THE BREHMER AGENCY

Excavation Safety

OSHA Cracking Down On Trenching Contractors

Over the last of couple years, there has been an increase in the number of trenching/excavation related fatalities nationwide. OSHA has taken notice of that fact and has created an emphasis program targeting contractors who are engaged in trenching/excavation activities. This newsletter has been created for current Brehmer Agency clients and prospective clients to serve as a reminder of what OSHA regulations require for companies engaged in this type of work.

Although this newsletter will cover much of what is contained in Subpart P of the OSHA construction standard, it simply cannot cover the entire standard. The items covered are the ones that most often result in employee injury and/or OSHA citation. To ensure 100 percent compliance with OSHA standards, contractors are required to comply with all portions of the Subpart P.

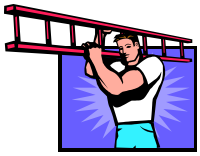
Most common OSHA citations in Heavy Construction

Violated Standard	Approx #
1926.651 Excavation/ General Requirements	825
1926.652 Excavation/ Requirements for protective systems	643
1926.021 Construction Safety Training and Education	174
1926.100 Head Protection	124
1926.501 Fall Protection Scope/Application/ Definitions	96

OSHA data Oct 2004-Sept 2005

Fatality facts

- **Approximately 50 people die each year in trenching accidents**
- **Most fatalities occur in trenches 5'-15' in depth**
- **Very high percentage of minority victims with Hispanic workers experiencing the highest number of fatalities**
- **100% of the fatalities were preventable**



When is a Ladder Required in the hole?

OSHA standards require a means of egress from an excavation when it reaches 4' in depth. Providing a ladder is the most common method of compliance with this requirement. The ladder must extend at least 3' above the top of the trench and be placed on firm ground within the trench.

A ladder must be provided every 25 feet of lateral travel. For a 50' long excavation, a single ladder in the center of the excavation would comply with OSHA requirements assuming there are no obstructions blocking travel in the trench from either direction. Additionally, the ladder cannot be placed so that it requires employees to leave the protection of the shoring or shielding in order to access the ladder. The ladder must be routinely inspected and be free of any visible defects.

As a rule of thumb, if your employees need to use their hands to exit the trench, a ladder is required.

Trench Protection Requirements

OSHA regulations do not require any cave-in protection for excavations 5' or less in depth if examination of the ground by a competent person provides no indication of a potential cave in. In a nutshell, unless the trench is unstable, no protection is required until the 5' depth is reached.

All trenches 5' deep or greater must be protected against cave in by use of shoring, shielding, sloping or benching.

Shielding or trench boxes are used to provide a "safety envelope" for employees working in an excavation. They will not prevent a cave in, they will merely reduce likelihood of soil trapping employees in excavation if a cave in occurs.

Shoring is placed in a trench so that they fit tightly between each wall of the trench. This essentially keeps pressure against the trench walls and reduces the likelihood of a cave-in.

Slopping or benching protects workers by widening the trench at the top. In theory, if there were a trench failure in a properly slopped or benched excavation, the worker could not become trapped in the hole. The angle of the slope or bench is different depending on which type of soil the trench is classified as. See article below for more specifics regarding proper soil classification and slope angle.

A penetrometer is an excellent tool to use for a manual test. It will give you the unconfined compressive strength of the soil which can be used to properly classify the soil. They are less subjective than the other manual tests. Approximate cost $60

Soil Classification and Sloping/Benching Requirements

OSHA regulations require that soil be inspected and classified initially and whenever a change in soil conditions warrants re-classification. Classification includes one manual and one visual test.

Manual tests include use of a penetrometer, thumb penetration, Plasticity (thread) test, dry strength test, etc. A visual test includes simply analyzing the soil and classifying it based on the following criteria:

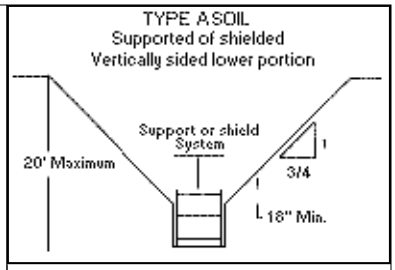
TYPE A SOILS are cohesive soils with an unconfined compressive strength of 1.5 tons per square foot (tsf) (144 kPa) or greater. Examples of Type A cohesive soils are often: clay, silty clay, sandy clay, clay loam and, in some cases, silty clay loam and sandy clay loam. (No soil is Type A if it is fissured, is subject to vibration of any type, has previously been disturbed, is part of a sloped, layered system where the layers dip into the excavation on a slope of 4 horizontal to 1 vertical (4H:1V) or greater, or has seeping water.
(Slope at 3/4 :1 ratio)

