

# Excavation and Trenching Quiz



## QUESTION

Cave-ins in trenching work is twice that of deaths incurred from any other sources of construction. What are the two basic methods to protect workers from cave 'ins'?

## ANSWER

- **Sloping**
  - Cutting back the trench wall at an angle that is inclined away from the work area of the excavation.
- **Temporary Protective Structures**
  - e.g. shoring, trench boxes, pre ' fabricated systems, engineering systems.

## WHY IS IT RIGHT

## DEFINITIONS

**An excavation** is a hole in the ground as a result of removing material.

**A trench** is an excavation in which the depth exceeds the width.

## More Anecdotal Excavation/Trench

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

is a narrow excavation (in relation to its length) made below the surface of the ground.

Excavations can be any size: wide, narrow, deep, or shallow.

Dig a hole in the ground and you have made an excavation.

A trench is an excavation, too, if it isn't more than 15 feet (4.5 meters) wide at the bottom. And, if you install forms or other structures in an excavation that reduce its width to less than 15 feet, measured at the bottom, the excavation is also considered a trench.

Most regulations require that if you work in an excavation that is five feet deep (or deeper), your employer must protect you from trench collapse, cave-ins and other trenching and excavation hazards.

**THE MOST IMPORTANT 'WORK' IN EXCAVATION IS DONE PRIOR TO ANY ACTUAL WORK BEGINS.**

### **Hazards / Risk Analysis**

The employer or supervisor is responsible for the work, and must take the necessary steps to identify all the hazards and risks before beginning any work.

- Identify the soil type(s) related to the excavation or trench you are going to dig. Soil properties often vary widely within a single trench (e.g., the soil type changes from top to bottom and along the length of a trench).
- Look for the legislative requirements that apply in your jurisdiction and the type of protective measures to be taken.
- Locate all buried services. Contact the owners of any underground utilities/services that may be in that location and ask them to identify and mark the location.
- Identify and locate overhead power lines.

- Make sure these services are de-energized as necessary.
- Know all of the contact numbers of these services if there is an emergency.
- Check areas adjacent to the site for potential hazards and sources that can impact the stability of soil. Be aware that nearby vehicles and equipment can cause the soil to vibrate and then collapse.
- Determine if nearby buildings or structures and their foundations may put pressure on the soil and affect the walls of the trench.
- Test for hazardous gas, vapours, and dust before entering.
- Test for oxygen levels in the space before entering, and during the work as required.
- Plan appropriate organization of the work site, and good housekeeping practices including moving debris and excavated soil far enough away from the excavation site.
- Remove water from the excavation.
- Protect workers from falling into the excavation.
- Identify appropriate personal protective equipment including high visibility apparel for vehicular traffic and make sure every worker wears them as required.
- Have a worker above ground when a worker is working in the trench to warn those in the trench of danger and to provide emergency help.
- Prepare work permits for work in confined spaces, as appropriate.
- Have a means of exit provided from the inside of the trench, usually no more than 8m (25 ft) away than any worker in the trench.
- Plan for adverse weather conditions (e.g. hot or cold environments, storms, etc.).
- Prepare an emergency plan and rescue procedures.
- Keep first aid boxes at the site.
- Educate and train workers about all existing and potential hazards and risks and appropriate safety measures.

## WHY IS EVERYTHING ELSE WRONG

### ▪ MAIN REASON

1. Trenches collapse because they are not properly protected.
2. Protective systems were properly employed in only 24 percent of the trenches. In the remainder, a protective system was either improperly used (24%), available but not in use (12%) or simply unavailable (64%).

### ▪ COMPETENT PERSON

Despite the fact that environmental conditions were a contributing factor in 68 percent of the fatalities, the competent person was not onsite when the fatality occurred 86 percent of the time. Most of the time (65%) the employer had not identified the soil type even though soil type is a factor in trench cave-ins.

### ▪ MONDAYS

A disproportionate number of fatalities (36%) occurred on Mondays, probably because rain or other factors changed conditions over the weekend. Under OSHA regulations, the competent person must inspect trench work in progress before each shift and after any changes in conditions.

### ▪ SCHEDULE/DEADLINES TIMES

The OSHA investigations showed that schedule time was more important than safety in 88 percent of the incidents. Seventy-two percent of the fatalities occurred in trenches less than nine feet deep. Only nine percent occurred deeper than 15 feet.

### ▪ TRADES/FATALITIES

The most commonly killed employees were construction laborers (53%), with plumbers and pipe fitters following next at nine

percent. Most (58%) were killed while installing pipe.

- **NATIONALITIES/FATALITIES**

Fifty-six percent of these fatalities were Hispanics, and 52 percent were foreign-born. For 44 percent, Spanish was their primary language. At least 30 percent had been working for their employer for less than a year, and most (59%) worked for a subcontractor.

- **UNION VS NONUNION**

Only six percent were union members. Since, nationwide, about 20 percent of construction work is union, the expected rate of union fatalities would be near 20 percent. The lower rate suggests that union jobs are safer, that supervisors and workers on union sites are better trained and that the union offers the kind of protection that workers need to speak up about safety issues on the worksite.

- **WRITTEN SAFETY/HEALTH PROGRAM AND SAFETY TRAINING**

Just over half the employers had a written safety and health program, but, of these, only 40 percent covered trenching. Sixty-five percent provided no trench safety training. Most employers (71%) had never been inspected by OSHA, but 21 percent had been previously cited by OSHA for trench safety violations.

- **TYPE OF WORKSITE/COMPANY SIZE**

About three in every four fatalities occurred at residential worksites. Most companies were small; 42 percent had fewer than ten employees. Though, typically, five or less workers were present on the site when the incident occurred, most of the projects (52%) involved contracts worth \$100,000 or more.