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Building Safe: Common Safety Violations in Excavation, Superstructure & Scaffolding Work

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Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.



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Course Description

- This course examines common construction safety violations that are issued for Excavations, Superstructure, and Scaffold Systems and the reasons why.
- This course will explain to contractors and design professionals how specific safety violations relate to sections of the Building Code and construction safety.
- This course will identify hazards through examples of both good and bad construction practices.



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Learning Objectives

At the conclusion of this training participants will be able to:

1. Discuss and use photos to illustrate risks on a construction job site for excavations and will be able to identify hazards to divert potential accident conditions.
2. Discuss risks on a construction job site for superstructure and will be able to identify hazards to divert potential accident conditions, thereby ensuring the safety of the workers and the neighboring buildings and people.
3. Analyze common issues on a construction job site for scaffolding and will be able to identify hazards in order to mitigate safety concerns on a construction project.
4. Be familiarized and be able to identify construction safety requirements in 2014 NYC Building Code Chapter 33.



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Excavation



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Construction Fencing



Construction Fencing



Construction Fences (BC 3307.7)

3307.7 Fences. All sites where a new building is being constructed, or a building is being demolished to grade, shall be enclosed with a fence. Fences shall also be installed to fully or partially enclose sites, as necessary, where there exists an open excavation, an unenclosed portion of a building accessible at grade, or other hazard to the public. Such fences shall be at least 8 feet (2438 mm) high, built solid for their entire length out of wood or other suitable material, and shall be returned at the ends to the extent necessary to effectively close off the site.

Exceptions: The Commissioner may approve the use of a chain link fence to:

1. Secure a site where work has been interrupted or abandoned and discontinued, and a registered design professional has certified that all construction or demolition equipment and material that pose a hazard to the safety of the public and property have been removed from the site or safely secured. Prior to the resumption of work, the chain link fence shall be replaced by a solid fence meeting the requirements of this section.
2. Secure portions of a site where a one- two- or three-family building, or a commercial building 40 feet (12 192 mm) or less in height, is being constructed or demolished and such building is setback at least 15 feet (4572 mm) from sidewalks or spaces accessible to the public and 5 feet (1524 mm) from adjoining buildings or structures.



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Construction Fence Design (BC 3307.7.5)

3307.7.5 Design of fences. Fence installations shall be designed by a registered design professional. The effect of wind on the fence shall be considered in the design in accordance with Chapter 16.

Exceptions:

1. Fences installed in connection with the construction or demolition of a one- two- or three-family building.
2. Fences that conform to a standard design approved by the commissioner provided the fence is installed at the site in accordance with the standard design.



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Guardrails



Guardrails



Excavation Guardrail (BC 3304.4)

3304.4.4 Guardrail system. All open edges of an excavation that are 6 feet (1829 mm) or greater in depth shall be protected by a guardrail system meeting the requirements of Sections 3308.7.1 through 3308.7.5, or by a solid enclosure at least 3 feet 6 inches (1067 mm) high. For the purpose of a guardrail system installed in accordance with this section to protect the open edge of an excavation, the term “floor” in Sections 3308.7.1 through 3308.7.5 shall mean “ground.”



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Guardrail Specifications (BC 3308.7.2)

3308.7.2 Height of railings and toeboard. Toprails, midrails, and toeboards shall be located as follows:

1. The top of the toprail shall be located at a height of 39 to 45 inches (991 and 1143 mm) above the floor.
2. The midrail shall be located at a height approximately midway between the toprail and the floor, or where more than one midrail is utilized, each shall be located equidistant from each other, the floor, and the toprail.
3. The toeboard shall be at least 3 ½ inches (89 mm) high and shall be installed so that there is not more than a ¼ inch (6 mm) gap between the floor and the bottom of the toeboard.

Exception: When conditions warrant, the height of the toprail may exceed the 45-inch (1143 mm) height provided additional midrails are installed so that there is no vertical gap larger than 24 inches (610 mm) between any toeboard, midrail, or toprail.



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Guardrail Specifications: Material and Dimensions (BC 3308.7.3)

3308.7.3 Dimensions and materials. Toprails, midrails, toeboards, and posts shall have the following dimensions and be constructed out of the following materials:

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Exceptions:

1. Guardrail systems designed by a registered design professional capable of withstanding, without failure:
 - 1.1 A force of at least 200 pounds (890 n) applied within 2 inches (51 mm) of the top edge, in any outward or downward direction, at any point along the top edge. Where the force is applied in a downward direction, the top edge shall not deflect more than 6 inches (152 mm) and in no case to a height less than 39 inches (991 mm) above the floor; and
 - 1.2 A load of at least 50 pounds (222 n) applied in any downward or horizontal direction at any point along the toeboard.



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Notification: Earth and Foundation Work (BC 3304.3.1)

3304.3.1 Notification of the department. No soil or foundation work within the property line shall commence unless the permit holder, or where there is no permit holder the person causing the soil or foundation work to be made, notifies the department, via phone or electronically, at least 24 hours, but no more than 48 hours prior to the commencement of such work. The notification shall state the date that such soil or foundation work is to commence. Should the notification date fall on a weekend or official holiday, the permit holder shall notify the department on the last business day before the commencement date.



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Excavation Notification: Adjacent Property (BC 3304.3.2)

3304.3.2 Notification of adjoining property owners. When an excavation to a depth of 5 feet to 10 feet (1524 mm to 3048 mm) is to be made within 10 feet (3048 mm) of an adjacent footing or foundation, or when any excavation over 10 feet (3048 mm) is to be made anywhere on a site, the person causing the excavation to be made shall provide written notice to the owners of the adjoining property not less than 10 days prior to the scheduled starting date of the excavation. The written notice shall provide a description of the work to be performed, the timeframe and schedule, and the contact information of the person causing the excavation and of the department.

Exception: Notification is not required where the excavation is set back from the edge of the adjacent footing or foundation or adjoining property by a ratio of 2 horizontal to 1 vertical, as measured from the deepest point of the excavation.



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Site Condition Photographs

Unstable Angle of Repose/No Shoring



Site Condition Photographs

Unstable Angle of Repose



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SOE Design and Drawings (BC 3304.2)

3304.2 Support of excavation drawings. The sides of all excavations, including related or resulting embankments, shall be supported as specified on drawings. Such drawings shall be site specific and shall clearly illustrate all related protection and support of the excavation, including but not limited to sloping, stepping, sheeting, shoring, bracing, guardrail systems, and fences as required by Section 3304.4, with all dimensions indicated. Such drawings shall also indicate any utilities or public infrastructure impacted by the excavation. The drawings shall be prepared by a registered design professional who has demonstrated knowledge or experience in the design of retaining structures or bracing systems for the support of excavation.



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Earth Work Plans Required

107.8 Earthwork plans. Where the application is sought solely for or includes earthwork, excavation or fill operations, including but not limited to site decontamination, soil remediation and grading, the applicant shall submit 1) a lot diagram showing the exact location of the lot and dimensions to the nearest corner; and 2) plans showing the exact location, extent, and depth or height of the proposed earthwork, excavation or fill operation and any existing utilities, foundations or other infrastructure potentially impacted by the earthwork, excavation or fill operation. For excavation operations, the plans shall also indicate the levels of footings of all adjacent structures or, if the adjacent structures are pile supported, this shall be stated. Where applicable, the plans shall also include underpinning details, soil information in accordance with Chapter 18, and a final grading plan representing the lot after all earthwork, excavation or fill operations have been completed.



