to place the anti-chafing device flat on the roof's edge with approximately 5" of the device draped over the edge of the roof. (Figure 22)

Note: Harness handle/green carabineer is at the end of the anti-chafing device and must clear the edge of the roof.

Figure 22

5.4 Take up any excess slack by moving right hand forward and parallel to rope. Pull hard with right hand taking up slack through DCD. (Figure 23)

Figure 23

Member # 1 (Lowering Member)

Member # 2 (Member to be Lowered)

5.5 Place the rope around the Friction Cleat andright hand forward, parallel to rope. (Figure 24).

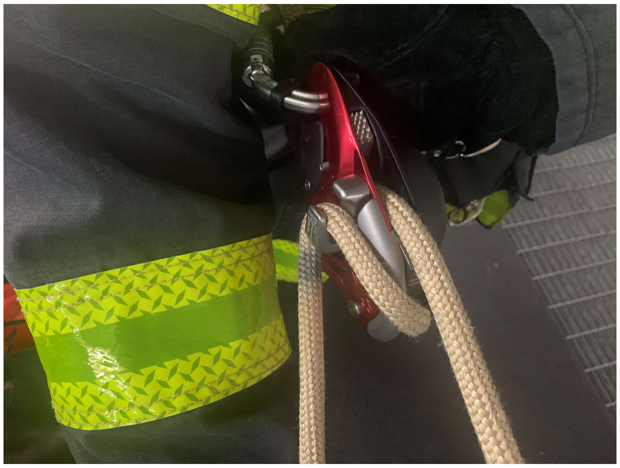

Figure 24

5.6 Left hand releases lever of DCD allowing lever to seat in locked position. (Figure 25)

Figure 25

Member # 1 (Lowering Member)

5.7 Raise left hand high and off the DCD. Right hand continues to hold rope forward and parallel to the working end of rope. This signals that the lowering member is ready. (Figure 26)

Figure 26

5.9 Give the command "DISMOUNT" to Member# 2 to dismount the roof.

Member # 2 (Member to be Lowered)

5.8 Confirm that Lowering Member #1 has removed slack from the DCD, has placed rope into Friction Cleat, DCD lever is in the locked position, and left hand raised high and off the DCD.

5.10 Place the left hand between the anti-chafing device and your left leg. Using the hand as a pivot, roll the body to the left, into a pushup position and make sure the rope is in the channel of the anti-chafing device.

5.11 Lower the body into a vertical position.

Note: As the vertical position is attained, the slack in the rope between the harness handle and the anti-chafing device will cause the member to drop slightly until the slack is eliminated.

Member # 1 (Lowering Member)

Member # 2 (Member to be Lowered)

5.12 Place feet approximately 12" apart against the wall, toes up, and give the command "DOWN" to be lowered.

5.13 At the command "DOWN", lower Member# 2. Control the descent, left hand on lever, pull back gently opening cam slowly. Right hand controls speed of descent by creating friction around the friction cleat.

Note: If a third member is available, they should be at the roof's edge for control and to relay commands.

6. MEMBER BEING LOWERED RESCUES A VICTIM AT LOWER LEVEL

Member # 1 (Lowering Member)	Member # 2 (Member to be Lowered)
	6.1 Continue being lowered, stopping just out of reach of victim, by giving verbal command to **"STOP"**. (Figure 27).
	Note: Descent should NOT be in line with windows.

Figure 27

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Member # 1 (Lowering Member)		**Member # 2 (Member to be Lowered)**
	6.2	In order for the Guide Member or Member# 1 to hear your verbal commands it will be necessary for you to look up toward the roof/window when giving them.
	6.3	Continue verbal commands "DOWN, STOP, DOWN, STOP" as necessary until member being lowered is shoulder to shoulder with the victim. When pulling yourself over by the window frame an acute angle might cause the member to rise higher than the victim. (Figures 28 & 29)

Figure 28

Figure 29

Member # 1 (Lowering Member)

6.4 On the command "STOP", halt lowering operation by bringing right hand forward hard creating friction around the Friction Cleat, while at the same time bringing lever forward with left hand. Left hand places DCD in the **NEUTRAL** position. Await the completion of the pickup.

Member # 2 (Guide Member)

6.5 Instruct the victim to place both arms around your neck, both legs around your waist, and maintain a firm hold. (Figure 30)

Figure 30

6.6 Place your arms around the victim's upper torso, under the armpits, and lock your hands behind the victim's back.

Note: Signal to lower must be given verbally by the member being lowered. Member must look up in order to be heard by the Guide Member or Member# 1.

Member # 1 (Lowering Member)

6.7 With the weight of the member and victim on the rope, with left hand on lever, pull back gently opening cam slowly. Lower the Member and victim while maintaining friction with right hand around the Friction Cleat. Control speed with right hand.

Member # 2 (Guide Member)

6.8 Continue descent until area of safety is reached.

7. LOWERING VICTIM(S) FROM AN UNTENABLE POSITION

Member # 1 (Lowering Member)

Note: The instructions in Sections 3.2 to 3.7 apply here.

Member # 2 (Guide Member)

Note: The instructions in Sections 3,4,5,6, **do not** apply here.

7.1 Open the Red DCD carabineer and place on the Figure Eight (8) loop held by the lowering member.

7.2 With both hands on green carabineer, turn to right, pulling hard and steady; bring carabineer to edge of parapet/windowsill. (Figure 31)

Figure 31

7.3 Pay out rope until Member# 2 has reached the edge of parapet/windowsill and has pulled an additional 15' of rope through DCD.

Member # 1 (Lowering Member)

Member # 2 (Guide Member)

7.4 After the additional 15' of rope has been pulled through the DCD, tie the bowline-on-the-bight and slippery hitch on the victim. Slide anti-chafing device up to slippery hitch.

Note: Anti-chafing device must remain between the DCD and the slippery Hitch. (Figures 32, 33, 34)

Figure 32

Figure 33

Figure 34

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Member # 1 (Lowering Member)

7.5 Take left hand off lever, clear of the DCD. Give the command "MOUNT THE PARAPET/WINDOWSILL"

Member # 2 (Guide Member)

7.6 Guide the victim onto the parapet/ windowsill, right leg over the side, sitting upright. (Figure 35)

7.7 Guide the victim's hands to the inner edge of the parapet/windowsill, instruct victim to grab the inner edge with both hands. Maintain 5" of anti-chafing device over the outer edge. Grab victim's left leg with right hand. (Figure 36)

Figure 35

Figure 36

Member # 1 (Lowering Member)

7.8 Take up any excess slack by moving right hand forward and parallel to rope. Pull hard with right hand taking up slack through DCD.

7.9 Place the rope around the Friction Cleat and right hand forward, parallel to rope.

7.10 Left hand releases lever of DCD allowing lever to seat in locked position.

7.11 Raise left hand high and off DCD. Right hand continues to hold rope forward and parallel to the working end of the rope. This signals that the lowering member is ready.

Member # 2 (Guide Member)

7.12 Instruct victim to slide buttocks to the outer edge of the parapet/windowsill until left knee is at the inner edge of the parapet/windowsill, make sure that the rope is in the channel of the anti-chafing device.

7.13 Assist victim to swing left leg over parapet/windowsill and into a vertical position. Maintain rope in center of anti-chafing device.

7.14 When victim is vertical give command "DOWN" to be lowered. Continue commands until victim is lowered to an area of safe refuge.

Member # 1 (Lowering Member)

7.15 At the command "**DOWN**", lower the victim. Control the descent, left hand on lever, pull back gently opening cam slowly. Right hand controls speed of descent by creating friction around the Friction Cleat.

