



Trenching and Shoring

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1.0 PURPOSE

This program is designed to enable USC staff to recognize the hazards involved in trenching establish procedures that are to be followed in order to prevent injury. Hazards associated with excavation are cave-ins; the striking of underground utilities; falling tools, materials, and equipment; and hazardous air contaminants or oxygen-deficient environments.

2.0 APPLICABLE STANDARDS

California: Title 8, Section 1541, General Requirements for Excavations
Title 8, Section 341(a), Permit Requirements

3.0 GENERAL REQUIREMENTS / UTILITIES

Before starting a job, ensure that all items that are needed are on hand. The following actions should be taken:

- Notify all regional notification centers and all underground utility owners who are not members of the notification centers two working days before starting the work.
- Estimate the location of the underground utilities.
- Obtain a permit from DOSH if workers are required to enter an excavation that is 5 ft. or deeper.
- While excavating, the exact locations of the underground utilities must be determined by safe and acceptable means.
- While the excavation is open, the underground utilities must be protected, supported, or removed as necessary.

4.0 COMPETENT PERSON

A "Competent person" is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

The competent person must be able to demonstrate the following:

- The ability to recognize all possible hazards associated with excavation work and to test for hazardous atmospheres.

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- Knowledge of the current safety orders pertaining to excavation and trenching.
- The ability to analyze and classify soils.
- Knowledge of the design and use of protective systems.
- The authority and ability to take prompt corrective action when conditions change.

During an excavation, a competent person must be on site to do the following:

- Conduct inspections of the excavations, adjacent areas, and protective systems before the start of work; as needed throughout the shift; and daily for potential cave-ins, failures, hazardous atmospheres, or other hazards.
- Take prompt corrective action or remove employees from the hazard.

5.0 PROTECTIVE SYSTEMS

When employees are in an excavation, they must be protected from cave-ins by an appropriate protective system. *Exception:* If excavations are made entirely in stable rock, or are less than 5 ft. deep, and a competent person has determined that there is no potential for a cave-in, no protective system is needed.

The Requirements for protective systems include the following:

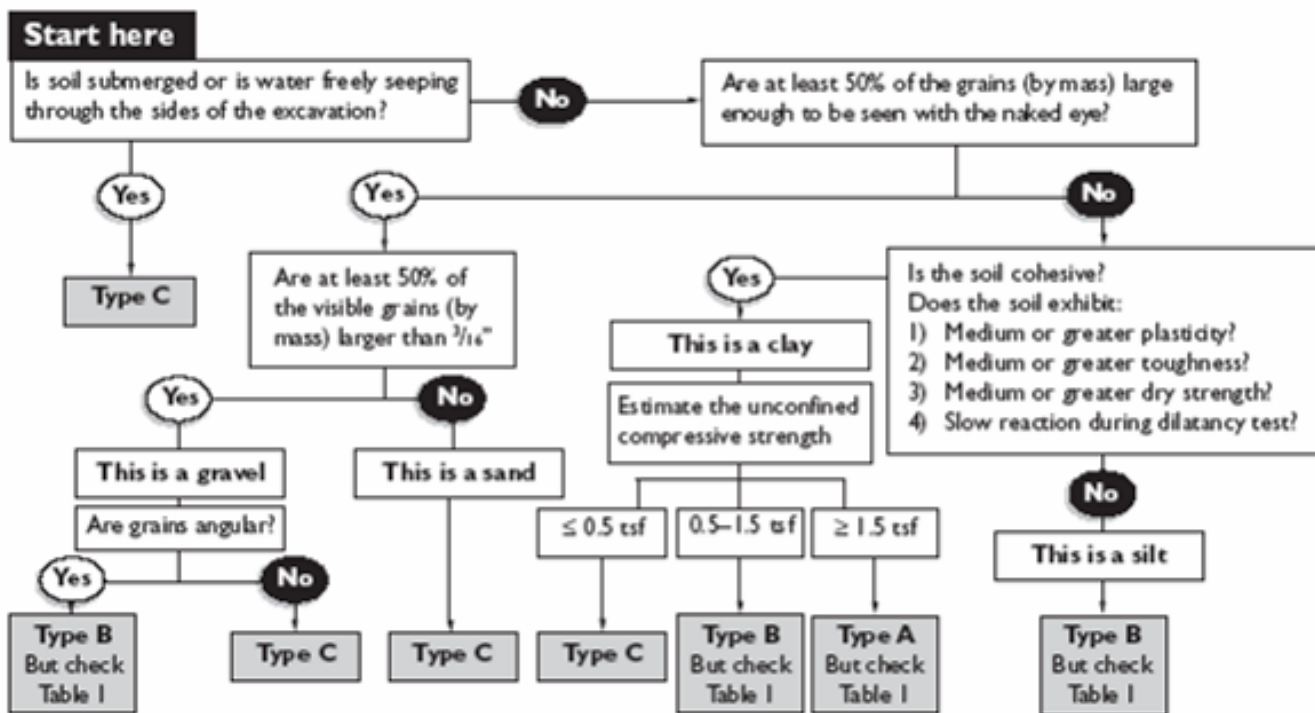
- Protective system design must be based on soil classification: Type A, B, or C soils.
- Soil classification is required as follows unless the protective system design is based on Type C soil:
 - Classification must take into account both site and environmental conditions.
 - Soil must be classified by a competent person as Type A, B, or C soil.
 - Classification must be based on the results of at least one visual and one manual analysis (see Table 1 and Illustration 1).

