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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**  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.

**Decay Stage**  The stage of fire development within a structure characterized by either a decrease in the fuel load or available oxygen 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 after the search team enters without the protection of a hoseline. 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 also 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.

**Fire Growth Potential**  The potential size or intensity of a fire based on the available fuel load.

**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.

**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 fire gases are moving towards the low pressure areas, the energy of the fire is pulling in additional oxygen from the low pressure areas. Based on varying building design and the available ventilation openings (doors, windows, etc.), there may be several 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, heat and smoke toward their position.
### Flow Path Control
The tactic of controlling or closing ventilation points which will:
- Limit additional oxygen into the space thereby limiting fire development, heat release rate and smoke production.
- Control the movement of the heat and smoke conditions out of the fire area to the exterior and to other areas within the building.

### Fuel Limited Fire
A fire 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 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 toward 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.

### Legacy Fire
Fires that primarily consist of natural fiber contents such as wood, wools and cottons. These fires have a relatively low heat release rate when compared to hydrocarbon based products.
Note: It was with these Legacy fires that the FDNY developed tactical fire fighting SOP’s during the late 1960’s.

### Modern Content Fire
Fires that involve hydrocarbon and synthetic based contents such as foam rubber, nylon, rayon and polypropylene. Modern fires have a relatively high heat release rate when compared to the natural fiber products found in legacy fires. Modern fires rapidly react to ventilation and the in-flow of additional oxygen.
<table>
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<th>Term</th>
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<tr>
<td>Pyrolysis</td>
<td>The transformation of materials into their basic compound when subjected to heat. Contents will continue to off-gas and add to the flammable fuel load within the compartment as long as the material is subjected to elevated temperatures.</td>
</tr>
<tr>
<td>Rollover</td>
<td>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.</td>
</tr>
<tr>
<td>Smoke</td>
<td>The combination of airborne solid particulates, liquid particulates and gases emitted when a material undergoes pyrolysis or combustion. Smoke is a heated fuel source. Smoke is a toxic mixture that contains numerous poisonous gases such as carbon monoxide, hydrogen cyanide and phosgene.</td>
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<td>Situational Awareness</td>
<td>The on-going activity of assessing what is going on around you during the complex and dynamic environment of a fire incident. Your operations will be more effective and safer by continually observing your surroundings, communicating conditions to other members and monitoring handie-talkie transmissions.</td>
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<tr>
<td>Tenability</td>
<td>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.</td>
</tr>
<tr>
<td>Ventilation</td>
<td>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.</td>
</tr>
<tr>
<td>Ventilation Induced Flashover</td>
<td>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.</td>
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### 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.

### 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 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, 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.
Note: This term replaces the former ventilation term, “Vent for 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.
Note: This term replaces the former ventilation term “Vent for Life.”

### Ventilation Limited Fire
A fire in which the heat release rate and fire growth are regulated by the available oxygen within the space.

### 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.
1. INTRODUCTION

1.1 Each fire incident the Department responds to requires various tactics to bring the incident under control. These tactics include search, hoseline operation, and ventilation procedures. These tactics are reliant upon each other in order to achieve a successful outcome.

1.2 When ventilation tactics are controlled and communicated between interior and exterior members and coordinated by the Ladder Company Officer inside the fire area to be vented, we dramatically increase the survivability of trapped civilians. In addition, this increases the safety of our members and improves 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. Some fire dynamic concepts to understand regarding fire development are:

2.1.1 Modern content fires are largely comprised of hydrocarbons and synthetics which rapidly consume the available oxygen in the air as they burn at a greater rate than legacy content fires.

2.1.2 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 limit the amount of available oxygen within the fire area.

2.1.3 Modern content fires enter an early decay stage due to the limited available oxygen, producing heavy smoke and varying heat conditions.