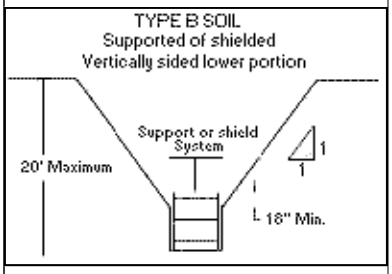
TYPE B SOILS are cohesive soils with an unconfined compressive strength greater than 0.5 tsf (48 kPa) but less than 1.5 tsf (144 kPa). Examples of other Type B soils are: angular gravel; silt; silt loam; previously disturbed soils unless otherwise classified as Type C; soils that meet the unconfined compressive strength or cementation requirements of Type A soils but are fissured or subject to vibration; dry unstable rock; and layered systems sloping into the trench at a slope less than 4H:1V (only if the material would be classified as a Type B soil).
(Slope at 1:1 ratio)

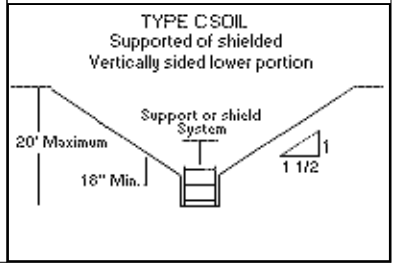
TYPE C SOILS are cohesive soils with an unconfined compressive strength of 0.5 tsf (48 kPa) or less. Other Type C soils include granular soils such as gravel, sand and loamy sand, submerged soil, soil from which water is freely seeping, and submerged rock that is not stable. Also included in this classification is material in a sloped, layered system where the layers dip into the excavation or have a slope of four horizontal to one vertical (4H:1V) or greater.
(Slope at 1 1/2 : 1 Ratio)

Soil classification determines the slope of the trench. The ratio of rise/run is the same regardless of whether the trench is slopped or benched. See diagrams to the right.

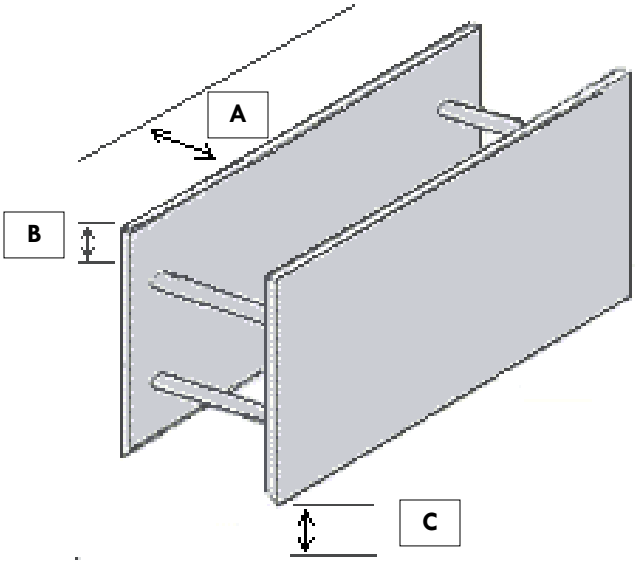
Soil classifications should be documented in supervisors daily log. Even if a class A soil is properly slopped, OSHA will cite contractors who cannot prove that they actually went through the process of classifying soil. If no test performed OSHA requires that you consider all soil class C and slope or bench accordingly.







Anatomy Of A Properly Placed Trench Shield



A
Spoils piles, material and tools must be stored no closer than 2' from the edge of the excavation. This is to reduce the amount of weight and stress on the trench walls

B
Trench boxes are required to extend at least 18" above the top of the trench. This is a requirement to prevent rocks and debris from accidentally being kicked into or rolling off spoils piles onto employees working in the hold

C
Trench boxes must be positioned so that they are no more than 2' off of the bottom of the trench. This is to prevent soil from sloughing off the trench wall and trapping employees by sliding underneath the trench box.

Protective System Design and Approval

All trench protection systems must be engineered and approved for use as such. All approved trench protection systems must come with an engineer stamped "tabulated data sheet." A tabulated data sheet will give specific information regarding use of the device for different soil classifications, trench depths, trench widths, etc. A "tabulated data sheet" must be maintained on the job site for all protection systems being used.