8. LOWERING AN UNCONSCIOUS, NON-AMBULATORY VICTIM

	Member # 1 (Lowering Member)		**Member # 2 (Guide Member)**
8.1	Pay out rope until Member# 2 has pulled an additional 15' of rope through DCD.		
		8.2	After the additional 15' of rope has been pulled through the DCD, tie the bowline-on-the-bight and slippery hitch on the victim. (Figures 37 & 38)

Figure 37

Figure 38

Member # 1 (Lowering Member)

Member # 2 (Guide Member)

8.3 Place the victim in the prone position on the windowsill. Ensure that all slack has been taken up prior to dismounting the victim. (Figure 39)

Note: Placing an unconscious victim in a prone position on a windowsill is an extremely difficult task. Additional member(s) might be required. (Figure 40)

Figure 39

Figure 40

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9. RESETTING: PREPARATION FOR ADDITIONAL LOWERING

Member # 1 (Lowering Member) **Member # 2 (Guide Member)**

9.1 After lowering Member/Victim to an area of safety, remove left hand from DCD.

9.2 Right hand removes rope from around the Friction Cleat. (Figure 41)

Figure 41

Member # 1 (Lowering Member)

Member # 2 (Guide Member)

9.3 With right hand **ALWAYS** maintaining contact with rope, walk to parapet/windowsill, while allowing rope to slide through right gloved hand. Look over edge to determine that member/ victim has been removed from rope.

9.4 Return to position at DCD, using hand over hand motion, bring rope back up through device until green carabiner clears parapet/sill. (Figure 42)

Note: Care must be taken to ensure that anti-chafing device remains on roof, or inside window.

Figure 42

10. NOTES

10.1 The Kernmantle life saving rope shall be used for life saving purposes only. It shall not be used for any other purpose.

10.2 Communication is essential in all rope rescue operations. The Incident Commander **must** be notified when any rope rescue operation is to be undertaken. This will enable the IC to arrange for any assistance needed at the location of the operation e.g.; Guide Member at roof/window level, and a member at the area of safe refuge.

10.3 Before a rope rescue begins, check that there are no obstructions in line with the planned descent, such as signs, wires, awnings, etc.

10.4 Every effort shall be made to lower an individual between lines of windows. This will provide for a smoother, easier descent and reduce exposure of the rope in case fire should show at a window.

10.5 Members must be alert to look for a reliable substantial object on the roof/floor above, such as bulkhead, aerial ladder, around a chimney, base of a dumb waiter shaft or skylight, or cut a hole, and tie rope around an exposed beam. Plumbing vent pipes, sheet metal housing for roof vents, T.V. antennae masts, newel posts or banisters are not reliable substantial objects.

10.6 To increase safety and improve visibility and communications, the lowering point should be established approximately 10' from parapet/windowsill. When obstructions exist, or footing is questionable, e.g. flat roof, ice, snow, melted tar, etc., the Figure Eight (8) knot can be tied anywhere along the rope. To make a difficult horizontal transition across the roof/room easier, the Lowering Member can use the Enhanced Horizontal Payout Button.

10.7 By **ALWAYS** maintaining the right hand in contact with the rope, it is possible for Member# 1 (Lowering Member) to walk to the edge of the parapet/window, by allowing the rope to slide through gloved hand. When communication is difficult, look over the edge in an attempt to make contact.

10.8 When performing any lowering operation, the Kernmantle life saving rope must be as perpendicular as possible to the roof/window edge at the point where the member descends.

10.8.1 If the angle of the rope from the substantial object to the roof's edge is too acute the weight of the person being lowered will cause the rope to slide along the roof edge. This should be avoided.

10.8.2 Additionally, if the angle of the rope is too acute the Lowering Member/Member to be Lowered/Victim will be pulled uncontrollably by the rope, and the line of descent will also be drastically affected. This should be avoided.

10.9 When members are being lowered to perform a rescue pick-up, they must:

10.9.1 Give the command "STOP" to halt lowering operation while **out of reach** of the victim. This is to alert the Guide Member and/or the Lowering Member that the Member being lowered is approaching the victim. (Figure 27)

10.9.2 Before this operation is completed in the safest possible manner, victims tend to jump onto their rescuers. In this situation a victim could easily fall to the ground.

10.9.3 The rescuer will give instructions to the victim at this point in the strongest and most forceful language necessary in order to complete the operation successfully. Reminder; language barriers exist, consider using hand signals.

10.9.4 Next, give the commands "DOWN, STOP, DOWN, STOP", as necessary until member being lowered is shoulder to shoulder with the victim. When pulling yourself over by the window frame an acute angle ***might*** cause the member to rise higher than the victim.

10.10 When a Guide Member is at roof/window level and visibility is good, hand signals can be used to control a lowering operation. (Figure 20)

10.10.1 Signals shall be as follows:

LOWER: Point downward with index fingers.

STOP: Clenched fists.

10.11 The fact that a member has been lowered to a window does not commit them to a rope rescue. If conditions do not demand the removal of the victim, good judgment dictates that the member enters the area and takes the necessary action to reassure, protect, and confine the victim until the danger has passed.

10.12 If a rope rescue is necessary, the goal is to reach a point of safety. A descent of one story may be all that is necessary.

10.13 When an unconscious/non-ambulatory victim is encountered and removing the victim requires the use of the rope, the bowline-on-a-bight and slippery hitch must be tied on the victim. (Figures 37, 38, 39, 40)

10.13.1 If more than one victim is encountered, consideration may be given to tying the bowline-on-a-bight and slippery hitch on the victim and assisting them to be lowered. The system can quickly be reset to lower an additional victim(s). (Figures 33, 34, 35, 36)

10.13.2 If a victim is to be lowered, a member **MUST** be in position below, at an area of safe refuge, to assist the victim to safety, and disconnect them from the bowline-on-a-bight and slippery hitch.

10.14 As a last resort (Doomed Captives, uncontrolled fire eliminating an interior vertical descent, structural collapse, out of reach of Aerial/Tower Ladder, Unconscious/Non-ambulatory victims) consideration may be given to lowering Civilians to an area of safe refuge by tying the bowline-on-a-bight and slippery hitch on them. The Incident Commander must be notified when attempting such a rescue. A member must be in position at the area of safe refuge below the victim to assist.

BY ORDER OF THE FIRE COMMISSIONER AND CHIEF OF DEPARTMENT

EVOLUTION 36
July 30, 2021

SINGLE SLIDE FROM A BUILDING WITH/WITHOUT A PARAPET USING KLSR

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1. EQUIPMENT

1.1 One Kernmantle life saving rope in carrying case.

1.2 Personal Harness.

2. OBJECTIVE

2.1 To enable a firefighter to remove themselves from an untenable position above grade.

Note: This slide may only be used as a last resort when circumstances are such that alternative methods of removing oneself are denied.

The single slide shall not be used to make rescue pickup.

3. PREPARATION FOR SINGLE SLIDE

3.1 Adjust harness leg straps for proper fit. Open bottom snap of coat for access to harness handle support strap.

3.2 Release the harness handle support strap.

3.3 Release rappel hook from the rappel hook support strap.

3.4 Place the carrying case approximately 10’ from edge, or parapet. Red Anchor flap facing the substantial object, Green Decent flap facing the edge, or parapet.

	
Figure 1	Figure 2

3.5 Open Red Anchor flap cover by pulling on orange tab.

3.6 Remove Red Anchor carabineer from pocket, walk to substantial object allowing rope to pay out from end of case. (Figure 1)

3.7 Tie a tensionless-hitch on substantial object. (Figure 2)

Note: number of wraps required on a tensionless hitch depends upon; diameter of substantial object, surface tension, and squared edges.