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SOE Plans to be Kept On Site

§28-104.2.2 Approval or acceptance to be indicated on construction documents. All construction documents, when approved, shall be stamped or endorsed “approved” under the official method of the department, followed by a notation of the date except that construction documents accepted with less than full examination by the department shall be stamped or endorsed “accepted” instead of “approved”. One set of “approved” or “accepted” construction documents shall be retained by the department and **another set shall be maintained at the project site until the work authorized by the permit is completed and signed-off by the department.**

3301.7 Documents to be kept on site. Where this chapter requires construction documents, drawings, inspection reports, logs, checklists, site safety plans, fire safety and evacuation plans, tenant protection plans, occupant protection plans, or monitoring plans, copies of such shall be maintained at the site for the duration of the job and made available to the commissioner upon request. Copies of such aforementioned construction documents or drawings shall also be maintained by the permit holder and the designer. Copies of such aforementioned inspection reports, logs, or checklists shall also be maintained by the permit holder and the entity that performed the inspection. Copies of such aforementioned plans shall also be kept by the permit holder and the entity that developed the plan.



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Compliance with Plans

§28-105.12.2 Compliance with construction and submittal documents. All work shall conform to the approved construction and submittal documents, and any approved amendments thereto. Changes and revisions during the course of construction shall conform to the amendment requirements of this code.



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Underpinning/Lateral Failure



Site Condition Photographs Underpinning/Lateral Failure



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Excavation: Safeguards For Adjacent Property (BC 3309.4.1)

3309.4.1 Additional safeguards during excavation. The following additional requirements shall apply during excavation:

1. The person causing the excavation shall support the vertical and lateral load of the adjoining structure by proper foundations, underpinning, or other equivalent means where the level of the foundations of the adjoining structure is at or above the level of the bottom of the new excavation.



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Subsurface Operations: Precautions (BC 3309.6)

3309.6 Subsurface operations affecting adjacent properties.

Whenever subsurface operations, other than excavation or fill, are conducted that may impose loads or movements on adjoining property, including but not limited to the driving of piles, compaction of soils, or soil solidification, the effects of such operations on adjoining property and structures shall be monitored in accordance with Section 3309.16.

Exception: Monitoring during underpinning shall be in accordance with Section 1814.



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Excavation: Pre-Construction Survey (BC 3309.4.3)

3309.4.3 Preconstruction Survey. No excavation work to a depth of 5 feet to 10 feet (1524 mm to 3048 mm) within 10 feet (3048 mm) of an adjacent building, or an excavation over 10 feet (3048 mm) anywhere on the site shall commence until the person causing an excavation to be made has documented the existing conditions of all adjacent buildings in a preconstruction survey.



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Excavation: Movement Monitoring (BC 3309.4.4)

3309.4.4 Monitoring. During the course of excavation work the following shall be monitored in accordance with Section 3309.16:

1. Buildings that are within a distance from the edge of the excavation that is equal to or less than the maximum depth of the excavation.
2. Historic structures that are contiguous to or within a lateral distance of 90 feet (27 432 mm) from the edge of the lot where an excavation is occurring.

Exception: Monitoring is not required for excavations to a depth of five feet (1523 mm) or less, provided:

1. The excavation occurs more than 5 feet (1524 mm) from all footings and foundations; or
2. Where the excavation occurs within five feet (1524 mm) or less from a footing or foundation, such excavation does not occur below the level of the footing or foundation.



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Monitoring/Cracks



Vibration Monitoring



Excavation: Movement Monitoring Design (BC 3309.16)

3309.16 Monitoring plan. Where monitoring is required by Section 3309, such monitoring shall be in accordance with a monitoring plan developed by a registered design professional and acceptable to the commissioner. The monitoring plan shall be specific to the structures to be monitored and operations to be undertaken, and shall specify the scope and frequency of monitoring, acceptable tolerances, and reporting criteria for when tolerances are exceeded.



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Special Inspections: Stability

1704.20 Structural stability. Special inspection for structural stability shall be required for construction work as specified in this section or elsewhere in this code. Structural materials and methods of construction utilized in temporary protections shall be subject to special inspection when such materials and methods of construction would be subject to special inspection as a permanent installation in accordance with the applicable sections of this chapter, including but not limited to special inspection for concrete, welding, and pile driving.

1704.20.1 Structural stability of existing buildings. Alterations to existing structures in which loads are transferred from one structural system of structural elements to another, such as installation of columns or girders, replacement of existing bearing walls, the creation of openings or slots in existing walls, girders or floors, alteration of arches, rigid frames, trusses in frame buildings, where the stability or integrity of a structural system is to be temporarily diminished, or where otherwise required by the commissioner, shall be subject to special inspections in accordance with Sections 1704.20.6 through 1704.20.10.

1704.20.1.1 Construction operations influencing adjacent structures. Where construction operations have the potential to affect structurally the condition or occupancy of the subject structure and/or an adjacent structure, the structural stability of such structures shall be subject to special inspections in accordance with Sections 1704.20.6 through 1704.20.10.



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Special Inspections: SOE

1704.20.2 Excavations. Methods employed to protect the sides of excavations meeting the requirements of Item 1 of Section 3304.4.1 shall be subject to special inspections in accordance with Sections 1704.20.6 through 1704.20.10.

1704.20.2.1 Slurry. The proportions and installation of slurry mixtures to protect the sides of excavations shall be subject to special inspection. Slurry mix proportions and installation procedures shall be provided by a registered design professional, and the special inspection agency shall verify compliance with the approved procedures.

1704.20.3 Underpinning. Underpinning of structures shall be subject to special inspections in accordance with Sections 1704.20.6 through 1704.20.10.



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Scaffolding



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Sidewalk Sheds: Lighting



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Sidewalk Sheds: Mud Sill



Sidewalk Sheds: Vertical Members



Sidewalk Sheds: Bracing



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Sidewalk Sheds: Deck Enclosure



Sidewalk Sheds: Coverage Past Lot Line



Sidewalk Sheds: Advertising



Sidewalk Sheds: When Required (BC 3307.6.2)

3307.6.2 Where required. A sidewalk shed shall be installed and maintained to protect all sidewalks, walkways, and pathways within the property line of a site, and all public sidewalks that abut the property....



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Sidewalk Sheds: Decking (BC 3307.6.3)

3307.6.3 Area to be protected. The decking of the sidewalk shed shall extend the full length of the area that falls within the zone specified in Section 3307.6.2, plus an additional 5 feet (1524 mm) beyond such length, or to within 18 inches (457 mm) of curb line, whichever is less. The decking of the sidewalk shed shall also extend the full width of the sidewalk, walkway, or pathway that remains open to the public, except for a clearance to avoid existing obstructions, not to exceed 18 inches (457 mm) along the curb and not to exceed 1 inch (25 mm) along the face of the building or structure.



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Sidewalk Sheds: Design (BC 3307.6.4.1)

3307.6.4.1 Designer. All sidewalk sheds shall be designed by a registered design professional.

Exception: Sidewalk sheds that conform to a design approved by the commissioner or the Board of Standards and Appeals, provided the shed is installed at the site in accordance with the standard design.



