SPRAY-IN-PLACE PIPE REHABILITATION

SAVES TIME AND MONEY

FOR GEORGIA CITY

By Chad Atcheson

Municipalities around the United States share a common problem: Their water infrastructure is aging and presents an increasing risk of leaks and water main breaks. These problems can mean water loss and disrupted service, and can quickly escalate from minor to major issues depending on the severity and location.

Experts estimate that problems with aging infrastructure cost municipalities hundreds of millions of dollars every year for maintenance, repair and replacement, and because of losses associated with shutdowns. The problem is not just monetary. Deteriorating pipes can adversely affect water quality through the leaching of lead from soldered joints, copper and steel pipe corrosion, and the buildup of biological material.

Properly maintaining infrastructure assets such as water mains is an essential part of utility management. Solutions such as pipeline asset management programs can help communities optimize the longevity of their assets as well as their annual pipe renewal budget. In addition, advanced solutions such as spray-in-place pipe (SIPP) rehabilitation, which is part of the pipeline asset management program offered by SUEZ, provide a new tool to extend the life of existing underground pipes while creating an alternative to traditional dig-and-replace pipe or direct replacement.

SIPP and Ringgold

Located near the Tennessee border in Catoosa County, Georgia, the historic City of Ringgold is one of numerous municipalities that have discovered the benefits of SIPP.

Home to approximately 3,600 residents, the City of Ringgold Water System operates a water plant that produces just under 1 million gallons per day (GPD), supplying drinking water to 1,400 households through a distribution system with 28 miles of main line.

According to water distribution superintendent Scott Black, the City water system is committed to providing high-quality water to its customers, and its success has been recognized by the Georgia Environmental Protection Division Public Drinking Water Consumer Confidence Report Certification, an annual water quality report required by the

Safe Drinking Water Act.

"We have two water plant operators and three distribution operators serving our community, and each of them goes above and beyond every day on the job," said Black.

In 2019, the City experienced a problem with a water main: One of its old cast iron main water lines had ruptured. This line feeds the City's entire industrial park, carpet mills and everything in that area, and accounts for approximately one quarter of the total water produced by the City each day.

This main also runs under the interstate, a location that would have made traditional repair or replacement methods difficult, time consuming and disruptive. Complicating the job was the presence of a pipe that connected to the main line; this pipe ran next to the edge of a 30-ft wide creek. "So close to the creek water that if you had excavated, the creek would have washed in on the pipe," according to Black.

"We were looking at pipe boring rather than digging a trench to solve the problem. While boring would minimize effects on the environment, we would have to dig down deep enough to bore and run a new line underneath both the creek and the interstate. That would have been feasible, but it would have been astronomically expensive and it would have taken approximately three months to complete," he said.

Fortuitously, Black and his colleagues had just learned about SUEZ's SIPP pipe rehab system, and decided to use it to address the needed repair.

Understanding SIPP

SIPP is an innovative, efficient and long-lasting pipe rehabilitation solution that scrubs underground pipes clean and then uses a state-of-the-art, computer-controlled robotic spray to apply an internal epoxy pipe lining on-site. Once cured, the epoxy lining seals the pipe, preventing leaks and water contamination, extending the pipes' service life, minimizing future maintenance costs and increasing the flow capacity for greater system efficiency.

With SIPP, no major road or sidewalk tear-ups are necessary, and this rehabilitation solution works on pipes made of different materials and ranging from 4 to 36 in. in diameter, both vertical and horizontal.

SUEZ uses a five-step SIPP rehabilitation process to restore aging underground systems, for most piping infrastructure.

The process begins with thorough system analysis that includes mapping the system, utilizing CCTV to evaluate digitally recorded findings and then diagnose and identify a restoration plan. Next, the pipe interior is prepared for restoration by drag scraping, power boring and/or hydro-jetting to create a clean, smooth dry surface.

A second CCTV inspection follows to determine if there are any leaks, infiltration or repairs that are needed outside of the SIPP scope of work. Then any repairs needed to address current piping issues are undertaken without the need for additional excavation, and (to ensure that the pipe is properly prepared) for the epoxy coating,

The epoxy coating is then applied, and lining and reassembly are completed. This is then followed by the last step – a final inspection and system analysis, including a thorough inspection of the epoxy lining and chlorination/disinfection before system restoration.

The internal epoxy lining is applied using state-of-the-art robotic spray application rigs – computer-controlled for more refined application and curing. Once it is cured, this coating creates an internal seal that prevents leaks and helps protect against future corrosion and biological buildup. Because the epoxy coating bonds with the pipes, it also seals cracks and protects against the formation of future infiltration. In addition, the coating elasticity means the newly applied lining is flexible and moves with the pipe, thus reducing the risk of leaks caused by infrastructure settling.

SIPP technology can yield an estimated cost saving of around 20 to 30 percent when compared to direct replacement, where it is necessary to dig up and replace the entire length of the pipe that needs attention. But cost savings are not the only benefit. An important advantage of SIPP is that it minimizes inconvenience to consumers by relining water pipes rather than digging them up and replacing them.

Another benefit is that the epoxy lining, which seals restored pipeline systems, may eliminate leaching of lead from soldered joints, and the corrosion of copper and steel pipe, thus significantly improving water quality. The two-component 100 percent solid epoxy system used by SUEZ to coat water distribution systems exceeds ANSI/NSF 61 standards. Epoxy is a Zero VOC material with certified zero fish kill.

Results in Ringgold

Black credits the leadership of City manager Dan Wright for understanding the benefits of SIPP and advocating for its use. The effort was well spent. Using SIPP, the repair and rehab of approximately 600 lf of 12-in. main took only a week. This worked very well, as there was only a small window to get the project completed before the onset of rainy season. This was important as the area that was being rehabbed is typically under water at that time of year because of the neighboring creek.

In fact, Black speculates that the SIPP project probably would have taken even less time, but this main line was one of the original ones put in during the 1940s or 1950s, and it yielded some surprises. "There was a lot we didn't know about this line, and when SUEZ used its camera, for example, they found an old coupling we did have to dig up and fix," he said.

"It turns out that there was a 7-ft long split in the 12-in. cast iron main. Since the SIPP rehab, we've had no issues with the line. And while on-site, SUEZ also relined the pipe near the creek," Black added.

In addition to the time saved and disruption minimized, safety was another benefit as there was no need to dig a trench. But to Black, the cost savings was remarkable. "Using SIPP was only one quarter to an eighth of the cost that it would have been to dig everything up," he said.

Chad Atcheson is responsible for managing the Network Asset Management Line of Business for SUEZ.