The Lateral Lining Market Has Arrived

Lateral Work Is Being Completed in All Corners of the World, with More on the Way

By Joan Blythe

Laterals have become the driving force for sewer rehabilitation projects on a global level, and today lateral lining has globally become a focal point in sewer rehabilitation projects.

LMK Enterprises Inc. of Ottawa, Ill., has added lateral licensee installers on four continents, including North and South America, Europe and Asia. Communities are more result orientated than ever, after having made large investments in technologies that lacked elimination of extraneous flows. Agencies in Argentina, Brazil, Canada, Denmark, Germany, Holland, Mexico, Singapore and Sweden have realized lateral rehabilitation takes a serious effort. In the United States, many agencies are letting contracts focus totally on laterals.

LMK's T-Liner system has globally met the demand for lateral renewal projects on a large scale. The system is a one-piece, cured-in-place main and lateral lining and is one of the tools being used. The main junction is renewed by placing a full circle CIPP (cured-in-place pipe) in the main pipe that extends 5 in. on each side of the service connection. The lateral lining arm extends up into the lateral pipe by an air inversion process, reaching lengths up to 200 ft of continuous lateral lining. The main/lateral lining is cured by steam and the entire installation is performed from within the main pipe with no digging. Professional engineers are welcoming the long-term solution, providing a new seamless cured-in-place lateral pipe that provides a verifiable, non-leaking connection to the main pipe by use of gasket sealing technology.

Lateral Projects Far and Near

The Far East:

Recently, LMK licensed its lateral technology in the Far East sewer rehabilitation market. The Public Utility Board (PUB) of Singapore is undertaking a phenomenal feat as its Catchment Project for turning the rivers from green to blue, and is in full production.

"I walked the Singapore project several months ago," says Larry Kiest of LMK. "It is an engineering marvel to say the least. CDM Engineer and Constructors is the lead engineering firm for the Catchment Project."

They are nearing completion of damming off the island's bay. The retention area, called "the catchment," will catch all water from the rivers and canals. Over a two-year period, Singapore will exchange the retained sea water with fresh water, allowing the ecology to adapt to being solely a body of fresh water. This fresh water will soon become a source of potable water for Singapore. Today, Singapore imports fresh water from Malaysia and other current sources that include desalinization and "new water," which is used water treated by reverse osmosis.

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This project includes potentially as many as some 11,000 laterals to be renewed. The PUB is sincere in its efforts to seal their collection system in order to eliminate exfiltration. It is imperative that the renewed collection system prevents sewerage leaching into their rivers and canals. LMK's T-Liner has been specifically identified for the lateral efforts and this work will continue through 2009.

Site access on this project is a present challenge as many of the sewers are located in narrow, 6-ft wide alleys, limiting vehicle access to manholes. Further, the mainline pipes have been lined, leaving an inner diameter of only 5.4 in., yet the laterals are 6 in. LMK Fabrication overcame challenges of onsite conditions by re-engineering the T-Liner installation equipment. LMK Fabrication designed and built two custom sea containers, both of which are self contained units engineered to effectively operate a T-Liner lining system in Singapore.

Europe:

In fall 2006, LMK licensed Berotech of Denmark for Germany, Holland, Sweden and Denmark. The first T-Liner was installed in Vojen, Denmark, and lateral renewal projects have since spread to many other communities including Copenhagen. Lateral renewal is a major part of sewer renewal projects in these four countries and Berotech is leading the way. The capability of installing a one-piece main and lateral lining without digging is the solution for Berotech to meet the European requirements for lateral lining projects.

Mexico:

Insade of Mexico has six locations in Mexico and is proud to extend its trenchless capabilities by introducing new technology to the country. Insade has completed a lateral renewal project in Guadalajara, which included renewing approximately 500 laterals using the T-Liner process.

United States:

Sewer rehabilitation projects in the United States have grown to a level where the contracts are consisting solely of lateral lining, or lateral lining represents the majority of the contract work as professional engineers are recognizing the need to address laterals. At a minimum, laterals should be renewed to a level that is above the water table, and since the major portion of the cost is in the initial setup, most cities recognize how economical it is to renew the lateral from the main to at least the property line. However, some cities renew the lateral by lining all the way to the foundation. Why? Because they understand that groundwater does not know to stop at the property line.