3.8 Place gloved hand on rope, walk towards edge, taking up slack, while allowing rope to slide through gloved hand.

3.9 Upon returning to the carrying case, open the green flap by pulling on orange tab, remove the green carabineer from the pocket. Slide the anti-chafing device off the rope. Secure the green flap back onto the hook-and-loop (Velcro). (Figure 3)

3.10 Open the anti-chafing device and place on the rope between the substantial object and the carrying case. Ensure that the hook-and-loop (Velcro) seam has been securely fastened. (Figure 4)

Figure 3

Figure 4

3.11 Double the Red Flap back upon the carrying case. Secure the Red flap against the bottom of the carrying case with the black webbing strap. (Figure 5)

Figure 5

Figure 6

3.12 Pick up carrying case and walk to the edge of the flat roof, or parapet. Look down ensuring no obstructions exist, drop carrying case over edge. Ensure that rope has deployed cleanly from end of carrying case, and case is not suspended. (Figure 6)

Note: the anti-chafing device MUST be placed on the rope prior to deploying the carrying case. (Figure 4)

3.13 Locate the point to grasp the rope and the rappel hook.

3.13.1 For a Roof with a Parapet – Standing to the right of the rope, rope on your left, place the left elbow on the outer edge of the parapet and reach down and grasp the rope with the left hand. (Figure 7)

3.13.2 For a Roof without a Parapet – Standing at the edge, right of the rope, rope on left, kneel down and grasp the rope at the roof's edge with the left hand. (Figure 8)

Note: Under smoky or unsure conditions it may be better to crawl to the roof's edge.

Figure 7

Figure 8

3.14 Turn to the left. The slider's back will now be to the point of descent.

3.15 With the right hand, lay the solid part of the rappel hook (gate to the left) on top of the rope at the point of the left hand. Grasp the rope and rappel hook together in the right hand.

3.16 The following procedures are in sequence for the triple action lock;

3.16.1 With left hand, pull down gate and take a quarter turn to the left and push gate toward solid part of rappel hook in right hand.

3.16.2 As the gate reaches end of motion, grab rappel hook, rope, and gate together with the right hand. (Figure 9)

Note: Member is now ready to proceed to take four (4) turns around the rappel hook.

Figure 9

Figure 10

3.16.3 Rope is always applied by taking turns under and over the rappel hook, away from the rappel hook, and away from the body.

3.16.4 Using left hand, make four (4) turns of the rope under and over the rappel hook. (Figure 10)

3.16.5 To close the triple action lock, release from the right hand. To ensure that the gate is closed and locked, apply lateral pressure with left hand against the gate.

4. SINGLE SLIDE FROM A BUILDING WITH A PARAPET

4.1 To dismount a **PARAPET**

4.1.1 After taking four turns, slide the right hand back along the rope approximately six inches (6") and grasp the rope firmly. (Figure 11)

4.1.2 Pick-up and slide the anti-chafing device up to the rappel hook with the left hand, turn to the right and straddle the parapet with the right leg to the outside.

4.1.3 Position the anti-chafing device on the parapet. The device lies flat, anti-slip coated surface down, hook-and -loop (Velcro) seam up, with approximately five inches (5") draped over the outer edge.

Note: Harness rappel hook should be at the end of the anti-chafing device and clear the parapet.

Figure 11

Figure 12

4.1.4 Place the left hand over the anti-chafing device and rope and grasp the inner edge of the parapet with the left hand. (Figure 12)

Note: To maintain the position of the anti-chafing device, the heel of the left hand is placed on the device.

4.1.5 Check slack in the rope to assure that the rappel hook has cleared the outer edge of the parapet and that the anti-chafing device is not being lifted from its proper position.

4.1.6 Move the gloved right hand along the rope while stretching the right arm out a full arm's distance. Grasp the rope firmly at this point.

4.1.7 Slide the buttocks to the outer edge of the parapet until the left knee is at the inner edge of the parapet. Using the right rigid arm for leverage, lean out over the parapet and make sure the rope is in the channel of the anti-chafing device. The rappel hook of the personal harness must clear the outer edge of the parapet.

4.1.8 With the right arm rigid, press the inside of the right fist firmly against the wall. The rope is between the fist and the wall.

4.1.9 Swing the body off the parapet into a vertical position then bring the right hand, gripping the rope, to the right buttock and maintain a firm grip on the rope.

4.1.10 Place the feet against the wall, toes up, approximately twelve inches (12”) apart.

4.1.11 Bring the left hand from the parapet and clear clothing, handi-talkie wire, helmet chin strap, etc. from the area of the rappel hook and rope.

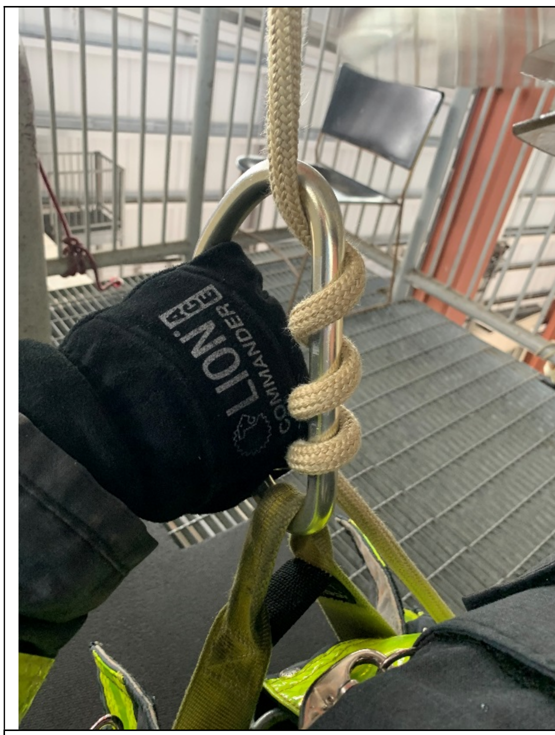

Figure 13

4.1.12 When ready to slide, grasp the rappel hook at the gate with the left hand, PALM DOWN. (Figure 13)

5. SINGLE SLIDE FROM A BUILDING WITHOUT PARAPET

5.1 To dismount a **FLAT ROOF**

5.1.1 After taking the four turns, slide the right hand back along the rope approximately six inches (6”) and grasp the rope firmly.

5.1.2 Grasp the anti-chafing device with the left hand. Slide the anti-chafing device up to the rappel hook, slide the right hand along the rope to the right buttock, grasp the rope firmly and turn to the right, facing the roof’s edge. (Figure 14)

5.1.3 Walk to the roof’s edge paying out slack through the hook. Use caution when approaching point of decent due to building depth, open shafts, snow/ice, etc.

5.1.4 Sit at the roof’s edge, legs over the edge, with the rope and anti-chafing device to the left. Maintain a firm grip on the rope with the right hand at the right buttock.

5.1.5 Position the anti-chafing device at the roof’s edge allowing the device to lie flat, anti-slip coating down, hook-and-loop (Velcro) seam up, with approximately five inches (5”) draped over the edge. (Figure 15)

Note: Harness rappel hook should be at the end of the anti-chafing device and clear the roof’s edge.

5.1.6 To maintain the position of the anti-chafing device, place the heel of the left hand on the device. Slide the body forward so that only the buttocks are on the roof.

Figure 14

Figure 15

5.1.7 Maintaining the position of the right hand, roll to the left while pushing off smartly with the left hand, keeping the body clear of the roof’s edge. A drop of approximately one foot (12”) will be experienced.