2.1.4 The needed oxygen to support rapid fire expansion can be provided 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 tragic implications for both civilians and operating members.
2.1.5 The traditional fire development curve follows the below stages. (Figure 1)
- Incipient
- Growth
- Fully developed
- Decay

2.1.6 The progression of modern content fires differs from the traditional fire development curve as follows. (Figure 2)
- Incipient stage
- A rapid Growth stage that consumes the available oxygen very quickly.
- Since modern content fires **rapidly** consume the available oxygen within the fire area, they enter into an earlier oxygen limited Decay stage when compared to legacy fires, and will remain in the Decay stage if no additional oxygen is added to the fire area.
- When units encounter this earlier decay stage, they shall control the ventilation of windows and maintain control of the door to the fire area. These actions will limit the in-flow of additional air into the space so as not to provide additional oxygen to the fire. The fire will pull the in-flow of any additional air towards the fire area. Wind blowing in towards a ventilation opening will increase the air flow towards 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.
TRADITIONAL FIRE BEHAVIOR

Fully Developed

Growth

Incipient

Time

Temperatur
3. CONTRIBUTING FACTORS AFFECTING VENTILATION TACTICS

3.1 Over the past years, the fire service has experienced a series of profound changes that collectively create a fireground of increased danger. 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, it can often make it difficult to detect deteriorating and unsafe conditions. This can result 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. The 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 slow down, operate in a controlled manner, continually assess conditions of the incident, and communicate within and between units.

- The use of Thermal Imaging Cameras (TIC) is critical at modern fires due to the heavy smoke conditions produced by modern fires. Units equipped with TIC’s must carry and use them at all structural fires. Maintaining situational awareness in the fire area is critical to safety and survival.

- Hydraulic forcible entry tools allow quicker access to the fire area resulting in an increase in the time between the Ladder Company gaining access to the fire area and the arrival of the Engine Company with a charged hoseline. Prior to the use of hydraulic forcible entry tools it was common for a hoseline to be in position 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 occupancy.

- The above factors coupled with the change in the typical fuel load make it critical to control, communicate, and coordinate our ventilation tactics with interior operations. Proper communications will increase the situational awareness and safety 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. Part of this initial size-up includes 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.
- Amount of fire venting from the building, including when fire or smoke is not venting out 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.
- 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. For example when heavy smoke venting from an opening changes to visible fire.
- Modern fires have affected the importance of certain fire indicators observed during size-up which impact safety and operations:
  - Legacy content fires develop slower, but have enough oxygen to support continuous combustion and create enough pressure to force smoke from the building, including around doors and windows. The smoke being pushed out of the fire compartment by the pressure of the fire clearly indicates the presence of a fire.
  - Modern content fires develop rapidly, consuming the available oxygen to support combustion causing transition into an earlier decay stage. 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 no longer accurate. Modern content fires require the control of ventilation tactics to prevent the potential escalation of interior fire conditions.
  - Flames venting from the windows of a legacy content fire, besides identifying the location of the fire, usually facilitated extinguishment of the fire since the fire was already vented. With modern content fires, heavy flames out the window are usually an indicator of high heat and smoke conditions within the interior, including areas remote from the fire. If a fire is already vented on arrival we must still control and coordinate all ventilation tactics.
  - The more that venting flames fill the 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 the 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, 10-84 Box 1628, 10-75, we have fire out 2 windows on the 3rd floor of a 5 story NFP MD. 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 and the need for an alternate attack strategy.

- **Interior Operations Size-up** “L-26 to Battalion 12, 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.
  
  - Upon hearing this transmission the member on the roof can initiate vertical ventilation tactics.

**Note:** The initial vertical ventilation must be coordinated with door control of the fire area. If the roof firefighter does not hear the above transmission, he/she must confirm with the Ladder Company Officer that the door is being controlled on the fire floor before vertical ventilation can begin.
Fire Floor Operations

“E-58 to L-26, 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.

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 re-group back at the entrance door prior to re-opening the door for hoseline advancement. Members should then advance behind the charged hoseline.

