

# Safety In The Trenches

## Four Steps To Working Safely In Trenches And Excavations

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Each year, between 100 and 400 workers die, and several thousand more are seriously injured in trench and excavation cave-ins. Most are men, between 20 and 30 years of age, and have had no excavation safety training. Ironically, 79 percent of the trenches are relatively shallow, only between 5- and 15-feet deep. If construction companies, utilities and others will follow the federal OSHA Standards and take four relatively simple steps, they could prevent most of these deaths and serious injuries.

### Step #1 – Have a Properly Trained “Competent Person” On-Site

OSHA requires that every employee must have appropriate training to do his or her job safely. And OSHA goes on to say that there must be a “Competent Person” on a trenching or excavation site who is capable of identifying existing or predictable hazards in the surrounds, or working conditions, which are unsanitary, hazardous or dangerous to employees and further, who has authorization to take prompt corrective measures to eliminate such hazards and conditions. This person must have specific training and be knowledgeable about soils analysis, the use of protective systems, and the requirements of the OSHA standard.

An important responsibility of the “Competent Person” is to regularly inspect trenches or excavations for signs of possible cave-ins, failure of protective systems, hazardous atmospheres, and the other hazardous conditions.

Although these inspections don't have to be documented, most safety professionals encourage some type of checklist to help ensure that inspections are complete.

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Often nearby surface structures, utilities, or underground installations make trench boxes the only sensible way to protect employees working below grade.

## Who Is Responsible for Jobsite Safety?

**The law says every employer is. Some details would be helpful.**

### What if you're the General (Prime) Contractor?

The prime contractor, according to OSHA, “assumes all obligations” and “in no case ... shall be relieved of overall responsibility for compliance with the requirements of the part for all work to be performed under contract.” This includes work to be performed by all subcontractors on the job site.

### What if you're a Subcontractor?

Again, the law states, “with respect to subcontracted work, the prime contractor and any subcontractor ... shall be deemed to have joint respon-

sibility.” The subcontractor “of any tier” is still responsible for the safety of workers involved in his part of the job.

### Who can be fined?

The general contractor, the subcontractor, and even the owner of the project are subject to enforcement and fines when it can be shown they “could have had (such) knowledge with the exercise of reasonable diligence.” The standard says: “Where joint responsibility exists, both the general (prime) contractor and his subcontractor or subcontractors, regardless of tier, shall be considered subject to the enforcement provisions of this Act.”

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### Step #2 – Follow the General Requirements

There are 12 points in OSHA's Trenching and Excavation Standard that must be considered. The high points are:

- Surface Encumbrances – Must be removed or supported.
- Underground Installations – Must be located prior to the start of work and must be protected, supported or removed, as necessary, to protect workers.
- Access and Egress – Trenches and excavations more than 4 feet deep must have ladder, ramp or stairway within 25 feet of each worker. In addition, the ladder, ramp or stairway must be in a protected area.
- Exposure to Vehicular Traffic – Workers exposed to traffic must be provided with, and must wear, warning vests or other suitable garments marked with, or made of, reflecting or high-visibility material.
- Exposure to Falling Loads – Workers should not be permitted under any overhead loads.
- Warning Systems for Mobile Equipment – A suitable warning system is required when operators do not have a clear and direct view of the edge of an excavation. Examples include barricades, hand or mechanical signals, and stop logs.
- Hazardous Atmospheres – Appropriate steps must be taken, including having the necessary emergency rescue equipment on-site whenever there is a possibility of a hazardous atmosphere.

• Protection from Hazards Associated with Water Accumulation – Employees cannot work in trenches or excavations where there is an accumulation of water. If the excavation work interrupts the natural drainage of surface water, diversion ditches, dikes or other suitable means must be used to prevent surface water from entering the trench. The "Competent Person" also has to inspect all trenches and excavations after rainstorms.

• Stability of Adjacent Structures – Specialized support systems and the services of a Registered Professional Engineer may be required to support nearby structures.

