Sliplining Rehabilitates Critical Water Supply Line

It's tough to imagine a more difficult job than rehabilitating a water pipeline passing 25 ft. beneath an interstate highway bordered with steep embankments in a busy tourist area, but that's what the Las Vegas Valley Water District faced. BY JIM FORCE

Utilities across North America are experiencing numerous nonrevenue water events—ranging from catastrophic failures to simple leaks—caused by water mains and transmission lines reaching the end of their useful lives. Proactive asset management and replacement programs such as those in place in Las Vegas can help managers and operators spot and correct problems before they affect water quality or utility service.

THE PROBLEM

The Las Vegas Valley Water District (LVVWD) is responsible for delivering water to more than 1 million people in southern Nevada, including the city of Las Vegas. In 2011, LVVWD used acoustic leak-detection equipment as part of its state-of-the-art asset management program to detect potential leaks in several important lines feeding the Las Vegas Strip. When a line was isolated, closed-circuit TV inspection revealed potential corrosion throughout the pipe. In addition, construction inspection reports suggested weld problems during installation.

LVVWD detected leakage in a 36-in. cement- and mortar-lined and coated steel pipe (MLCP). Installed in 1993 and providing water to the Las Vegas Strip, the line runs under Interstate 215 (I-215), which is part of a 50-mile beltway circling about 75 percent of the city. Complicating matters, access to the line was below the interstate, which runs under Las Vegas Boulevard.

EVALUATION

Grappling with site constraints, cost, and reliability, LVVWD engineering and asset management personnel evaluated various pipe materials, techniques, and challenges.

- Replacement with new MLCP would require a new, expensive casing and cost 50 percent more than sliplining with fusible polyvinyl chloride (FPVC) or high-density polyethylene pipe.
- Cured-in-place pipe was evaluated, but there weren’t any installations of Class IV pressure lining at the diameter and pressure needed for a potable water system.
- Pipeline alignment changed as the line dropped from Las Vegas Boulevard to below I-215.

Ultimately, LVVWD personnel chose FPVC and sliplining based on cost, risk, and performance. “We determined that 30-in. DR25 FPVC would provide the maximum cross-sectional flow area for the given inner diameter of the compromised host pipe,” said Peter Jauch, LVVWD engineering manager. The project was launched in mid-December.
INSTALLATION

FPVC was inserted into each section of host pipe through an insertion pit. LVVWD’s contractor decided that five sections of pipe would be fused aboveground, and the 300-ft below-grade I-215 crossing would be fused in-pit. At each end of the alignment, the water line makes several bends to reconnect to the MLCP line. Restrained standard ductile iron fittings were used in each case to connect the horizontally offset, fused PVC segments and to connect each end of the remaining steel line.

Because of the highly constrained work area adjacent to I-215, in-pit fusion of 10-ft pipe sticks was used to restore the section of pipe directly below the highway. Although FPVC is usually supplied in 40-ft lengths, the manufacturer provided 10-ft pipe sections to accommodate the tight worksite. Standard ductile iron fittings were used for the vertical offsets to facilitate connection to appurtenances and other pipe segments.

“The use of standard ductile-iron fittings simplified connections back to the steel line as well as insertion of various appurtenances,” said Ryan Pearson, LVVWD project engineer.

After sliplining insertion and pressure testing on Jan. 25, 2013, the new pipeline was put into service in February. Fieldwork took about 180 days to complete; the pipe was replaced in just 37 days.

A VIABLE OPTION

For challenging pipeline alignment such as the I-215 project, sliplining with FPVC proved to be a feasible, cost-effective alternative to more disruptive methods. As detailed in the accompanying case studies, if pipe-diameter reduction is acceptable, sliplining is a viable option when jack and bore or open-cut methods are impractical.

CASE STUDIES

CITIES CHOOSE SLIPLINING FOR PIPE REPAIR

Water utilities are increasingly using sliplining to rehabilitate large-diameter lines with fusible polyvinyl chloride (FPVC).

RHODE ISLAND

The city of Newport, R.I., detected leakage around the city’s main pumping station, which serves 80 percent of the region’s population and is located in the city’s historic downtown. The leaky pipe had no in-line isolation valves or any viable means of a bypass connection. In a single pull through the deteriorating host pipe, the city used 30-in. FPVC to successfully slipline 3,900 linear ft. of a 36-in. pre-stressed concrete cylinder sewer force main. Disruption was minimal — a welcome development during the height of the summer tourist season.

