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Safe Excavations + Underpinning
Under the 2014 Codes

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Bernard Ross

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Major Projects

Common Field Issues

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

Course Description

This course will examine construction incidents that occurred in New York City in 2013 and discuss lessons learned. The course will describe changes to 2008 NYC Building Code for Chapter 33 that deals with Construction Safety and describes how these code changes mitigate risk and will be enforced by the Department of Buildings. Lastly, the course will discuss safety program initiatives established by the Department of Buildings to uphold public safety.

Learning Objectives

Participants will be made aware of Code changes to Chapter 33 of the 2008 NYC Building Code related to construction safety and be able to determine appropriate usage on projects.

Participants will discuss and be able to identify specific regulations that contribute to on-site safety.

Participants will gain knowledge of safety initiatives and programs in order to educate on the potential risks construction projects pose to adjoining property and public.

Topics

1. Excavation Inspection Safety Issues
2. Excavation Inspection Required Documents
3. Excavation Inspection-Related Code Changes for 2014
4. Excavation Engineering Audit, Review Process
5. Code Changes

Common Excavation Safety Issues

Guardrails Missing or Inadequate

Construction Fences Inadequate

Egress Inadequate

Truck Ramps Not Properly Supported

Shear Cuts and Improper Angle of Repose

Common Excavation Safety Issues (Continued)

