





**Salisbury University Trenching and Excavation Safety Program**

**1. Written Program.** Salisbury University will review and evaluate this standard

Asked to establish the location of the utility underground installations prior to the start of actual excavation and provide advise concerning surface encumbrances.

3.1.4 When excavation operations approach the estimated location of underground installations, the exact location of the installations will be determined by safe and acceptable means (modern techniques and customary types of equipment) where this determination is unclear the utility owner will be contacted for assistance.

3.1.5 While any excavation is open, underground installations will be protected, supported or removed as necessary to safeguard employees.

#### **4. Protection from Hazards Associated with Water Accumulation**

4.1 Employees will not work in excavations in which there is accumulated water, or in excavations in which water is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation. The precautions necessary to protect employees adequately vary with each situation, but could include special support or shield systems to protect from cave-ins, water removal to control the level of accumulating water, or use of a safety harness and lifeline systems.

4.2 Inspect all excavations after any rainfall or other hazard producing occurrence, to determine if any change to the soil's capacity to resist the force has occurred. This will be done by a person that has the competence to do so.

4.2.2 Water should not be allowed to accumulate within the excavation. If such has occurred it will be removed utilizing proper pumping procedures.

4.3 Water will be controlled or prevented from accumulating by the use of water removal equipment. The water removal equipment and operations will be monitored by a competent person to ensure proper operation.

4.4 If excavation work interrupts the natural drainage of surface water (such as streams), diversion ditches or dikes, suitable means will be used to prevent surface water from entering the excavation and to provide adequate drainage of the area

used. The use of mobile equipment near the excavation requires proper vehicle barricades and/or stop blocks.

## 6. Access and Egress from Excavations

6.1. Structural ramps. Structural ramps that are used solely by employees as a means of access or egress from excavations will be designed by a competent person. Structural ramps used for access or egress of equipment will be designed by a competent person qualified in structural design, and will be constructed in accordance with the design.

6.2. Means of egress from trench excavations (less than 20 ft deep). A stairway, ladder, ramp or other safe means of egress will be located in trench excavations that are 4 feet (1.22 m) or more in depth so as to require no more than 25 feet (7.62 m) of lateral travel for employees.

6.3. Means of egress from trench excavations (20 ft or greater in depth). Ladders will be equipped with ladder platforms at 20-foot intervals.

## 7. Trench Safety

7.1. Trenches more than five feet deep require shoring or will be laid back to its angle of repose (stabilized slope).

7.2. In hazardous soil conditions (loosely compacted or rocky), trenches under five-foot need protection.

73 There shall be at any excavation site a competently trained person, who is capable of identifying existing and predictable hazards and who shall have the authority to take prompt corrective action to eliminate them on the site. This individual shall be able to identify soil classifications and protective systems (shoring, bracing and piling) to be used in accordance with OSHA Trenching Standards found in 29 CFR 1926.652.

74 Trenches more than five (5) feet deep require shoring or will be laid back to a stable slope. In hazardous soil, trenches under five (5) feet will also be protected.

75 Portable trench boxes or sliding trench boxes used in place of shoring and sloping shall be designed, constructed and maintained to provide protection at least equal to the required sheeting and shoring. Shields shall be designed by a registered professional engineer and will meet the standards found in 29 CFR 1926.652.

76 Shields shall be installed so as to restrict lateral or other hazardous movement. Trench boxes and shields shall extend to the bottom of the trench and no less than eighteen (18) inches above the vertical top of the trench or excavation face.

Exceptions are found in 29 CFR 1926.652. Excavation to a level not greater than 2 feet (.61 m)









18.1.4 All other employees whose work operations are or may be in an area where trenching and excavation operation are conducted shall be instructed to an awareness level about the procedures, and prohibitions relating to work in such areas.

## 18.2 Refresher Training.

18.2.1 Retraining shall be provided for all authorized and affected employees whenever there is a change in their job assignments, a change in equipment or processes that present a new hazard, or when there is a change in these procedures. **Note:** Retraining (to include a procedural review) will also be provided whenever there is a "close-call" or these procedures fail.