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Side Walk Sheds: Installation & Maintenance (BC 3307.6.5.2 and 6.5.3)

3307.6.5.2 Supervision of installation, adjustment, repair, and removal. The installation, adjustment, repair, or removal of a sidewalk shed shall be performed under the supervision of a competent person designated by the permit holder for the sidewalk shed.

3307.6.5.3 Responsibility for maintenance and use. Sidewalk sheds shall be maintained and used by the general contractor, or where there is no general contractor, the contractor causing the work to be performed, or where there is no active work, the building owner.



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Sidewalk Shed: Inspection

(BC 3307.6.5.7 and 6.5.8)

3307.6.5.7 Installation inspection. Upon completion of the installation of a sidewalk shed, the shed shall be inspected by a qualified person designated by the designer, the permit holder for the shed, or a third party acceptable to both the designer and the permit holder to verify that the sidewalk shed is in a safe condition and has been installed in accordance with drawings and the requirements of this chapter. Following the inspection, the qualified person who inspected the sidewalk shed shall prepare, sign, and date an installation inspection report. A new installation inspection report shall be prepared each time the sidewalk shed is reinstalled at the site.

3307.6.5.8 Periodic inspection. Six months following the initial installation inspection, and every six months thereafter, the sidewalk shed shall be inspected by a qualified person designated by the designer, the permit holder for the shed, or a third party acceptable to both the designer and the permit holder to verify that the sidewalk shed is in a safe condition and is in compliance with drawings and the requirements of this chapter. Following the inspection, the qualified person who inspected the sidewalk shed shall prepare, sign, and date an inspection report.



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Sidewalk Sheds: Daily Inspections (BC 3307.6.5.10)

3307.6.5.10 Daily inspection. Sidewalk sheds shall be visually inspected daily by a person designated by the general contractor, or where there is no general contractor, the contractor causing the work to be performed, or where there is no active work, by the building owner to verify:

1. The lights are functioning;
2. No brace or rail is hanging unattached at one or more ends;
3. No portions of the support structure are disconnected;
4. No section of parapet is missing; and
5. All legs remain on their support and are supported to the ground.

Exception: The inspections for a scaffold suspended or supported above a sidewalk shed shall be in accordance with Section 3314.



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Construction Signs

(BC 3301.9 and 3307.1.1)

3301.9 Required signs. Signs shall be posted at a construction or demolition site in accordance with Sections 3301.9.1 through 3301.9.5.

3307.1.1 Signs. Other than as specified in Section 3301.9 and 3301.10, there shall be no sign, information, pictorial representation, or any business or advertising messages posted on a sidewalk shed, bridge, fence, or other protective structure listed in this section that is erected at the construction or demolition site.

Where a protective structure required by this section obscures from view a lawful existing sign, a temporary sign may be installed in accordance with Section 3301.10.

No illuminated signs shall be permitted on any protective structure required by this section.



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Suspended Scaffold: Life Line



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Suspended Scaffold: C-Hook Tieback



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Suspended Scaffold: Wire Rope Birdcage



Suspended Scaffold: Wire Rope Splice



Suspended Scaffold: Counterweight

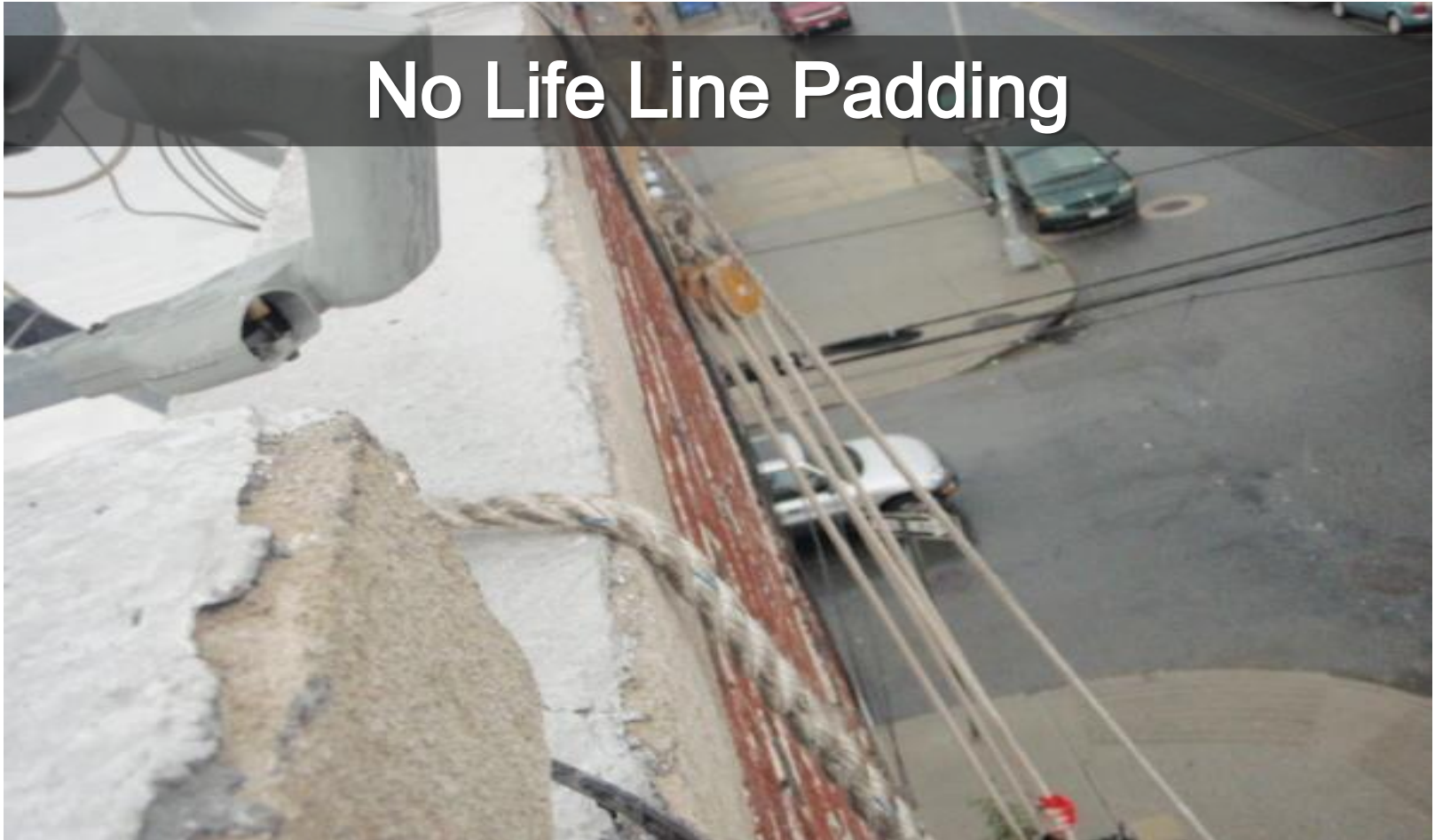


Suspended Scaffold: Outrigger Beam



Suspended Scaffold: Life Line Padding

No Life Line Padding



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Suspended Scaffold: Parapet



Suspended Scaffolds: Permit Exceptions (BC 3314.2)

Exceptions:

1. 1. A permit is not required for a two-point suspended scaffold suspended from a parapet using C-hooks.
2. A permit is not required for a suspended scaffold provided:
 - 2.1. The scaffold is installed and used in conjunction with a construction, alteration, or demolition project that holds a valid permit from the department for such project;
 - 2.2. The site is closed to the public and enclosed with a fence in accordance with Section 3307; and
 - 2.3. The installation, use, and removal of the scaffold is confined within the site or over an area protected by sidewalk sheds or roof protection.