Improper Sheeting, Shoring and Bracing

Improper Excavation Sequencing

Lack of Box Pits

Unbraced Underpinning

Housekeeping

Inspection-Related Documents

Approved Adequate Plans

Adjacent Property Survey

Monitoring Required Structures

TR1s

Special Inspectors

Construction Fences

Construction Fences

Egress

Egress

Angle of Repose

Truck Ramp

Truck Ramp

Un-Shored Excavation

Un-Shored Excavation

Guardrails + Un-Shored Excavation

Guardrail

Raker Bracing

Rakers

Un-Shored Excavation

Box Pits

Box Pits

Box Pits

Box Pits

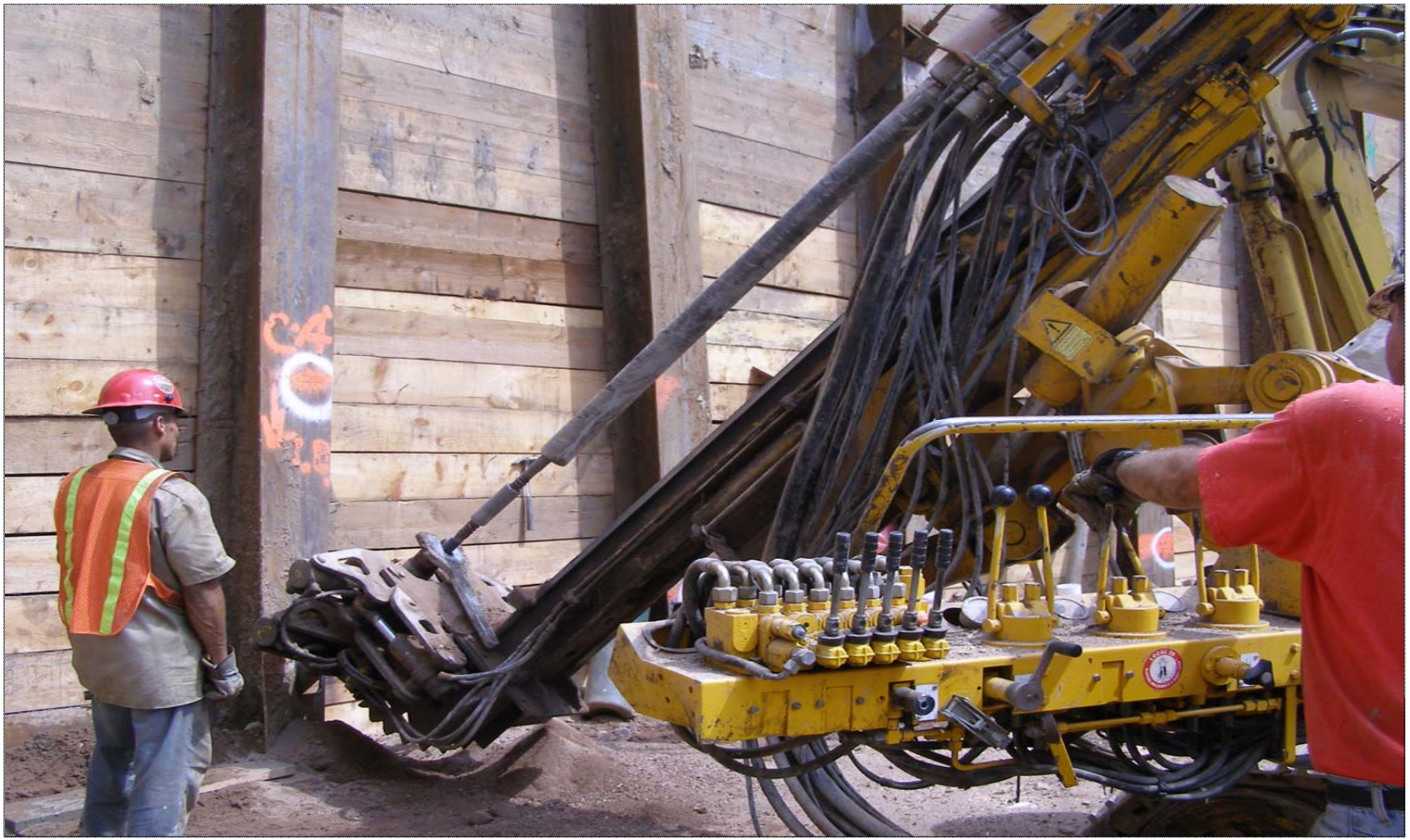
Box Pits

Box Pits

Shoring

Tiebacks

Tiebacks



Excessive Water

Excessive Water

Building Undermining

Failure U/P Light Structure

Failure U/P Light Structure

Failure U/P Light Structure

Failure U/P Light Structure

Failure Multi-ring Light Structure

Soil Improvement Failure

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Chapter 33 Revisions

Chapter 33 Revisions: BC 3303.12.3

3303.12.3 Deep excavations.

Where the proposed lowest level of a building with a footprint of 10,000 square feet (3048 m) or greater is constructed at a depth greater than 75 feet (22 860 mm), a hoist meeting the requirements of Section 3318 shall be available at all times for Fire Department use once such floor has been poured and set. The hoist shall serve the level at grade and all stories below grade.

Exception: Subject to the approval of the commissioner, alternate means available at all times for Fire Department use, including but not limited to a vehicular ramp, shall be provided.

Chapter 33 Revisions: BC 3303.13.2

3303.13.2 Safety monitoring plan.

Where work has been interrupted or abandoned and discontinued for a period of at least three months, a safety monitoring plan shall be prepared and submitted to the department. Such safety monitoring plan shall be specific to the site, shall identify safeguards to be instituted and maintained to secure the site, and shall specify monitoring to be performed during the duration of suspension of work. The site shall be monitored in accordance with such plan.

Chapter 33 Revisions: BC 3303.13.3

3303.13.3 Filling and grading. Where work has been interrupted or abandoned and discontinued for a period of at least three months, all open excavations shall be filled and graded to eliminate all steep slopes, holes, obstructions or similar sources of hazard. Fill shall consist of clean, noncombustible material. The final surface shall be graded in such a manner as to drain the lot, eliminate pockets in the fill, and prevent the accumulation of water without damaging any foundations on the premises or on adjoining property.

Exception: Filling and grading is not required for abandoned, discontinued, or interrupted excavations that are:

Secured in accordance with Section 3303.13.2, and

Inspected periodically by an engineer to verify continued stability of the excavation, with a record of such inspections signed, sealed, and dated by the engineer.

Chapter 33 Revisions: BC 3304.1

3304.1 Scope. The provisions of this section shall apply to all soil and foundation work, including but not limited to excavations made for the purposes of taking earth, sand, gravel, or other material, as well as to soil and foundation work related to accessory uses such as garages, pools, and decks, and also to the underpinning or bracing of buildings or structures, in order to safeguard.

Chapter 33 Revisions: 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.

Chapter 33 Revisions: 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.

Chapter 33 Revisions: 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 [an] 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.

Chapter 33 Revisions: BC 3304.3.2 (Continued)

3304.3.2 Notification of adjoining property owners.

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.

Chapter 33 Revisions: 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.”

Chapter 33 Revisions: BC 3304.7

3304.7 Access.

Every excavation shall be provided with at least one safe means of ingress and egress that is kept available at all times.

