

# Public Works

TRENCHLESS TECHNOLOGY | By Stephanie Johnston

## Five million feet and growing

Two projects display Fusible PVC's merits.

**S**ince introduced a decade ago, more than 1,000 miles of Fusible PVC—the trade name for manufacturing and installation processes patented by Underground Solutions Inc. (UGSI) of Poway, Calif.—have been installed in North America.

Five million feet in 10 years is tremendous market acceptance. One reason is that government agencies had already installed a lot of bell-and-spigot PVC. Roughly two-thirds of water and sewer pipeline is polyvinyl chloride; 30% is ductile iron and other materials; and the remaining 5% HDPE.



Five million feet of Fusible PVC has been installed in North America, signaling tremendous market acceptance.



PVC pipe can be mechanically joined or fused for trenchless applications. The former doesn't require expensive butt-fusion equipment but has lower tensile strength, so is more common in gravity sewer pipeline projects than pressure pipelines like water and force mains.

Another is that the material is highly compatible with ductile iron, which facilitates connections and extensions. According to the trade association that represents PVC pipe manufacturers, the two have the same outside diameter regimen and use the same slip-on or mechanical joint fittings, valves, and appurtenances. Customers often conveniently get everything they need from a single supplier.

Fusing creates a monolithic pipe, eliminating the possibility of future leaky joints, that can be pulled into an alignment via pipebursting, sliplining, and horizontal directional drilling (HDD). Trenchless methodologies like these comprise 80% of PVC installations. Micro-tunneling and pipe jacking are also feasible, according to [www.undergroundolutions.com](http://www.undergroundolutions.com).

UGSI President and CEO Andrew Seidel describes the patents as “pipe-and-fusion joint technology intended for conveying compatible liquids under pressure and gravity flow conditions. The fused joint properties provide a robust tensile capability for installation, as well as a long-term pressure capability comparable to the pipe itself.”

Theoretically, anyone can fuse PVC. However, only UGSI-licensed entities are permitted to install Fusible PVC. The company trains installers and warrants their work for a year. Most of the nation's 100 or so third-party installers are contractors, but government agencies have been trained as well.

Last year, Consolidated Mutual Water Co. in Lakewood, Colo., was named Rehabilitation Project of the Year by *Trenchless Technology* magazine. The user-owned utility is a nonprofit entity that serves roughly 85,000 people within 26 square miles. Large sections of its 325-mile network is old 4- and 6-inch cast-iron pipe that's been failing with alarming frequency.

To avoid open-cut replacement, utility managers looked at various equipment and methodologies and decided to self-perform trenchless. Crews use TT Technologies Inc.'s 800G static-pull pipebursting system and McElroy Manufacturing Inc. thermal butt-fusion

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equipment to install UGSI's DR 18 Fusible C-900 PVC pipe.

This replacement methodology was twice as fast as open-cut. Typical runs are 500 to 800 linear feet, but crews have done several that are more than 1,800 linear feet long—something not many contractors can say. Since 2010, writes Editor Jim Rush, "Consolidated has quietly become one of the best pipe-bursting entities in North America."

#### **Small-diameter lines**

Usually, of course, water and wastewater utilities contract out such work.

Located on the southeast side of the Kansas City metropolitan area, City of Lee's Summit, Mo., Water Utilities serves

93,000 customers. The department's 580-mile system is mainly cast iron and ductile iron buried in clay soils, which is a recipe for corrosion.

In 2009, managers decided to replace mains that were being repaired most frequently: small-diameter lines in residential areas. To minimize inconvenience to residents, they focused on trenchless construction, particularly pipebursting because it would let them install a new line using the same path as the existing line with minimum excavation.

Potential contractors were allowed to choose between HDPE and Fusible C-900 PVC. The latter allowed the utility to maintain material continuity with other PVC pipe installed in its system, upsize lines with minimal increase in outside diameter, and use standard PVC and ductile iron fittings to reconnect the lines. Almost 13,000 linear feet of the PVC were installed by Wiedenmann and Godfrey, of Belton, Mo.

Three years later, in 2012, almost 25,000 linear feet were to be installed using two trenchless methods: 24,000 feet of 6-inch and 8-inch Fusible C-900 via pipebursting and 600 feet of 6-inch Fusible C-900 via HDD.

The project bid in March 2012 and was awarded to Lamke Construction of Marthasville, Mo., a first-time PVC fuser. The contractor began construction

in May and by November had installed more than 9,000 feet via pipebursting.

"It worked well," says Pat Dougherty of Lamke. "We've been pleased with the material's overall performance. I wouldn't hesitate to utilize the pipe on future projects."

The remaining 10,000 feet were installed beginning in April 2013 when the weather warmed enough to eliminate concerns that the temporary system installed prior to the bursting process would freeze.

"We're very pleased with the benefits this pipe has provided for these small main replacement projects," says Lee's Summit Senior Staff Engineer Kevin York.

UGSI's brand names mirror American Water Works Association standards for the manufacture of PVC pipe in various lengths; i.e., Fusible C-900 (4- to 12-inch-diameter) and Fusible C-905 (12 inches and above). Until recently, no AWWA or ASTM standard specifically addressed installation and pressure-testing of fused PVC. However, AWWA C605-13 (Standard for Underground Installation of Polyvinyl Chloride (PVC) and Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe and Fittings) has been updated to address "fused joints" (joining two pieces of plastic by heating or melting). The revised standard went into effect Feb. 1, 2014. **PW**