



BIE SAFETY ADVISOR

Trenching and Excavation Safety

As most of March 2017 weather has seemed to behave like a lion here in New York State, spring is just around the corner! A time of year when excavation activities for many companies greatly increases, it is a good time to be reminded of the dangers of trenching and excavation.

Two workers are killed every month in trench collapses. Employers must provide a workplace free of recognized hazards that may cause serious injury or death. The employer must comply with the trenching and excavation requirements of 29 CFR 1926.651 and 1926.652 or comparable OSHA-approved state plan requirements.

An excavation is any man-made cut, cavity, trench, or depression in an earth surface formed by earth removal.

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 meters).

Dangers of Trenching and Excavation Cave-ins pose the greatest risk and are much more likely than other excavation-related accidents to result in worker fatalities. Other potential hazards include falls, falling loads, hazardous atmospheres, and incidents involving mobile equipment. One cubic yard of soil can weigh as much as a car. An unprotected trench is an early grave. Do not enter an unprotected trench.

Trench Safety Measures Trenches 5 feet (1.5 meters) deep or greater require a protective system unless the excavation is made entirely in stable rock. If less than 5 feet deep, a competent person may determine that a protective system is not required.

Trenches 20 feet (6.1 meters) deep or greater require that the protective system be designed by a registered professional engineer or be based on tabulated data prepared and/or approved by a registered professional engineer in accordance with 1926.652(b) and (c).

Competent Person OSHA standards require that employers inspect trenches daily and as conditions

change by a competent person before worker entry to ensure elimination of excavation hazards. A competent person is an individual who is capable of identifying existing and predictable hazards or working conditions that are hazardous, unsanitary, or dangerous to workers, soil types and protective systems required, and who is authorized to take prompt corrective measures to eliminate these hazards and conditions.

Access and Egress OSHA standards require safe access and egress to all excavations, including ladders, steps, ramps, or other safe means of exit for employees working in trench excavations 4 feet (1.22 meters) or deeper. These devices must be located within 25 feet (7.6 meters) of all workers.

Protective Systems There are different types of protective systems. **Benching** 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.* **Sloping** involves cutting back the trench wall at an angle inclined away from the excavation. **Shoring** requires installing aluminum hydraulic or other types of supports to prevent soil movement and cave-ins. **Shielding** protects workers by using trench boxes or other types of supports to prevent soil cave-ins. Designing a protective system can be complex because you must consider many factors: soil classification, depth of cut, water content of soil, changes caused by weather or climate, surcharge loads (e.g., spoil, other materials to be used in the trench) and other operations in the vicinity.

Additional Information

Visit OSHA's Safety and Health Topics web page on trenching and excavation at www.osha.gov/SLTC/trenchingexcavation/index.html and www.osha.gov/dcsp/statestandard.html for more information and the NIOSH Website for interactive tools.



Monthly Toolbox Talk

Trenching and Excavation Awareness

According to the Bureau of Labor Statistics, in the United States between 2000 and 2009, 350 workers died in excavation or trench collapses. In 2016 OSHA Fatality Statistics show that trenching collapse related deaths have doubled from the previous year. Trenching operations usually include water, sewer, pipeline, communications or power line construction. One study indicated 64% of fatalities occurred in excavations of less than 10 feet (3 meters). In addition to collapses, trenching operation hazards include: falls; falling objects from above and hazardous atmospheres. Prior to any trenching or excavation, local utility companies should be contacted to locate and identify any underground cables, pipes, tunnels or tanks that may be in the excavation area. "Pot-hole" to determine their exact location prior to digging.

Trench Depths

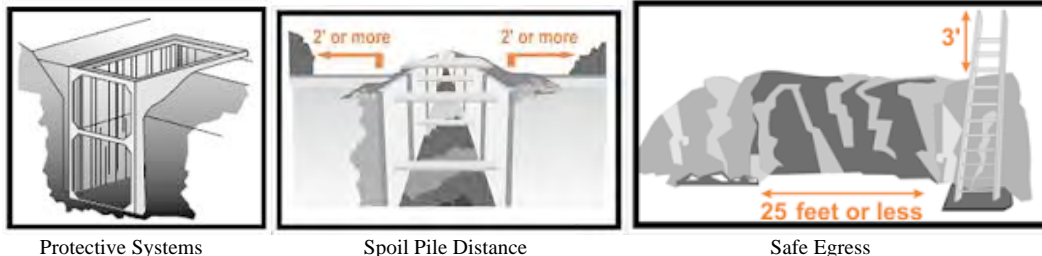
- Less than 5 feet (1.5 meters) - A competent person should review the excavation soil and plans and determine if a protective system as described below is required.
- 5 feet (1.5 meters) to less than 20 feet (6.1 meters) - a protective system must be in place unless a competent person has determined that the excavation is entirely in solid, stable rock with no potential for cave-in.
- 20 feet or greater – a protective system designed and approved by a registered professional engineer must be installed.

Competent Person

A person trained in trenching and excavation safety should inspect the excavation daily. The inspection should be repeated if conditions change (e.g. after rain fall, freeze/thaw weather changes). The competent person should be authorized to order immediate corrective action, including restricting entry into the excavation, until any hazards or potential hazards have been eliminated.

Protective Systems to prevent cave-ins

- Benching – excavating the sides of an excavation to form one or more horizontal levels or steps
- Sloping – Cutting back the trench wall at an angle away from the excavation.
- Shoring – Installing a support system of using materials such as posts, beams, planking and hydraulic jacks to support or "shore up" the sides of the excavation.
- Shielding - Using trench boxes or similar enclosures to prevent cave-ins.
- Refer to ANSI A12.10-1998 for specific design requirements.



Other safety requirements

- Keep heavy equipment away from the sides of the excavation
- Keep spoils piles at least 2 feet (1 meter) away from the trench edge.
- For excavations deeper than 4 feet – conduct air monitoring similar to confined space entry – oxygen, combustibles, and toxic gases/vapors.
- Ladders, steps, or ramps must be provided for safe exiting from the trench. An exit point must always be within 25 feet of all workers at all times. These may need to be continuously relocated as the job progresses.
- Ensure workers are trained on work hazards and proper work practices.
- Develop a trench emergency action plan and train workers and supervisors on the proper actions to take in an emergency.