Initial Roof Operations

“L-102 Roof to L-102, I’m in position to vent.”

This transmission indicates that the Roof Firefighter is ready to begin initial roof ventilation. The Ladder Company Officer inside the fire area to be vented will give approval if the inside team has control of the fire apartment door.

Post Initial Vertical Ventilation Size-up

“L-165 Roof to L-165, 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.”

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.
6. **VENTILATION TACTICS**

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 In order to be effective, ventilation tactics must be properly controlled, communicated, and coordinated.

6.2 At structural fires ventilation tactics are used to ventilate the building both horizontally and vertically. When these tactics are properly coordinated, the following can be accomplished.

- A dramatic 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.
- Facilitate 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 between the seat of the fire and the ventilation points. 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 window(s) remote from your location. Where door control was lost on the fire floor, department members have been severely or fatally injured.

7. **HORIZONTAL VENTILATION**

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 door and window openings until a charged hoseline is advancing **within** the fire area and extinguishing the fire. The benefits of controlling and properly performing horizontal ventilation are:

- Limits the in-flow of additional oxygen, reducing the potential for increased severity of interior conditions.
- Improves conditions within hallways and stairwells by controlling the flow path movement of heat and smoke from the immediate fire area.
- Maintains tenability within the fire area, increasing the time available to locate the fire and search for victims.
- Permits a rapid advance of the attack hoseline within the immediate fire area allowing for quicker extinguishment.
- Reduces the danger of heat and flame passing over or around the attack hoseline.
• Reduces the potential for ventilation induced flashover in areas where members are conducting operations.

• Reduces the potential for auto exposure.

8. HORIZONTAL VENTILATION OPERATIONS

8.1 Interior Operations: All interior and exterior horizontal ventilation tactics must be controlled, communicated, coordinated and approved 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 The Ladder Company Officer inside the fire area shall:

• Ensure door control at the fire area entrance.

• Maintain situational awareness by monitoring handie-talkie transmissions.

• Evaluate information from members operating on the exterior. (Such as life hazards, ventilation profile, bars on windows).

• Evaluate wind conditions that could impact interior fire conditions.

• Communicate the location of the fire, fire conditions or difficulty finding the fire to the Engine Officer and IC.

• Determine the location of the hoseline and any delays or difficulties with the stretch.

• If there are water problems, the Ladder Company Officer must perform a risk assessment and operate accordingly.

• Coordinate search operations with the advance of the hoseline.

• Be aware of all potential ventilation points within the structure or fire area. Ventilation points that are behind your operating position may place you in a flow path. You need to control flow path formation until there is a charged hoseline advancing in the fire area to extinguish the fire.

• Continually assess the volume of smoke and heat conditions in the fire area utilizing the TIC to enhance the initial size-up. If the officer encounters a high heat and smoke condition, he/she shall immediately exit and isolate the area. Ventilation will not sufficiently cool or relieve these conditions. The horizontal ventilation of window(s) can cause these fire conditions to rapidly expand placing members in an untenable environment. A charged hoseline is needed to provide the required cooling of the area or extinguishment of the fire.
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:

- While getting into their operating position conduct a size-up and communicate findings to the Ladder Company Officer (such as life hazard, ventilation profile, bars on windows, wind conditions).
- 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.

**Note:** Additional responsibilities of members performing horizontal ventilation are addressed in the various Firefighting Procedures volumes/books.

9. **VERTICAL VENTILATION**

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. This continuous smoke generation of modern fires will quickly overwhelm available exhaust ventilation points and will not provide the intended or expected removal of the smoke and heat conditions from the interior as in the past. 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 will draw the 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 until the arrival of the charged hoseline.
- Relieve the upper portions of the building of heat, smoke and fire gases permitting a thorough examination of the hallways for potential victims. Members will still require full PPE, use of the SCBA and TIC to effectively conduct these searches.
10. VERTICAL VENTILATION OPERATIONS

10.1 Interior Operations: Initial vertical ventilation tactics must be communicated to and coordinated by the Ladder Company Officer operating inside the fire area to be vented.

