



The Occupational Safety and Health Administration rates water, sewer and pipeline construction as the fourth most deadly occupation in the United States during 1999–2000. Photo courtesy of TrenchSafety.org.

Open Trench Failures Continue to Rise

Are Municipalities Neglecting Safer Trenchless Alternatives?

By Del Williams

Construction worker Jose Gonzalez was killed while working on a sewer project in Gilbert, Ariz., on June 21, 2001. The open trench he was working in collapsed, burying him alive. Another co-worker was severely injured in the accident. A similar death occurred in Scottsdale, Ariz., just weeks before.

Unfortunately, this scenario is not uncommon. Despite the fact that hundreds of people are killed and severely injured in open-trenching accidents throughout the United States every year, most municipalities continue to award construction contracts to companies utilizing open-trench methods, when safer trenchless technology is available to them.

The Occupational Safety and Health Administration (OSHA) rates water, sewer and pipeline construction, essentially open-trench work, as the fourth most deadly occupation in the United States for the period 1999–2000. This information is per the 2001 OSHA Industry Profile report on occupational fatalities, injuries, safety violations and

assessed penalties for the prior 12-month period.

OSHA has been keenly aware of the high death rate associated with open-trenching since 1973 and the difficulty gaining compliance from trenching contractors to OSHA safety regulations. In a special report issued by the Administration in 1985 specifically regarding open-trench safety violations OSHA stated, “Trenching work creates hazards to workers that are extremely dangerous. Although it would be expected that, after more than 12 years of enforcement activity, most employers would be adhering to shoring and sloping requirements, experience has shown that such is not the case. Compliance with OSHA construction standards applicable to such operations is frequently bypassed.”

The OSHA report further states, "Because of the continuing incidence of trench collapses and accompanying loss of life, the agency has determined that an increased OSHA enforcement presence at worksites where such operations are being conducted is warranted."

Despite the increased OSHA emphasis on safety standards enforcement in the mid-80s, open-trenching contractors continued to dominate the construction industry in OSHA standards violations. In a 1995 OSHA report listing the 100 most frequently cited OSHA construction safety violations, open-trenching rated in the top five.

Since then, the situation has not improved. Following the recent open-trenching death in Gilbert, Ariz., a senior OSHA spokesperson for the state noted that open-trenching fatality incidents are rising. According to the 2001 OSHA Industry report,

- Open-trenching has the highest number of OSHA safety violations of all heavy construction industries for the period 1999–2000,
- The highest number of safety violations in the utility, communications and power line construction industries for this period, and



Sections of pipe await placement at one trenchless project. Increasingly, municipalities throughout the United States are specifying that contractors employ trenchless technologies for installing sewer and water lines.

- The highest number of violations of all U.S. occupations for non-compliance to OSHA safety training and education requirements.

Further, open-trenching leads all of the above categories in dollar-volume of assessed penalties by OSHA.

OSHA statistics demonstrate that open-trenching is one of the most haz-

ardous and deadly occupations in the United States, largely because of trenching contractor's non-compliance to OSHA safety standards. Another factor is that the open-trenching process is inherently unstable. Excavated soil stockpiled on the edge of a trench increases the pressure to trench walls. Vibrations from nearby excavation equipment such as backhoes increase the likelihood of a cave-in. Even trench wall sloping, shoring and worker shielding offers only limited protection when collapsing soil can weigh more than a ton per cubic yard. Most trenching deaths and serious injuries result from cave-ins, toxic fumes, drowning, electrocution and explosions.

The question is why are not more municipalities turning to trenching alternatives that avoid many of its inherent dangers? The technologies exist, with a proven track record not only for safety, but also for cost savings. Many of these technologies for trenchless construction have already been adopted outside the U.S. In parts of the world such as Japan and Germany, trenchless construction is utilized due to the heavy urbanization and the impact open trenching causes.

Microtunneling and soil piercing pilot tubes are two existing trenchless methods that are gathering support. A micro-tunneling pipeline installation involves



Sewer construction using pilot tube technology provides a safer alternative to open trenching.

microtunneling excavation, a subterranean, unmanned tunneling method that uses a laser-guided "mole" to lead the way for sewer pipe installation through sections of soil spanning 300 to 500 ft. The only excavations on the surface of the ground are construction pits located at either end of a pipeline section. The pipes are precisely pushed through the soil from one pit to the other. In new sewer pipe systems, an auger is used to perform the tunneling.

The process of installing a sewer using pilot tube technology is similar to the microtunneling process, especially when clay pipe is used. Since 1992, NO-DIG (a company specializing in trenchless technology) has installed more than 220,000 linear feet of pipe using microtunneling techniques.

Today more and more municipalities throughout the United States are specifying that contractors use trenchless technologies that are inherently safer and accrue substantially less liability. As an increasing number of local governments are becoming self-insured, interest in using safer methods is becoming more prevalent.

The Oregon Department of Transportation even has a trenchless technology expert to help employees and contractors keep current with new techniques that can eliminate the need to excavate. The department saved a total of \$1.5 million on six recent trenchless projects, according to the Portland, Ore., Daily Journal of Commerce.

Yet, incidents such as the Gilbert cave-in remain a tragic reminder that trenching is dangerous, despite all of OSHA's efforts. While not a panacea, trenchless technology has come of age and deserves a closer look by both municipalities and the contractors they employ.

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