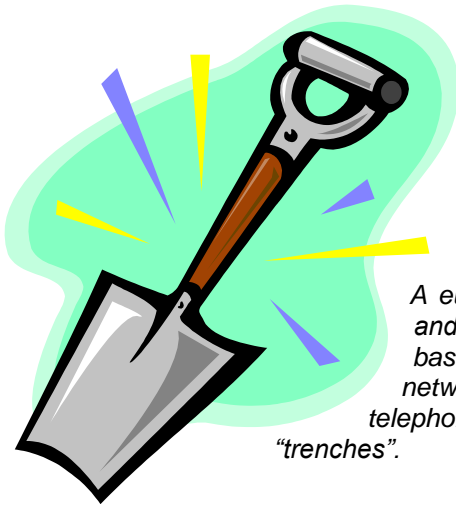


Ditch Diggers Dig Safely

Greater Houston
Chapter



A euphemism for an industry that specializes in underground excavation and trenching is "ditchdigger." They practice their trade on a day to day basis, placing a myriad of piping underground, which comprises the grid network of sub-surface utilities (gas, light, power, storm, sewage, telephone, fiber optic, steam, etc.). All of these utilities are placed in "trenches".

OSHA's CFR 1926 (Excavation) Subpart P deals with safe excavating and trenching. The average piece of pipe is placed under the surface of the ground at a level averaging between three and thirty-three feet. Now that's a pretty big hole in the ground, and that's also a pretty unsafe hole.

It's unsafe because Mother Nature doesn't like anyone tearing up the landscape and digging deep holes, and Mother Nature's way of dealing with this intrusion is to close the gap (trench) in the ground with the same soil that was just taken out. The net result is what we call a "trench collapse" and if a human being is caught in this avalanche of soil they are usually suffocated in minutes.

So how can we dig these holes (excavations) in a safe manner? By adhering to OSHA's Excavation Standard, and digging safely.

On a construction site where pipe is going to be placed in the ground, OSHA's Subpart P (Excavations) says the first thing we (the ditchdigger) has to do is ascertain the type of soil being dug.

OSHA defines four different types of soil, as follows:

	Maximum	Allowable	Slope	Vertical	(90°)
Stable Rock					
Type "A" Soil	"	"	"	¾:1	(43°)
Type "B" Soil	"	"	"	1:1	(45°)
Type "C" Soil	"	"	"	1½:1	(34°)

Once the type of soil is known, then this same excavator has four options regarding the manner in which he is going to shore the sidewalls:

- Option #1 Lay Wall Back at Slope Shown for the TYPE of Soil
- Option #2 Shore Wall with Trench Shields
- Option #3 Shore Wall with Timber Shores
- Option #4 Shore Wall with Aluminum Hydraulic Shores

In the TABLES & FIGURES shown in Subpart P (Excavations) the sizes of shores and shields are illustrated, varying depending on (a) Type of Soil, (b) Trench Depth, and (c) Trench Width. This data is for excavations up to a maximum of 20 feet. Shoring systems for

excavations deeper than 20 feet must be determined by a Registered Professional Engineer, in the state where the excavation will occur.

The competent person on-site must determine the type of soil by testing it, using a number of testing procedures also shown in OSHA's Subpart P (Excavation) Standard. This same competent person is also required to perform a "visual" test of the trench, the trench sidewalls, and surface conditions adjacent to the trench. If the trench walls have fissures, freely seeping water, major root outcroppings, or is in previously disturbed soil, then the soil must be classed as Type C Soil.

What are some other guidelines and procedures that must be put into place either prior to excavation or during the excavation process as it occurs? Here's a short list of "must" items:

- **20-Foot Max** – Trench shore systems in trenches more than 20 feet must be designed by a Registered Professional Engineer.
- **Aluminum Hydraulic Shores** – One of four options to prevent trench collapse.
- **Benching** – Benching dimensions are shown on Tables B-1, B-2, and B-3 in Subpart P (Excavation) Standard. NOTE: No "benching" in Type C Soil.
- **Confined Spaces** – Manholes, pits, shafts, tunnels, large-bore pipe are determined by OSHA to be (by definition) "confined spaces." As such, before entering, workers may be required to test the atmosphere, use spark-proof tools and practice emergency exiting procedures.
- **Gas Cans** – Gasoline and similar combustible liquids, must be stored in a metal spring-loaded container with a flash-arrestor in the nozzle, and be clearly labeled as to their contents.
- **Ladders** – Extension ladders must be placed in all trenches four feet or more deep.
- **Maximum Allowable Slopes** – Vary depending on type soil.
- **One-Call System** – Before "digging" the nearest One-Call Center must be notified, to call for marking of existing underground utilities.
- **Personal Protection Equipment** – PPE on excavation sites should include (but is not limited to) wrap-around safety goggles, hearing protection, hard hats, work gloves, heavy-duty work boots, appropriate work clothing, respirators, etc.
- **Pocket Penetrometer** – Spring-loaded device used to test for type of soil:
 - Type A Soil 1.5 tons per square feet (unconfined compressive strengths)
 - Type B Soil .5 to 1.5 tons per square feet (unconfined compressive strengths)
 - Type C Soil .5 or less tons per square feet (unconfined compressive strengths)
- **Ramps** – Soil ramps may be used to access and exit trenches (with limitations).
- **Soils Classification** – Four types of soils and must be determined prior to excavation.
- **Spoil Pile** – Soil excavated from trench must be placed a minimum of 2 feet back from the lip of the trench wall.
- **Superimposed Loads** – No superimposed loads (i.e. pipe, vehicles, compressors, sleds, cement trucks, etc.) should be closer than two feet to lip of the trench wall.
- **Tabulated Data Sheet** – Must appear on all trench shields, indicating depth of trench the shield can be used in depending on type of soil.
- **Timber Shores** – One of four options to prevent trench collapse.
- **Trench Shields** – One of four options to prevent trench collapse.

Did you know that a cubic yard (3' x 3' x 3') of soil weighs approximately 3,000 pounds. A cubic yard of soil falling (crashing down) on a worker will probably suffocate a worker in an instant, or kill him outright. Trenches five feet or more deep must be shored prior to entry. NO EXCEPTIONS.

Some construction activities are more hazardous than other. Even under the best of conditions, excavation is highly dangerous. Ongoing training regarding the hazards is a "must" for all workers. Using the "buddy system" is particularly good for these workers...particularly "new-hires."