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Suspended Scaffolds: Design Exceptions (BC 3314.3)

3314.3.2 Suspended scaffolds. Suspended scaffolds shall be **designed** by a registered design professional.

Exceptions:

Design is not required for a single tier non-adjustable suspended scaffold whose platform is 40 square feet (12 192mm) or less in size.

1. In lieu of a registered design professional, a two-point, single tier, suspended scaffold may be designed by a licensed rigger provided:
 - 2.1. The scaffold or scaffold outrigger beam or suspension member support structure is not anchored to the building or structure, other than tiebacks; and
 - 2.2. The scaffold will not be loaded, or designed to be loaded, in excess of 75 pounds per square foot (366.15 kg/m²); and either
 - 2.2.1. The scaffold utilizes c-hooks; or
 - 2.2.2. The distance from floor or roof on which the support structure is located to the top of the outrigger beam or suspension member support structure is less than 15 feet.

In lieu of a registered design professional or a licensed rigger, a two-point, single tier, suspended scaffold meeting the requirements of Item 2 of these exceptions that is used exclusively for sign hanging work may be designed by a licensed sign hanger.



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Suspended Scaffolds: Installation & Use (BC 3314.4)

Supervision of the Installation of Suspended Scaffolds:

1. A licensed sign hanger/designated sign hanging foreman may supervise the installation of a suspended scaffold utilized exclusively for sign hanging.
2. A licensed rigger/designated rigging foreman or a competent person designated by the contractor may supervise the installation of a suspended scaffold utilized for either:
 - 2.1 New building construction
 - 2.2 Full demolition
 - 2.3 A vertical or horizontal enlargement; or
 - 2.4 Façade work on a major building with a site safety plan
3. For all other work, the installation of a suspended scaffold must be supervised by a licensed rigger/designated rigging foreman.



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Suspended Scaffolds: Installation Inspection (BC 3314.4)

Suspended Scaffold Installation Inspection

1. The suspended scaffold, along with support devices (such as c-hooks and outrigger beams), and the support surface (such as the roof or parapet) must be inspected prior to installation, and at the completion of installation by the:
 - 1.1 Licensed rigger/sign hanger/designated foreman supervising the installation; or
 - 1.2 A qualified person designated by the scaffold designer (if the installation is supervised by a competent person); such qualified person must be a registered design professional or an employee of the registered design professional.
2. Following installation, the inspector must issue a sign-off letter.

***NOTE:** Inspections are not required for a non-adjustable suspended scaffold that does not require design (“floats”).*



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Suspended Scaffolds: Pre-Shift Inspection (BC 3314.4)

Suspended Scaffold Pre-shift Inspection

1. A pre-shift suspended scaffold inspection checklist must be developed by the licensed rigger/sign hanger who installed the scaffold, or by the scaffold designer.
2. The checklist must be kept on site.
3. Suspended scaffolds must be inspected in accordance with the checklist prior to the start of each shift by the individual supervising the use of the suspended scaffold.

Note: *Inspections are not required for a non-adjustable suspended scaffold that does not require design (“floats”).*



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Suspended Scaffolds: Notification (BC 3314.4.1.5)

3314.4.1.5 Notification of adjustable suspended scaffold installation and removal. Prior to the initial installation of the adjustable suspended scaffold at a site, and prior to the final removal of the adjustable suspended scaffold at a site, the department shall be notified at least 24 hours, but not more than 48 hours, prior to such installation or removal.



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SSM Duties/Façade Jobs (Rule 3310-01)

Options For Fulltime Safety Oversight

- Licensed Site Safety Manager (SSM).
- Licensed rigger or designated foreman (SSM endorsement not required).
- Qualified Person For Site Safety (QPSS) endorsed by licensed SSM.

Mandatory SSM Presence on Site

- Prior to commencement of work.
- During installation, modification, removal of supported scaffolds/mast climbers.
- Within 24 hours of issuance of any hazardous violations.
- During all rigging and suspended scaffold operations **NOT** performed under the supervision of a licensed rigger or his designated foreman.



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QPSS Qualifications (Rule 3310-01)

The licensed rigger (acting as QPSS); designated rigging foreman (acting as QPSS); QPSS must have following training:

- OSHA 10 or greater construction training (and Building Code refresher every five years thereafter);
- Jobsite-specific safety orientation; and
- Beginning July 1, 2016:
 - 40-hour site safety manager training (and 7-hour refresher every 3 years thereafter); and
 - 32-hour supported scaffold installer training (and 8-hour refresher every 4 years thereafter); and
 - 32-hour suspended scaffold supervisor training (and complete the 8-hour refresher every 4 years thereafter); and
 - OSHA 30 or greater construction training.



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Supported Scaffold: Working Deck



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Supported Scaffold: Plank Overhang



Supported Scaffold: Screw Adjustment



Supported Scaffold: Foundation



Supported Scaffold: Tieback



Supported Scaffold: Guardrails



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Supported Scaffold: Access



Supported Scaffold: Netting



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Supported Scaffolds: Height (BC 3314.1.1)

3314.1.1 Height. For the purposes of this section, the height of a scaffold shall be measured from the base of the scaffold to the top of the uppermost vertical member of the scaffold, with any temporary structure, but not any permanent structure, on which the scaffold rests included in the height measurement.



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Scaffolds: Permits Requirements (BC 3314.2)

3314.2 Permit. Prior to the installation and use of a scaffold the contractor or licensee who is to install the scaffold, or a designated representative of the installer, shall obtain a permit for such scaffold.



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Supported Scaffolds: Permit Exceptions (BC 3314.2)

- 4. A permit is not required for a supported scaffold, provided:
 - 4.1. The scaffold is not an outrigger scaffold (thrust out);
 - 4.2. No hoisting equipment with a manufacturer's rated capacity greater than 2,000 pounds (907kg) will be located on the scaffold;
 - 4.3. The scaffold will not be loaded, or designed to be loaded, in excess of 75 pounds per square foot (366.15 kg/m²); and
 - 4.4. The scaffold is less than 40 feet (12 192mm) in height.



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Supported Scaffolds: Design Exceptions (BC 3314.3)

Exception: Design is not required for a supported scaffold, provided:

1. The scaffold is not an outrigger scaffold (thrust out);
2. No hoisting equipment with a manufacturer's rated capacity greater than 2,000 pounds (907kg) will be located on the scaffold;
3. The scaffold will not be loaded, or designed to be loaded, in excess of 75 pounds per square foot (366.15 kg/m²);
4. The scaffold is less than 40 feet (12 192mm) in height;
5. Side-arm or end-arm scaffold brackets are used exclusively for the support of workers; and
6. The scaffold is a light duty scaffold, a medium duty scaffold, or a heavy duty scaffold.



