

To The Point About Trenching and Excavation Safety for Construction Workers

FACT SHEET

LENGTH: 10 MINUTES

Production Year: 2023

PROGRAM SYNOPSIS:

Working in and around a trench or excavation can be very dangerous and poses serious hazards that kill and injure many construction workers each year. Understanding and controlling trench and excavation hazards can prevent these types of incidents and save lives. This program details safe work practices that construction workers can use to protect themselves from cave-ins and other hazards when working around trenches and excavations.

PROGRAM OBJECTIVES:

After watching the program, the participant should be able to explain the following:

- What is a cave-in;
- Who is the “competent” person;
- The different soil types;
- Protective systems used around trenches and excavations;
- Safe access and egress from trenches;
- General safe work practices when around trenches and excavations.

PROGRAM OUTLINE:

INTRODUCTION

- A construction site is an ever-changing workplace; a workplace full of hazards that can hurt us, make us ill, or kill us. Controlling these hazards and keeping construction workers safe is the point of our safety and health program. Some of these hazards are presented during trenching and excavation operations.
- Working in and around a trench or excavation can be very dangerous and poses serious hazards that kill and injure many construction workers each year. Understanding and controlling trench and excavation hazards can prevent these types of incidents and save lives.
- That is the point of our organization’s safety requirements for trenching and excavation operations and that is the point of this program. So, pay close attention as we get to the point about trenching and excavation safety.

CAVE-INS

- An excavation is any man-made cut, cavity, or depression formed by the removal of earth. A trench is a specific type of narrow excavation, where its depth is greater than its width.
- The greatest danger posed during trenching or excavation operations is a cave-in or collapse.
- What makes a cave-in so dangerous is that a cubic yard of soil can weigh as much as a car and collapsing soil can travel as fast as 20 feet per second.
- A cave-in makes very little noise and can occur without warning. During a cave-in, the extreme weight of the soil will crush and engulf anything in its path. For workers in the trench, a cave-in is often fatal.
- Some factors that can increase the likelihood of a cave-in include the movement of tools and equipment involved in the trench work, wet conditions caused by rain or other water sources, and vibration from nearby traffic or heavy equipment.
- Some of the other hazards that may be encountered include nearby objects falling into the trench, explosive or toxic fumes or vapors accumulating in the trench, and workers falling into the trench or excavation.

COMPETENT PERSON

- There are many hazards that make trench and excavation work dangerous for construction workers. This is why trenches must be inspected daily by a competent person, as well as any time conditions change. The point of these daily inspections is to ensure all hazards are controlled.
- This is the job of a competent person, an individual who is capable of identifying existing and potentially hazardous conditions onsite and taking action to control or eliminate those conditions. For example, using forced air ventilation to rid a trench of harmful fumes.

- The competent person will also be able to identify the various types of soil onsite and determine the protective measures or systems that will be used to keep the trench safe and protect workers.
- Other duties and responsibilities of the competent person include identifying any underground utilities onsite and their location so they can be avoided, and inspecting the site for any surface water that could enter the trench and make sure it is controlled.
- In order for the competent person to decide what type of protection a trench or excavation may need, he or she must first determine the type of soil that is present. There are four classifications or types of soil. Each soil type is distinguished by the cohesiveness of the soil. The more cohesive the soil is, the less likely it is to cave-in or collapse.

