

# Slipline & Save

California municipalities maximize budgets by sliplining with fused PVC pipe systems

By Jim Force

*P*ipelines do not stop flowing during a recession. These tough times, however, mean municipal water managers must maintain their underground infrastructure as cost-effectively as possible. This is especially true in California, where budget woes are among the worst in the country.

A growing number of communities in the Golden State are saving significantly on pipeline repair and rehabilitation projects by sliplining with fused polyvinyl chloride (PVC) pipe systems. Installation is fast and nondisruptive, and municipalities get more flow for their dollar because fused PVC pipe can provide a larger interior diameter (ID) with an outside diameter (OD) and working pressure equivalent to those of high-density polyethylene (HDPE) pipe.

"We are seeing a significant increase in the use of our Fusible PVC pipe for sliplining, especially in congested areas of California," said Bo Botteicher, technical director of Underground Solutions, Inc. (UGSI), developer of the Fusible PVC pipe sliplining process. "We've completed more than 80 projects in California since 2006, and in nearly every case we've been selected because of lower capital and operating costs."

Until 2006, the primary pipe material used for trenchless applications was HDPE. The advent of fused PVC pipe systems provides owners, designers and contractors an alternative that is compatible with the PVC and ductile iron pipe already prevalent in many utility systems.

In the last few years, UGSI's Fusible PVC pipe has been used in more than 1,000 water, wastewater and water reuse pipelines throughout North America. It has been installed via horizontal directional drilling, sliplining, pipe bursting, jack and bore and in direct-bury installations. In California, project pipe sizes have varied from 4 to 27 in. in diameter, with more than 135,000 In ft already installed or currently under contract.

In sliplining applications, fused PVC pipe provides a fully structural replacement pipe (independent of the host pipe) while providing greater ID and flow capacity compared to HDPE pipe at a given pressure class. Greater ID also translates to lower annual pumping and operating costs. Evaluated over the life of the pipeline, these savings can be significant.

"Municipalities have achieved significant savings while realizing the benefits of a leak-free, fully restrained fused PVC pipe system that is easy to maintain," Botteicher said. "With reduced material

and installation costs, our Fusible PVC systems have repeatedly produced savings to utility owners in competitive bidding, ranging from 5% to 30% of total project value depending on project scope."

## California Solutions & Savings

Costs were uppermost in the minds of officials in Santa Cruz, Calif., when they advertised a water main replacement project in early 2008. Eight contractors bid on the project, six submitting bids based on UGSI's Fusible C-905 pipe as their lowest overall installed cost option. Lewis & Tibbits, Inc. won the project. A major factor in the cost difference was the higher strength-to-weight ratio of the fused PVC pipe, which allowed it to meet the 18-in. ID requirement using an 18-in. ductile iron pipe.

The Santa Cruz job called for 2,000 In ft of 18-in. ID pipeline to be sliplined into an existing 24-in. steel main. Contractors completed the project in May 2008, and both the city and the contractor were pleased with the results.

"We are very happy with fusible PVC pipe and will use it on future projects," said Douglas Valby, P.E., civil engineer with the city of Santa Cruz.

Lewis & Tibbits Vice President Eddie Renshaw said, "Underground Solutions has a great pipe product that is easy to work with. We liked the support they provided during pipe fusion and installation."

Fused PVC pipe also provided significant cost savings on a water main sliplining project near Atherton, Calif. In early 2008, California Water Service Co. (Cal Water) became interested in evaluating fused PVC pipe for a slipline project being designed for its upcoming Bear Gulch District. To investigate the suitability of using UGSI's Fusible PVC pipe for a 5,280-In-ft, 20-in. riveted steel water line slated for rehabilitation, the design and operations team visited the city of Santa Rosa, Calif., to observe Fusible C-905 pipe being installed in a slipline project. After witnessing the field installation and speaking with several local references, Cal Water elected to include 16-in. DR25 Fusible C-905 pipe.

## ARTICLE SUMMARY

**Challenge:** Even in challenging economic times, municipalities must invest in maintaining their underground infrastructure. Communities in California are facing especially tight budgets and need cost-effective solutions.

**Solution:** Use of fused PVC pipe in sliplining applications is on the rise, particularly in the Golden State.

**Conclusion:** In addition to cost, installation and compatibility benefits, the solution offers a larger ID and OD and working pressure equal to those of HDPE pipe.



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## PRODUCTS IN ACTION

The fused PVC pipe allowed for longer pull lengths, which was important given the high cost of pavement repair in the town of Atherton. Equally important was the compatibility of Fusible C-905 pipe with standard mechanical joint fittings with gripper-style restraints, which reduced installation costs. Finally, the increased ID of the fused PVC pipe would increase capacity and reduce annual energy costs for pumping. Given these advantages, Cal Water chose to build and construct the project using only Fusible PVC pipe.

"This was our first Fusible PVC project of sizable length, and we had a very positive experience working with UGSI," said Scott Wagner, design engineer with Cal Water. "They were responsive to all of our questions and were very professional during construction, working with West Valley Construction to complete their portion of work in a timely manner and to ensure the pipe and joints were of high quality."

### Emergency Response

In Sunnyvale, Calif., UGSI's 20-in. Fusible C-905 pipe came to the rescue in an emergency when a 24-in. water line near a high school failed just one week before the new school year began. Working with Preston Pipelines, fittings and pipe supplier Roberts and Brune and Sunnyvale municipal field service crews, UGSI began pipe fusion on Aug. 20, 2007. The installation was completed, and the 1,000-ft slipline was pressure-tested three days later. O'Grady Paving paved the street on Aug. 25, and the pipeline was accepted for use on Aug. 27, opening day.

The city appreciated the quick turn. "We maintained a tight schedule due to the high volume of street traffic and the scheduled opening day of an adjacent high school," Sunnyvale Public Works Director Marvin A. Rose said. "The use of fused PVC pipe enabled the repair to be completed within the available time and budget."

"[The] pipe allowed the city of Sunnyvale to maximize ID based on external pipe size and the required pressure class," Botteicher said. Although other materials were considered for this emergency project, Botteicher said Fusible C-905 was selected because it provided 35% to 57% more flow area than alternative materials having a similar OD. "This will result in lower operating pressures and reduced pumping costs over the life of the pipeline," he concluded.

### Caltrans Applications

In addition to these San Francisco Bay-area projects, UGSI's Fusible PVC pipe has routinely been installed in California Department of Transportation (Caltrans) median strips and rights-of-way, crossing under major freeways, including the I-5, I-10, I-880, I-605, Highway 101 and Highway 1. The pipe also has also been used on Caltrain corridors, passing under railroad tracks, and over bridges.

"The pipe and the fusing method are especially well-suited to sliplining in difficult quarters and on tight time schedules," Botteicher said.

Given the tight utility budgets across the country, the example set by California water and wastewater systems can help other utilities across the country meet the increasing challenges of network rehabilitation. [www](#)

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