• Protection of Employees from Loose Rock or Soil – Spoil material must be set back at least two feet from the side of the excavation. Additional measures may be required to keep any loose rock or soil from falling or rolling into the excavation.

• Inspections – The "Competent Person" must inspect the excavation prior to the start of work, and as needed throughout the shift, and after every rainstorm or other hazard-increasing occurrence. Exposed employees must be removed from hazardous areas until necessary precautions have been taken to ensure their safety.

• Fall Protection – Walkways shall be provided where employees or equipment are required or permitted to cross over an excavation that is 6 feet or more deep and 30 inches or more wide.



Adequate means of entrance and exit must be provided for workers, allowing them to exit trench boxes or shoring systems quickly. Note the ladder in the foreground to the right.

### Step #3 – Carefully Analyze the Soil

OSHA's Standard is concerned with just four soil types: Stable rock (rare), Type A (mostly cohesive, also rare), Type B (moderately cohesive), and Type C (the least cohesive).

OSHA requires that the "Competent Person" classify the soil using at least one visual and one manual test, unless the soil is considered a Type C (the soil that requires the most stringent protection for employees) and is sloped, shored or shielded accordingly. Classifying the soil is the first step in choosing a protective system. And that leads to the fourth step.

### Step #4 – Utilize a Protective System

Unless you are working in stable rock, OSHA requires that all trenches and excavations more than 5 feet deep be

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properly sloped, shored or shielded. (Some local and state regulations are more stringent on this minimum depth. Always refer to, and know, the regulations where you are working.) Trenches and excavations less than 5 feet deep may also require protection if the “Competent Person” determines that there is a possibility that a cave-in might occur.

There are four types or methods to provide a protective system:

- Sloping or Benching – The walls of the trench or excavation are sloped or benched back, based on the soil type. For example, if working in Type B soil, and the excavation is less than 20 feet deep, OSHA says that the walls can be sloped back at 45 degrees. In Type C soil, the walls can be sloped back at 34 degrees.

- Shoring – There are several options for shoring, including timber and aluminum hydraulic shoring. Within the aluminum hydraulic shoring category, there are vertical shores and horizontal walers.

- Shielding – Many contractors prefer the use of aluminum or steel trench shields.

- Site-Specific Designs – Contractors and utility companies can always utilize the services of a Registered Professional Engineer to design a system for a specific job.

By following these four relatively simple steps, contractors and utility companies can provide a safe workplace for all employees and comply with OSHA requirements. ■

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*testing equipment, steel road-crossing plate, and confined space equipment. Additional information is available at [www.trenchsafety.com](http://www.trenchsafety.com).*

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Slide rail systems such as this one, being installed in Memphis, are just one of several protective systems available to construction and utility companies and their contractors.

## Use of Checklists

A comprehensive checklist can go a long way toward helping ensure that proper steps are being taken to protect workers. Questions that might be included in a checklist, used by a “Competent Person” to inspect an excavation, include:

- Has the “Competent Person” had specific training in – and is knowledgeable about – soils analysis, use of protective systems, and requirements of OSHA’s 29CFR1926-Subpart P: Excavations and Trenches?
- Does the “Competent Person” have the authority to remove workers from an excavation immediately?
- Are hard hats worn by ALL employees?
- Are spoils, materials and equipment set back at least two feet from the edge of the excavation?
- Are barriers provided at all remotely located excavations, wells, pits, shafts, etc.?
- Are utility companies contacted and/or utilities located as required by local, state and federal law?
- Are underground installations protected, supported or removed as necessary?
- Is the atmosphere within ALL excavations tested when there is a possibility of an oxygen-deficient, combustible, toxic, or other harmful contaminant?
- Is emergency equipment available when hazardous atmospheres could or do exist?
- Has the “Competent Person” classified the soil using one manual test and one visual test, as specified by the standard?

A sample checklist can be downloaded from TrenchSafety Supply, Inc.’s website at <http://www.trenchsafety.com/Usefulinfo/pdf/CPChecklist.pdf>.