5.1.8 Now in a vertical position, place the feet against the wall, toes up, approximately twelve inches (12”) apart.

5.1.9 Using the left hand, clear clothing, handi-talkie wire, helmet chin strap, etc., from the area of the rappel hook and rope.

5.1.10 When ready to slide, grasp the rappel hook at the gate with the left hand, PALM DOWN.

6. SLIDING

6.1 Sliding is controlled by allowing the rope to pass through the gloved right hand. The hand must be in position against the right buttock at all times. This position affords absolute control of the slide.

6.2 Look down to avoid any obstructions not noted or not present when the rope was deployed. Continue to an area of safety.

6.3 The line of descent should be between the rows of windows.

6.4 Upon reaching area of safety quickly open the rappel hook gate and remove the rope, allowing the next member to slide if needed.

7. SINGLE SLIDE - ROPE DEPLOYED

Note: Evolution 35; sections 1. to 7.13 apply here. After lowering all members and/or civilians to area of safe refuge, the lowering member shall perform a single slide to an area of safe refuge.

7.1 After lowering all members and/or civilians to an area of safe refuge, place the DCD in the LOCKED position.

7.2 Right hand slides back upon the rope approximately three feet (36”), double rope upon itself creating a bight approximately twenty-four inches (24”). Push the bight up thru the red carabineer located on the DCD. Tie an overhand knot on the lowering end of the rope that has gone over the edge, preventing accidental lowering while single slide is being performed. (Figures 16, 17, 18, 19)

7.3 With left hand on rope, walk towards edge, taking up slack, allowing rope to slide through gloved left hand.

7.4 **Note:** Sections 3.13 to 6.4 apply here.

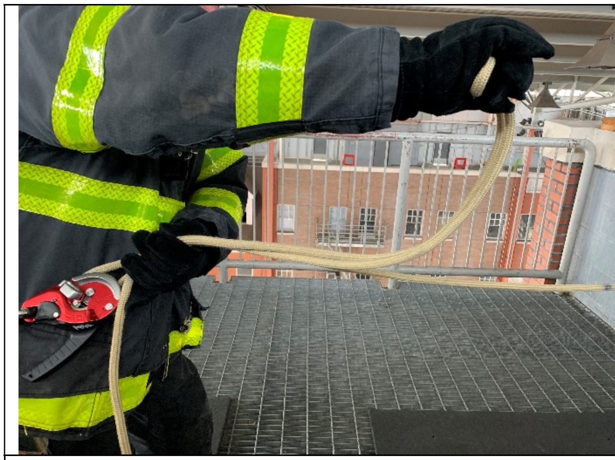

Figure 16

Figure 17

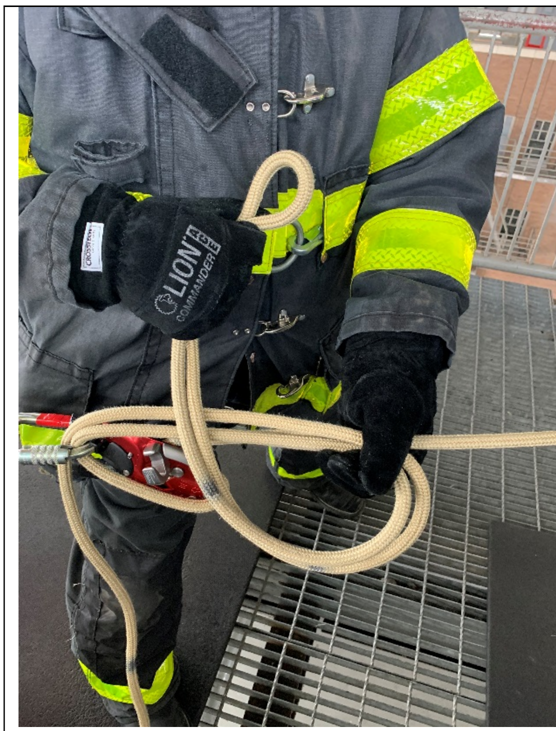

Figure 18

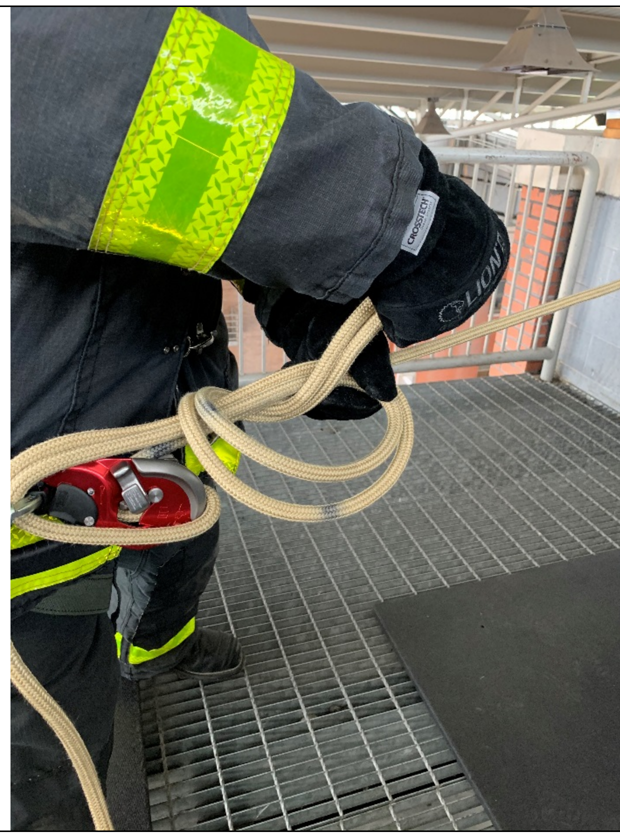

Figure 19

8. NOTES

8.1 The imaginary line from the substantial object to the planned point of descent should be as close to perpendicular as possible to the roof's edge. This will avoid an acute angle of the rope, which would result in the rope sliding along the roof's edge when weight is placed on it.

8.2 The substantial object must be carefully selected. There are many objects of questionable integrity that should never be used: e.g., soil pipe vents, TV antennae masts, etc. Any chimney or other object chosen should be quickly examined for soundness and any sharp edges.

8.2.1 When using a vertical object, such as a chimney, allow the rope to drop to the base, close to the roof. The object should be at optimum strength at this point.

8.2.2 When tying a tensionless-hitch, you must ensure there is no movement (no tension) of the carabineer. The number of wraps depends upon; diameter of the substantial object, surface tension, and squared angles.

8.3 After making the required turns of rope around the rappel hook, do not release the right hand from the rope for any reason. Should you slip or fall from a parapet or roof while preparing to dismount, you will still have control and will not "free fall".

8.4 Under smoky or unsure conditions it might be safer to crawl to the roof's edge.

8.5 A sharp edge could compromise the rope, you **MUST** remove the anti-chafing device from the carrying case and apply to rope draping over edge prior to performing a single slide.

8.6 If multiple members are endangered and the use of the KLSR is required, consideration may be given to lowering members using the KLSR and allowing the last member to perform a single slide to an area of safe refuge.

BY ORDER OF THE FIRE COMMISSIONER AND CHIEF OF DEPARTMENT

APPENDIX
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INTRO TO LADDER COMPANY TOOLS

The duties of a Ladder Company include, but are not limited to, forcible entry, search & rescue, ventilation, overhauling and laddering. The following is a list of tools carried by ladder companies to accomplish these duties:

HOOKS

- Come in various sizes: 6, 10, 12, 15 or 20 feet. The six foot hook is the most commonly used. Hooks are used mostly for pulling ceilings and opening walls. After a roof cut has been made hooks may also be used to push down or pull up these openings.
- There are two different types of hooks:

1. Wooden with a pike end

2. Halligan hook with the shaft made of metal or fiberglass

- When carrying any hook, care must be taken to avoid injuring people in front or behind. Hooks should be carried with the hook end straight up, to the rear and close to the body.

