



IT'S A SHORE THING

Trench Shoring Manufacturers Remember Their Toughest Jobs

EXTREME EXCAVATIONS

Coble Shores Challenges

By Steve Barnhardt

Pipeline Utilities Inc. of Raleigh, N.C., bid for a storm water repair and upgrade project at the University of North Carolina's Boshamer Stadium that involved removing the existing 60-in. pipe and installing a new 72- and 84-in. pipe. In order to successfully complete the project, Pipeline Utilities would have to excavate to a depth of up to 35 ft at the deepest point in poor soil conditions, and they would then be required to lay 300 ft of the new pipe and set three new 14-ft diameter precast manholes.

In addition to the complexity of the actual construction, the project would need a fairly complex shoring system. The jobsite conditions that would affect the shoring system began with the soil conditions. Soil is often the first variable that directs the use of a protective system. Generally, as soils worsen with depth, they gain additional weight and exert a greater pressure against a protective system. As the soils become more granular, they also become prone to raveling. Excessive soil raveling can prove problematic as a contractor attempts to shore an excavation. While trying to advance the cut of the excavation, the soil will often just fall in, never allowing you to move your shoring forward. In these types of conditions, your only option is to shore the excavation continually as you remove the soil.

In addition to the poor soil conditions, the depth further complicated the issue. Thirty-five ft is a very deep excavation and at that depth, thousands of pounds per square foot of soil pressure can be exerted upon the shoring system.

The final complicating issue was the large pipe that would need to be installed. For comparative purposes, a standard trench shield may yield about 65 in. of vertical pipe clearance under the pipe spreaders. The larger of the new pipe being installed would require up to 102 in. of vertical clearance, clearly in excess of the conventional pipe clearances for most systems.

The Solution

Coble Trench Safety Shoring Specialists Brett Sondergard and John Knighten met with Pipeline Utilities early in the bid phase for this project and looked at all parameters surrounding the project. A plan was put in place with accurate costs that would be needed before the bid. As always, the plan could be subject to change, but it provided a reasonable approximation of the shoring cost and other costs such as an appropriately sized excavator to work with the shoring system.

"We felt immediately that the slide rail system would easily accommodate the poor soil conditions we would encounter on this project," says Sondergard. "The slide rail system's efficiency becomes pronounced in bad soils because you can advance the panels along the rails ahead of the excavation's cut, which helps to prevent soil raveling. In addition to helping prevent soil raveling, the system has the benefit of being positive shoring. Positive shoring is a system



that acts to prevent a soil collapse, as opposed to just protecting employees in the event of a soil collapse, which is typically the role of a standard trench shield."

In addition, the poor soil conditions exert a greater soil pressure against the system. This effect is similar to that of the depth and together they both increase the stress on a slide rail system. The SBH slide rail system is built to handle these intense soil pressures and can comfortably achieve the 35 ft of excavated depth needed on this project. Large triple slide rails are dug into the ground, and slide rail panels are advanced along tracks in the rail to provide soil protection to the full length of the excavation. During installation, the linear rolling strut is advanced along the rail to prevent "toe in" of the system. Once the system is installed to the full depth, the rolling strut can be rolled up to provide additional vertical clearance as needed. Using site specific engineering, it was possible to achieve the necessary 102 in. of vertical clearance with the site conditions present and ultimately provide the optimal method of shoring the excavation.

The steel sheeting guides were needed due to the presence of the existing lines and are an added benefit to the SBH slide rail system. Steel sheeting guides act as slide rail panels and can be inserted along the tracks in the slide rail. A sheeting guide is inserted along the base of the excavation and at the top of the excavation. The area between the sheeting guides remains open and is shored once steel sheets are inserted along grooves in the sheeting guides. The benefit of this design is that the sheets can be inserted around existing lines, which helps to mitigate the effect of crossing existing utility lines.

Thanks to a thorough planning phase and attention to detail, the slide rail system was installed without any incidents. The system performed and the contractor was satisfied with the system, as well as Coble Trench Safety's ability to make such a complex shoring project flow smoothly from installation through removal.

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