

## SECTION 02150

### SHORING AND UNDERPINNING

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Shoring for open excavations requiring a protective system.

##### 1.02 REFERENCES

- A. OSHA Construction Standards Chapter P: Excavations, Trenching, and Shoring.

##### 1.03 RESPONSIBILITY

- A. Contractor/Developer is solely responsible for safety. It is the Contractor/Developer's responsibility to adhere to all of OSHA's current regulations.

##### 1.04 DEFINITIONS

- A. Accepted Engineering Practices: Those requirements or practices which are compatible with standards required by a duly licensed or recognized authority.
- B. Benching: A method of protecting persons and property against cave-ins by excavation the sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels.
- C. Excavation: Any man-made cut, cavity, or depression in an earth surface, including trenches, formed by earth removal and producing unsupported earth conditions (sides). If installed forms or similar structures reduce the depth-to-width relationship, and excavation may become a trench.
- D. Failure: The permanent deformation or breakage of a structural member or connection; or the collapse of all or part of an excavation.
- E. Protective System: Any recognized method of protecting persons and property against cave-ins, the collapse of adjacent structures, or material that may fall or roll from an excavation side or into and excavation. Protective systems include support systems, sloping and benching systems and shield systems.
- F. Shield/Trenchbox : A structure that is able to withstand the forces imposed on it by a cave-in and thereby protect persons and property within the structure without preventing a cave-in. Shields may be permanent structures or may be designed to be portable and moved along as work progresses. Portable shields used in trenches are usually referred to as "trench boxes" or "trench shields".
- G. Shoring: A structure that supports the sides of an excavation and thereby protects persons and property by preventing cave-ins.
- H. Sides: A vertical or inclined earth surfaces formed at the outer edges of an excavation.

- I. Sloping: A method of protecting persons and property against cave-ins by excavation to form sides that are inclined away from the excavation, the angle on incline being of such a degree for the conditions of exposure that a cave-in will not occur.
- J. Support System: A structure which protects persons and property by providing support to an adjacent structure, underground installation, or the sides of an excavation.
- K. Trench: A narrow excavation made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench is not greater than 15 feet.

#### 1.05 DESIGN OF PROTECTIVE SYSTEMS

- A. Use professional engineer to design support systems, shield systems, and the structural components of these systems, and sloping and benching systems to resist without failure all loads that are intended to be imposed or transmitted to them.
- B. Fully compensate in design procedures for hydrostatic pressure in the excavation sides.

### PART 2 PRODUCTS

#### 2.01 MATERIALS

- A. Materials shall be as per 1.05 of this section.

### PART 3 EXECUTION

#### 3.01 STABILITY OF ADJACENT STRUCTURES

- A. Use support systems such as shoring, bracing, or underpinning where stability of adjoining buildings, walls, sidewalks, pavements, or other structures is endangered by excavation operations.

#### 3.02 INSPECTIONS

- A. Contractor/Developer shall employ and have on site at all times a competent person, as defined by OSHA, who is responsible for excavation inspection.
- B. Inspect excavations daily for evidence of possible cave-ins, indications of failure of protective systems, or other hazardous conditions.
- C. Upon discovery of hazardous conditions, cease all work in the excavations until additional precautions have been taken to ensure persons and property safety.

#### 3.03 ADDITIONAL REQUIREMENT FOR TRENCH EXCAVATION

- A. Do not excavate material to a level greater than 2 feet below the bottom of the members of a support system if the system is designed to resist the forces calculated for the full depth of the trench, and indications of a possible cave-in below the bottom of the support system are not evident while the trench is open.

END OF SECTION