TRENCH/EXCAVATION
Competent Person
Quick Reference Guide

DEFINITIONS

Competent Person: One who 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.

Intent: In order to be a "competent person" for the purpose of this standard one must have had specific training in, and be knowledgeable about, soils analysis, the use of protective systems , and the requirements of this standard and must be designated by the employer

Inspections : Daily inspections of excavations, the adjacent areas, and protective systems shall be made by a competent person for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection shall be conducted by the competent person prior to the start of work and as needed throughout the shift. Inspections shall also be made after every rain storm or other hazard increasing occurrence. These inspections are only required when employee exposure can be reasonably anticipated.

GENERAL REQUIREMENTS

- Protecting **SURFACE ENCUMBRANCES** that may create a hazard to employees.
- Locating **UNDERGROUND INSTALLATIONS** prior to opening an excavation.
- Providing appropriate **ACCESS AND EGRESS. (4 feet)**
- Reducing employees **EXPOSURE TO VEHICULAR TRAFFIC** with the use of warning vests.
- Employee **EXPOSURE TO FALLING LOADS** shall be eliminated.
- Providing a **WARNING SYSTEM FOR MOBILE EQUIPMENT** operating adjacent to or near an excavation.
- Testing the air in excavations to identify potentially **HAZARDOUS ATMOSPHERES. (4 feet)**
- **PROTECTION FROM HAZARDS ASSOCIATED WITH WATER ACCUMULATION.**
- Ensuring the **STABILITY OF ADJACENT STRUCTURES.**
- Adequate **PROTECTION OF EMPLOYEES FROM LOOSE ROCK OR SOIL** that may fall or roll into an excavation.
- Daily **INSPECTIONS** by a competent person (see above definition)
- Appropriate **FALL PROTECTION** near excavations. **4 feet)**

REQUIREMENTS FOR PROTECTIVE SYSTEMS

Each employee in an excavation shall be protected from cave-ins by an adequate protective system except when excavations are less than **4 feet** in depth and examination of the ground by a competent person provides no indication of a potential cave-in.

Disclaimer: For use by the trained and knowledgeable "competent person" only. Refer to appropriate requirements of your local city, county, state, federal regulations or manufacturer's tabulated engineering for further clarification.

SOIL CLASSIFICATION

Type A Soil:

Cohesive soils with an unconfined compressive strength of 1.5 ton per square foot (tsf) 144 kPa) or greater. Examples of cohesive soils are: Clay, silty clay, sandy clay, clay loam and, in some cases, silty clay loam and sandy clay loam. Cemented soils such as caliche and hardpan are also considered Type A.

However, no soil is Type A if:

1) The soil is fissured; or
2) The soil is subject to vibration from heavy traffic, pile driving, or similar effects; or
3) The soil has been previously disturbed; or
4) The soil is part of a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4H:1V or greater; or
5) The material is subject to other factors that would require it to be classified as a less stable material.

Type B Soil:

(1) Cohesive soil with an unconfined compressive strength greater than 0.5 tsf but less than 1.5 tsf; or
(2) Granular cohesionless soils including: angular gravel (similar to crushed rock), silt, silt loam, sandy loam and, in some cases, silty clay loam and sandy clay loam.
(3) Previously disturbed soils except those which would otherwise be classed as Type C soil.
(4) Soil that meets the unconfined compressive strength or cementation requirements for Type A, but is fissured or subject to vibration; or
5) Dry rock that is not stable; or
(6) Material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep than four horizontal to one vertical (4H:1V , but only if the material would otherwise be classified as Type B.

Type C

1) Cohesive soil with an unconfined compressive strength or 0.5 tsf or less; or
2) Granular soils including gravel, sand, and loamy sand; or
3) Submerged soil or soil from which water is freely seeping; or
4) Submerged rock that is not stable; or
5) Material in a sloped, layered system where the layers dip into the excavation or a slope of four horizontal to one vertical (4H:1V) or steeper.

SOIL TESTING

(Minimum: One visual and one manual test are required.)

Visual Tests: Visual analysis is conducted to determine qualitative information regarding the excavation site in general, the soil adjacent to the excavation, the soil forming the sides of the open excavation, and the soil taken as samples form excavated material.

