

Trenchless TECHNOLOGY

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LMK Enterprises: Lateral Thinking

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LMK Enterprises

Lateral Thinking

(From left) Larry Kiest Jr. with members of his team: Rick Fast, president of R&D, Walter Huber, sales consultant, and Shaun Flanery, vice president of Performance Pipelining.



by Keith Gribbins

Sewer laterals have long been a challenge for municipalities. This stretch of sewer, connecting the mainline to the end user, has been a constant problem point for city maintenance plans.

These utilities are more vulnerable to root intrusion. They're prone to problems with inflow and infiltration (I/I). And they run beneath the homeowner's yard, as well as streets, which makes resorting to typical dig-and-replace methods a nuisance for residents and cities alike.

So what's the best way to rehabilitate sewer laterals and keep them operating efficiently?

It's a question Larry Kiest Jr. asked himself over a decade ago. As a licensed plumber and operating engineer at the time, Kiest recognized the need to repair house service laterals without using traditional methods of excavation, digging up yards, driveways and streets.

Kiest formed LMK Enterprises Inc., Ottawa, Ill., in 1994, and as president and CEO, has set about producing trenchless renewal technologies to solve problems for lateral sewer pipes, sealing connections and sectional repairs for mainline pipes. The company has developed innovative and unique cured-in-place pipe (CIPP) products that cause minimal disruption, yet provide quality renewal to sewer infrastructure problems.

LMK processes boast a unique CIPP inversion method, which utilizes a saturated liner/bladder assembly to make installations easier, environmentally sound and of high quality. The company is even tackling the problem of I/I that occurs at the connection of the service lateral and mainline with its newest product —

the T-Liner™. Experts calculate that up to 60 percent of I/I can come from the lateral-main interface in a sewer system.

Today, LMK has 28 licensees utilizing its trenchless products, including Kiest's original plumbing company, Performance Pipelining Inc. To him, it's important to not only promote his products as a manufacturer, but to utilize the processes he has developed and refined as a contractor.

"I'm not here as a manufacturer who makes a product, sells it and depends on someone else to make it work. I'm a contractor that developed this product. I install it every day. I've worked all over the nation using our processes to renew pipes and I think that gives us a lot of credibility," said Kiest.

Contracting Roots

Coming from a family of plumbing professionals, Kiest entered the sewer industry as a licensed plumber and operating engineer over 21 years ago. By the early '90s, Kiest had begun his own pipe renewal company, Performance Pipelining Inc. His business provided video inspection, cleaning and manhole rehabilitation to general contractors and municipalities, but his dream was to enter the lateral rehab market.

"Back when I started, my entire focus was to develop a lateral lining system," said Kiest.

While maintaining his contracting business, Kiest sought to develop an expandable polyethylene system for service laterals. He ended up filing for his first patent application and approaching companies like GE Plastics, Phillips Driscopipe and Mokon Inc. for help. However, Kiest was never able to make the system work and abandoned the application and a plastic-expanding concept he was developing. But in 1993, Kiest had a breakthrough at a trade show where he met a company promoting a filter material made of a seamless construction. According to Kiest, he saw an advantage in this material for use in the trenchless rehab industry.

The combination worked and Kiest found himself filing for his second patent. Oddly enough, it wasn't specifically for a lateral system, but rather LMK's spot repair system — the Performance Liner®.

"I really wanted to do the laterals, but I just couldn't get it," said Kiest. "However, I was able to do the spot repairs. It just came naturally to me."

As he developed his system, Kiest realized he needed to improve on the standard for CIPP installation methods. At the time, liners were saturated with epoxy resin by hand. The process involved placing the liner around a pneumatic plug and pulling it through the mainline sewer pipe to the point of repair. The resin was cured utilizing hot water.

According to Kiest, the method exposed many unforeseen problems. The length of the repair was restricted to the length of the plug. The liner and resin were not contained and left workers exposed. Resin loss, as the liner was pulled to the point of repair, would cause the liner to cure improperly. Even exact placement was a gamble.

"We had to rely on measurements from a televised inspection to properly position the liner and found that

many times this method was inaccurate or was easily misjudged, causing an incorrect placement of the liner," noted Kiest.

So Kiest sought to design a unique liner/bladder assembly to install his sectional repair system. He utilized a translucent bladder that allowed the installer and inspector to verify a thorough liner saturation. The liner/bladder as an assembly is installed simultaneously under one inversion, where the bladder extends past the liner so it's open-ended and there's no need for cutting.

The polyester or vinyl ester resin is introduced into one end of the liner tube and a vacuum is drawn from the other end to ensure complete liner saturation. The outer bladder protects the technicians from resin exposure and prevents resin loss as the liner is towed to the point of repair.

"Most importantly, the resin that is essential in providing the structural integrity only comes in contact with the pipe at the point of repair," explained Kiest. "The result is extra resin for complete migration with full resin contact at the point of repair."

The curing process takes two hours or less and is suitable for pipes with a diameter from 4 to 48 in. and lengths from 3 to 50 ft.