If you are missing a tabulated data sheet, one can generally be obtained by contacting the supplier of the protective system. For older systems or systems of unknown origin, a professional engineer must be contacted to inspect the device and provide a new "tabulated data sheet."

When working in trenches 20' or deeper, all trench protection systems must be approved by an engineer. A contractor cannot simply stack trench boxes on each other to obtain that depth unless this process has been approved by an engineer. Make sure that you save all records from the consulting engineer to present to OSHA in the event of an inspection. If you cannot produce records, you will likely be cited.

There are head injury hazards all over the place on a excavation job site. All employees should be in an approved hard hat at all times whether they are in the trench or on top of the trench.

Confined Space Entry Into Live Sewer

All live sewers (sanitary or storm) are considered permit required confined spaces at all times because of our inability to control the atmosphere 100% of the time.

For example, despite taking precautions to ventilate and monitor the air in a live sewer, a contractor cannot control what a nearby home or business may flush down the system. A company could flush potentially deadly chemicals into the space that would not permit the entrant an opportunity to escape. Additionally, firefighters often wash gasoline off of a roadway following a car accident. That could enter the storm sewer creating an explosive atmosphere.

To enter spaces safely and in compliance with OSHA requirements:

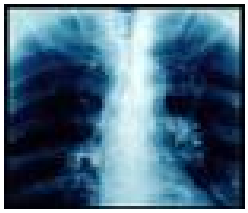
- Train employees on confined space entry
- Perform hazard analysis on space prior to entry
- Monitor air prior to and during entry
- Fill out entry permit per OSHA standards
- Provide and use emergency retrieval system
- Provide ventilation in space as needed
- Provide an attendant to monitor entrant status at all times. This person should have no other assignments while entry is taking place.
- Implement emergency action plan to react to an entrant who cannot exit the space on their own

The Competent Person…. It's not an easy job!!

A competent person is an individual with working knowledge and formal training on excavation/trenching safety. This individual is generally in charge of the job and must have the authority to stop work in the event that a hazard is identified. Below are some of the functions of the competent person:

- Inspect the excavation daily and after any major weather event to ensure that it is safe for employees to enter. Document this inspection
- Inspect, classify and document soil classifications
- Monitor work performed by employees to ensure it is being done as safely as possible
- Supervise the use of shoring, shielding, benching and sloping to ensure they are done properly
- Monitor excavation dewatering activities to ensure that trench integrity is maintained
- Enforce the use of water as a means of dust control when cutting any concrete product
- Account for all employees at all times

These are just the main functions of the competent person and is not meant to list all that is expected of them. Bottom line is that being a competent person is a big job and one which can have terrible consequences if the wrong individual is put in this position. Please make sure that all of your people have received recent competent person training and are the best choice not just for field production, but for the safety of your workforce.



Silica

The "New" Asbestos

Silicosis claims and other silica exposure related ailments are becoming increasingly common. To combat this, OSHA has been targeting industries with silica exposure hazards for a couple years.

As a rule of thumb, if OSHA sees a cloud of dust, they will do an inspection and issue citations. *What can you do to combat this?*

Respiratory Protection Program

Many companies simply give their employees a dust mask and think they have complied with OSHA requirements. This could not be further from the truth. Unless a contractor has industrial hygiene sampling data that states that their employees are not being over exposed, giving employees dust masks to use voluntarily does not comply with OSHA requirements.

What if I mandate the use of dust masks when my employees are exposed to dust?

If an employer wants to mandate respiratory protection, they are required to implement a respiratory protection program. Respiratory protection programs require that employees fill out a medical history questionnaire. This questionnaire must be reviewed by a physician or other licensed health care professional (PLHCP). After review, the employee may be cleared to wear a respirator or may have to see the physician for a visit.

Once the employee has been cleared to wear a dust mask by a physician, the employee must be fit tested with a respirator and trained on use and limitations of the respirator. After fit testing and training, the employee needs to be monitored to ensure that they are using it correctly. This includes maintaining a face free of facial hair including stubble. **Bottom line, a respiratory protection Program is a lot of work and somewhat costly.**

A must simpler and cost effective solution is to equip all cut-off saws with a wet-cut kit and Hudson sprayer & **MANDATE THEIR USE**. Silica dust is virtually eliminated by introducing water into the cut. By mandating their use in the field, you will eliminate exposure to the silica created when cutting concrete pipe and also comply with OSHA requirements. Provide dust masks on site to be used temporarily in the event of an equipment failure...i.e. broken hose, pump, etc. Failure to plan ahead and fill up the water tank does not constitute equipment failure.