Chapter 33 Revisions: BC 3304.10

3304.10 Dewatering.

The person causing the soil or foundation work to be performed shall dewater the site, as needed, for the progress of the work. Measures shall be taken to prevent settlement, slope failure, and damage to adjacent buildings, structures, and property affected by dewatering operations.

Chapter 33 Revisions: BC 3304.12

3304.12 Slurry.

Where slurry is utilized to support an excavation, trench, or drill or bore hole, slurry mix proportions and installation procedures shall be provided by a registered design professional on signed and sealed design and installation procedures. The installation procedures shall account for all imposed loads, including those from the earth, adjacent structures, and adjacent equipment. The use of slurry to support excavations shall be subject to special inspection in accordance with Section 1704.20. Where such construction methods are used to install foundation elements, the new foundation elements installed as part of such operations shall 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, and welding.

Chapter 33 Revisions: BC 3309.2

3309.2 License to enter adjoining property.

The responsibility of affording any license to enter adjoining property shall rest upon the owner of the adjoining property involved; and in case any tenant of such owner fails or refuses to permit the owner to afford such license, such failure or refusal shall be a cause for the owner to dispossess such tenant through appropriate legal proceedings for recovering possession of real property. Nothing in this chapter shall be construed to prohibit the owner of the property undertaking construction or demolition work from petitioning for a special proceeding pursuant to Section 881 of the *Real Property Actions and Proceedings Law.*

Chapter 33 Revisions: 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.

Chapter 33 Revisions: 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.

Chapter 33 Revisions: 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.

Chapter 33 Revisions: BC 3309.4.4 (Continued)

3309.4.4 Monitoring.

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.

Chapter 33 Revisions: 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.

Chapter 33 Revisions: 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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Common Engineering Issues

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Topics

1. Introduction to Support of Excavation, Underpinning
2. Examples of ‘Good’ and ‘Bad’ Underpinning and Support of Excavations (SOE)
3. Overview of Engineering Audits by the Excavation Unit Engineering Team
4. Common Errors Observed

Topics (Continued)

5. New York City Building Code Chapters Relevant to the Excavation, Underpinning and Support of Excavations

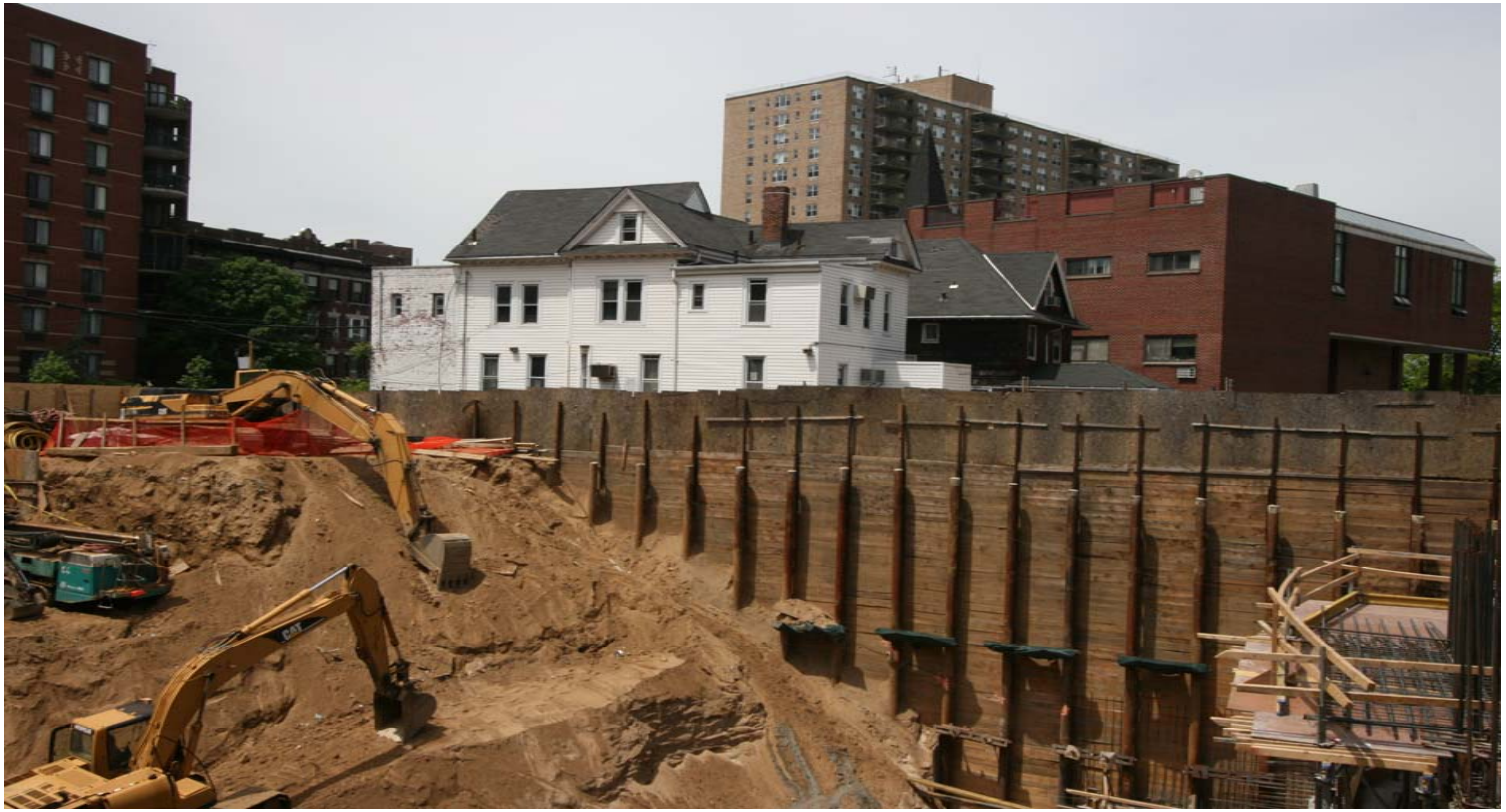
- Chapter 18 – Soils and Foundations
- Chapter 33 – Safeguards during Construction
- Chapter 16 – Structural Designs
- Chapter 17 – Structural Tests and Special Inspections