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Scaffolds: Minimum Plan Requirements (BC 3314.3.3)

3314.3.3 Drawings. Where design is required by this section, the drawings shall, at a minimum, include a plan view and an elevation view, with full dimensions, detailing:



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Scaffolds: Installation and Use (BC 3314.4)

3314.4 Installation, inspection, repair, maintenance, adjustment, use, and removal of scaffolds. Scaffolds shall be installed, inspected, repaired, maintained, adjusted, used, and removed in accordance with the specifications of the manufacturer, where such specifications exist, and the requirements of Section 3314.4.1 through 3314.4.8.



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Scaffolds: Supported Scaffold Installation (BC 3314.4.1.2)

3314.4.1.2 Supervision of supported scaffold installation and removal. The installation and removal of a supported scaffold shall be supervised by a competent person designated by the contractor installing or removing the scaffold.



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Scaffolds: Supported Scaffold Use (BC 3314.4.2.2)

3314.4.2.2 Supervision of supported scaffold use.

The use of a supported scaffold shall be supervised by a competent person designated by the scaffold controlling entity.

Scaffold Controlling Entity: The contractor or other entity that exercises responsibility for the site where scaffold is located.



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Superstructure



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Safeguarding Public & Property (BC 3301.2)

3301.2 Safety measures and safeguards. Contractors, construction managers, and subcontractors engaged in construction or demolition operations shall institute and maintain all safety measures required by this chapter and provide all equipment or temporary construction necessary to safeguard the public and property affected by such contractor's operations.



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Design (BC 3301.6.1)

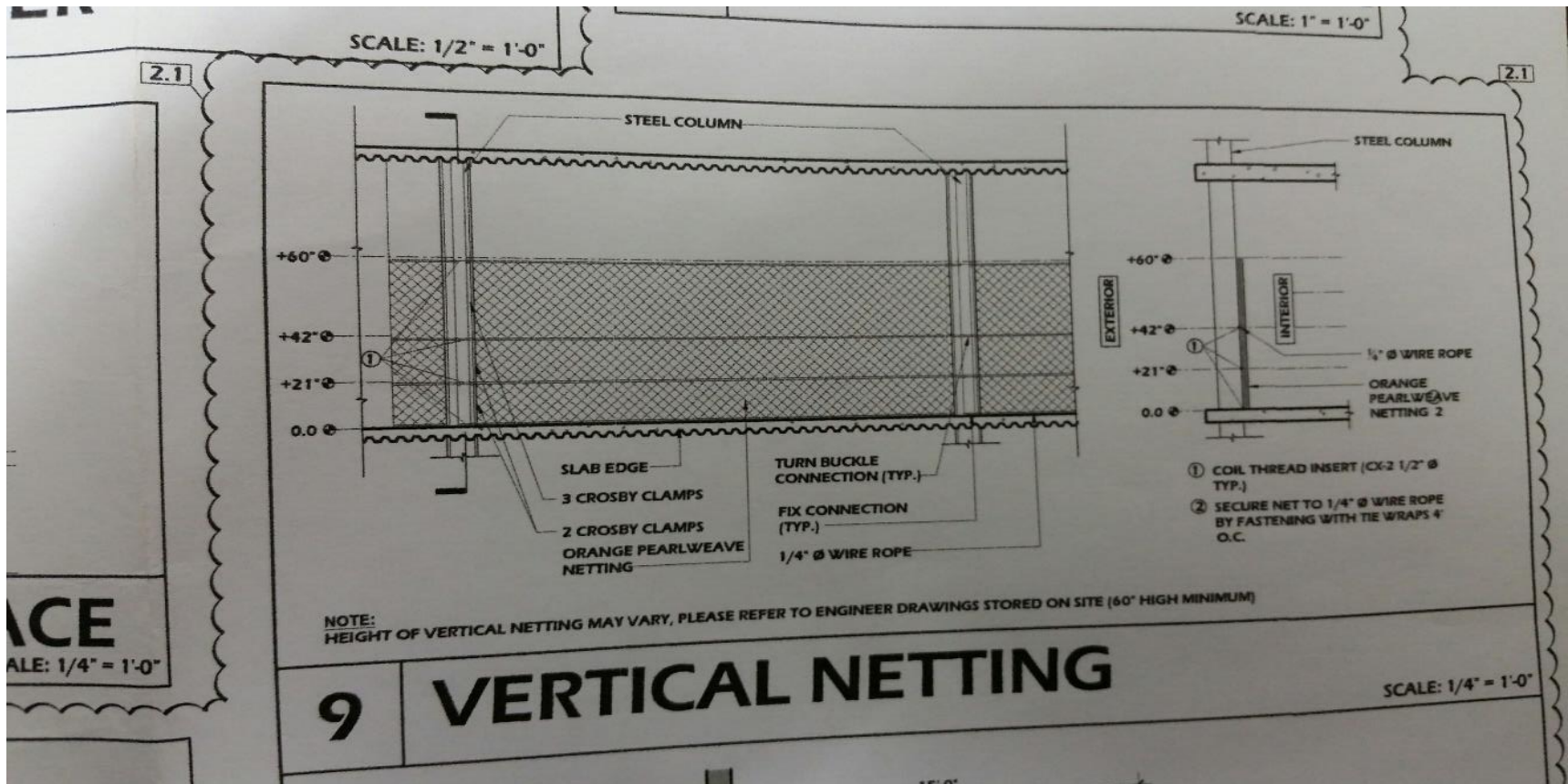
3301.6.1 Design. Whenever design is specifically required by the provisions of this chapter, such design shall be in accordance with the requirements of this code and executed by, or under, the supervision of a registered design professional who shall cause his or her seal and signature to be affixed to such documents that may be required for the work.

Exception: Where this chapter specifically indicates that the design may be executed by another individual.



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Design Vertical Netting



Manufacturer's Specifications (BC 3301.1.3)

3301.1.3 Manufacturer specifications. All equipment shall be used in accordance with the specifications of the manufacturer, where such specifications exist, and the requirements of this code. Where there is a discrepancy, the stricter requirement shall apply.



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Notification: Accident & Damage (BC 3301.8)

3301.8 Accidents and damage to adjoining property. The department shall be notified immediately by the permit holder, or a duly authorized representative, of an accident at a construction or demolition site, or of any damage to adjoining property caused by construction or demolition activity at the site.



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Definition of Accident (BC 3302.1)

3302.1 Definitions. The following words and terms shall, for the purposes of this chapter, have the following meanings.

ACCIDENT. An occurrence directly caused by construction or demolition activity or site conditions that result in one or more of the following:

1. A fatality to a member of the public, or
2. Any type of injury to a member of the public; or
3. A fatality to a worker; or



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Definition of Accident (cont.) (BC 3302.1)

4. An injury to a worker that requires transport by emergency medical services or requires immediate emergency care at a hospital or offsite medical clinic; or
5. Any complete or partial structural collapse or material failure; or
6. Any complete or partial collapse or failure of pedestrian protection, scaffolding, hoisting equipment, or material handling equipment; or
7. Any material fall exterior to the building or structure.



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Site Safety Programs (BC 3310.3 and 3310.4)

3310.3 Site safety plan. No permit shall be issued for the type of work listed in Section 3310.1 until a site safety plan that meets the requirements of Article 110 of Chapter 1 of Title 28 of the *Administrative Code* has been approved by the department.

