





Trenching and Excavation Hazards

- What is the first thing you should do before you dig?
- Classes of soil
 - Stable Rock
 - Class A
 - Class B
 - Class C




DID YOU KNOW?
THE FATALITY RATE FOR EXCAVATION WORK IS 112% HIGHER THAN THE RATE FOR GENERAL CONSTRUCTION.




Type A Soil

- Type A – Cohesive soils (1.5 tsf or more)
 - clay, silty clay, sandy clay, cemented soils;
- Can't be Type A if:
 - Soil is fissured
 - Subject to vibration
 - Previously disturbed




Type B Soil

- Cohesive soils (0.5-1.5 tsf)
- Granular soils such as crushed gravel, silt
- Previously disturbed soils (normally type A or B)
- Unstable dry rock
- Layered system



Type C Soil

- Cohesive soils (0.5 tsf or less)
- Granular soils such as gravel, sand
- Unstable submerged rock
- Layered system



Now what?

- Based on soil type and depth of planned trench or excavation:
 - Sloping or benching
 - Protective systems
 - Protecting undercut structures including utilities
 - Provide means of egress (ladder)
 - Don't forget about spoil pile hazards
 - Accountability on site

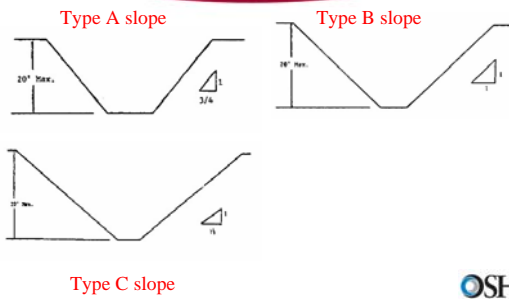


Sloping and Benching

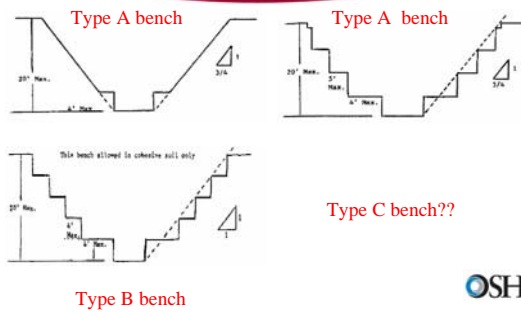
- At what depth do you need to slope/bench?
- Angles of sloping?
- Difference between sloping and benching?



Sloping

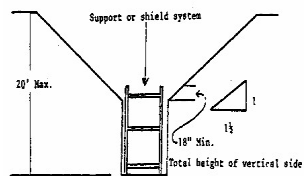


Benching



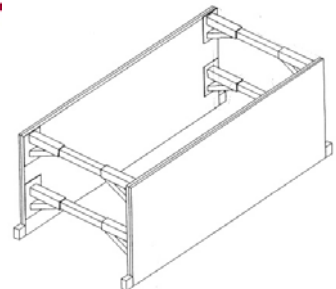
Protective Systems

- Trench Boxes
- Shoring
- Undercut structures
 - Sidewalks
 - Buildings
 - Soil/rock



Trench Shields or Boxes

- Engineered for Type C soils
- Can be used with all classes of soils
- Shields can be moved horizontally with workers inside
- Worker must stay inside shields



Spoil Pile

- Must be at least 2 ft. back from edge of excavation
- Remove rocks and large clumps of soil



OSHA

Barricade Excavations

- Excavations must be barricaded or marked if they are not readily visible



OSHA

Egress



- Means of egress every 25 feet when trench depth is 4 ft or greater
- Ladders
- Ramps

OSHA

Competent Person

- Responsibilities:
 - Knows requirements of standard
 - Analyzing and classifying soil
 - Selecting and installing protective systems
 - Placing spoil piles
 - Providing safe egress
 - Proximity of equipment
 - Vibration effects of vehicles

OSHA

Competent Person

- Responsibilities:
 - Changes in weather
 - Water conditions
 - Assessing dangerous atmospheres
 - Water seepage
 - Underground utilities
 - Adjacent structures
 - Dangerous work practices

OSHA

Case Study

Trench Collapse

OSHA
Occupational
Safety and Health
Administration

Description of Work

- Plumbing subcontractor was responsible for tying the plumbing from the building into the existing line in the alley.
- Employer attempted the work the previous week but did not have an excavator large enough to obtain necessary depth



Description of Work

- Cave-in issues were observed the previous week.
- A larger excavation was created but a very narrow trench was extended into the alley to locate the tap.
- A trench box was on site early in the day but...
- Employee was instructed to expose the connection in the narrow portion of the trench.
- 10 to 12 feet deep with vertical walls.

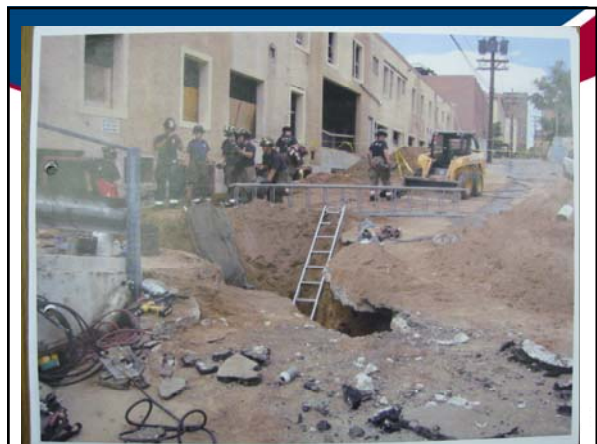


Description of Work

- An A-frame ladder was laid down so employees could enter the trench.
- Employee entered the trench with a shovel.
- "Only one in at a time"
- In a very short period of time the trench collapsed and completely buried the worker.




Accident Photos






OSHA's Investigation

- Serious Citations for:
 - 1926.20(b)(2) – Frequent Inspections
 - 1926.21(b)(2) – Training to recognize hazards
 - 1926.501(b)(4)(ii) – Covers for floor holes
 - 1926.651(c)(2) – Trench egress
 - 1926.651(k)(2) – Employees not removed
 - 1926.1053(b)(4) – Improper use of ladders
 - 1926.1060(a)(1)(iii) – Ladder training



OSHA's Investigation

- One Willful Citation for:
 - 1926.651(a)(1) – Protective systems
- Total Penalty: \$32,100



Confined Space Discussion?



Disclaimer

- This information has been developed by an OSHA Compliance Assistance Specialist and is intended to assist employers, workers, and others as they strive to improve workplace health and safety. While we attempt to thoroughly address specific topics, it is not possible to include discussion of everything necessary to ensure a healthy and safe working environment in a presentation of this nature. Thus, this information must be understood as a tool for addressing workplace hazards, rather than an exhaustive statement of an employer's legal obligations, which are defined by statute, regulations, and standards. Likewise, to the extent that this information references practices or procedures that may enhance health or safety, but which are not required by a statute, regulation, or standard, it cannot, and does not, create additional legal obligations. Finally, over time, OSHA may modify rules and interpretations in light of new technology, information, or circumstances; to keep apprised of such developments, or to review information on a wide range of occupational safety and health topics, you can visit OSHA's website at www.osha.gov.