Tunneling for Underpinning – Too Dangerous

Never try to dig a tunnel for underpinning a foundation.

Use box pits.

Deficient Design of Deep SOE



45-foot deep sheeted excavation:

Uppermost tieback too low from the top of excavation

Failure of Deep SOE

Example: Tension cracks visible at top of the supported soil by SOE shown in the last slide: improperly designed SOE.

Failure of SOE During Installation – FDNY Rescue

Example: Improper means and methods/sequence for SOE installation – excavation performed without first installing lagging

Shear Cut – No SOE (Sheeting)

12-foot high vertical shear cut; no SOE or angle of repose visible

Deep Shear Cut Without SOE

Example: 15-foot high shear cut; no SOE or angle of repose visible

Bad Underpinning of Rubble Stone Foundation

Example: Pins too long and installed originally – without bracing

Bad Underpinning – 8-foot pins, not 4-foot

Deficient Underpinning – Floor Cracks

Example: Picture shows outward movement of foundation wall and underpinning shown in the two previous slides

Terrible SOE

Example: No lagging provided; steel placed without any connections

Improperly Designed SOE (Sheeting) – Collapse

Soldier Piles Installed: No Subsurface Information

Result: Two soldier piles pierced existing column footing

Good Example: Box Pit and Underpinning

Left: Front view of box pit

Right: Completed pin

Underpinning of Three-Story Building Column

Proper design and construction: 10 foot by 10 foot footing of a three-story building column was underpinned without causing any damage

Good SOE – Sheeting

15-foot deep excavation close to the sidewalk

Good Example – Multi-Tier Underpinning

Multi-tier underpinning works if properly designed, sequenced and monitored.

Excavation Engineering Unit – Overview

The Engineering Unit is part of the Excavation, Interior Demolition, Stalled Sites and Scaffold Unit.

Headed by a chief engineer and supported by an assistant chief engineer and four structural engineers/ plan examiners.

All engineers are licensed, New York State professional engineers with several years of professional experience.

We provided technical support to our unit and perform engineering audits to enhance safety for the public.

Excavation Engineering Unit – Overview (Continued)

Audit Referrals from Department Units and External Organizations		
Inspectors	Borough Offices	BEST
Emergency Response Team	Special Operations	Plan Examiners
Department Attorneys	NYC Development Hub	Major Projects Initiative
Engineers	Other City Agencies	Industry Professionals

Engineering Plan Audit/Review Process

We provide a list of required documents, including plans, to the design professionals, also known as applicants.