3310.4 Site safety monitoring program. For a project that requires a site safety plan, the general contractor shall enact and maintain a site safety monitoring program to implement such site safety plan. The site safety monitoring program shall, at a minimum, comply with Sections 3310.5 through 3310.10.

Exception: Subject to the approval of the commissioner, a site safety monitoring program may be waived, reduced, or modified in accordance with Section 3310.11.



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SSM-SSC: Inspection Duties (BC 3310.8.3)

3310.8.3 Inspections. It shall be the responsibility of the site safety manager or coordinator to inspect personally, on a regular basis throughout the day while active work is occurring, the site to ensure compliance with the requirements of this chapter. At a minimum, inspections shall consist of those prescribed in rules promulgated by the commissioner, with such inspections performed personally by an individual certified by Chapter 4 of Title 28 of the *Administrative Code* as a site safety manager or coordinator.



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SSM-SSC: Notification Requirements (BC 3310.8.2.1)

3310.8.2.1 Notification of conditions to the department.

The site safety manager or coordinator shall immediately notify the department directly if he or she discovers any of the following conditions in the routine performance of the job:



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Key Definitions Walkable Floor and Working Deck (BC 3302.1)

- **WALKABLE FLOOR (CONCRETE CONSTRUCTION).** A floor where the concrete slab has been poured and the formwork stripped.
- **WALKABLE FLOOR (PRECAST CONCRETE CONSTRUCTION).** A floor where the frame is erected and the precast concrete floor is fixed in place.
- **WALKABLE FLOOR (STEEL CONSTRUCTION).** A floor where the frame is erected and the deck is tack welded or fixed in place.
- **WORKING DECK (CONCRETE CONSTRUCTION).** The level where the floor is being formed.
- **WORKING DECK (DEMOLITION).** The level where the floor is being broken up.
- **WORKING DECK (PRECAST CONCRETE CONSTRUCTION).** The level where the floor is being placed.
- **WORKING DECK (STEEL CONSTRUCTION).** The floor where the metal decking and steel components are being placed before concrete is poured.



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Standpipe Pressure Gauge



Construction Standpipe

BC 3303.8 (1)

3303.8 Standpipe systems during construction, alteration or demolition.
During construction, alteration or demolition operations, standpipe systems shall comply with the following:

1. When, during the course of the construction of a new building the working deck reaches a height of 75 feet (22 860 mm) or greater above the ground in a building for which a standpipe system will be required, a permanent or temporary standpipe system meeting the requirements of Section 905 shall be kept in a state of readiness at all times for use by fire-fighting personnel. The standpipe system shall serve all floors where the permanent stairs are required per Section 3303.11. No standpipe shall be considered to be in a state of readiness unless it is painted red in accordance with the provisions of Section 905.11 of this code. When freezing conditions may be encountered, the system in whole, or the part of the system subject to freezing conditions, shall be maintained as a dry system.



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Standpipe Pressure Gauges (BC 3303.8.1.4.13)

4.13 Pressure gauges. A system of pressure gauges shall be installed at the compressor and at the most remote points of the system from the compressor.



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Material - Personnel Hoist in Readiness



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Elevator or Hoist In Readiness (BC 3303.12.2)

3303.12.2 Floors closed to the public. All floors closed to the public in a new or existing building undergoing construction or demolition work shall be served by, at least, either:

An elevator meeting the requirements of Chapter 30, which shall be kept in readiness at all times for Fire Department use; or

A hoist meeting the requirements of Section 3318, which shall be available at all times for fire department use.

Exceptions: An elevator or hoist is not required during the course of construction or demolition for:

A building that does not require a permanent elevator.

Floors that are located within a vertical distance of seven stories or 75 feet (22 860 mm) or less from the working deck.



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Definitions: Unenclosed Perimeter (BC 3302)

UNENCLOSED PERIMETER. Any exterior portion of a building that is not solidly enclosed with the permanent façade, including the windows; or any exterior edge of a roof that is not enclosed with its permanent parapet or guardrail.



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Safety Netting (BC 3308.1 and .2)

3308.1 Scope. Safety netting systems and guardrail systems shall be provided as required by this section to protect unenclosed perimeters. Except where this section authorizes the temporary removal of unenclosed perimeter protection, no work shall occur, nor shall materials be stored on any level where required unenclosed perimeter protection is not installed.

3308.2 Permit. A permit is not required for the installation of safety netting systems and guardrail systems that are in accordance with this section. A permit is required for alternative methods granted under Section 3308.8, including but not limited to cocoon systems, climbing formwork, and enclosure panels.



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Horizontal Netting (BC 3308.6.1.1)

3308.6.1.1 During construction. When, during the course of new building construction, or during the vertical or horizontal enlargement of an existing building, the uppermost walkable floor reaches a height of six stories or 75 feet (22 860 mm) above the level of the ground or an adjoining roof, horizontal safety netting shall be provided at a level not more than two stories or 30 feet (9144 mm) below:

1. In concrete structures: the stripping floor; or
2. In steel structures: at the uppermost story where the concrete floor slab has been poured.

Exception: When tarpaulins encase one or more floors immediately below the finished concrete floor in order to maintain temporary heat, the horizontal netting may be located no more than three floors below the finished concrete floor.



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Vertical Netting (BC 3308.5)

3308.5 Vertical safety netting systems. Vertical safety netting shall be installed and maintained to cover all unenclosed perimeters.



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Guardrails at Perimeter (BC 3308.7)

3308.7 Guardrail system. A guardrail system shall be installed and maintained to protect all unenclosed perimeters.

Exceptions: A guardrail system is not required at:

1. The story at grade.
2. Levels where vertical safety netting is installed in accordance with Section 3308.5.
3. Levels where a supported scaffold covers the full width of the unenclosed perimeter, provided the scaffold is decked and flush against the building at such level where the unenclosed perimeter exists, with no gap between the scaffold and the building greater than 3 inches (76 mm), and also provided that the scaffold is provided with netting and guardrails in accordance with Section 3314.8.



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Guardrails/Netting/Leading Edge



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Guardrails & Vertical Netting



