

TECH Bulletin: Excavating & Trenching

EXCAVATING & TRENCHING REQUIREMENTS

OSHA (Occupational Safety & Health Administration) recognizes excavating as one of the most hazardous activities of a construction operation. OSHA has revised Subpart P, Excavations, of 29 CFR 1926.650, .651, and .652 to make the standard easier to understand, permit the use of performance criteria where possible, and provide construction employers with options when classifying soil and selecting employee protection methods.

Excavation and trenching are defined as two separate items within OSHA regulations. **Excavation** means any man-made cut, cavity, trench, or depression in an earth surface formed by earth removal. **Trenching** is defined as a narrow excavation (in relation to its length) made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet. If forms or other structures are installed or constructed in an excavation so as to reduce the dimension measured from the forms or structure to the side of the excavation to 15 feet or less (measured at the bottom of the excavation), the excavation is also considered a trench.

Daily inspections of excavation, the adjacent areas, and protective systems, per OSHA, shall be made by a “competent” person for evidence of a situation that could result in possible cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. The designated “competent” person shall be able to demonstrate the following:

- (1) Training, experience, and knowledge of:
 - a. Soil analyses,
 - b. Use of protective systems; and,
 - c. Requirements of 29 CFR Part 1926 Subpart P.

- (2) Ability to detect:
 - a. Conditions that could result in cave-ins,
 - b. Failures in protective systems,
 - c. Hazardous atmospheres; and,
 - d. Other hazards including confined spaces.

- (3) Authority to take prompt corrective measures to eliminate existing and predictable hazards and stop work when required.

An inspection must be conducted and documented by the competent person prior to the start of work and as needed throughout the shift. The following list specifies the frequency and conditions requiring inspections:

- ◆ Daily and prior to the start of each shift
- ◆ As dictated by the work being done in the trench
- ◆ After each rainstorm
- ◆ After other events that could increase hazards (snowstorm, windstorm, thaw, earthquake, etc.)
- ◆ When fissures, tension cracks, sloughing, undercutting, water seepage, bulging at the bottom or other similar conditions occur
- ◆ When there is a change in the size, location or placement of the spoil pile
- ◆ When there is an indication of change or movement in adjacent structures

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Trenches of 4 feet or more in depth should be provided with a fixed means of egress. Spacing between ladders or other means of egress must be such that a worker will not have to travel more than 25 feet laterally to the nearest means of egress. Ladders must be secured and extend a minimum of 36 inches above the landing.

OSHA categorizes soil and rock deposits into four types as follows:

- A. **STABLE ROCK** is a natural solid mineral matter that can be excavated with vertical sides and remain intact while exposed. Most of the time it is identified by a rock name such as granite or sandstone.
- B. **TYPE 'A' SOILS** are cohesive soils with an unconfined compressive strength of 1.5 tons per square foot or greater. These types of soils are often clay, silt clay, sandy clay, clay loam and in certain cases, silty clay loam and sandy clay loam.
- C. **TYPE 'B' SOILS** are cohesive soils with an unconfined compressive strength greater than 0.5, but less than 1.5 tons per square foot. Examples include angular gravel silt, silt loam, and/or previously disturbed soils
- D. **TYPE 'C' SOILS** are cohesive soils with an unconfined compression strength of 0.5 tons per square foot or less. Granular soils like gravel, sand and loamy sand, submerged soil, soil from which water is freely seeping, and submerged rock that is not stable fall into the Type 'C' soil category.

OSHA Regulation identifies the following types of test equipment and several methods to be used for evaluation of soil types:

1. **POCKET PENETROMETERS** are direct-reading, spring-operated instruments used to determine the unconfined compressive strength of saturated cohesive soils. Once pushed into the soil, an indicator sleeve displays the reading. This type of instrument reads in either tons per square foot or kilograms per square centimeter.
2. **PLASTICITY OR WET THREAD TEST** is conducted by molding a moist sample of the soil into a ball and attempting to roll it into a thin thread, approximately 1/8-inch diameter by 2 inches in length. The soil sample is held by one end. If the sample does not break or tear, the soil is considered cohesive.
3. **VISUAL TEST** is a qualitative evaluation of conditions around the site. The entire excavation site is observed, including the soil adjacent to the site and the soil being excavated. If the soil remains in clumps, it is cohesive; if it appears to be coarse-grained sand or gravel, it is considered granular.

During a visual test the evaluator should check for crack-line openings along failure zones that would potentially indicate tension cracks. The evaluator should also look for signs of bulging, boiling or sluffing, as well as for signs of surface water seeping from the sides of the excavation or from the existing water table.

It is paramount that the evaluator be aware of the hazards associated with excavation and trenching (and requirements to address those hazards). Terminology and the definitions for various terms used throughout the specific trenching and excavation requirements are detailed in the OSHA regulations that pertain to this topic.