NOTE: **The *__Wooden Hook__* with a pike end is referred to as *"__6 ft Hook__"*.**

The *__Halligan Hook__* will always be referred to as *"__Halligan Hook__"*.

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AXE:

♦ The FDNY uses a flat head axe.

Flat Head Axe

♦ The flat head axe is usually carried by the Forcible Entry Firefighter, married together with the halligan tool.

HALLIGAN TOOL

♦ One of the most versatile tools of the FDNY arsenal.

♦ Usually carried by the Forcible Entry Firefighter, married together with a flat head axe.

♦ Roof & Outside Vent Firefighters carry the halligan with a flat head axe, maul or halligan hook.

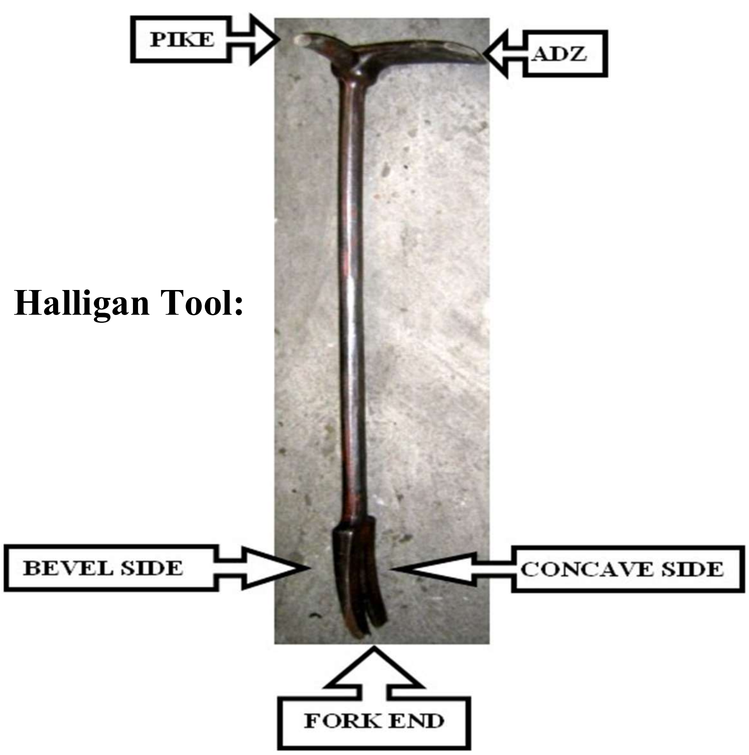
♦ To marry the halligan with the axe:

○ Place blade of the axe between the teeth of the halligan fork.

○ Handle of the axe should be parallel to & resting between the adz and pike of the halligan.

○ These two tools make up, what is commonly referred to as: a "**Set of Irons**."

Halligan Tool:



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MISCELLANEOUS HAND TOOLS

K-TOOL:

1. Mortise and rim cylinder puller.
2. Used to pull out majority of lock cylinders.
3. This tool is used in conjunction with the axe and halligan.
   a. Force working edge of K-Tool behind cylinder and ring.
   b. Tap with axe until K-Tool takes a bite into body of cylinder.
   c. Using the Halligan, pry cylinder out of door.
   d. Once cylinder is removed, use a key tool in the hole to move the locking bolt to open position.

.

BOLT CUTTERS

- Used for cutting bolts, locks, metal cables, etc.
- Should not be used on case hardened locks.

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SHOVELS

Used for overhauling, clearing floors of plaster, sheetrock, etc.

WIRE CUTTER

A tool with insulated handles and used for cutting electrical wires. Rubber insulated gloves must be worn when using wire cutters.

MAUL

The maul (sledge hammer) has many different uses, e.g. with a halligan for force entry, breaking concrete covers over gas curb valves, breaching cinder block walls, etc.

DUCK BILL

Its long, sharp pointed pick may be used for forcing padlocks.

HYDRANT MAIN SHUT OFF KEY

Used to close the valve of the main, supplying water to a hydrant.

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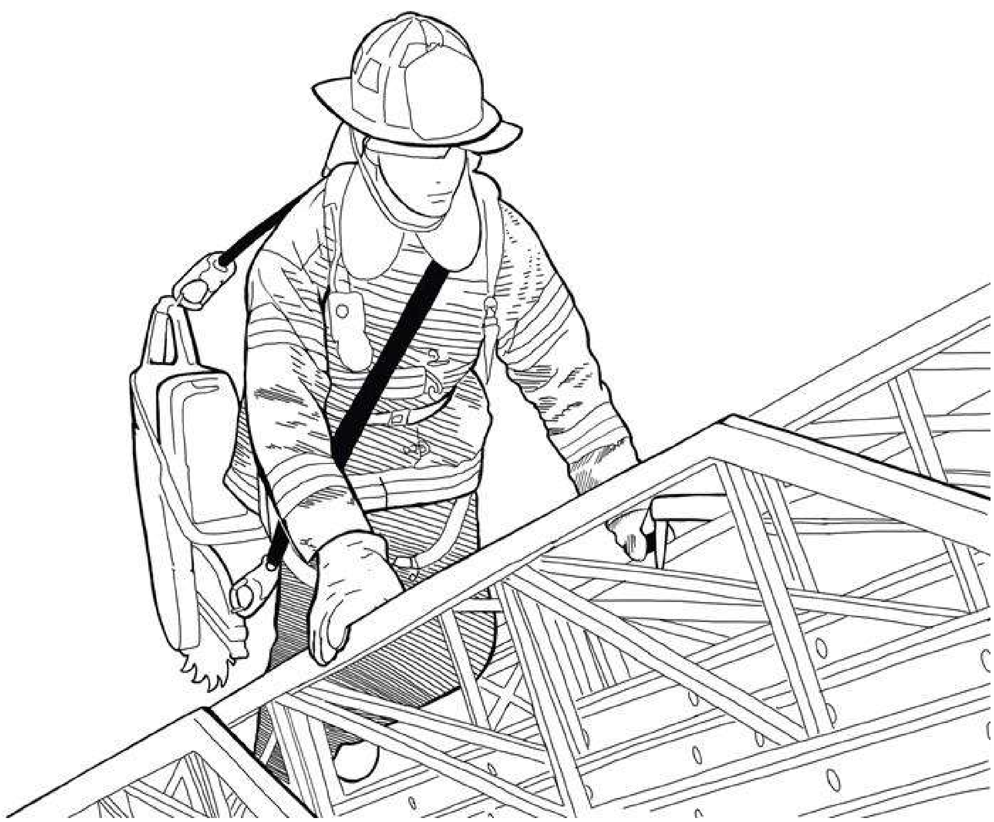
Aerial Ladder Climb with Roof Saw Removal and Dismount

Inspection of the sling for serviceability must be a normal part of saw maintenance. Check the sling for any damage (ex. tears, rips, fraying, fuel saturation, etc.). When a sling is deemed unserviceable it is to be placed “Out of Service” and a replacement obtained (by requisition) from the Fire Tools and Equipment Unit

- Each Roof saw is equipped with a carrying sling.
- When the saw is stored on apparatus, attach sling so that it is ready to be carried.
- Each member should adjust the saw to their own height, taking into account for the gear to be worn during practical applications. This sizing should be done when the member receives their positional assignment for the tour.



