Excavations Meeting Kit

Each year excavation and trenching cave-ins cause thousands of injuries and deaths. More injuries and fatalities occur from hazardous atmospheres in the trench, being struck-by equipment operating in and around the excavation, falling loads or spoil piles, and tripping and falling on materials in the dig.

EXCAVATION HAZARDS

1. **Soil Type:** There are four general types of soil to be aware of:

- Hard, very dense, with little natural moisture, high internal strength. Excavation usually requires mechanical equipment.
- Very stiff and dense, with low-to-medium moisture content, medium internal strength.
- Stiff to firm and compact to loose, with low degree of internal strength.
- Soft to very soft and loose, very sensitive to vibration and motion, with almost no internal strength and often wet or muddy.

1. **Weather and Moisture.** Water in an excavation can undermine the sides of the excavation and make it more difficult for workers to escape.
2. **Vibration and Equipment.** Vibration from vehicles and equipment can shake the ground and loosen soil which can lead to a cave-in.
3. **Previous Excavation.** A site that has been excavated before is more likely to cave-in because previous digging weakens the strength and stability of the soil.
4. **Time.** The longer an excavation is left open and unprotected the more likely it is to cave in.
5. **Falls and Falling Loads.** Workers and work equipment can fall into an excavated area. When possible, install a barrier and safety signage around the perimeter of the excavation to clearly mark the fall hazard.
6. **Hazardous Atmospheres.** Trenched areas sometimes have depleted oxygen levels, which is safety hazard that must be taken into consideration on excavation sites.
7. **Mobile Equipment.** Mobile equipment operators might have an obstructed view and therefore not be able to detect when they are approaching the perimeter of the trench.
8. **Hitting Utility Lines.** In addition to causing expensive damage to municipal infrastructure, hitting utility lines when digging can also cause electrocution and natural gas leaks, which can lead to worker fatalities.

PRINCIPAL EXCAVATION SAFETY HAZARD – CAVE-INS

Cave-in is defined as the separation of mass of soil or rock material from the side of excavation, or the loss of soil from under a trench shield.

Thousands of employees are injured each year performing this type of work, and hundreds are killed. In fact, the fatality rate for trenching is twice that of deaths incurred from other forms of construction.

Trench collapses kill an average of two workers every month, making this a serious threat to worker safety. To prevent cave-ins, OSHA requires a professional engineer or a qualified professional to analyze soil composition, and then design and implement a system that:

- Slopes
- Shields
- Supports

BEST EXCAVATION SAFETY PRACTICES FOR EXCAVATION WORKERS

1. Never enter an unprotected trench.
2. Park heavy equipment as far from trench edges as possible. Keep soil or other materials at least two feet away from the sides of the trench.
3. Find out where utilities are located underground before crews start digging.
4. Inspect trenches daily before work begins, after storms, or events that may cause changes to the trench.
5. When exposed to traffic, workers can prevent accidents by wearing highly visible clothing.
6. Educate workers on the dangers involved in excavation and on proper safety precautions.
7. When the trench is more than four feet deep, test atmospheric conditions before work begins.
8. Create systems to protect workers and prevent collapses.
    - Benching – Building steps into the sides of an excavation
    - Sloping – Angling the trench wall away from the excavation
    - Shoring – Installing supports such as aluminum hydraulics to prevent soil movement
    - Shielding – Protecting workers with trench boxes or other protective equipment
1. Provide safe entrances and exits to the trench. OSHA requires that ladders, steps, or ramps be used whenever a trench or excavation is more than four feet deep and that all employees work within 25 feet of these provisions at all times.

- Train a specific individual to oversee each excavation job and properly enforce specific safety regulations.
- Have an expert examine soil stability before the dig.
- Trenches over 20 feet in depth need a site-specific, professionally engineered protective system.
- Develop and have employees practice a trench collapse emergency plan.
- Before work begins and throughout each workday, the job foreman or the safety enforcement employee should recheck the excavation site for soil and safety apparatus stability, especially after a storm.
- Closely monitor the trench for hazards other than cave-ins such as noxious gases, and unstable edges.
- Don’t go near an unprotected trench.
- Check weather conditions before work, be mindful of rain and storms.
- Always wear proper protective equipment.
- Planning and implementation of safety measures must be done by a competent person.

FINAL WORD

No worker’s life should end in a trench. Cave-ins during excavations are some of the most common and grisliest causes of worker fatalities in construction, yet they are entirely preventable. With proper training, procedures, and supplies, employers can help to prevent these accidents.