

## Protective System Outline

### 1. Overview

- a. Define different types of protective systems
- b. Identify uses and limitations of different protective systems
- c. Understand the usage characteristics of different protective systems
- d. Understand how to safely implement the protective system
- e. Understanding workers rights

### 2. Define different types of protective systems, uses and limitations, usage characteristics, and safe implementation

- a. Benching
  - i. Means a method of protecting workers from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near vertical surfaces between levels. Benching cannot be done in Type C soil.
  - ii. Benching can only be used for type A and B soils.
  - iii. If it is type C sloping or some other means of protection must be used.
  - iv. Benching is cutting into sides of excavations and making stair like shelves into the sides.
- b. Sloping
  - i. Involves cutting back the trench wall at an angle inclined away from the excavation.
  - ii. Sloping or benching for excavations greater than 20 feet deep shall be designed by a registered professional engineer.
  - iii. Can be used for every soil type (the slope will vary depending on soil type).
- c. Shoring
  - i. Requires installing aluminum hydraulic or other types of supports to prevent soil movement and cave-ins.
  - ii. All shoring should be installed from the top down and removed from the bottom up. Hydraulic shoring should be checked at least once per shift for leaking hoses and/or cylinders, broken connections, cracked nipples, bent bases, and any other damaged or defective parts.
  - iii. Timber shoring
    1. Shoring is the provision of a support system for trench faces used to prevent movement of soil, underground utilities, roadways, and foundations.
    2. Shoring or shielding is used when the location or depth of the cut makes sloping back to the maximum allowable slope impractical.
    3. Shoring systems consist of posts, wales, struts, and sheeting. There are two basic types of shoring, timber and aluminum hydraulic.
  - iv. Hydraulic shoring
    1. The trend today is toward the use of hydraulic shoring, a prefabricated strut and/or wale system manufactured of aluminum or steel. Hydraulic shoring provides a critical safety advantage over timber shoring because

workers do not have to enter the trench to install or remove hydraulic shoring. Other advantages of most hydraulic systems are that they:

- a. Are light enough to be installed by one worker;
  - b. Are gauge-regulated to ensure even distribution of pressure along the trench line;
  - c. Can have their trench faces "preloaded" to use the soil's natural cohesion to prevent movement; and
  - d. Can be adapted easily to various trench depths and widths.
- v. Pneumatic shoring
1. Screw Jacks. Screw jack systems differ from hydraulic and pneumatic systems in that the struts of a screw jack system must be adjusted manually. This creates a hazard because the worker is required to be in the trench in order to adjust the strut. In addition, uniform "preloading" cannot be achieved with screw jacks, and their weight creates handling difficulties.
  2. Single-Cylinder Hydraulic Shores. Shores of this type are generally used in a water system, as an assist to timber shoring systems, and in shallow trenches where face stability is required.
  3. Underpinning. This process involves stabilizing adjacent structures, foundations, and other intrusions that may have an impact on the excavation. As the term indicates, underpinning is a procedure in which the foundation is physically reinforced. Underpinning should be conducted only under the direction and with the approval of a registered professional engineer.
- d. Shielding
- i. Trench Boxes are different from shoring because, instead of shoring up or otherwise supporting the trench face, they are intended primarily to protect workers from cave-ins and similar incidents.
  - ii. The excavated area between the outside of the trench box and the face of the trench should be as small as possible.
  - iii. The space between the trench boxes and the excavation side are backfilled to prevent lateral movement of the box.
  - iv. Shields may not be subjected to loads exceeding those which the system was designed to withstand.
- e. Combination
- i. Using more than one type of protective system at the same time.

### **3. Employee rights and responsibilities**

- a. Employee rights and responsibilities
  - i. To assure safe and healthful working conditions for working men and women
  - ii. By authorizing enforcement of the standards developed under the Act
  - iii. By assisting and encouraging the States in their efforts to assure safe and healthful working conditions

- iv. By providing for research, information, education, and training in the field of occupational safety and health
- b. A right to
  - i. A safe and healthful workplace
  - ii. Know about hazardous chemicals
  - iii. Information about injuries and illnesses in your workplace
  - iv. Complain or request hazard correction from employer
  - v. File a confidential complaint with OSHA to have their workplace inspected.
  - vi. Receive information and training about hazards, methods to prevent harm, and the OSHA standards that apply to their workplace. The training must be done in a language and vocabulary workers can understand.
  - vii. Get copies of their workplace medical records.
  - viii. Participate in an OSHA inspection and speak in private with the inspector.
  - ix. File a complaint with OSHA if they have been retaliated or discriminated against by their employer as the result of requesting an inspection or using any of their other rights under the OSH Act.
  - x. File a complaint if punished or discriminated against for acting as a “whistleblower” under the additional 20 federal statutes for which OSHA has jurisdiction.
- c. Whistleblower Protection
  - i. OSHA's Whistleblower Protection Program enforces the whistleblower provisions of more than twenty whistleblower statutes protecting employees who report violations of various workplace safety,

This material was produced under a grant (SH-31234-SH7) from the Occupational Safety and Health Administration, U.S. Department of Labor. It does not necessarily reflect the views or policies of the U.S. Department of Labor, nor does the mention of trade names, commercial products, or organization imply endorsement by the U.S. Government.