TEXAS

A leaky pipeline passing beneath Zaragosa Boulevard in El Paso, Texas, was prone to leaks, which led to frequent roadway flooding. The boulevard is a major port of entry from Mexico that’s traveled by more than 45,000 vehicles daily. The 36-in. pre-stressed concrete cylinder pipeline was rehabilitated in 2007 by sliplining 16,300 linear ft. with 24-in. FPVC. Much less disruptive than using an open-cut method that would have required property easements, FPVC sliplining was also less expensive than heavier plastic pipe that would have required larger installation equipment or shorter pulls.

CALIFORNIA

After comparing FPVC with other fused plastic pipe, the California Water Service, Atherton, Calif., opted to use 16-in. FPVC to slipline 5,280 linear ft. of 20-in. riveted steel pipe. The sliplining took place beneath Atherton Avenue in an affluent section of the city. The longer pull length of FPVC compared with the other pipe material was important because of the high cost of pavement repair.
HDPE Pipe Roadshow

The Alliance for PE Pipe will be having its HDPE Pipe Total Solutions Roadshow and Expo on McElroy’s Fulton Campus on April 15.

All water and sewer professionals and staff are invited to this all-day free event hosted by McElroy that will kick off at 8 a.m. It will be a great opportunity to learn more about high-density polyethylene piping systems, how they are installed and maintained.

Come learn about the most innovative and environmentally-sound infrastructure of the future at our facility at 840 N. Fulton St.

For directions, more details and to RSVP, visit www.pepipe.org/roadshow.

OneFit™ Inserts

McElroy’s OneFit Inserts are designed to make jobsites more efficient by allowing an operator to fuse smaller pipe sizes within a 36” jaw machine with a single pair of inserts.

Because of OneFit’s single-insert design, the need for master or multiple nesting inserts is eliminated and fewer items have to be stored, moved and installed. With its lightweight aluminum construction, one person can easily install them into the jaws of the fusion machine.

The inserts were successfully tested to the maximum fusion force on pipe with a DR 7 wall thickness to ensure their durability and strength. OneFit inserts are currently available in all existing 36” jaw insert sizes for 12” to 24” pipe. OneFit inserts for larger jaws may be made available upon request.

Features include:

- Lightweight aluminum design
- Serrated jaws hold pipe firmly in place during fusion
- Eliminates the need for master inserts or multiple nesting inserts
- Perfect for applications using a single pipe size
McElroy in the News

McElroy’s new QuickCamp™ System was featured recently in ThomasNet News®. Read the full story

Our pictures this month come from CONEXPO in Las Vegas March 4-8 where McElroy debuted the new QuickCamp™ System which attracted a steady stream of visitors at this enormous show that showcased groundbreaking new products used in most every facet of the construction industry.

The QuickCamp System is a climate-controlled enclosure that gives operators the ability to fuse pipe in extreme weather. It includes the shelter, a 900 fusion carriage and a MegaMc® PolyHorse® that work together to tackle challenging jobsites regardless of outdoor conditions.

McElroy still has a slate of new shows scheduled across the globe where we will be exhibiting our revolutionary fusion products for both HDPE and PP-R pipe.

Here’s our schedule for the rest of 2014:

- **INDOWATER** (Stall CB03)
  May 7-9, Surabaya, Indonesia
- **Singapore International Water Week** (Stall B2-C28)
  June 1-5, Singapore
- **AWWA ACE14** (Booth 514)
  June 8-12, Boston
- **MEA Operations Summit**
  August 12-14, Rochester, Minn.
- **NRWA Water Pro Conference**
  Oct. 6-8, Seattle, Wash.
**M&E Indonesia**
Oct. 29­31, Jakarta, Indonesia

## Recent Posts

Weren’t able to make it to @conexpoconagg this year? Check out the new QuickCamp™ System we showed off: [http://goo.gl/BbWsNv](http://goo.gl/BbWsNv)  
**Mar 17th**

Collect, store & analyze fusion joint data w/the DataLogger 5 & DataLogger Vault. Come see @conexpoconagg booth 5827. [pic.twitter.com/3uZyMGXt5f](http://pic.twitter.com/3uZyMGXt5f)  
**Mar 7th**

Haven’t made it down to the McElroy booth yet at#CONEXPO/CON-AGG? Here’s a quick overview of the products we’re showing off. Come see them all in person. Booth 5827 in the Silver lot 3. [http://goo.gl/S1cdFn](http://goo.gl/S1cdFn)  
**Mar 6th**

Don’t Pitch a Tent! Get QuickCamp-the fully enclosed, all-weather solution from McElroy @conexpoconagg  
[getQuickCamp](http://pic.twitter.com/lCT8pFYWR9)  
**Mar 4th**

## Important Links

- Alliance for PE Pipe
- WaterWorld
- Water Tech Online
- North American Society of Trenchless Technology
- Plastics Pipe Institute

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