Note: Initial vertical ventilation is the venting of bulkheads, scuttles or skylights over stairwells and hallways.

10.1.1 The Ladder Company Officer inside the fire area shall:

• Establish door control of the fire area.

• Order initial vertical ventilation once door control is assured.

10.2 Exterior Operations: Initial vertical ventilation tactics must be communicated to and coordinated by the Ladder Company Officer operating inside the fire area to be vented.

Note: Initial vertical ventilation is the venting of bulkheads, scuttles or skylights over stairwells and hallways.

10.2.1 Members performing vertical ventilation shall:

• Conduct an initial size-up of the incident, including a ventilation profile and monitoring of handie-talkie transmissions to improve situational awareness.

• Upon arrival on the roof, 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).

• No vertical ventilation shall be performed unless the roof firefighter directly communicates with and receives approval from the Ladder Company Officer. Note: The roof firefighter may perform vertical ventilation without direct communication upon hearing radio transmissions that the interior team has door control on the fire floor, or a charged hoseline is advancing into the fire apartment.

• After initial vertical ventilation is completed, perform additional venting as needed dependent upon fire conditions.

• Any change in fire conditions caused by vertical ventilation tactics must be communicated to 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. Once a building is horizontally ventilated, the time for effective extinguishment is limited since the fire will rapidly expand.

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 the hoseline placement and must coordinate their actions to prevent premature ventilation. Premature ventilation can precipitate fire extension, endangering occupants and members.

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, “E-310 to Battalion 58, we are knocking down visible fire.

The two transmissions above are an indication to the exterior member to prepare to conduct Ventilation for Extinguishment. Before venting the window(s) the member must communicate with and receive approval from 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: The approval to perform this horizontal Ventilation for Extinguishment tactic only applies to the window(s) in the immediate fire area 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 lessen 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 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 operating inside the fire area to be vented as the ventilation may also negatively impact the members operating in the interior.

12.2 When entering an IDLH, all members must comply with the provisions of Firefighting Procedures, Volume 4, Book 1, Chapter 1, Safety Team, Section 1.2 which states:

> When a fire progresses past the incipient stage, the fire area is 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 must be able to contact a handie-talkie equipped member of the safety team outside of the IDLH atmosphere.

12.3 The only exception to this Federally mandated standard for the teaming of members, is when a known life hazard is found and immediate action could prevent the loss of life. This does not apply to standard search and rescue procedures.

12.3.1 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.

**Note:** In all incidents of such individual action, the Incident Commander shall forward a report detailing the full particulars to the Chief of Operations. A thorough review of each of these incidents will be conducted.

12.4 Members of the Department must continuously perform a risk assessment when operating at incidents. It is acceptable to take significant risk for a known life hazard and adjust our standard operating procedures accordingly. In the absence of a known life hazard, standard search and operational procedures will be utilized to locate any possible victims. What may appear to be a routine fire operation at first, can quickly transition into a major incident with little or no warning. Unapproved and uncoordinated ventilation tactics have been a factor at numerous incidents resulting in serious or fatal injuries to members as they searched for the location of the fire and possible victims.
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 toward 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 the 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 your position.

- Once a decision has been made and approval has been granted to enter, the member should clear out the window for access and be cognizant that a new flow path has been created.

- Upon completion of clearing the window and before entering, 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. If a victim is found immediately transmit radio code 10-45, include your location and planned exit route. 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.

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. **CONCLUSION**

Modern day fires have been scientifically proven to be different from the fires of years past. The characteristics of modern furnishings coupled with the energy efficient construction being utilized today, present new challenges to the Department. Continuous training, education and evaluation of our tactics and procedures will allow us to meet these challenges in the safest most effective manner possible.