

Trenches are needed for the installation and repair of utility lines, water and sewer lines, television cable, to build roads, and many other uses. Cave-ins are perhaps the most feared trenching hazard. But other potentially fatal hazards exist including asphyxiation due to lack of oxygen, inhalation of toxic vapors, drowning, etc. Electrocutation or explosions can occur when workers contact underground utilities. The following hazards cause the most trenching and excavation injuries.

NO PROTECTIVE SYSTEM

All excavations are hazardous because they are inherently unstable. Pre-job planning is vital to accident-free trenching; safety cannot be improvised as work progresses. The following actions must be taken by a competent person prior to workers entering an excavation.

- Contact JULIE to locate underground utilities at least 2 days before excavation work begins
- Plan for traffic control if necessary, if exposure to vehicular traffic exists high visibility clothing must be worn
- Evaluate soil conditions and select appropriate protective systems
- Test for low oxygen, toxic gases for excavations 4' deep or greater. Insure adequate ventilation or respiratory protection if necessary.
- Determine proximity to structures that could affect choice of protective system
- Direct installation of protective systems in 5' deep or greater
- Ensure safe access and egress. Excavations 4' deep or greater require ladders, steps ramps or other safe means of exit. These must be located within 25' of all workers.
- Ensure appropriate protections are in place if water accumulation is a problem.
- Inspect the site daily at the start of each shift, following a rainstorm, or after any other hazard-increasing event.
- Keep excavations open the minimum amount of time needed to complete operations.

FAILURE TO INSPECT TRENCH AND PROTECTIVE SYSTEM

Trenches and excavations must be inspected daily for evidence of possible cave-ins, hazardous atmospheres, failure of protective systems, or other unsafe conditions.

Inspect excavations:

- Before construction begins;
- Daily before each shift.
- As needed throughout the shift; and
- Following rainstorms or other hazard-increasing events (such as a vehicle or other equipment approaching the edge of an excavation).

Inspections must be conducted by a competent person who:

- Has training in soil analysis.
- Has training in the use of protective systems.
- Is knowledgeable about the OSHA requirements.
- Has authority to immediately eliminate hazards.

UNSAFE SPOIL PLACEMENT

Excavated material (spoils) are hazardous if they are set too close to the edge of a trench/excavation. The weight of the spoils can cause a cave-in, or spoils and equipment can roll back on top of workers, causing serious injuries or death.

Provide protection from spoils by one or more of the following.

- Set spoils and equipment at least 2' back from the excavation.
- Use retaining devices, such as a trench box, which extend above the top of the trench and the top of the spoils if they are present. This will prevent equipment and spoils from falling back into the excavation.
- Where the site does not permit a 2-foot setback, spoils may need to be temporarily hauled to another location.

UNSAFE ACCESS/EGRESS

To avoid fall injuries during normal entry and exit of a trench or excavation, ladders, stairways, or ramps are required. In some circumstances, when conditions in a trench or excavation become hazardous, survival may even depend on how quickly you can climb out.

- Provide stairways, ladders, ramps, or other safe means of egress in all trenches that are 4' deep or more.
- Distance between egress points can be no more than 50' apart
- Ladders must extend at least 3' above the top of the excavation.
- Structural ramps that are used solely for access or egress from excavations must be designed by a competent person.
- When two or more components form a ramp or runway, they must be connected to prevent displacement, and be of uniform thickness.
- Cleats or other means of connecting runway components must be attached in a way that would not cause tripping (e.g., to the bottom of the structure).
- Structural ramps used in place of steps must have a non-slip surface.
- Use earthen ramps as a means of egress only if a worker can walk them in an upright position, and only if they have been evaluated by a competent person.

ADDITIONAL SAFETY CONCERNS

- Equipment should be operated only by trained and authorized workers.
- No work should be performed on the faces of sloped or benched excavations above workers without protecting workers at the lower levels.
- Drainage must be provided whenever work is performed in excavations where water is accumulating or can accumulate.
- Guardrails must be provided on walkways or bridges that cross excavations if the distance from the bridge to the bottom of the excavation is 6' or greater.
- High visibility clothing must be worn by all workers when vehicular traffic is present or in close proximity to the excavation site. The tool room has vests available.
- It also may be necessary to provide traffic control in busy work areas. Refer to the Traffic Closure Request Process and the *Closure Request Form* available from the Transportation Demand Management (TDM) website.