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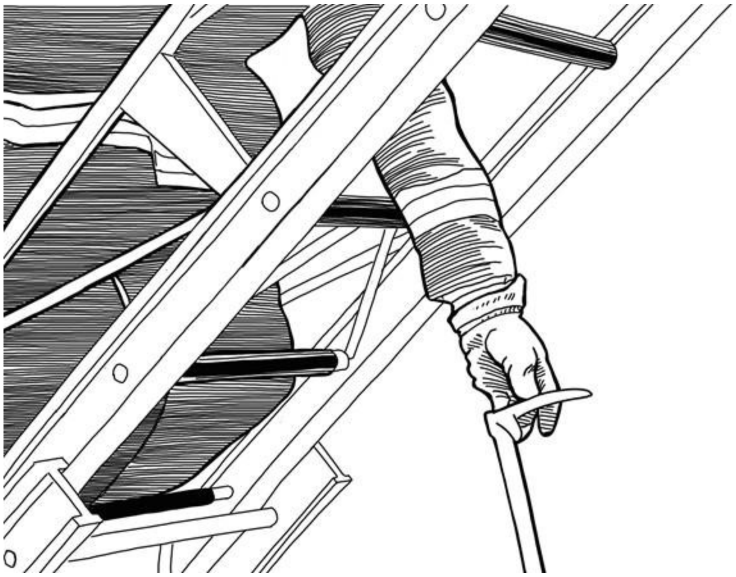
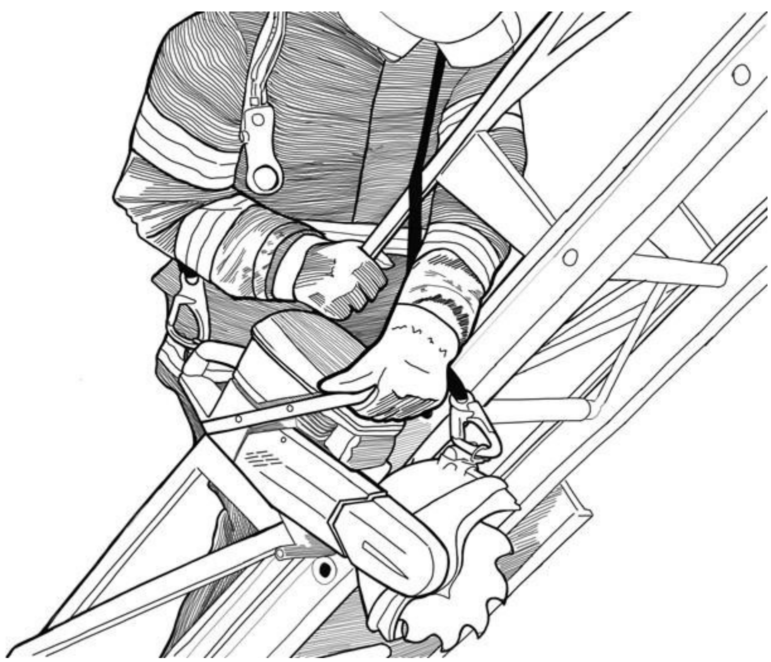
Dismounting Aerial ladder with Power Saw:



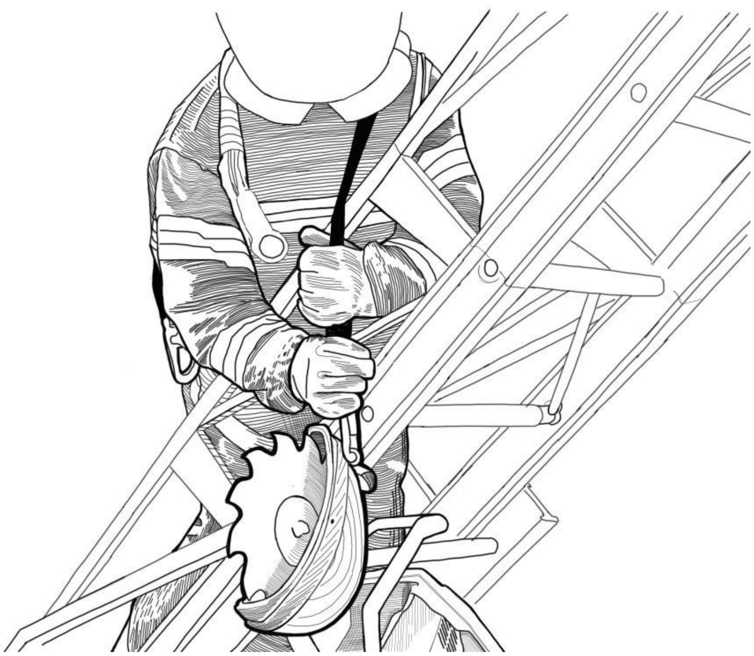
- After dropping hand tools on roof the Firefighter shifts body to the right side of the aerial ladder and lets the saw hang over the outside of the right rail

- The firefighter maintains grip of aerial ladder with the right hand and places the left arm through the right rail of the aerial ladder and grasps the portable power saw handle in an "arm lock".



- Once the left “arm Lock” has secured the firefighter and the saw the firefighter uses their hand to release the double action carabineer from the rear of the throttle grip handle of the saw.

• The firefighter returns their right hand to the portable power saw handle and grasps the saw sling with the left hand where it is attached to the saw on the blade guard and slowly lowers the saw to the roof by slowly passing the saw harness through both hands.



• Firefighter properly dismounts aerial ladder.

• While using this procedure the firefighter safely maintains contact with the aerial ladder at all times.

Note: The Sling Must Be Removed From The Saw Before Starting The Saw.

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Probationary Firefighters Manual

PORTABLE FIRE EXTINGUISHERS

Portable fire extinguishers are classified according to their intended use on the four classes of fires (A, B, C, and D). In addition to the letter classification, extinguishers also receive a numerical rating. The number preceding the letter designates the potential size fire the extinguisher can be expected to extinguish (Figure 2-1).

Extinguishers suitable for more than one class of fire should be identified by multiples of the symbols previously described. Most present-day extinguishers have these markings on them when they are purchased. If a new extinguisher is not properly marked, the seller should be requested to supply the proper decals.

The "picture-symbol" labeling system now in use is designed to make the selection of fire extinguishers easier and their use more effective and safe. The system also emphasizes when *not* to use an extinguisher on certain types of fires. Examples of this labeling system are shown in Figures 2-2 and 2-3.