After we receive the documents, we issue review comments through objection sheet and/or marked-up plans.

Design professionals are welcome to meet with us to discuss questions or seek clarification.

Engineering Plan Audit/Review Process (Continued)

After an applicant submits amended plans and documents, we perform a final review.

If acceptable, we place our acceptance seal on the reviewed plans and advise the applicant to have the plans approved by the respective borough plan examination.

Engineering Plan Audit/Review Process (Continued)

Voluntary Quick Audits:

To assist the construction industry, we meet with industry professionals for voluntary quick audits.

Quick audits consist of an hour-long meeting with a design professional and construction team to review underpinning and/or support of excavation plans.

We review plans, mark comments and/or recommendations for improving designs – but do not place our acceptance seal on the reviewed plans.

Common SOE Mistakes

1. Improper or deficient design of support of excavation and underpinning. Lateral loads and their effect not considered in the design of underpinning.

2. Insufficient embedment of the soldier piles/beams in soil for the sheeting (SOE).

3. Missing or inadequate bracing for underpinning or support of excavation.

4. Missing or deficient details for the underpinning pins (missing width, thickness, sequencing, top and bottom, elevations).

Common SOE Mistakes (Continued)

5. Shimming or dry packing of underpinning not specified and/or insufficient details provided
6. Adjacent buildings, structures not shown on the plans
7. No monitoring specified for protection of adjacent buildings and/or Landmark structures within 90 feet of lot lines (TPPN 10/88)
8. No pre-construction surveys for determining type of construction, framing and conditions of adjacent buildings
9. Tieback details, design and test loads not specified
10. Inadequate soil investigations (i.e., groundwater table not shown on plans, dewatering need not identified, and/or effect of dewatering on adjacent structures not addressed.)

Common SOE Mistakes (Continued)

Lateral loads and their effect not considered in the design of underpinning:

We have noticed this mistake very frequently.

If the underpinning pins are deep, the lateral loads transferred to the structure being underpinned can be very large. Ignoring these loads in the design calculations for the underpinning can lead to instability and collapse of fragile, old, masonry buildings.

2014 Code Changes – Chapter 18
Soils and Foundations

Overall rearrangement for clarity and revision.

BC 1801 GENERAL AND DEFINITIONS

1801.2 Design: Revised to exclude any load reduction for design of temporary structures. The following section of 2008 code is deleted:

> *Where the structural design of soil or foundation members is based on allowable working stresses, the load reductions as described in Section 1605.3.1.1 shall be modified to use the following factors and the design shall be based on the resulting load values:*

2014 Code Changes – Chapter 18

1801.3 Definitions: This is a new sub-section.

See below for some important definitions:

MICROPILE. A micropile is a drilled and grouted deep foundation element with a diameter that measures 5-inches (127 mm) to 14-inches (356 mm) that develops its load-carrying capacity by means of a bond zone in soil (also commonly known as a minipile).

UNDERPINNING. The alteration of an existing foundation to transfer loads to a lower bearing stratum using new piers, piles, or other structural support elements installed below the existing foundation.

2014 Code Changes – Chapter 18 (Continued)

SECTION BC 1802 GEOTECHNICAL INVESTIGATIONS AND MATERIAL CLASSIFICATIONS

1802.4.1 Scope of investigations: (Revised)

1. Borings shall be uniformly distributed under the structure or distributed in accordance with load patterns imposed by the structure.

2. As a minimum, investigations for structures shall include:

2.1. one exploratory boring for built-over areas up to and including 750 square feet (69.7 m2)

2014 Code Changes – Chapter 18 (Continued)

2.2. two exploratory borings for built-over areas greater than 750 square feet (69.7 m2) but less than 5,000 square feet (465 m2), and at least one additional boring for each additional 2,500 square feet (233 m2), or part thereof, of built-over areas up to 20,000 square feet (1860 m2).

7. For structures to be supported on deep foundations, the required number of borings shall be not less than two borings, and based on a minimum of one boring per 2,000 square feet (609.6 m2) for the first 20,000 square feet (1860 m2) and one boring per every additional 4,000 square feet (609.6 m2).

2014 Code Changes – Chapter 18 (Continued)

BC1802.6 Reports: New subsection 1802.6.1 added.

