Oklahoma City's First Large Scale PVC Sliplining Project A Success

Slipline lowered into shored insertion pit.

Joint is lined up for quick coupling and insertion.

Editor's Note: The following article was taken from the January/February issue of Trenchless Technology Magazine and was written by Lamson Vylon Pipe Director of Advertising Cindy Bolen and Vylon National Product Manager Bob Capkovic.

As 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 slipliner pipe with a 28.2 OD. Less than two 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 concrete 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.

"Chemical resistance is the principal reason for the increasing use of PVC pipe in virtually every phase of U.S. industry."

John Parrish
Project Manager

The PVC Pipe manufacturer worked closely with The Concho Co. throughout the entire process. According to Jim Parrish, project manager for The Concho Co., the project represents the firm's first and largest contract installation of 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 PVC 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 tension meter 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.

The PVC slipliner pipe 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 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. Full and complete knowledge of PVC

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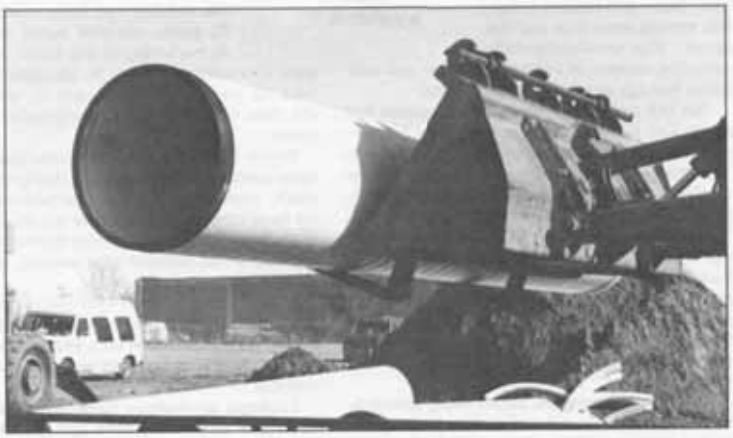

Lightweight, 15-foot long PVC slipline joints are easily handled and staged for insertion.

MILESTONES
UNI-BELL MEMBER UPDATE

The Uni-Bell PVC Pipe Association is a non-profit technical and educational organization headquartered in Dallas, Texas, which provides information regarding the proper specification of gasketed PVC pipe products, for use in water, sewer, drainage and irrigation applications. The Association is made up of manufacturers committed to providing quality products and service to the PVC pipe industry. Formed in 1971, Uni-Bell offers technical service, research and development data and support in standards development.

Uni-Bell is proud to be directly affiliated with quality producers of gasketed PVC pipe, PVC fittings, PVC resin and PVC compound micro ingredients.

Uni-Bell member companies benefit from a philosophy that top quality pipe, service and technology go hand in hand. They serve the PVC pipe industry and their customers with quality products, professional personnel and Uni-Bell technical expertise.

Refer to Page 12 for a complete listing of current member companies.

LAMSON Vylon Pipe

The name Carlon and its Fluids Systems Division have been associated with gasketed PVC pipe products since 1970.

In January of this year, this division adopted a new name, Lamson Vylon Pipe. Carlon has been a wholly owned subsidiary of Lamson and Sessions since 1987.

Lamson and Sessions is a Cleveland, Ohio based and New York Stock Exchange traded company that has been in operation since 1892.

The name Lamson Vylon Pipe identifies the future direction of the company based on its PVC material and profile wall pipe production technologies. Lamson Vylon Pipe produces 4"-48" PVC sanitary sewer and drainage pipe and has recently introduced 21"-48" slipline pipe.

THE GEON COMPANY

BF Goodrich's Geon Vinyl Division has been a leading producer of PVC resins and compounds for over four decades. On April 29, 1993, the BF Goodrich Company announced the formation of the Geon Company, a wholly owned subsidiary with an initial public offering that involved 13 million shares at $18 per share.

The Geon Company operates 13 manufacturing facilities in the United States, Canada and Australia with a total employment of about 1,900. The company will continue to supply PVC resins and compounds to a variety of applications, including construction products such as pipe, siding and windows. Although a newly formed corporation, The Geon Company is a Fortune 400 Company based on 1992 sales of $970 million when it was a division of BF Goodrich.

The Geon Company is listed on the New York Stock Exchange under the symbol GON.

Come Grow With Us

The PVC Pipe Industry continues to grow and, therefore, so does Uni-Bell. We are looking for the qualified individual to fill the position of Association Engineer.

Candidates must have a degree in Civil Engineering. Experience in water and wastewater is a plus with specific PVC pipe experience being given special consideration. Above all else, this self-starter must possess excellent communication abilities, both written and oral. In return for these unique qualifications, the Association offers competitive salary and full benefits including family medical coverage and pension plan, all at our newly renovated and exparded, non-smoking offices in North Dallas.

This position is a high profile opportunity for the right individual to begin a rapid journey upward with the most dynamic facet of the water and wastewater industry.

Candidates shoulc send resume and salary history in strictest confidence to:

Mr. Dave Eckstein
Deputy Executive Director
Uni-Bell PVC Pipe Association
2655 Villa Creek Dr., Suite 155
Dallas, TX 75234
No Telephone Inquiries Will Be Accepted

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Oklahoma Sliplining Project

provided The Concho Company with the needed edge to successfully bid and complete a major PVC sliplining project.

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

As existing concrete and clay pipe systems continue to fail throughout North America, large diameter closed profile PVC pipe will continue to enter the sliplining market. PVC slipliner features the advantages of both high density polyethylene and fiberglass for pipe durability and length. The strong, closed profile crosssection with a material modules 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. The PVC Pipe Manufacturer 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, the pipe manufacturer is ready to provide state-of-the-art sliplining products for the advancement of trenchless technology.

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High impact toughness and longitudinal stiffness contribute to PVC slipliner pipe's ease of installation.