
**RISK MANAGEMENT ADVISORY**

*Utica National Insurance Risk Management Department Bulletin*

***Construction Series*** ***Think Safety!***

# Trenching and Excavation

## Business Case

Cave-ins are perhaps the most feared trenching hazard. But other potentially fatal hazards exist, including asphyxiation from lack of oxygen in a confined space, inhalation of toxic fumes, drowning, etc. Electrocution or explosions can occur when workers contact underground utilities. OSHA requires that workers in trenches and excavations be protected, and that safety and health programs address the variety of hazards they face.

**Hazard:** Trench collapses cause dozens of fatalities and hundreds of injuries each year.

**Solutions:**

- Never enter an unprotected trench.
- Always use a protective system for trenches 4 feet deep or greater.
- Employ a registered professional engineer to design a protective system for trenches 20 feet deep or greater.
- Protective Systems:
  - Sloping to protect workers by cutting back the trench wall at an angle inclined away from the excavation not steeper than a height/depth ratio of 11/2:1, according to the sloping requirements for the type of soil.
  - Shoring to protect workers by installing supports to prevent soil movement for trenches that do not exceed 20 feet in depth.
  - Shielding to protect workers by using trench boxes or other types of supports to prevent soil cave-ins.
- Always provide a way to exit a trench – such as a ladder, stairway or ramp – no more than 25 feet of lateral travel for employees in the trench.
- Keep spoils at least two feet back from the edge of a trench.
- Make sure trenches are inspected by a competent person prior to entry and after any hazard-increasing event such as a rainstorm vibrations or excessive surcharge loads.



Utica National Insurance Group • Utica Mutual Insurance Company and its affiliated companies, New Hartford, NY 13413 • www.uticanational.com

**Form 5-R-689 Ed. 05-2010**

**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<br>(granite or sandstone) | Vertical | 90º |
| Type A<br>(clay) | 3/4 :1 | 53º |
| Type B<br>(gravel, silt) | 1:1 | 45º |
| Type C<br>(sand) | 11/ 2:1 | 34º |
| Type A (short-term)<br>(For a maximum excavation depth of 12 ft.) | 1/ 2:1 | 63º |

Source: OSHA Technical Manual, Section V, Chap. 2, Excavations: Hazard Recognition in Trenching and Shoring (Jan. 1999).

Click on the following link for more information on trenching and excavation:

www.osha.gov/SLTC/etools/construction/trenching/mainpage.html

Recommended uses:

- New hire training and orientation
- Tool box meetings
- Pre-job planning
- Job safety analysis
- Accident investigation



  