1802.6.1 Conditions requiring geotechnical reports. The owner or applicant of record shall submit a written report to the commissioner for any of the following conditions:

1. Any load-bearing value greater than those in Section 1804 is claimed.

2. The structure is determined to be in Seismic Design Category C or D in accordance with Section 1613.

3. Test pits are implemented in lieu of borings as per Section 1802.4.1.

2014 Code Changes – Chapter 18 (Continued)

4. The structure will bear on or above compressible soils (Section 1804.2.2), uncontrolled fill (Section 1804.2.3) or artificially treated soils (Section 1804.2.4).

5. As required by the commissioner.

2014 Code Changes – Chapter 18 (Continued)

SECTION BC 1811 COMPOSITE PILES (New)

1811.1 General. Composite piles shall conform to the requirements of Sections 1811.2 through 1811.5.

1811.2 Design. Composite piles consisting of two or more approved pile types shall be designed to meet the conditions of installation.

1811.3 Limitation of load. The maximum allowable load shall be limited by the capacity of the weakest section incorporated in the pile.

2014 Code Changes – Chapter 18 (Continued)

SECTION BC 1812 HELICAL PILES (New)

1812.1 General. Helical piles may be used to support axial compression, or resist axial tension and lateral loads. All helical pile foundation systems shall be approved by the commissioner in accordance with Section 28-113.2 of the *Administrative Code*.

1812.2 Design. Design of helical pile foundations shall be based on a geotechnical investigation in accordance with Sections 1802 and 1808.2 with the following additional conditions stated in Sections 1812.2.1 and 1812.2.2.

2014 Code Changes – Chapter 18 (Continued)

Exception: For the repair of residential porches, stoops and slab on grades, helical test probes may be used to substitute for test borings, provided the pile has a torque to capacity ratio approved in accordance with Section 28-113.2.1 of the *Administrative Code*.

2014 Code Changes – Chapter 18 (Continued)

SECTION BC 1814 UNDERPINNING AND SUPPORT OF ADJACENT PROPERTY

1814.3 Monitoring: Revised to require the engineer (NYSPE) to develop a monitoring plan with locations, type of instrumentation, adjacent building types, etc.

When excavation, foundation construction, or underpinning is required, adjacent structures and properties shall be monitored in accordance with a plan prepared by the engineer. The engineer shall develop the scope of the monitoring program, including location and type of instruments, frequency and duration of readings, and permissible movement and vibration criteria.

2014 Code Changes – Chapter 18 (Continued)

This scope shall take into account the structures or property to be monitored and the conditions thereof. The monitoring program shall include necessary actions to address exceedances. These actions shall include notification of the commissioner. Monitoring of Historic and Landmarked structures shall be subject to special requirements as determined by the department.

2014 Code Changes – Chapter 33

SECTION BC 3309 PROTECTION OF ADJOINING PROPERTY

3309.4.1 Additional Safeguards During construction: Require to support both vertical and lateral loads.

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.

2014 Code Changes – Chapter 33 (Continued)

3309.4.3 Preconstruction Survey: This was part of Section 3309.4 of 2008 Code.

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.

2014 Code Changes – Chapter 33 (Continued)

3309.4.4 Monitoring (new): Monitoring required during course of excavations with certain excepts only.

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.

2014 Code Changes – Chapter 33 (Continued)

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.

2014 Code Changes – Chapter 33 (Continued)

3309.5 Underpinning. (Revised to include underpinning during demolition operations.)

Whenever underpinning is required to preserve and protect an adjacent property from construction**, demolition**, or excavation work, the person who causes such work shall, at his or her own expense, underpin the adjacent building provided such person is afforded a license in accordance with the requirements of Section 3309.2 to enter and inspect the adjoining buildings and property, and to perform such work thereon as may be necessary for such purpose.

2014 Code Changes – Chapter 33 (Continued)

If the person who causes the construction, demolition, or excavation work is not afforded a license, such duty to preserve and protect the adjacent property shall devolve to the owner of the adjoining property, who shall be afforded a similar license with respect to the property where the construction, demolition, or excavation is to be [made] performed.

2014 Code Changes – Chapter 33 (Continued)

3309.16 Monitoring plan (New): Monitoring plan required to be developed by a NYSPE.

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.