Table 1
Site Conditions That Affect Rock/Soil Slope Stability

<i>Condition</i>	<i>Requirement</i>
Soil is fractured/unstable dry rock.	Downgrade to Type B.
Soil is fractured/unstable submerged rock.	Downgrade to Type C.
Soil is cemented (caliche, hardpan, etc.).	Classify as Type A.
Soil is fissured.	Downgrade from Type A to Type B.
Soil is subject to vibration.	Downgrade from Type A to Type B.
Soil has been previously	Downgrade from Type A disturbed. to Type B.
Soil is submerged or water is freely seeping through the sides of the excavation.	Downgrade from Type A to Type C. Downgrade from Type B to Type C.
Soil profile is layered with the layers dipping into the excavation on a slope of four horizontal to one vertical or steeper.	Downgrade from Type A to Type C. Downgrade from Type B to Type C.

Illustration 1

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6.0 SPECIFIC EXCAVATION REQUIREMENTS

Standard shoring, sloping, and benching must be used as specified in the general Industry Safety Orders or according to tabulated data prepared by a registered engineer. In addition the following conditions should be met:

- Protective systems for excavations deeper than 20 ft. shall be designed by a registered engineer.
- Additional bracing must be used when vibration or surcharge loads are a hazard.
- Excavations must be inspected as needed after every rainstorm, earthquake, or other hazard increasing occurrence. (Water in the excavation may require a reclassification of soil type.)
- People must be protected from falling materials by scaling, installation of protective barriers, or other methods, and must be protected from excavated or other material by keeping such material 2 ft. from the excavation edge or by using barrier devices.
- Uprights should extend to the top of the trench and its lower end not more than 2 feet from the bottom of the trench.
- Ladders or other safe access must be provided within 25 ft. of a work area in trenches 4 ft. or deeper.
- Excavation beneath the level of adjacent foundations, retaining walls, or other structures must be avoided unless specific regulatory requirements for that type of activity have been met.
- The shored, braced, or underpinned structures should be inspected prior to work/daily when stability is in danger.

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- Walkways or bridges with standard guardrails must be installed when employees or equipment are required or permitted to cross over excavations that are at least 6 ft. deep and wider than 30 in.
- Barriers must be erected around excavations in remote locations. All wells, pits, shafts, and caissons must be covered or barricaded, or if temporary, backfilled when work is completed.

7.0 PROGRAM APPROVAL AND REVIEW

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