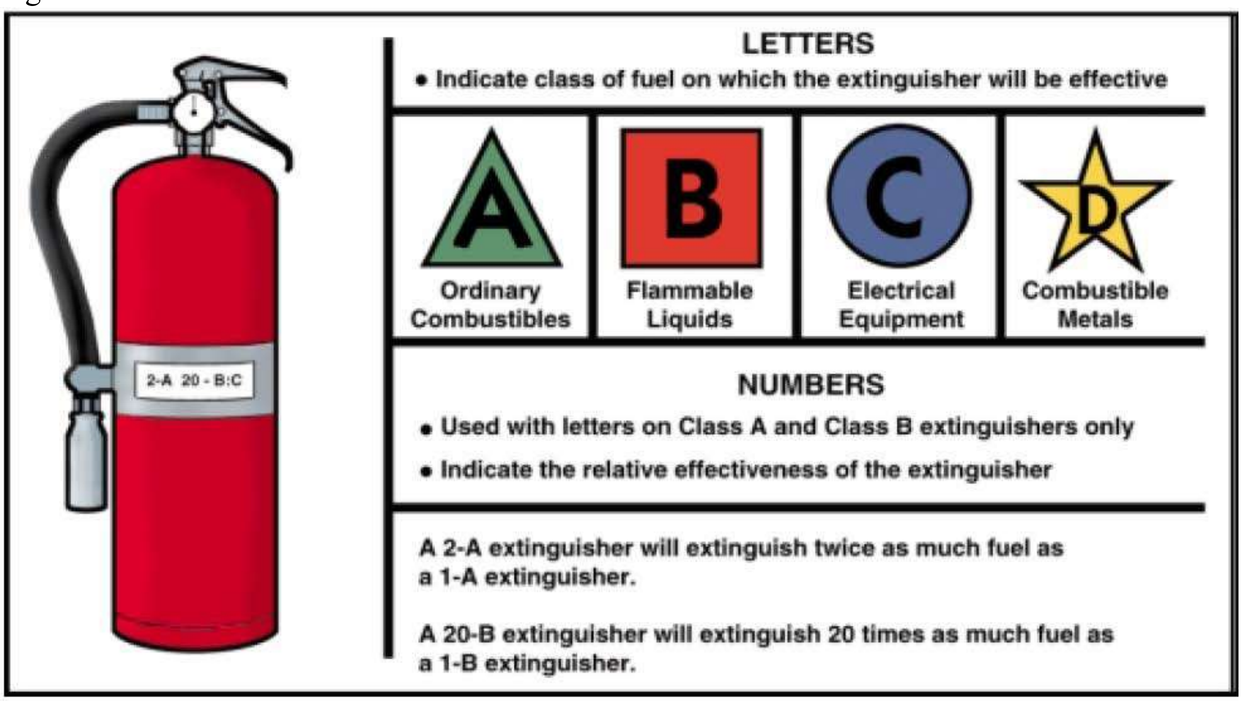

Figure 2-1

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Figure 2-2

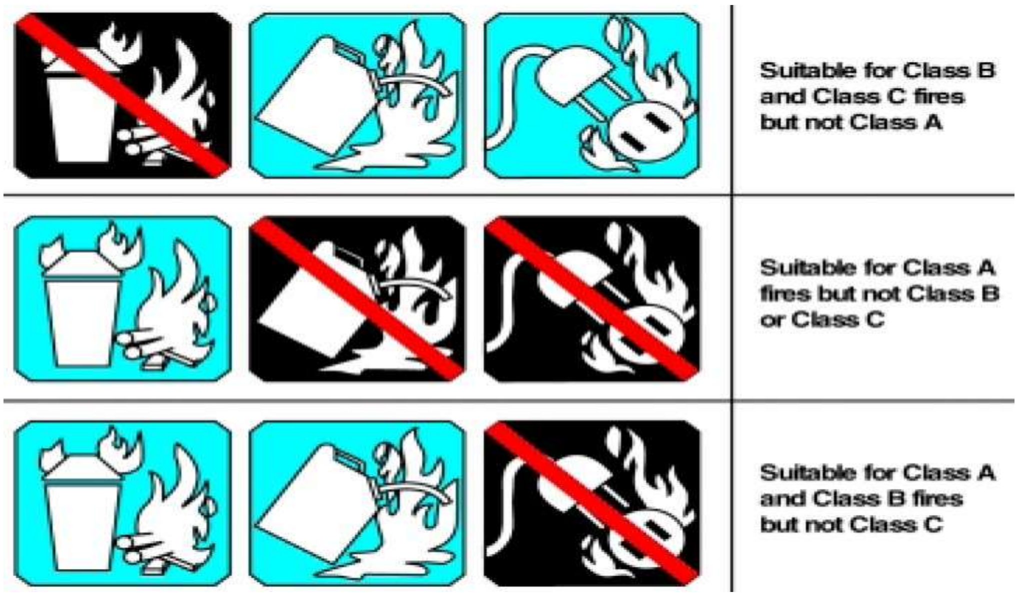


Figure 2-3

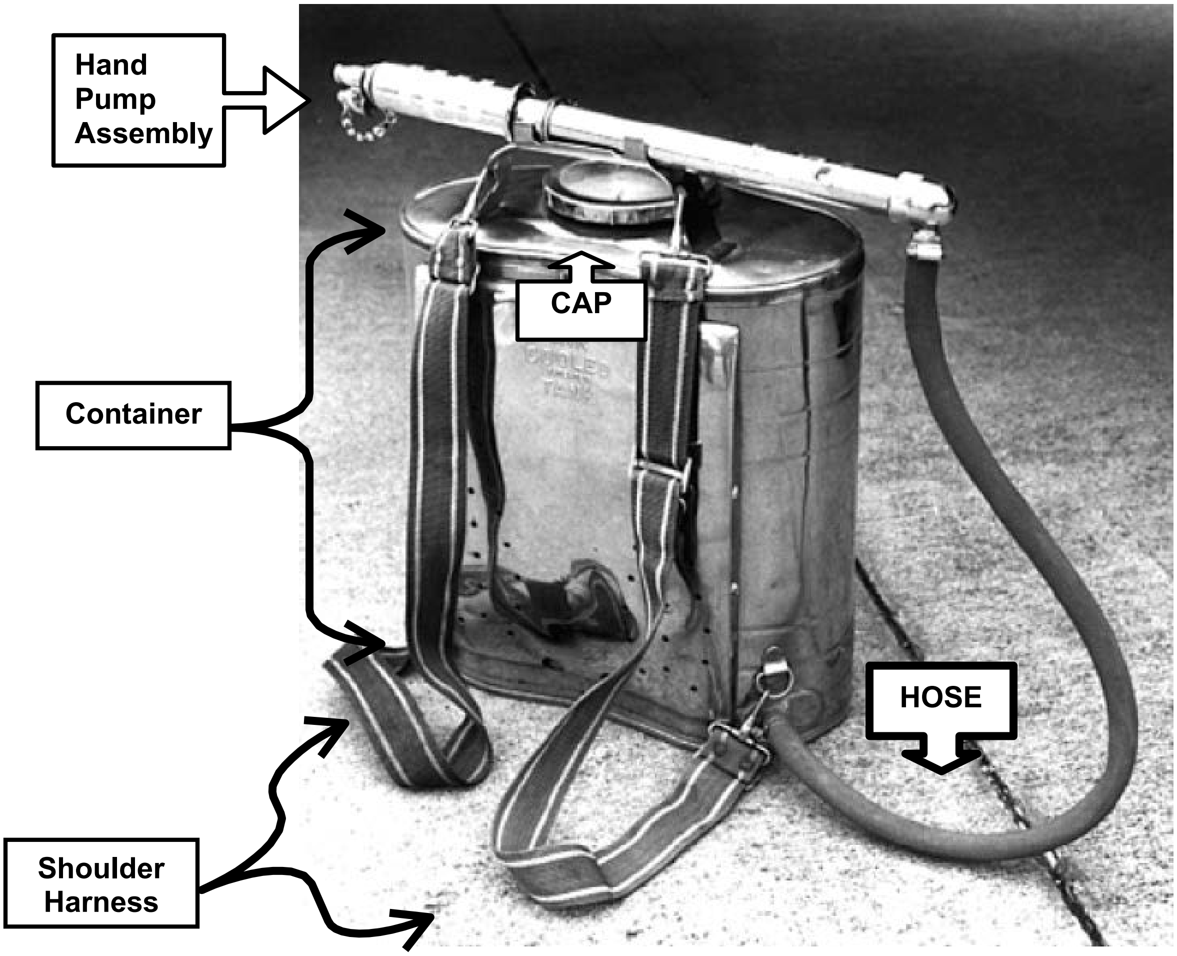
Class A Fire Class A fires, listed under the green pyramid involve such things as wood, cloth, paper, rubber and many plastics. Generally, these ordinary combustibles require cooling with water or certain dry chemicals that also retard combustion.

