

Understanding Excavation: Building Structure



Landmark West!

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Summary of Construction Issues

- *Movement*
- *Vibration*
- *Noise*
- *Protection*
- *Support of Excavation*
- *Access*
- *Party Walls*

Movement

- Everything moves when it is pushed
- *Uniform vertical movement* of a building is often not damaging, and even may not be noticed.
- *Uniform horizontal movement* is rare but not usually damaging.
- *Differential settlement* can cause overall tilt and cracks in walls. This is the most common type of movement-related damage.
- *Differential horizontal movement* can cause separation of walls.

Vibration

- All *vibrations* have an *amplitude* (the maximum distance that something moves when shaking) and a *frequency* (how fast it shakes).
- Vibrations are typically damaging to buildings when the vibration frequency is close to the building's natural frequency.
- Seismographs used in construction measure *peak particle velocity* in inches per second.
- People's perception of vibration varies and may not correlate to damaging vibration.

Noise

- *Noise* is a special case of vibration. Physically there is no difference between noise and vibration. The difference is in our perception.
- Noise typically carries far less kinetic energy than vibration (noise is mostly transmitted through air; vibration is entirely transmitted through solid material).
- The frequencies of audible noise are far from the frequencies that can damage buildings.

Protection

- All construction requires *protection* of passers-by and neighboring buildings.
- The most common types of protection are:
 - *fences* to separate the construction site from streets and neighboring yards,
 - *sidewalk bridges* to protect the general public from falling objects,
 - *platforms* to protect neighboring roofs from falling objects.

Support of Excavation

- Whenever new cellars are created, existing cellars are expanded or deepened, or yards are lowered, two forms of structure are required:
 - Permanent retaining structure (foundation walls or retaining walls).
 - Temporary retaining structure to hold the soil until the permanent structure is built (*support of excavation*.)
- *Underpinning* requires a specific form of SoE.

Access

- Access is required for *protection* installation and removal.
- Access is probably required for installation, maintenance, and removal of *vibration monitors*.
- Access may be requested for construction logistics
- Access may be requested for *support of excavation*.

Party Walls

- *Party walls* are walls shared by two distinct buildings on separate tax lots. They straddle the lot line and are usually primary structure for both buildings.
- There is supposed to be a legal party-wall agreement but there may not be.
- Party walls can be extended up or down by either owner, but not horizontally. Vertical extensions should be the full thickness of the wall. Extensions can be used by both buildings.

Protection

“Protection Of Adjoining Property” in the Building Code (BC 3309) provides a lot of detail regarding the responsibilities of the construction team with regard to protecting neighboring buildings. This is the basis for all DoB rules regarding protection.

Building Surveys

- Adjoining buildings must be examined before any construction work. (BC 3309.3)
- Adjoining buildings must be surveyed before excavation work (5 to 10 feet deep within 10 feet, or 10 feet deep anywhere). (BC 3309.4.3)
- Examinations and surveys are to be performed by the construction team, but if refused access by the adjoining owner, that owner assumes the responsibility. (BC 3309.4)
- Any surveys should be shared.

Vibration Monitoring

- Vibration and movements of all *adjacent buildings* must be monitored during excavation and foundation work. This work is to be performed by the construction team. (BC 1814.3)

TPPN 10/88

- “Technical Policy and Procedure Notice 10/88” of the DoB gives requirements for vibration and movement monitoring of *landmarked* buildings when excavation and foundation work is performed within 90 feet. (BC 3309.4.4 ¶2)
- Monitoring per TPPN 10/88 must be performed by the construction team. This data should be shared between both owners.
- We recommend monitoring TPPN 10/88 for old buildings even if they are not landmarks.

Noise

Local Law 113 of 2005, and the referenced sections of the Administrative Code of New York (Sections 24-202 and following) describe the requirements for maximum allowable noise levels at a construction site. The provision of a noise mitigation plan and general compliance with the maximum noise levels.

Summary of Physical Issues

- *Ground Conditions*
- *Foundation Wall Construction*
- *Superstructure Wall Construction*
- *Minor Structures*

Natural Ground Conditions



Foundation Wall Construction



Foundation Wall Construction



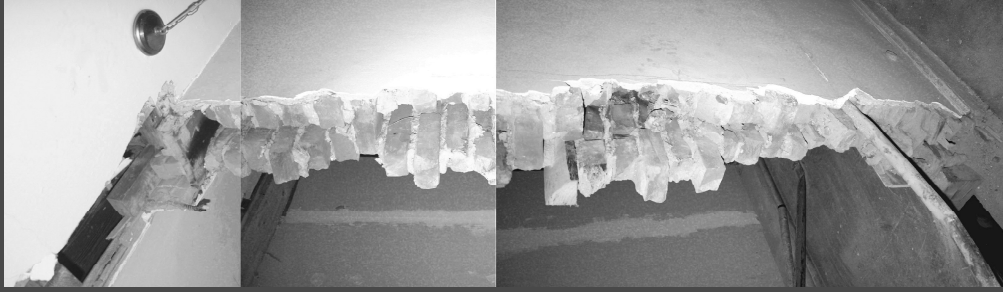
Superstructure Wall Construction



Superstructure Wall Construction



Superstructure Wall Construction



Minor Structures