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Vertical Netting/Perimeter



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Horizontal Netting



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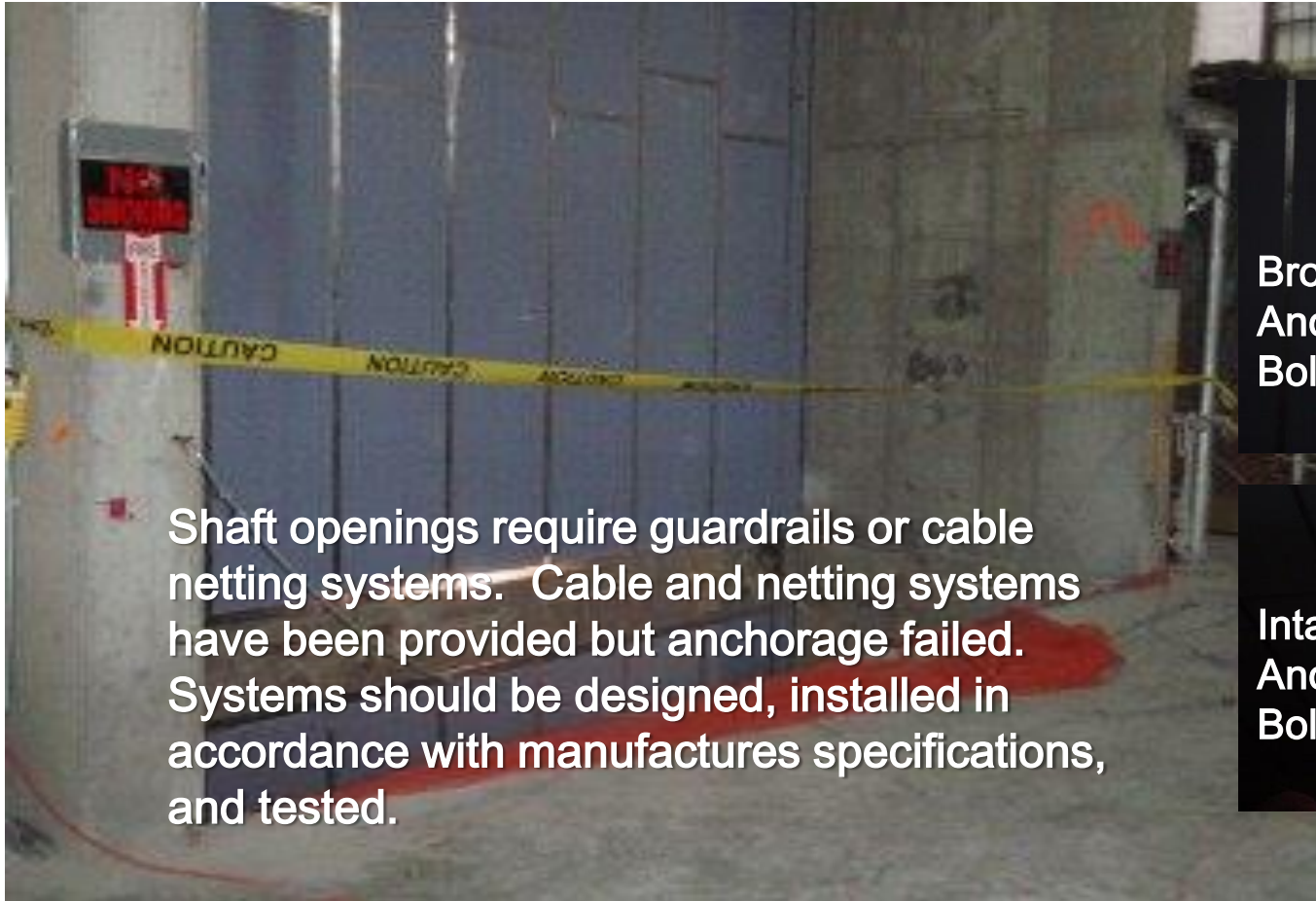
Fall Hazards Open Shaft



Guardrail or Cable/Netting
Required At Open Shafts

Fall Hazards

Open Shaft-System Failure

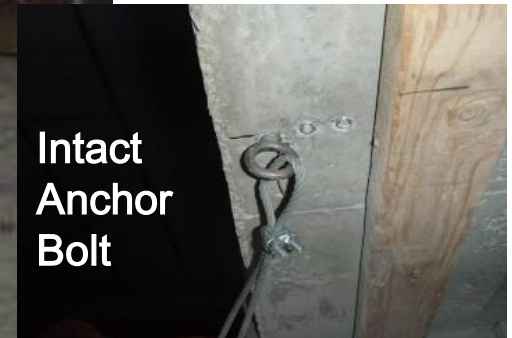


Shaft openings require guardrails or cable netting systems. Cable and netting systems have been provided but anchorage failed. Systems should be designed, installed in accordance with manufactures specifications, and tested.

Broken
Anchor
Bolt



Intact
Anchor
Bolt



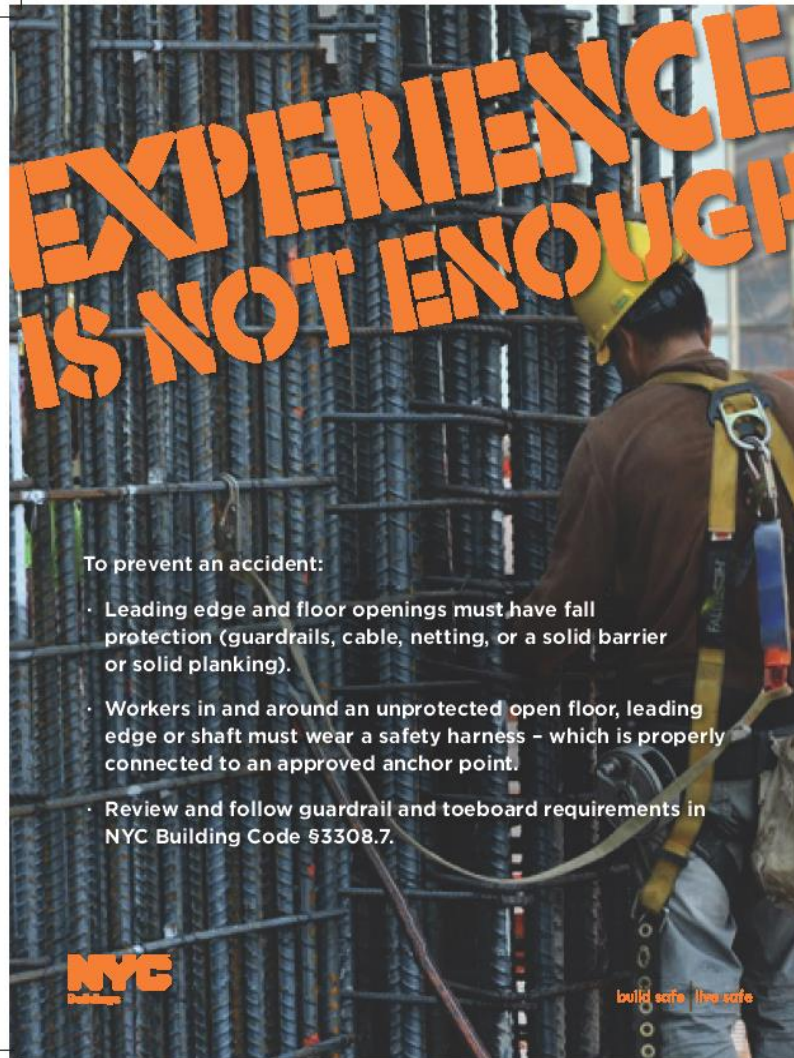
Guardrails/Floor Opening



Temp Handrails Missing



Personal Fall Protection



**EXPERIENCE
IS NOT ENOUGH**

To prevent an accident:

- Leading edge and floor openings must have fall protection (guardrails, cable, netting, or a solid barrier or solid planking).
- Workers in and around an unprotected open floor, leading edge or shaft must wear a safety harness - which is properly connected to an approved anchor point.
- Review and follow guardrail and toeboard requirements in NYC Building Code §3308.7.

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Harness and Lanyard



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Life Line Anchorage



Alternate Safety Systems (BC 3308.8 and .8.1)

3308.8 Modifications and alternative systems. The commissioner may, based upon a written request from a registered design professional, modify the requirements for safety netting systems and guardrail systems required by this section, including but not limited to the installation of alternative systems, provided such modification or alternative system meets or exceeds the level of safety afforded to the public and property by safety netting systems and guardrail systems installed in accordance with this section.

