

# Oklahoma City's First Large Scale PVC Sliplining Project a Success

by Cindy Bolen and Bob Capkovic

**A**s temperatures dipped into the 'teens, in Oklahoma City, construction workers barely kept warm at the job site. They were approaching completion of the city's first successful large scale PVC sliplining installation.

In December of 1992, an extensively corroded 30-inch concrete pipe was successfully sliplined with 7700 linear feet (LF) of 27-inch ID PVC Vylon® Slipliner pipe with a 28.2 OD. Less than 2 inches of clearance remained at the top of the liner pipe. With annular clearances this small, a "slight" .2 foot grade correction at a manhole in any horizontal or vertical direction could mean the need

for another jacking pit.

Deterioration from gasses in the pipeline forced the existing pipe to disintegrate, corrode and eventually fail. This confronted Oklahoma City Water Utilities Trust engineers with some serious problems.

The city's pipeline was in danger of collapsing beneath the roadway, resulting in service disruptions to surrounding businesses and homes, traffic jams and delays, excessive emergency repair costs, and the wrath of the tax-paying public. As city officials were faced

with a possible cave-in and little time and money to respond, they needed to repair the problem at hand while preventing such events from taking place in the future.

The installation represents an innovative approach to trenchless rehabilitation. In the past, the use of PVC-made piping for sliplining applications was not available. The project was awarded by the Oklahoma City Wastewater Engineering and Maintenance Department to The Concho Co., a utility and sitework contracting firm. Established in 1922, Concho operates primarily in the greater Oklahoma City area performing sewer and water installation and replacement contracts.

The manufacturer, Lamson Vylon Pipe, worked closely with The Concho Co. throughout the entire



Lightweight, 15-ft. long Vylon Slipline joints are easily handled and staged for insertion.



process. According to Jim Parrish, project manager for the Concho Co., the project represents the firm's first and largest contract installation of Lamson Vylon Pipe's new PVC slipliner pipe. "It was a learning experience for all concerned," states Parrish.

The installation began with a thorough cleaning. This was critical considering the small annular clearance. The line was then televised to determine if any obstructions were present which would prevent installation of the Vylon Slipliner. A jacking pit was constructed by excavating a pit down to the springline of the old concrete line. Next, a trench box was placed in the pit and a horizontal wall saw was used to cut the concrete pipe just below the springline. This would ensure the jacking head would be in the center of the slipliner axis. An angle-iron frame was then placed on the remaining lower half section of the pipe that carried the jacking head.

A tensionmeter was used to monitor pushing loads applied to the liner sections through the cable bridle. It was necessary to restrain the first three or four sections against the trench box to "home" the section being stabbed to the preceding one, as the gasketed coupling was so tight. It was found lubricating the liner pipe with a 50-50 mix of pipe joint lubricant and water resulted in lower

pushing loads. Pushing loads ranged from 18,500 pounds while installing 1454 linear feet to 11,000 pounds while installing 1275 linear feet.

Vylon Slipliner was grouted, televised and completely installed within six weeks from the start of the project. The Concho Company used three pushing or jacking pits to insert all of the Vylon Slipliner pipe. The longest one-way push was approximately 2100 LF. Had it not been for a slight bend coming out of a manhole, 3500 feet could have easily been pushed during the installation.

Estimating the cost of pipeline rehabilitation without excavation requires more than just an accurate proposal. To be competitive and successful, contractors must be able to see beyond the lines and symbols on the working drawings and be capable of perceiving specific installation problems not shown. At the very least, knowledge of materials can prevent a loss due to unforeseen labor costs. Here is where full and complete knowledge of PVC provided The Concho Company with the needed edge to successfully bid and complete a major PVC sliplining project.



Slipline lowered into shored insertion pit.

"Chemical resistance is the principal reason for increasing use of PVC pipe in virtually every phase of U.S. industry," says Parrish. With the recognition of its other features, including ease of installation, durability and cost advantages, PVC piping has achieved significant use for sliplining, septic sanitary sewers, storm, outfall and industrial applications, deep direct bury, tunnel lining/casing, microtunneling, bridge column forming and specialty fabrications (fittings and manholes). PVC is also ideal for such environments as unstable soils, deep sand and high ground water level conditions, clay soil conditions and extremely rocky and mountainous environments.

Produced in diameters of 21 through 48 inches, Vylon Slipliner can be quickly

installed into deteriorating pipelines while they are in operation. As a result, there is no service disruption, downtime or emergency repair costs. And, with little impact on the community, sliplining offers significant savings when compared to direct bury replacement costs.

The Trenchless Technology Center in Ruston, LA and Kidoh Construction Company with Iseki were the first to receive approval for the use of PVC pipe in a microtunneling application. They successfully installed 200 LF of 24-in. PVC Vylon Slipliner in a prepared environment consisting of gravel, sand and clay strata. PVC Vylon Slipliner was specified based upon its previous successes.

As existing concrete and clay pipelining systems continue to fail throughout North America, large diameter closed profile PVC pipe will continue to enter the sliplining market. Vylon Slipliner features the advantages of both high density polyethylene and fiberglass for pipe durability and length. The strong, closed profile cross-section with a material modulus in excess of 550,000 pounds/in. can accommodate jacking or comprehensive forces in excess of 25,000 pounds with a 2:1 factor of safety. Lamson Vylon Pipe, with the support of the Oklahoma City Wastewater Engineering and Maintenance Department, developed a "gasketed push-on coupling system" to eliminate external interferences and internal flow restrictions while limiting downsizing to 3-inches if the conditions of the original pipeline permit.

With this first large scale sliplining project successfully completed, Lamson



Joint is lined up for quick coupling and insertion.

Vylon Pipe is ready to provide state-of-the-art sliplining products for the advancement of trenchless technology.

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