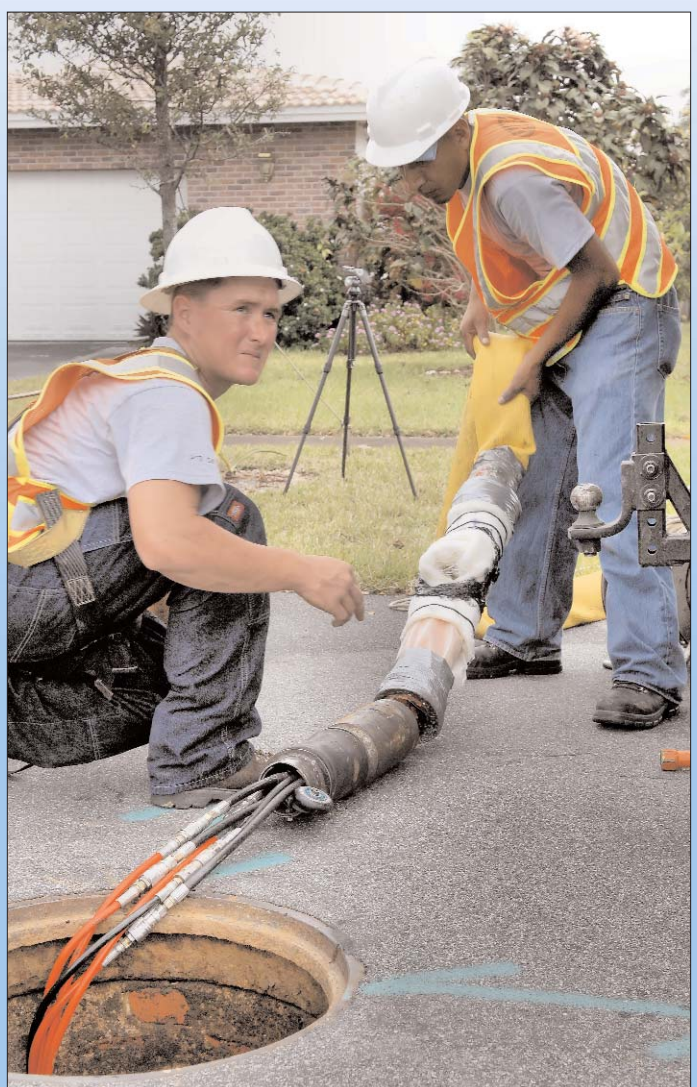
The City of Naperville, Ill., has completed more than 1,300 T-Liners to date through a contract with Performance Pipelining Inc., of Ottawa, Ill. The reduction of I/I has exceeded the city's expectations, and therefore a $6 million treatment plant expansion has been deferred due to a large part of the I/I reduction program.

COVER STORY

Naperville's I/I reduction program included 1,500 cleanouts to be installed. The city received pricing of approximately $1,400 for cleanout installations made by conventional excavation. To date, the city crews have installed approximately 1,500 cleanouts using LMK's Vac-a-Tee for a turnkey price of $700 per lateral. This pricing includes the cost of materials, labor and equipment for a savings of more than $1 million.

Prince William Service Authority (PWSA) of Manassas, Va., is in its second year of lateral rehabilitation. B. Frank Joy Co. of Hyattsville, Md., is the T-Liner licensed installer contracted to renew laterals for the PWSA. The total contract includes some 2,500 laterals to be renewed. Most of the laterals are 4 in. in diameter, and lateral lengths range up to 90 ft. At the upper most end of the lateral being rehabilitated, a cleanout is installed by using a unique non-invasive patented process called Vac-a-Tee.

This process requires a small, vacuum-excavated bore hole in order to insert a proprietary saddle that snaps onto the lateral pipe. The saddle is bonded and sealed to the pipe by use of a water-activated sealant. The connection is subjected to a



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hydraulic exfiltration test. When the test is complete, a diamond core saw is inserted down through the cleanout riser, the crown of the lateral is cut and the coupon is removed.