A. Observe samples of soil that are excavated and soil in the sides of the excavation. Estimate the range of particle sizes and the relative amounts of the particle sizes. Soil that is primarily composed of fine-grained material is cohesive material.
B. Observe soil as it is excavated. Soil that remains in clumps when excavated is cohesive. Soil that breaks up easily and does not stay in clumps is granular.
C. Observe the side of the opened excavation and the surface area adjacent to the excavation. Crack-like openings such as tension cracks could indicate fissured material. If chunks of soil spall *off* a vertical side, the soil could be fissured. Small spalls are evidence of moving ground and are indications of potentially hazardous situations.
D. Observe the area adjacent to the excavation and the excavation itself for evidence of existing utility and other underground structures, and to identify previously disturbed soil.
E. Observe the opened side of the excavation to identify layered systems. Examine to see if layers slope toward the excavation. Estimate the degree of slope of the layers.
F. Observe the area adjacent to the excavation and the sides of the open excavation for evidence of surface water, water seeping from the sides of the excavation, or location of the level of the water table.
G. Observe the area adjacent to the excavation and the area within the excavation for sources of vibration that may *affect* the stability of the excavation face.

Manual Tests: Manual analysis of soil samples is conducted to determine quantitative as well as qualitative properties of soil and to provide more information in order to classify soil properly.

A. Plasticity. Mold a moist or wet sample of soil into a ball and attempt to roll it into threads as thin as 1/8-inchin diameter. Cohesive material can be successfully rolled into threads without crumbling. For example, if at least a two inch length of 1/8-inch thread can be held on one end without tearing, the soil is cohesive.
B. Thumb Penetration. The thumb penetration test can be used to estimate the unconfined compressive strength of cohesive soils. Type A soils with an unconfined compressive strength of 1.5 !sf can be readily indented by the thumb; however, they can be penetrated by the thumb only with very great *effort.* Type C soils with an unconfined compressive strength of 0.5 !sf can be easily penetrated several inches by the thumb, and can be molded by light finger pressure.
C. Dry Strength. If the soil is dry and crumbles on its own or with moderate pressure into individual grains or fine powder it is granular any combination of gravel, sand, or silt). If the soil is dry and falls into clumps which break up into smaller clumps, but the smaller clumps can only be broken up with difficulty, it may be clay in any combination with gravel, sand or silt. If the dry soil breaks into clumps which do not break up into small clumps and which can only be broken with difficulty, and there is no visual indication the soil is fissured, the soil may be considered unfissured.

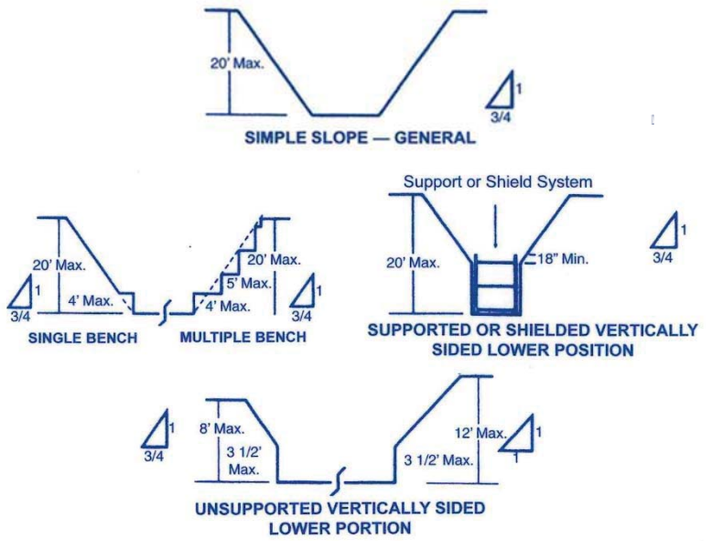
Other available options using SOIL REPORTS

Blows Per Foot	Cohesive Soil	Granular Soil
0-4	C-Soft	C - Very Loose
4-8	B- Medium	C - Loose
8-15	B or A- Stiff	C - Medium Loose
15-30	A- Very Stiff	C- Medium
>30	A- Hard	* B - Dense

