Sliplining Renews 100-Year-Old Sewer

edited by James W. Rush

Officials of the Northeast Ohio Regional Sewer District in Cleveland were confronted with major inflow and infiltration (I&I) problems with the Mill Creek Interceptor, a brick sewer built in the late 1930s. The flow was in excess of 75 percent of pipe capacity, but replacement was not feasible because of the interceptor's location under a major city thoroughfare.

Officials discovered the problem after TV inspections revealed areas of enormous surface water infiltration. At times, it was even compared to Niagara Falls. In 1998, the sewer district brought in the engineering firm URS Greiner to study the problem and design a system to eliminate the I&I.

"The line suffered from traffic loading and loss of soil support over the years led to some cracking along the crown," said Hugh Blockslidge, URS. "But the size of the pipe allowed more than one rehabilitation option to be functional."

The question: Should the sewer be replaced or should trenchless alternatives cured-in-place piping or sliplining be used?

The interceptor sewer is located on Broadway, a major thoroughfare in Cleveland. Digging up the old pipe would create many traffic headaches. In addition, the costs associated with the excavation and removal of the old line would be high. These factors led the district and URS Greiner to opt for the trenchless solution.

The district sought bids on sliplined and cured-in-place processes. The lowest bid, submitted by Marra Construction Co., Solon, Ohio, utilized sliplining. After reviewing sliplining pipe products, Marra president John Marra and his engineer decided to use Lamson Vylon PVC Slipliner.

Pipe requirements were 615 ft of 54-in. slipliner going into a 60-in. host pipe, 4,714 ft of 42-in. into a 48-in. pipe and 2,287 ft of 36-in. into a 42-in. pipe. Using an N factor of 0.009, because of the smooth interior surface and the reduced I&I, the slipliner actually increases the line's capacity. Another benefit to slipliner is its ability to withstand the corrosive environment of the sewer, and its 46 psi rating, which is comparable to a new pipe.

Marra Construction crews lower a 15-ft section of Lamson Vylon slipliner into the insertion pit.

Because Marra Construction Co. was relatively new to sliplining, Vylon met with the contractor before and during construction to ensure proper installation. The first step of the project was reviewing videotapes to observe the extent of the deterioration, note any offsets at the joints and determine the amount of leakage. Next, Marra used high-pressure water to clean the host pipe and remove the debris, said Tony Paglia, project manager.

Since flow through the pipe was running in excess of 75 percent, a partial bypass was set up. Even with the bypass, the pipe was still running at 50 percent of capacity.

Insertion pits 20 ft by 10 ft were installed at designated points along the length of the pipe. At these points, the pipe was cut at the spring lines, allowing the bottom half of the pipe to be used as a guide for the sliplining process. Marra developed its own "nose cone," which was installed in front of the first slipliner and protected it from unforeseen debris or joint irregularities. Using a system of pulleys, the pipe was jacked into the host pipe.

Using standard 15-ft sections of Vylon pipe, Marra installed an average of 1,200 ft per day. In order to navigate radius bends, 7-ft pipe sections were used. Work started in December 1999 and was completed in November 2000.

***James W. Rush** edited this material from information supplied by Worthington Sales Co., Columbus, Ohio.*