Miami-Dade Water and Sewer Department of Miami-Dade County, Fla., is in full lateral lining production. The county has excavation crews that can dig and replace shallow laterals with county crews at an economical price. The deeper the lateral pipe, the more interesting things become due to the water table and the size of the excavation required. The water table is extremely high, which leads to significant hydrostatic head on lateral connections. Many of the sewer lines were originally installed by divers fitting the pipe together underwater because pumping down the ditch was not possible. The groundwater travels through layers of coral that encompass most of Miami's subterranean conditions. Due to the adverse conditions, the county is renewing approximately 800 laterals on this pilot project as part of their I/I reduction program.

"Our crews are busy in Miami-Dade and many other cities, as lateral projects in South Florida are in demand," says John Rinehart of LMK Pipe Renewal, LLC of Fort Lauderdale, Fla.

New Castle County of Delaware has embarked on a multi-decade program of sewer rehabilitation to reduce the volume of I/I entering its sanitary system, especially during rain storms. The county's program had identified those portions of the county's system that are leaking the most, and is progressively rehabilitating all facets of its system within these leaky neighborhoods with the goal of significantly reducing I/I. Jim Shelton of Malcolm Pirnie, who serves as New Castle County's program manager for this sewer rehab program says, "Malcolm Pirnie and New Castle County realized early on in this program two main things: First, a lot of the leakage was from the lateral connection back to the house and second, lining the mains and laterals without eliminating the leakage at the connection would have almost no impact on I/I reduction.

"We researched and trialed a number of lateral lining products," Shelton says. To provide the longest possible

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life and the best possible I/I reduction, Malcolm Pirnie specified that lateral liners must have five significant features:

•Full circumference mainline portion with hydrophilic seals to ensure the tap connection is hydraulically tight and mechanically braced without relying on adhesion between the lateral liner, and the mainline liner poly-coating for the bond.

•Liner tubes specifically manufactured for the pipe diameter and for changes in diameter, especially where the plumbers 4-in. line transitions to the utility contractor's 6-in. line.

•Inversion installation to minimize twisting of the liner and to provide resin migration to mechanically lock the liner to the host pipe.

- Hydrophilic end seals positioned at the uppermost end of the lateral lining preventing water from migrating and re-entering the sewer, which happens in about 5 percent of the cases.
- A 10-year contractor's warranty on craftsmanship and materials.

New Castle County is currently lining several hundred laterals, with plans to line several thousand over the course of its rehabilitation program.

LMK Enterprises Inc. has pioneered the lateral renewal industry and is committed to continuing to lead the way in lateral renewal technologies. As lateral projects increase, the need for proper specifications becomes more important. A new ASTM

Standard was published in May 2006, titled "F2561-06 Standard Practice for Rehabilitation of a Sewer Service Lateral and Its Connection to the Main Using a One-Piece Main and Lateral Cured-in-Place Liner."

The Market

This lateral market has not been an easy undertaking by any means. Specialized installation equipment was being developed and the need for specialized lining tubes and resins were a major hurdle. The demand for lateral lining while providing a non-leaking connection started in Nashville, Tenn., in the early 1990s. Nashville Metro was quick to recognize that rehabilitation of mainlines was not the end of its I/I issues. Lateral renewal soon became a standard item in Nashville's contracts. These contracts called for a sealed system and verification through air testing. This was a difficult challenge to the industry and hence was the creation of the innovative one-piece main and lateral CIPP.

Insade of Mexico, an LMK licensed installer, recently completed a lateral renewal project in Guadalajara that included the renewal of 500 laterals using the T-Liner process.

The one-piece main and lateral CIPP technology has advanced to meet long-term engineering design. Advances include a variety of lining tubes, each specifically designed for the lateral pipe condition as laterals host a variety of piping configurations. Such products include Y- or T-shaped factory connections and what is commonly referred to as "hammer taps." Laterals also change in pipe diameter and fittings, such as 45- to 90-degree bends which are typical in the piping layout.

One of the most significant advances made in lateral lining is the development of gasket sealing technology. This technology took the question of "Will it bond to the mainline?" out of the equation, since there really is no equation or engineering design to quantify levels of adhesion between a lateral lining and a mainlining. This was a huge concern since specific materials used in mainline linings scientifically resist adhesion. Another factor that prevents bonding is the presence of fats, oils and grease (FOG) in collection systems.

The lateral lining market has arrived and with millions of feet of mainline CIPP in the ground, the future for the lateral market holds enormous opportunities; not only for technology providers and installation contractors, but as well an opportunity for municipal agencies to finally complete their I/I reduction program by sealing the collection system.

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