

Sliplining Helps Restore Aging Sewer Lines

After surveying the condition of the East Baton Rouge Parish sewer system, the Baton Rouge Department of Public Works concluded that many of the interceptor sewers placed into service over the last 70 years needed repair or replacement.

Video inspection and flow monitoring of the reinforced concrete pipe (RCP) and vitrified clay pipe (VCP) used in the system showed that sections were leaking badly because of cracked and broken joints, severe corrosion and misalignment.

Shread-Kuyrkendall & Associates Inc. of Baton Rouge was retained by the city to prioritize the lines for repair. Based on the firm's report, 28 sewer lines were selected for rehabilitation. Shread-Kuyrkendall recommended that either sliplining or cured-in-lace linings be used to repair the lines.

Hartec Corp., a local Baton Rouge contractor, landed the project. The company chose to reline the pipes with Vylon Slipliner segmented PVC pipe, in part because the pipe could be installed without bypass pumping.

Hartec called in Line One Inc., of Lewisville, a sliplining specialist, to assist with the project. Line One performed the pre-inspection, cleaning and sliplining. Hartec constructed the insertion pits, controlled traffic and grouted the annular space between the slipliner and the existing conduit to hold the new pipe in place. Together the companies sliplined 7,900 linear feet of failing sewer pipe 24 in. to 54 in. in diameter. The repaired sections ranged from 200 to 600 feet in length and included one section under Route 110 north of Interstate 10.

Condition of Existing Pipe

According to Greg Strudwick, owner of Line One, "It was only a matter of time before all 28 sections of pipe would no longer be able to hold up the ground above them."

Strudwick noted that trunk lines are more vulnerable than other pipelines.

"In sewers with diameters larger than 15 inches that have turbulent flow, gases are released promoting acid production at the crown that eats away the concrete. As the concrete is devoured, the pipe's wire reinforcement begins corroding and the structural integrity of the pipe is threat-



The old pipe is broken away in an entry pit so the liner can be slid into place.

ened," he said. "Moreover, the surface roughness, due to pitting, slows the rate of flow. When our crews got in there to clean, between the debris and the condition of the walls of the pipe, the line was carrying one-half to two thirds its capacity."

Although sliplining reduces the inside diameter of the pipe, the reduced inflow and infiltration combined with the smooth interior surface of the slipliner actually increases the line's capacity for wastewater.

"I was amazed at the improved flow after we completed each line," said Chris Hicks, Executive Vice President of Hartec. "In many lines, flow was enhanced by 35-40 percent."

Installation

Excavators were used to dig insertion pits and lower pipe sections. Pits were 10-12 feet wide, 25 feet long and 15-20 feet deep. Hartec used stacked trench boxes, sliding 1-inch thick plates on the open ends and behind the box walls.

"With saturated soil, we wanted to make sure it wouldn't flow in under the box walls or around the existing pipe," Hicks said. "It would endanger the workers standing in the pit and also eventually migrate into the recently cleaned line."

Because work took place during Baton Rouge's dry season, no dewatering was necessary. With trench protection in place, workers entered the pit and removed the top of the old pipe using sledgehammers and jackhammers. Cleaning buckets were pulled through the

line with a pneumatic winch.

After removing the debris from the line, the Vylon slipliner was lowered, joints assembled and the pipe pulled into place. The majority of the slipliner was pulled with a winch downstream from an upstream insertion pit.

"Pulling the pipe in the direction of the flow seemed to be the most fluid way to move and position the pipe," Strudwick said. "However, some short pushes upstream were necessary, usually at the end of a segment or when making closure."

During insertion, the previously installed joints were left protruding about 2 feet into the pit and inflatable lifting bags were positioned at the spring line between the host pipe and the slipliner pipe. When inflated, the bags anchored the slipliner train in place during assembly.

Workers lubricated the gasket and bell of the slipliner with subaqueous lubricant, lowered and positioned the next section of slipliner and winched the joints together. Closure pieces were constructed in the field when 15 feet or less were required to complete a section.

After the slipliner was installed, a lightweight, cellular grout was pumped between the host pipe and the slipliner. Bulkheads were built at the end of each line segment to contain the grout and prevent sewage from entering the annulus. Three 2-inch tubes were built into each bulkhead. The grout was fed through the center tube at the 12:00 position. The other two tubes served as vents at the 10:00 and 2:00 positions.