SOIL TYPES

- The competent person will perform various tests on the soil as a means to gauge its cohesiveness and determine the soil type.
- For all soil types other than stable rock, some type of protective system must be used to prevent a cave-in or shield workers from the danger. There are four basic types of protective systems used: benching, sloping, shoring, and shielding.
- Sloping is one of the most commonly used methods to protect against a trench collapse. Sloping is the process of cutting back a trench wall at an angle inclined away from the trench floor. The minimum angle of the slope is dependent on the type of soil present.
- Stable rock is the most cohesive type of soil and the only type that does not require protection from cave-ins.
- Type A soil has less cohesion than stable rock, but otherwise is considered the most stable type of soil. The walls of an excavation consisting of Type A soil may be sloped at a ratio of $\frac{3}{4}$ to 1 as a means of cave-in protection.
- Type B soil is *less* cohesive than Type A soil. The walls of an excavation consisting of Type B soil may be sloped at a ratio of 1 to 1 as a means of cave-in protection.
- Type C soil is the least stable of all soil types and is thus the most dangerous. Extreme caution must be taken to prevent cave-ins when a trench contains Type C soil. The walls of an excavation consisting of Type C soil may be sloped at a ratio of 1-1/2 to 1 as a means of cave-in protection.
- Be aware that multiple types of soil can be found in a single trench.

PROTECTIVE SYSTEMS

- Benching is another means of protecting workers from cave-ins by excavating the sides of a trench to form one or more horizontal levels or steps. However, only Type A or Type B soils may be benched in this manner. Benching is not permitted for Type C soil.
- Another protective system that may be used is shoring. Shoring involves installing hydraulic, mechanical, or timber supports to prevent the movement of the soil and cave-ins. One common use of shoring is to support the trench wall near pipes and other underground obstacles. Also, engineered shoring is often used in excavations over twenty feet deep.
- Shielding is another common means of protecting workers from a trench collapse. Shielding utilizes portable trench boxes or similar movable shields to protect workers from a collapse should one occur.

SAFE ACCESS

- When a trench or excavation's depth is 4 feet or deeper, workers must be provided safe access and egress in the form of a ladder, steps, ramp, or other safe means.
- When ladders are used, they must be inside the protective system of the trench and must extend at least three feet above the trench edge.
- To ensure workers can exit a trench quickly, a ladder or other means of exit must be located no more than 25 feet from all workers in the trench.
- As trench work progresses, make it a point to also move the ladder to ensure it's always within 25 feet of the work being performed.

SAFE WORK PRACTICES

- Next, let's discuss some of the safe work practices construction workers must follow to prevent incidents and injuries when performing or working in proximity to underground operations.

- Another method used to prevent cave-ins is benching. Benching occurs when the sides of a trench are shaped to form horizontal levels or “steps.” However, it’s important to note that benching is NOT allowed in Type C soil.
- If you are an equipment operator, you must make it a point to place your vehicle and any spoil piles of soil at least two feet away from the trench edge. The weight of spoil piles, materials, supplies, and equipment located too close to the edge can cause the trench wall to collapse.
- Also, unsecured materials too close to the trench edge can roll or fall into the trench. Keep all items a safe distance from the edge and secure or chock any item that may roll.
- Workers involved in excavation work are frequently in close proximity to moving equipment or objects. This makes it critical to always wear your hardhat, as well as other PPE, and be sure to wear a high-visibility shirt or vest so you can be clearly seen by equipment operators.
- Make it a point not to stand directly behind vehicles or equipment where the operator cannot see you, and do not approach or cross the path of mobile heavy equipment unless the operator indicates that it’s safe to do so.
- When working in a trench, be sure to stay within the sloped or protected area while working.
- And while it’s often necessary to work near loads that are being lifted or lowered, you should never place yourself directly under a raised load.
- When it’s not possible to stay clear of these types of hazards while remaining inside the protected area, you should exit the trench until it’s safe to return.
- If you have any concerns, seek out and find the competent person and confirm that the trench is safe to enter.

CONCLUSION

- In this program, we have provided an overview of the hazards associated with trenching and excavation operations.
- We have discussed the duties of the competent person, the four types of soil found on excavation sites, and the various means used to protect workers from a trench collapse.
- Now it’s up to you, the excavation worker, to make it a point to never enter or work in a trench that appears to be unsafe. Use the information presented in this program to ensure you remain safe, healthy, and injury-free when working in or near trenches and excavations.
- After all, preventing injuries is the point of our safety and health program, which is why you must always make it a point to be safe.