



Introduction

Excavation and trenching are among the most hazardous construction operations. The Occupational Safety and Health Administration's (OSHA) Excavation standards, 29 Code of Federal Regulations (CFR) Part 1926, Subpart P, contain requirements for excavation and trenching operations.

PROTECTIVE SYSTEMS: HOW TO PREVENT CAVE-INS

OSHA generally requires that employers protect workers from cave-ins. Two methods covered in this toolbox talk at sloping and benching the sides of the excavation.

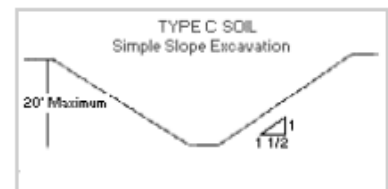
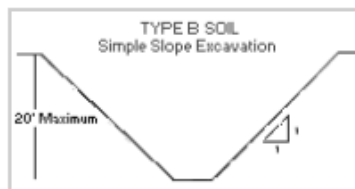
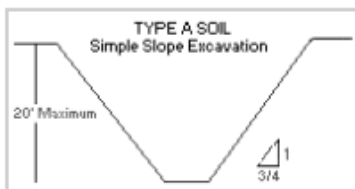
Sloping

Maximum allowable slopes for excavations less than 20 ft (6.09 m) based on soil type and angle to the horizontal are as follows:

Table V:2-1 Allowable Slopes

Soil Type	Height:Depth Ratio	Slope Angle
Stable Rock	Vertical	90°
Type A	0.75:1	53°
Type B	1:1	45°
Type C	1.5:1	34°
Type A (short term)	0.5:1	63°

(For a maximum excavation depth of 12ft)

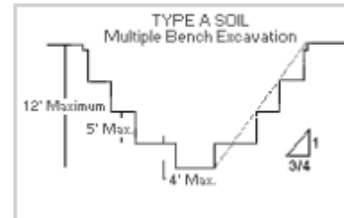
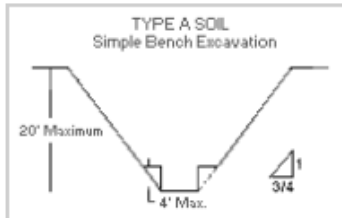


The above figures illustrate the different types of slope excavations for Type A, B, and C soils in single slope excavations.

Benching

There are two basic types of benching, simple and multiple. The type of soil determines the horizontal to vertical ratio of the benched side. As a general rule, the bottom vertical height of the trench must not exceed 4 ft (1.2 m) for the first bench. Subsequent benches may be up to a maximum of 5 ft (1.5 m) vertical in Type A soil and 4 ft (1.2 m) in Type B soil to a total trench depth of 20 ft (6.0 m). All subsequent benches must be below the maximum allowable slope for that soil type. For Type B soil the trench excavation is permitted in cohesive soil only.

The figures below illustrate two types of excavations made in Type A soil: Single Bench Excavation and Multiple Bench Excavation.



The figures below illustrate two types of excavations made in Type B soil that are permitted in cohesive soil only: Single Bench Excavation, and Multiple Bench Excavation.

