Sliplining Records Under Heavy Flows

by Paul J. Miller

Though sliplining is a well-accepted, proven method of renewing sewer pipelines for the Los Angeles County Sanitation Districts, a recent project was the districts' first completed with segmented PVC pipe. The project appears to be judged by all as a smooth success.

"The installation went very smoothly, much better than anticipated," said Ronnie Burtner, project engineer for the Sanitation Districts. "There's always a bit of trepidation at the initial use of a new product, but it went very smoothly."

Stew Harvey from GSM, product representative for the supplier of the slipliner pipe, described it as "a really good project." He cited the long pushes as demonstration of the capability of the pipe.

The District 5 Trunk Rehab Project uses 15-ft segments of the 36-in. closed profile-wall PVC sliplining pipe.

Contractor Mladen Buntich Construction Inc. of Sunland, Calif., achieved a near-record push length in one day. Crews under the direction of Will Dixon, field engineer for Mladen Buntich, slipped 2,520 lf of pipe in one six-hour day.

Rehab Project

The District 5 Trunk Sewer Rehabilitation, Phase II Project was located in Torrance, an unincorporated territory of LA County. The work consisted of the rehabilitation by sliplining of 8,300 ft of 42-in. clay tile-lined, reinforced concrete pipe which is severely corroded. Design specifications listed segmental, closed profile-wall PVC pipe as one of the approved materials for the slipliner pipe.

The project was awarded to Mladen Buntich Construction, no stranger to sliplining applications. According to Dixon, the firm typically completes several sliplining projects each year either for the County Sanitation Districts or for the City of Los Angeles Public Works. Dixon recently came on board with the contractor after a long tenure as a project manager with the City of Los Angeles Public Works, Bureau of Engineering.

Mladen Buntich chose Lamson Vylon PVC Slipliner Pipe as the product it wanted to install on this project. This was a first for both the contractor and for the Sanitation Districts.

The District 5 Trunk Sewer lay at depths of 6 to 17 ft. A total of 12 push pits, each excavated to a length of 24 ft to accommodate the push unit used by Mladen Buntich, were needed for the project. In general, each pit was set up to allow pushes in both directions.

The contractor employs a sliplining push unit manufactured by Akkerman Inc. — one of the first units produced by the Brownsdale, Minn.-firm. The jacking unit incorporates a cradle designed to hold the pipe segment as it is pushed to join the pipe string. The unit provides up to 200 tons of jacking thrust for advancing the pipe string. Platforms on either side of the new pipe segment enable the pit crew to work safely out of the trunk sewer flows.

Mladen Buntich began the project in February of 1999. The pipeline was first televised to determine its condition and any connection points. A sliplining mandrel was drawn through the pipeline to ensure that the new slipline pipe material would pass through the host pipe.

The trunk sewer flows were able to be reduced by the use of an existing diversion structure in the pipeline. However, flows were uninterrupted for the duration. Dixon reported pushes upstream of the structure ran at 70 percent to 80 percent full, while downstream work was 20 to 30 percent of the flow capacity during the sliplining process. The first sections of pipe were sliplined in March, with the pipe work completed by October.

The sewer flows continue uninterrupted at 20 to 80 percent flow capacity during the sliplining process.

A special sliplining push unit with power for up to 200 tons thrust is employed on the project.

Long Reach

On the 170th Street push, Mladen Buntich had set up the pit for long pushes in either direction. Before workers were finished, they installed over a half-mile of pipe from that one location. They first pushed 1,365 ft downstream before switching and pushing 1,155 ft upstream. And that's all within one six-hour work period. The average installation time on the long push was just more than two minutes per joint.

LA County Sanitation Districts' Burtner reported that crews were installing some of the 15-ft joints of the PVC pipe in less than 10 minutes. "They pushed the pipe segments much farther and faster than we anticipated," said Burtner.

According to Dixon, the Mladen Buntich crew installed a total of 168 segments of pipe within the six hours. A bonus feature was the low thrust force required to move the long pipe string. "We never saw anything greater than 5 to 6 tons of jacking force on the entire project," said Dixon. "That was well below the 10-ton load rating recommended by the pipe manufacturer. It performed well. There were never any problems with the slip-lining."

When the new PVC pipe was in place, the contractor moved into the final phase of the sliplining project. The annular space between the new pipe and the host pipe needed to be grouted. A lightweight cellular concrete grout was pumped into the space at low pressure, less than 10 psi.

The last phase of the project involved rehabilitation of 28 manholes. Mladen Buntich installed a cured-in-place, fiberglass liner in the manholes, sealing them from inflow and infiltration, as well as providing protection from corrosion. The trunk sewer rehabilitation project was finally completed in late January 2000.

Burtner explained that the districts had approved the closed profile-wall PVC sliplining pipe for some previous projects, but that this project was the first one on which a contractor had chosen to use the pipe. He commented that the contractor was pleased with the installation. Time will tell if the new pipe will live up to its performance predictions, project engineer Burtner said.

Dixon said installing the PVC pipe in high flows required some adjusting in the sliplining process. "The lighter PVC pipe tends to bob back up in higher flows," he said. But after they modified some techniques, the crews soon learned how to handle the new pipe.

The high production rates of sliplining they experienced certainly makes the PVC pipe an attractive alternative, said Dixon. "We were happy with the way it performed."

The author is editor of ***Trenchless Technology****.*

A crew member follows a short coupling section as it moves to join the pipe string.