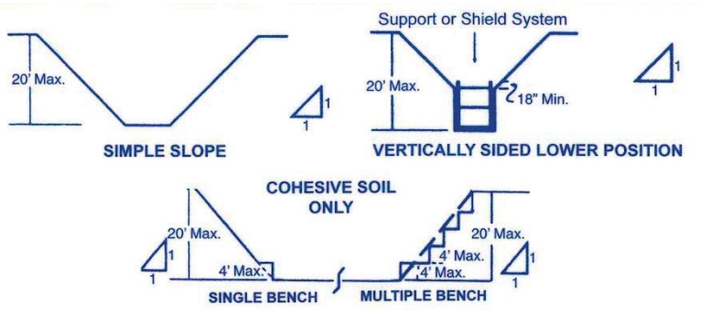
Type A if hardpan or cementation exists

SLOPING & BENCHING

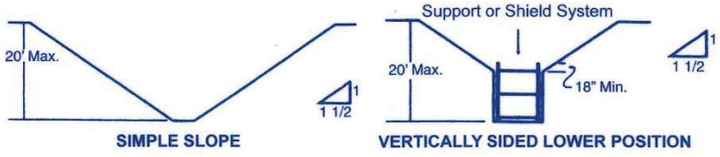
TYPE "A" SOIL



TYPE "B" SOIL



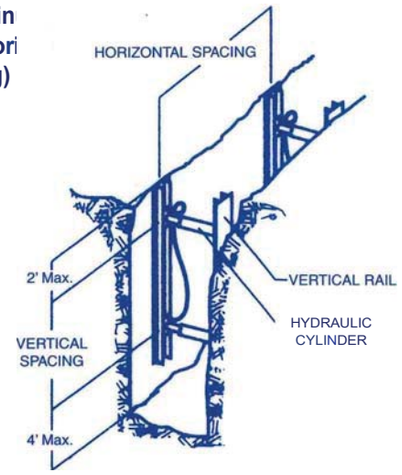
TYPE "C" SOIL



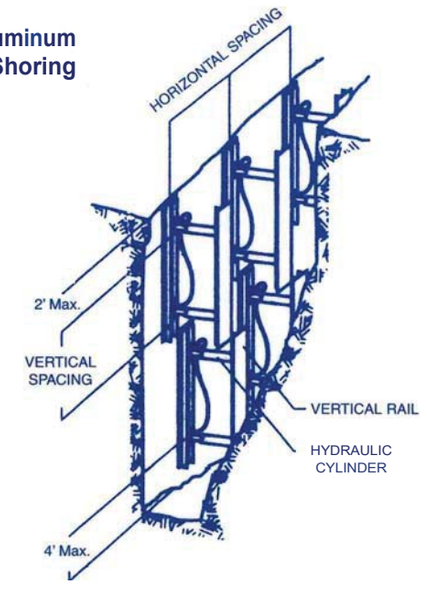
SPEED SHORE ALUMINUM HYDRAULIC SHORING

Typical Installations

Vertical Alumin Hydraulic Shori (Spot Bracing)



Vertical Aluminum Hydraulic Shoring S tacked)



Note: Always install shoring from the top down and remove from the bottom up.

Table VS-1 Type "A" Soil **SPEED SHORE**

Depth of Excavation FEET	HYDRAULIC CYLINDERS					Sheeting Note 3
	Maximum Horizontal Spacing *(FEET)*	Maximum Vertical Spacing Note 6) *(FEET)*	Width of Excavation *FEET*			
			O to 8	8 to 12	12 to 15	
O to 15	8	4	2" dia.	2" dia.	2" dia. 1	Note2)
O to 25	8	4	2" dia.	2" dia. 1	2" dia. 1	Note2)

Table VS-2 Type "B" Soil

Depth of Excavation FEET	HYDRAULIC CYLINDERS					Sheeting Note3)
	Maximum Horizontal Spacing *(FEET)*	Maximum Vertical Spacing Note 6 *(FEET)*	Width of Excavation *FEET*			
			O to 8	8 to 12	12 to 15	
O to 10	8	4	2"dia.	2" dia.	2" dia. 1	Note2)
O to 20	6	4	2" dia.	2"dia. 1	2" dia. 1)	Note2)
O to 25	5	4	2"dia.	2" dia. 1	2" dia. 1	Note7)

Table VS-3 Type "C" Soil

Depth of Excavation FEET	HYDRAULIC CYLINDERS					Sheeting Note4)
	Maximum Horizontal Spacing *(FEET)*	Maximum Vertical Spacing Note 6) */FEET)*	Width of Excavation *FEET*			
			O to 8	8 to 12	12 to 15	
O to 10	6 Note 5	4	2" dia.	2" dia.	2"dia. 1	Note2)
O to 20	4	4	2" dia.	2" dia.	2"dia. 1	Note7)
O to 25	4	4	2" dia.	2" dia.	**N/A**	Note7)

Notes to Tables VS-1 , VS-2 , VS-3

(1) Two inch diameter cylinders shall have a structural steel tube oversleeve 3.5 **x** 3.5 **x** 0.1875inches extension (installed over the aluminum oversleeve extension) or a steel tube oversleeve3 x 3 x 0.1875 inch extension (installed without the aluminum oversleeve) that extends the full retracted length of the cylinder.

(2) The bottom of the sheeting shall extend within 2 feet of the bottom of the excavation. If there is an indication of a possible loss of soil from behind the support system, sheeting must extend to the bottom of the excavation.

(3) Four feet wide sheeting is required at each Vertical Shore if raveling or sloughing of the excavation face appears likely to occur.

(4) Four feet wide sheeting shall be used.

(5) When 4 feet horizontal spacing is exceeded, the open spaces between the sheeting must be monitored for sloughing and raveling of the excavation face.

(6) The bottom hydraulic cylinder shall be a maximum of 4 feet above the bottom of the excavation.

(7) Sheeting shall extend to the bottom of the excavation.

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