2014 Code Changes – Chapter 16 Structural Design

SECTION BC 1603 CONSTRUCTION DOCUMENTS

1603.1 General: New item 5 and 6 are added (see below).

Exception: In lieu of the requirements of 1603.1.1 through 1603.1.10, construction documents for buildings constructed in accordance with the conventional light-frame construction provisions of Section 2308 shall include drawings that indicate the following structural design information:

1. Floor and roof live loads.
2. Ground snow load, *Pg*.

2014 Code Changes – Chapter 16
Structural Design (Continued)

3. Basic wind speed (3-second gust), miles per hour (mph) (km/hr) and wind exposure.

4. Seismic design category and site class.

5. Flood design data, if located in flood hazard areas established in Section G102.2 of Appendix G.

6. Design load-bearing values of soils or rock under shallow foundations and/or the design load capacity of deep foundations.

2014 Code Changes – Chapter 16
Structural Design (Continued)

BC 1604: General Design Requirements.

1604.9 Counteracting structural actions. Structural members, systems, components and cladding shall be designed to resist forces due to earthquake and wind, with consideration of overturning, sliding and uplift. Continuous load paths shall be provided for transmitting these forces to the foundation. Where sliding is used to isolate the elements, the effects of friction between sliding elements shall be included as a force.

2014 Code Changes – Chapter 16
Structural Design (Continued)

1604.10 – Wind and Seismic Detailing. Lateral-force-resisting systems shall meet seismic detailing requirements and limitations prescribed in this code and ASCE 7-10, excluding ASCE 7-10 Chapter 14 and ASCE 7-10 Appendix 11A, even when wind load effects are greater than seismic load effects.

2014 Code Changes – Chapter 16
Structural Design (Continued)

SECTION BC 1610 SOIL LATERAL LOAD

Revised to include hydrostatic loads.

1610.1 General. Foundation walls and retaining walls shall be designed to resist lateral soil and hydrostatic loads. The soil loads specified in Table 1610.1 shall be used as the minimum design lateral soil loads unless specified otherwise in a geotechnical investigation.

Chapter 17: Structural Tests and Inspections

This chapter has been re-arranged and made clearer.

SECTION BC 1704 SPECIAL INSPECTIONS

1704.1.3 Responsibilities of the permit holder. Section re-arranged. In 2008 Code, this was 1704.1.1. Requirement for providing access for inspection made explicit:

4. Access for Special Inspection. The construction or work for which Special Inspection is required shall remain accessible and exposed for special inspection purposes until completion of the required special inspections.

Chapter 17: Structural Tests and Inspections
(Continued)

BC1704.20 (Revised – previously 1704.19 Structural Safety):

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.

Chapter 17: Structural Tests and Inspections
(Continued)

BC 1704.20.3: Underpinning of structures shall be subjected to Special Inspections in accordance with Sections 1704.20.6 to 1704.20.10.

1704.20.3.1 New foundations. In addition to the Special Inspection for structural stability, any new foundation elements installed as part of underpinning operations shall 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.

Chapter 17: Structural Tests and Inspections
(Continued)

1704.20.7.1 Monitoring (new). The design documents shall include any requirements for monitoring of the subject structure and/or adjacent structures, as determined by the registered design professional responsible for the design. The monitoring plan shall be specific to the buildings 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.

Chapter 17: Structural Tests and Inspections
(Continued)

1704.20.5 Raising and moving of a building (new).

A periodic Special Inspection shall be required in accordance with Sections 1704.20.6 through 1704.20.10 where the lowest above-grade floor or the lowest subgrade floor of a building is to be raised, lifted, elevated or moved.

Chapter 17: Structural Tests and Inspections
(Continued)

1704.21.1 Subsurface investigation Special Inspection. Revised, re-numbered and special inspections to comply with the requirements of *NY City Plumbing Code*.

1704.21.1.1 Soil borings and test pits. Prior to the approval of construction documents, soil borings and test pits shall be performed in accordance with the provisions of Section 1114.2.1 of the *New York City Plumbing Code*. Soil borings and test pits shall be performed under the supervision of a special inspector. The results of the soil borings and test pits shall be filed on forms provided by the department.

Chapter 17: Structural Tests and Inspections
(Continued)

1704.21.1.2 Soil percolation tests. Prior to the approval of construction documents, soil percolation tests shall be performed in accordance with the provisions of Section 1114.2.2 of the *New York City Plumbing Code* at the site of a proposed on-site storm water drainage and detention facility installations to determine the suitability of the soil and site. Such test shall be performed under the supervision of a Special Inspector. The results of the percolation tests shall be filed on forms provided by the department, stating the suitability of the site and the capacity of the subsoil for the proposed use.

Questions?

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

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