18.2.2 Additional retraining shall also be conducted whenever a periodic inspection reveals, or whenever the University has reason to believe, that there are deviations from or inadequacies in the employee's knowledge or use of these procedures.

18.2.3 The retraining shall reestablish employee proficiency and introduce new or revised operational methods and procedures, as necessary.

18.3 Certification. The University shall certify that employee training has been accomplished and is being kept up to date. The certification shall contain each employee's name and dates of training.

## 19. Protection of Employees in Excavations

19.1 Each employee in an excavation will be protected from cave-ins by an adequately designed protective system except when:

19.1.1 Excavations are made entirely in stable rock; or

19.1.2 Excavations are less than 5 feet (1.52 m) in depth and examination of the ground by a competent person provides no indication of a potential cave-in.

19.2 Protective systems will have the capacity to resist without failure all loads that are intended or could reasonably be expected to be applied or transmitted to the system.

## 20. Design of Sloping and Benching Systems

20.1 The slopes and configurations of sloping and benching systems will be properly selected and constructed as follows:





21.1.4 Option 4 - Design by a Registered Professional Engineer. Support systems, shield systems, and other protective systems not utilizing Option 1, Option 2 or Option 3, above, will be approved by a registered professional engineer. Designs will be in written form and will include the following:

21.1.4.1 A plan indicating the sizes, types, and configurations of the materials to be used in the protective system; and

21.1.4.2 The identity of the registered professional engineer approving the design.

## **22. Materials and Equipment used for Protective Systems**

22.1 Materials and equipment used for protective systems will be free from damage or defects that might impair their proper

23.1.5 Removal will begin

## 26. Applicable Definitions

**Accepted Engineering Practices** - means those requirements which are compatible with standards of practice required by a registered professional engineer.

**Aluminum Hydraulic Shoring** - means a pre-engineered shoring system comprised of aluminum hydraulic cylinders (cross braces) used in conjunction with vertical rails (uprights) or horizontal rails (wales). Such system is designed specifically to support the sidewalls of an excavation and prevent cave-ins.

**Bell-Bottom Pier Hole** - means a type of shaft or footing excavation, the bottom of which is made larger than the cross section above to form a bell shape.

**Benching (Benching System)** - means a method of protecting employees 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.

**Cave-In** - means the separation of a mass of soil or rock material from the side of an excavation, or the loss of soil from under a trench shield or support system, and its sudden movement into the excavation, either by falling or sliding, in sufficient quantity so that it could entrap, bury, or other wise injure and immobilize a person.

**Competent Person** - means 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.

**Cross Braces** - mean the horizontal members of a shoring system installed perpendicular to the sides of the excavation, the ends of which bear against either uprights or wales.

**Excavation** - means any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal.

**Faces or Sides** - means the vertical or inclined earth surfaces formed as a result of excavation work.

**Failure** - means the breakage, displacement, or permanent deformation of a structural member or connection so as to reduce its structural integrity and its supportive capabilities.

**Hazardous Atmosphere** - means an atmosphere which by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritating, oxygen deficient, toxic, or otherwise harmful, may cause death, illness, or injury.

**Kickout** - means the accidental release or failure of a cross brace.





**Structural Ramp** - means a ramp built of steel or wood, usually used for vehicle access. Ramps made of soil or rock are not considered structural ramps.

**Support System** - means a structure such as underpinning, bracing, or shoring, which provides support to an adjacent structure, underground installation, or the sides of an excavation.

**Tabulated Data** - means tables and charts approved by a registered professional engineer and used to design and construct a protective system.

**Trench (Trench Excavation)** - means a narrow excavation (in relation to its length) made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet (4.6 m) or less (measured at the bottom of the excavation), the excavation is also considered to be a trench.

**Trench Box.** See "Shield."

**Trench Shield.** See "Shield."

**Uprights** - means the vertical members of a trench shoring system placed in contact with the earth and usually positioned so that individual members do not contact each other.

Uprights