3308.8.1 Request content. A request submitted under Section 3308.8 shall include



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Cocoon/Alternative Protection



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Cocoon/Alternative Protection



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Roof Protection (BC 3309.10)

3309.10 Protection of roofs. Whenever any building is to be constructed or demolished above the roof of an adjoining building, it shall be the duty of the person causing such work to protect from damage at all times during the course of such work and at his or her own expense the roof, skylights, other roof outlets, and equipment located on the roof of the adjoining building , and to use every reasonable means to avoid interference with the use of the adjoining building during the course of such work, provided such person causing such work is afforded a license in accordance with the requirements of Section 3309.2 to enter and inspect the adjoining building and perform such work thereon as may be necessary for such purpose; otherwise, the duty of protecting the roof, skylights, other roof outlets, and equipment on the roof of the adjoining building shall devolve upon the owner of such adjoining building.

Adjoining roof protection shall be secured to prevent dislodgement by wind. Where construction or demolition work occurs at a height of at least 48 inches (1219 mm) above the level of the adjoining roof, adjoining roof protection shall consist of 2 inches (51 mm) of flame-retardant foam under 2 inches (51 mm) of flame-retardant wood plank laid tight and covered by flame-retardant plywood, or shall consist of equivalent protection acceptable to the commissioner, and shall extend to a distance of at least 20 feet (508 mm) from the edge of the building being constructed or demolished.



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Overhead Protection Adjacent Spaces and Equipment (BC 3309.13)

3309.13 Protection of adjoining equipment and spaces. Whenever a major building is constructed or demolished, and provided such work requires a site safety plan in accordance with Section 3310, it shall be the duty of the person causing such work to protect from damage, at all times during the course of such work and at his or her own expense, all mechanical, electrical, and similar equipment on the adjoining property that are within 20 feet (508 mm) from an unenclosed perimeter of the major building, and to protect all publically accessible spaces on the adjoining property that are within 20 feet (508 mm) from an unenclosed perimeter of the major building, and also to use every reasonable means to avoid interference with the use of such equipment and spaces during the course of such construction or demolition work, provided such person causing such work is afforded a license in accordance with the requirements of Section 3309.2 to enter and inspect the adjoining property and perform such work thereon as may be necessary for such purpose; otherwise, the duty of protecting such adjoining equipment and spaces shall devolve upon the owner of such adjoining property.

Exception: Equipment on an adjoining roof shall be protected in accordance with Section 3309.10.



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Housekeeping/Site Maintenance



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General Housekeeping (BC 3303)

3303.4 Housekeeping. Housekeeping at a site shall be in accordance with Sections 3303.4.1 through 3303.4.9.

3303.4.1 Slipping and tripping hazards. Slipping and tripping hazards in areas used by the public shall be minimized in accordance with Sections 3303.4.1.1 and 3303.4.1.2.

3303.4.1.1 Maintenance. All areas used by the public shall be maintained free from ice, snow, grease, debris, equipment, materials, projections, tools, or other items, substances, or conditions that may constitute a slipping, tripping, or other hazard.

3303.4.1.2 Location of hose lines, wires, ropes, pipes, chains and conduits. Hose lines, wires, ropes, pipes, chains, and conduits shall be located so that they will not constitute a tripping hazard to the public. Where it is necessary to carry such across sidewalks, or any public way, they shall either be suspended at least 8 feet (2438 mm) above ground or, if left on the ground, suitable chamfered planks or a pedestrian bridge shall be provided to cover such.



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Debris Control

(BC 3303.4.4)

3303.4.4 Control of debris. Control of debris shall include the following measures:

1. All floors, roofs, and working decks shall be cleaned of debris at least daily, and a daily inspection made by a competent person to verify such has occurred. If the building is a major building, such inspection shall be noted in the site safety log.
2. Debris that cannot be removed from the site by the end of the shift shall be placed in containers meeting the requirements of this section or shall be secured overnight to protect the public and property and shall be removed from the site or placed in containers at the beginning of the next shift.

Exception: Combustible debris shall not be permitted to accumulate and shall be removed from the site in accordance with Section 3303.5.1.

3303.5 Removal of material and debris. Material and debris shall be removed in a manner that prevents injury or damage to the public or property.

3303.5.1 Removal of combustible debris. Combustible debris shall not be permitted to accumulate, and shall be removed from the site at reasonable intervals in accordance with the requirements of the *New York City Fire Code*.



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Storage: Unenclosed Perimeters (BC 3303.4.5.2)

3303.4.5.2 Storage near unenclosed perimeters. All material or equipment not being used shall be stored at least 10 feet (3048 mm), measured along all horizontal dimensions, from all unenclosed perimeters of the building or structure. Such material or equipment shall be secured in accordance with the requirements of Section 3303.4.5.1.

Exceptions: Provided the material or equipment is secured against accidental movement, in lieu of the 10 foot (3048 mm) set back distance:

1. Material or equipment that weighs 750 pounds (340.2 kg) or more may be stored at least 5 feet (1524 mm) from the unenclosed perimeter.
2. Where the floor area is less than 1,000 square feet (304.8 m²), material or equipment, regardless of weight, may be stored at least 5 feet (1524 mm) from the unenclosed perimeter.
3. Where located on a floor or working deck that is at or above the level of the horizontal safety netting in accordance with Section 3308, material or equipment may be stored at least 2 feet (610 mm) from the unenclosed perimeter.
4. Material related to concrete operations may overhang the unenclosed perimeter of the building or structure, provided:



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Concrete Reshoring/Plans



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Concrete Reshores (BC 3305.3.6)

3305.3.6 Reshoring. Reshoring shall be provided to support the construction where forms and shores are stripped before the concrete has attained sufficient strength to support the superimposed loads due to construction above. Reshoring shall comply with Sections 3305.3.6.1 through 3305.3.6.8.

3305.3.6.1 Reshores limitations. Reshores shall comply with the requirements of Sections 3305.3.6.1.1 through 3305.3.6.1.7.

3305.3.6.1.1 Secureness of reshores. Reshores of wood or metal shall be screw adjusted or jacked and locked and wedged to make them secure. Reshores shall not be jacked or screwed so tightly that they preload the floor below or remove the normal deflection of the slab above.

3305.3.6.1.2 Reshores in proximity to unenclosed perimeters. Reshores within 10 feet (3048 mm) of an unenclosed perimeter of a building shall be secured to prevent them from falling off the building.



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Concrete Reshores (cont.)

(BC 3305.3.6)

3305.3.6.1.3 Wedges. Wedges shall not be used within 10 feet (3048 mm) of the façade or at such other locations as determined by the commissioner

3305.3.5 Removal of forms and shoring. The removal of forms and shoring shall comply with the requirements of Sections 3305.3.5.1 through 3305.3.5.6.

3305.3.5.1 Removal schedule. Before starting construction, the contractor shall develop a procedure and schedule for removal of shores and installation of reshores and for calculating the loads transferred to the structure during the process.

3305.3.6.8 Reshoring schedule. A signed and sealed reshoring schedule shall be provided and maintained at the construction site whenever reshoring is employed.

Exception: A separate reshoring schedule is not required when the required reshoring information is covered on the approved construction documents prepared by the applicant of record.



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Thank you!



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This concludes the American Institute of Architects Continuing Education Systems Course.

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