Class B Fire Class B fires, listed under the red square involve flammable liquids, flammable gases, greases. Exclusion of air by smothering, or inhibiting the combustible chain reaction with a chemical are the most efficient methods of extinguishment for Class B fires,

Class C Fire Class C fires, listed under the blue circle, involve live electrical equipment, and for safety reasons, a non-conductive agent must be used to extinguish these fires.

Class D Fire Class D fires, listed under the yellow star, involve burning metals such as magnesium, sodium, or potassium. These fires require an extinguishing agent that does not react with the burning metal to give off dangerous gases or cause explosions

PUMP TANK EXTINGUISHER



Extinguishing Agent: Water

Use: Class "A" fires

Capacity: 5 Gallons

Range: Variable (30 to 40 feet max.)

Pressure Source: Hand pumping action of operator

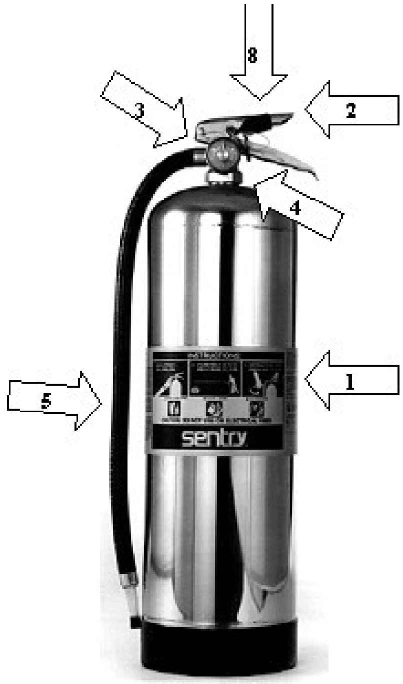
Recharge: After Use

Freeze: Yes

Maintenance: Wash, flush, check hose connection, condition of hose, nozzles, harness, operating parts. Place drop of oil on piston rod packing, keep air vent in cap open.

To Operate: Place on back, grasp pump assembly, operate hand pump assembly while directing stream at base of fire.

PRESSURIZED WATER EXTINGUISHER



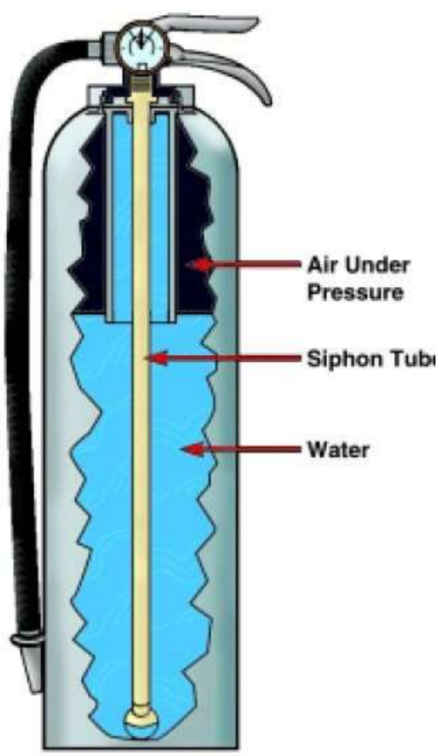
1. Container or Shell
2. Discharge Lever
3. Pressure Gauge
4. Head Assembly
5. Hose & Nozzle
6. Siphon Tube
7. Bottom Screen
8. Locking Ring Pin
9. Air Valve

Extinguishing Agent:	Water (Cools and saturates)
Use:	Class "A" fires
Capacity:	2½ gallons
Range:	35'to 40'
Expelled:	55 seconds
Pressure Source:	Compressed air (100 psi)
Examine:	**Each Tour, i.e.9x6 & 6x9**

Recharged:
After use

- See detailed recharging instructions on the following pages

(Always follow directions of manufacturer on label; some models are different.)

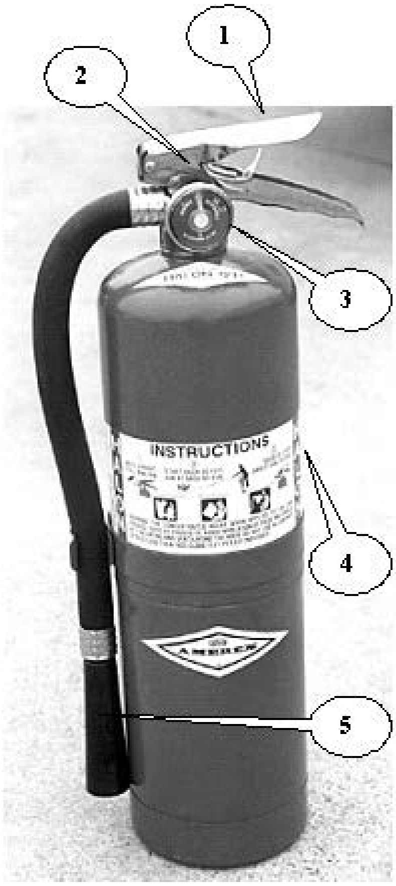


Freeze:	Yes
Electricity:	Conductor

Maintenance:
Wash flush head and container after use. Examine container for rust etc. Check head assembly, strainer, gasket, hose coupling, hose for brittleness, nozzle clogged, head coupled properly. After recharging check gauge reading and for leakage. If hydrostatic test date is greater than 5 years, extinguisher must be placed out of service.

To Operate:
Hold upright, pull pin, grasp hose, squeeze lever, direct stream at base of fire.

DRY CHEMICAL EXTINGUISHER



1. Discharge Lever
2. Locking ring pin
3. Pressure gauge
4. Container or shell
5. Nozzle

Extinguishing Agent: Bicarbonate of soda with drying additive to prevent absorption of moisture. Has some cooling, smothering and radiation shielding effect on fire.

Use: Class B fires
Class C fires – non-conductor
Class A fire – small surface fire

Capacity: Classified according to weight in pounds of dry chemicals

Range: For 5 & 10lb about 4 to 12 feet will operate at minus - 40 degrees
Pressure Source: Compressed air at 150 psi.

Examine: Each Tour, i.e. 9 x 6 & 6 x 9

Recharge: After use, or leakage of air below operable range
Discharge Time: Varies according to capacity of extinguisher. For capacities of5 lb. to 10 lb. about 10 - 16 seconds

Maintenance: Examine for damage, leakage of air at least every six months and tag it.

To Operate: Pull pin, squeeze lever, direct discharge at base of fire. On flammable liquid fires, discharge as directed at the near side of the fire, moving the nozzle rapidly side to side and gradually progressing forward as the flames are extinguished.

PURPLE K EXTINGUISHER

Extinguishing Agent: Potassium bicarbonate base dry chemical

Use: Class B fires. Particularly effective in combating methanol fires.

Capacity: 27 lbs of extinguishing agent.
Total weight: 52 lbs
Range: 19'- 20'

Discharge Time: 11 seconds

Examine: Each Tour, i.e. 9 x 6 & 6 x 9

Recharge: Send to Tech Services with RT-2 attached for replacement
Temp. Restrictions: Can be used between – 40F and +120F

Maintenance: Thoroughly examine once a month for physical damage (corrosion, etc.) If defective, send to Tech Services with RT-2 for replacement

Operation:

1. Remove ring pin and hose
2. Squeeze handle
3. Direct stream at base of flames using a side to side motion. Hold extinguisher upright.

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