

# Trenching and Excavation

Trenching and excavation are among the most hazardous construction operations out there.

## What's at Stake

On average, two workers are killed **every month** in trench collapses.

- Cave-ins pose the greatest risk and are much more likely than other excavation-related accidents to result in worker fatalities.
- One cubic yard of soil can weigh as much as a car.
- Other potential hazards include falls, falling loads, hazardous atmospheres, and incidents involving mobile equipment.

## Four Ways to Protect Workers in the Trenches

Your company may train and designate you as a competent person for trenching and excavations. You may be asked to do, or verify certain safety measures, before workers can enter an excavation. Here are four easy ways supervisors can help in implementing and enforcing their company's trenching and excavation program.

### 1. Get Your Hands Dirty

Some types of soil are stable and some are not. When digging a trench, it's important to know the type of soil you're working with so you know how to properly slope, bench, or shore the trench. This can help prevent a cave-in. Examples of soil types include:

- Clay
- Gravel
- Sand

The three most common soil testing methods are the:

1. Plasticity test
2. Thumb penetration test
3. Pocket penetrometer test

For best results, it is recommended you use more than one of these methods to test the soil. Knowing the type of soil makes it possible to determine the right protective system to keep workers safe when they're working in an excavation. Excavations done in solid rock, do not usually require a protective system. If a site has previously been excavated, the soil will be classified one class lower, regardless of other classifying factors.

Soil can either be cohesive or granular.

- Cohesive soil contains fine particles and enough clay so that the soil will stick to itself. The more cohesive the

## ? DID YOU KNOW?

An excavation is a man-made cut, cavity, trench, or depression in the ground. A trench is a narrow excavation in the ground with a depth greater than its width - but not greater than 15 feet (4.6 m).

- soil, the more clay it has, and the less likely a cave-in will happen.
- Granular soils are made of coarse particles, such as sand or gravel. This type of soil will not stick to itself.
- The less cohesive the soil, the greater the measures needed to prevent a cave-in.

### 2. Confirm the Trench Measures Up

Know the requirements for when a protective system is required and when an engineer must design that system. For example, in the United States:

- 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 a protective system is not required.
- Trenches 20 feet (6.1 meters) deep or greater require a protective system designed by a registered professional engineer.

## 🔧 TOOL

Use the Trench/Excavation Checklist on page 9 to carry out an inspection before work begins in any excavation.

Find more related tools at [SafeSupervisor.com](http://SafeSupervisor.com)

### 3. Protective Systems

Protective systems for trenches include:

- Sloping the soil for stability.
- Cutting the soil to create stepped benched grades.
- Supporting (shoring) the excavation walls by installing aluminum hydraulic or other types of supports to prevent soil movement and cave-ins.
- Shielding workers from a cave-in, by using a trench box to protect workers in a trench.

### 4: Other Precautions

PPE is the last line of defense used as a supplement rather than a substitute for fall protection systems. PPE for vertical fall hazards include:

- A competent person must inspect trenches daily and whenever conditions change, such as after it rains.

- Keep heavy equipment, excavated dirt, and other materials and equipment away from the edge of an excavation.
  - U.S. requires at least 2 feet back from the edge.
  - Many jurisdictions in Canada require the distance to be 3 meters.
- Employees must have a safe way to enter and exit a trench, such as a ladder or ramp.
- Locate underground utilities before digging.
- Test for atmospheric hazards such as low oxygen, hazardous fumes and toxic gases.
  - Typically required when the excavation is greater than 4 feet deep.

## TOOL

Use the Fatality Report on page 2 to capture workers and drive home the message that trenching and excavation work can be deadly.

Give your workers the Trenching and Excavation Safety handout on page 5, before they start work in a trench.

Find more related tools at [SafeSupervisor.com](http://SafeSupervisor.com)

- Never let employees work under suspended or raised loads and materials.
- Ensure employees wear high visibility or other suitable clothing when exposed to vehicular traffic.

## SHOP TALK

# 10 Reasons Training Messages Don't Reach Their Target

### 1. They Really Can't Hear You

Do you mumble or talk too fast? Are you dealing with an employee with hearing loss? Is the environment distracting? These factors can affect what trainees hear.

### 2. You're Speaking Greek

Don't assume knowledge level and understanding. Define any words which may be unfamiliar. Keep the message focused and simple.

### 3. They Hear the Message but Don't Understand the Reason

Many trainees want to know the "what" and the "why". Especially if you're trying to introduce a change in procedure or technique. Explaining the "why" is what will lead to a change in behavior.

### 4. The Message Seems Irrelevant

Before explaining a safety procedure, point out the hazards and how it affects them. It makes a lot more sense to wear protective gloves when you know about flesh-melting chemicals.

### 5. Your Jokes Are Garbling the Message

Humor can be an important tool in training. But, if you kid around too much, it may be hard for trainees to tell when you are serious.

### 6. You're Not Listening

Give your trainees lots of chances to ask questions. You can gauge the level of understanding by what they ask. No questions, doesn't equal understanding. Trainees may

not have questions because they don't understand what you said.

### 7. You're Not Tailoring Your Message

Differences in literacy levels and culture may make it difficult for you to communicate with your trainees. Be sensitive to these differences and look for ways to bridge them.

### 8. You're Not Testing Their Comprehension

Don't assume the message has been comprehended. Ask the group to repeat the message back to you. "Okay, now what is the procedure for disposing of oily rags?"

### 9. You're Relying Too Heavily on the Spoken Word

Different people have different learning styles. Some need to hear. Some need to see. Others need to do. Still others won't learn a thing until they get their hands on a training manual. Most need a combination of these methods.

### 10. You're Not Anticipating Obstacles

There may be roadblocks to following your instructions. Habit and uncertainty are common ones. Try to anticipate and remove these. Does the trainee have the tools, equipment, or procedures to follow through on what you said?

