EDITORIAL FOCUS: PIPE MAINTENANCE & REPAIR

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Sliplining Helps Restore Deteriorated Sewer Line

By MICHAEL LIVERMORE

Officials with the city of Elyria, Ohio, in 1997 discovered a concrete sewer line serving a local industrial park was failing. The line had been installed in the early 1980s with what was projected to be a design life of 40 to 50 years. Despite being coated with bituminous epoxy, most of the pipe had suffered deterioration, in some places up to 50 percent.

The line includes more than 6,600 feet of pipe, with large sections under residential streets. From the city's perspective, replacing the line would have been cost prohibitive because of the expense of removing the existing line and installing a new one. The city also wanted to avoid disrupting newly paved and upgraded streets in the area.

Elyria officials opted to use trenchless technology to rehabilitate the sewer in two phases, the first of which involved 3,800 feet of 48-in. slipliner going into 54-in. diameter concrete pipe and 250 feet of 42-in. slipliner going into 48-in. concrete pipe. The city reviewed different types of trenchless technologies and sought bids on slip liners and cured-in-place pipe. The bids were received on Nov. 20, 1997. The low bidder, Triad Engineering and Contracting Co. of Walton Hills, Ohio, submitted the successful low bid using Vylon Slipliner Pipe.

The Vylon pipe is chemically resistant to items often found in sanitary and storm sewers, and, at 46 psi, its high stiffness and structural strength provide the same performance as a new pipe. It is lighter in weight than fiberglass and polyethylene liners and is more versatile in the field. This was a crucial element in the Elyria project because there were several tight radius curves. Sliplining these curves was possible because of company's ability to manufacture the liner in lengths as short as 2.5 feet.

Segmented Feature Simplifies Installation

Vylon pipe is segmental and eliminates the need to stop the flow of sewage completely or initiate any bypass pumping during installation. The segmental liner requires smaller insertion pits when compared to continuous liner pipe.

Another benefit of sliplining is that a variety of general and tunneling contractors can install the pipe in contrast to cured-in-place systems that require specially licensed contractors. Because most experienced underground contractors can learn to work with slipliner, more companies can bid on projects. This will ultimately lead to a more competitive bid.

A section of pipe is lowered into an insertion pit. Pits were excavated at designated points along the pipeline and the host pipe was cut at the springline to allow for insertion of the slipliner.

On the Elyria project, the lower bidder, Triad Engineering and Contracting, used the product for the first time. To aid Triad in understanding some of the nuances of sliplining, Lamson provided field personnel at the job startup. These personnel periodically visited the job site to offer any additional assistance requested.

Work on the first phase began in May 1998 and was completed in August 1998.

The second phase involved rehabilitation of 2,200 feet of 60-in. concrete pipe with 54-in. slipliner, and approximately 620 feet of 54-in. concrete pipe with 48-in. slipliner. Construction began in September 1998 and was completed in early November 1998. The project was the first to use Vylon's 54-in. diameter slipliner. The company recently expanded into this size range to accommodate the larger diameter pipes typically found in major public or private sewer systems.

In each phase, Triad began the installation process by using high pressure water cleaning to remove debris from the existing lines. At designated points throughout the job site, insertion pits 20 feet wide by 30 feet long were excavated and the host pipe was cut at springline. The bottom half of the pipe was left in place to form a channel for placement of the sliplining pipe.

After preparation of the insertion pit, the first piece of slipliner was placed in the channel and inserted by pushing. The insertion method involves a push ring attached to a pulley system. This system is used to evenly distribute the jacking forces on the pipe. After insertion, the first piece was held in place and joined with the next section. The joint system uses a flush bell and a gasketed coupling that provides a water tight seal. This procedure of restraining, joining and insertion was repeated until an entire section was lined. Triad repeatedly lined between 600 to 900 feet from a single insertion pit.

Upon completing the installation, bulkheads were built at the manholes to keep the flow out of the space between the concrete pipe and the slipliner. The annular space was then grouted to secure the slipliner pipe in place and prevent point loading of the host pipe continued to deteriorate.

Testing of the line occurred in early 1999, and the project was deemed a success. Construction was completed with minimal disruptions to public streets and the operation of the municipal sewer system. WW

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