Trenching and Shoring Guidelines

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Excavation: Any man-made cut, cavity, trench, or depression in an earth surface that is formed by earth removal.

Hazardous Atmosphere: An atmosphere that by reason of being explosive, flammable, corrosive, oxidizing, irritating, oxygen-deficient, toxic, or otherwise harmful may cause death, illness, or injury to persons exposed to it.

Ingress and Egress:

III. Requirements

Excavations shall be made in accordance to the industrial standards set forth in 29CFR 1926.650, .651, .652.

A competent person shall be placed in charge of all excavations.

The competent person should have and be able to demonstrate the following:

Training, experience, and knowledge of:
- Soil analysis;
- Use of protective systems

Ability to detect:
- Conditions that could result in cave-ins
- Failures in protective systems
- Hazardous atmospheres
- Other hazards including those associated with confined spaces

Has the authority to take prompt corrective measures to eliminate existing and predictable hazards and to stop work when required.

A. Underground utilities must be located and marked before excavations begin.

B. Spoil piles shall be a minimum of two (2) feet from the edge of the dig area.

C. Employees are not allowed in the excavation while heavy equipment is digging.

D. A competent person shall conduct visual inspections:

- Daily and before the start of each shift
- As dictated by the work being done in the trench
- After every rainstorm
- After other events that could increase hazards, such as a snowstorm, windstorm, thaw, earthquake, dramatic change in weather, 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 any indication of change or movement in adjacent structures.

E. For trenches 4 feet or greater in depth a trench inspection form shall be filled out by a competent person.

IV. Soil Types

Soil and rock deposits are categorized into four types, A through D as follows:

Stable Rock: A natural solid mineral matter that can be excavated with vertical sides and remain intact while exposed. This is usually identified by a rock name such as granite or sandstone.

Type A: Most stable: clay, silty clay, sandy clay, clay loam, silty clay loam and sandy clay loam. No soil is Type A if it is fissured, is subject to vibration of any type, has previously been disturbed, is of a sloped, layered system where the layers dip into the excavation on a slop of 4 horizontal to 1 vertical or greater, or has seeping water.

Type B: Medium stability: angular gravel, silt, silt loam, medium clay, and unstable dry rock; previously disturbed soils unless classified as Type C; soils that meet the requirements of Type A if it is fissured or subject to vibration or dry unstable rock.

Type C: Least stable: gravel, sand and loamy sand, soft clay, submerged soil or dense, heavy unstable rock, and soil from which water is freely seeping.

Layered geological Strata (where soils are configured in layers): the soil may be classified on the basis of the soil classification of the weakest soil layer. Each layer may be classified individually if a more stable layer lies below a less stable layer (ie, where a Type C soil rests on top of stable rock).

V. Test Methods and Evaluating Soil Type

The competent person in charge of the excavation shall be responsible for determining whether the soil is Type A, B, or C. If the competent person wants to classify the soil as Type C, testing is not required. However, tests must be conducted to determine if the soil can be classified as Type A or B. To do this, the competent person shall use a visual test coupled with one or more manual tests.

Visual Test

In addition to checking the items on the trench inspection form, the competent person should perform a visual test to evaluate the conditions around the site. In a visual test, 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-granular sand or gravel, it is considered granular. The competent person also checks for any signs of vibration.

During a visual test, the evaluator should check for crack-line openings along the failure zone that would indicate tension cracks, look for existing utilities that indicate that the

X. Standing Water and Water Accumulation

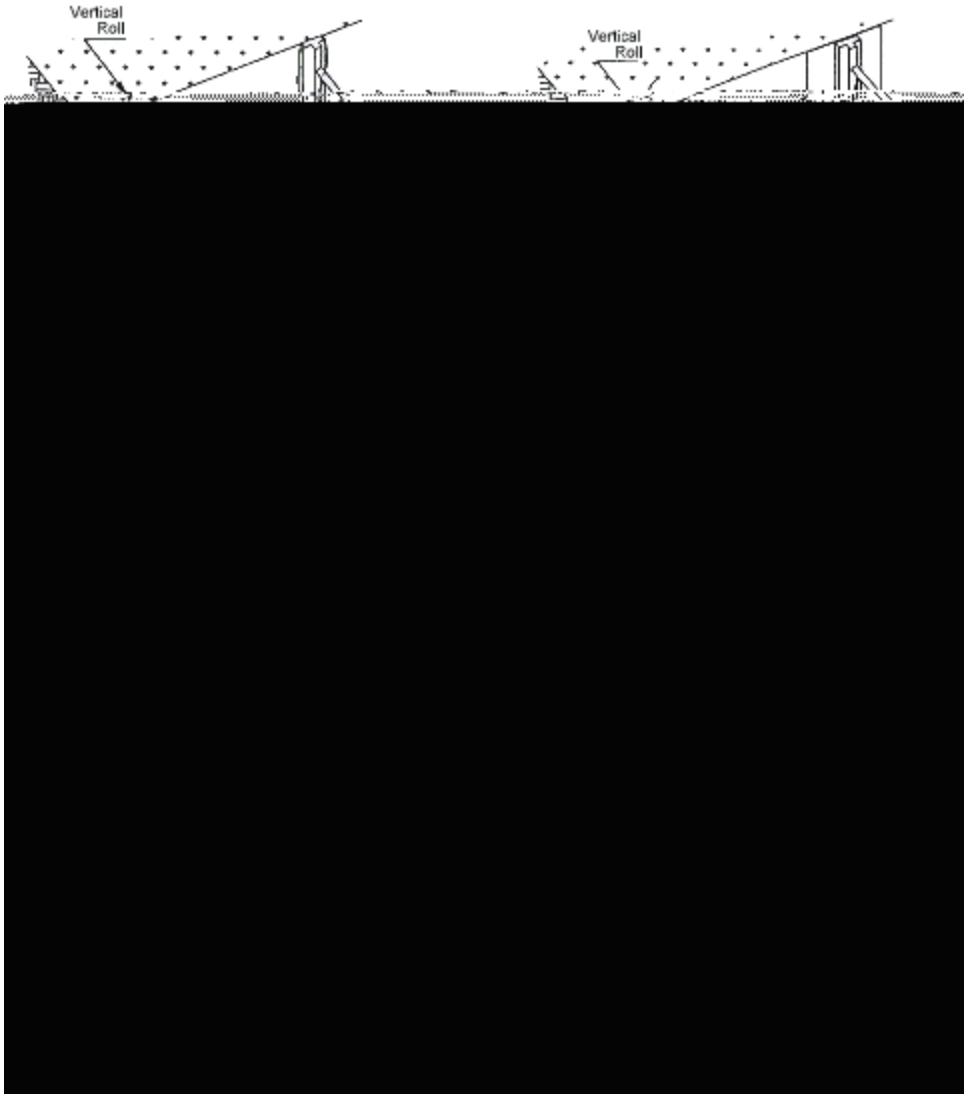
Methods for controlling standing water and water accumulation must be provided and

Sloping

Maximum allowable slopes for excavations less than 20 feet based on soil type and angle to the horizontal are as follows:

Soil Type	Height / Depth Ratio	Slope Angle
Type A	¾:1	

Three vertical shores, evenly spaced, must be used to form a system.



Pneumatic Shoring works in a manner similar to hydraulic shoring. The primary difference is that pneumatic shoring uses air pressure in place of hydraulic pressure. A disadvantage to the use of pneumatic shoring is that an air compressor must be on the excavation site.

Shield (Trench Box)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