

Know

You Should



A Message from the American Concrete Pipe Association

Bulletin No. 132

OSHA To Get Tough On Trenching Regulation Enforcement

OSHA is expected to place additional emphasis on enforcing its current regulations as a result of increased trenching-related fatalities. Trenching is generally recognized as one of the most hazardous operations in the construction industry. In 2003, fatalities related to trenching increased by 61% over 2002, and represented 6% of total construction fatalities in the United States. Of the 53 OSHA-investigated trench related fatalities 36 were due to trench collapses. As a result OSHA convened a Trenching Initiative Meeting in April 2004 for the purpose of interpreting trench-related fatality statistics and drafting an outline of steps that should be taken to reduce them. Stricter enforcement of existing OSHA regulations related to trenching is expected as a result of the meeting.

OSHA Section 1926.652 is the regulation that deals with requirements for protective systems in excavations. **The regulation requires that, unless the excavation is in rock, a protective system such as sheeting or a movable trench box must be used to protect employees from cave-in when trenches are five feet deep or deeper.** Alternatively the contractor can slope the sides of the trench, typically at no steeper than 1.5 horizontal to 1 vertical.

Furthermore, section 1926.652(g)(2) of the regulation dictates that the shield

system, namely **the sheeting or trench box, must extend to within twenty four inches of the bottom of the trench.** In this case there must be no indications while the trench is open of a possible loss of soil from behind or below the bottom of the shield.

In Canada occupational health and safety issues come under provincial jurisdiction. Canadian provinces have regulations governing protective systems in trenches that are similar to OSHA in the United States but in some cases are stricter.

The leading manufacturers of HDPE and PVC pipes in the United States all reference ASTM D 2321, *Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications*, in their installation recommendations.

Thermoplastic pipes are flexible pipes. They arrive on site as a conduit only. Flexible pipes have very little inherent strength and depend upon a properly installed embedment material for their load carrying capacity. The soil/pipe structure has to be built on site by the installer by appropriately placing and compacting the embedment material in 6" layers. Disturbing this material after proper placement and compaction destroys the soil/pipe structure.

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Accordingly, ASTM D2321 Section 6.4.1 *Supports Left in Place* states:

“Unless otherwise directed by the engineer, sheeting driven into or below the pipe zone should be left in place to preclude loss of support of foundation and embedment materials.”*

(*The top of the pipe zone is illustrated in ASTM D 2321 as the top of the pipe.)

Furthermore, Section 6.4.2 *Movable Trench Wall Supports* states:

“Do not disturb the installed pipe and its embedment when using movable trench boxes and shields. Movable supports should not be used below the top of the pipe zone unless approved methods are used for maintaining the integrity of embedment materials”.

In addition to loss of support, light weight plastic pipe has been known to “float” up from the suction created when the trench box is lifted.

This is an obvious conflict with OSHA regulations for pipe diameters greater than 18” in diameter since OSHA only allows “excavation of material to a level no greater than 2 feet (.61m) below the bottom of the members of a support system”. So, what happens if the contractor installs plastic pipe with movable supports in accordance with OSHA regulations and the pipe fails from

lack of proper side fill support? The contractor then hears the age old refrain of “you didn’t install it correctly”.

In response to this dilemma, one major manufacturer of HDPE pipe has published a trench detail on its website that details the use of **a trench with a width equal to three times the pipe diameter when using a trench box**. For example, **this would result in a trench which is 9 feet wide for a 36" diameter pipe and a trench which is 12 feet wide for a 48" diameter pipe**.

Failure to clearly specify the correct installation and trenching procedures could result in either a violation of OSHA regulations or an infringement of ASTM standard installation procedures. In either case the engineer could be held liable in the event of an injury or death, or the failure of the pipe due to improper installation practices.

Concrete pipe is a rigid pipe. It arrives on site as both a structure and a conduit. Due to the inherent strength of the concrete it is **much less** dependent upon support from the embedment material. The installer of concrete pipe can lower, and move a trench box in accordance with OSHA regulations and still adhere to proper installation practices.

Concrete Pipe – the SAFE choice