This process is used extensively by the City of Portland — a municipal licensee of the LMK products.

Since 1999, Portland crews have performed 130 work orders (3,950 ft) on combination sanitary sewers, 10 work orders (270 ft) on storm pipes and 74 work orders (1,435 ft) on service branches using LMK's spot repair and lateral repair technologies. The city's response has been positive.

"We've been really pleased with the purchase," said Tom Caufield, maintenance engineer with the Bureau of Environmental Services in Portland. "We've done a couple of installations that are extremely deep that we believe have already paid for the buying of the process."

Innovations in the Making

Nearly a year after LMK's spot repair process was complete, Kiest developed the lateral CIPP system he had envisioned since the beginning. Using the same principles refined in LMK's spot repair process, Kiest miniaturized the system to work in laterals.

"We made the technology smaller and still used the liner/bladder assembly," said Kiest. "Then we developed some different equipment to install it."



LMK develops its innovative products at its new 30,000-sq ft facility in Ottawa, Ill.

The lateral liner/bladder assembly is installed from a small excavation pit either to the house or main. It's good for restoring structural integrity to defective laterals and eliminating root intrusion and any I/I, stated Kiest.

But even LMK's lateral system could not stop the I/I that often occurs at the connection of the lateral and the mainline.

"It was a good system," said Kiest. "It would stop groundwater. It would restore structural integrity. It would stop root intrusion — all that. But it would not make a non-leaking connection between the mainline and the lateral."

So LMK sought to develop a system that would renew the mainline/lateral connection and the entire lateral pipe, providing a Verifiable Non-Leaking Connection (VNLC). Sewer collection system experts report that 40 to 60 percent of groundwater infiltration comes from house laterals and, specifically, the connection to the mainline.

"It's very important to seal that connection for I/I removal and sewer rehabilitation," agreed Paul Stonecipher, program design manager for Consoer, Townsend, Envirodyne Engineers, which manages the overflow abatement program for the Metropolitan Government of Nashville and Davidson County. "We've seen at that point that there is a lot of focus of water and the opportunity for a lot of construction defects."

In Nashville, the abatement of sanitary sewer overflows is mandated, and verification of quality rehabilitation is one of the most stringent in the industry. LMK set its sights on developing a structural lateral lining system that would provide a Verifiable Non-Leaking Connection. The development process took over three years with a committed research and development team, said Kiest.

Numerous field tests were performed in Nashville, with attempts to meet the Metro's stringent air test specifications of 3.5 psi. At first, the system failed miserably. Then LMK considered joining its sectional and lateral lining processes, achieving a full circle seal that was one piece.

"We were putting a spot repair in the mainline and then putting a lateral down and trying to connect it," recalled Kiest. "And as I was doing that, I thought, 'What if we sealed these two at the factory somehow?' I knew if I had the seal already done instead of trying to make it in the field, I would have it."

The result was LMK's T-Liner system, consisting of a full circle repair to the main pipe that extends 6 in. on either side of the lateral connection for a total of 16 in. in the mainline. A simultaneous inversion of the liner is performed in the lateral to a distance of up to 75 ft from the main. The best parts: "The entire operation is 100 percent trenchless and provides the crucial VNLC," said Kiest.

LMK's T-Liner system has been used extensively in Nashville for the last four years.

"We are very impressed with the way their product seals and goes in," explained Stonecipher. "I particularly like their approach — where you televise it from the cleanout to the positioning of the lateral insertion. We certainly feel comfortable with their product and its performance."

The T-Liner system has also been used to seal leaking connections for Hazen & Sawyer PC and its clients in Broward County, Fla.

"If you're down in groundwater, say 6 to 8 ft deep, then it becomes very cost-effective to use LMK," explained Peter Larsen, associate with Hazen & Sawyer in Florida. "Their crews work like clockwork. They were very professional and I was very impressed."

LMK distributes its products through a network of 28 licensed installers across the United States, Canada, South America and Europe. Its biggest installer is Kiest's own contracting company, Performance Pipelining.

"We make this product, we install it and we support other people who install it," said Kiest.

Performance Pipelining has three full-time crews that travel all over the United States installing LMK products. "We take the jobs no one else wants because our system works where others won't," explained Shaun Flanery, vice president of Performance Pipelining. With 13 issued patents under its belt, the contractor is looking for ways to please customers, as well as become more efficient and cost-effective.

"Right now, we're focusing on efficiency and productivity," said Flanery. "You have to be able to go out there and get the quantity in, which brings down the prices for everybody, and still maintain a quality repair."

Kiest's contracting company also seconds as LMK's research and development team. The two work together to develop and test new products, as well as refine others.

"Currently, we've got four new processes that are under development," Kiest said.

LMK is committed and enthusiastic about its future innovations and sees the trenchless industry on the verge of exploding, said Kiest. Add that to the company's new 30,000-sq ft facility, and LMK is looking at a future that is as big as its eagerness to grow.

"Our goal is to never stand still, but to educate our industry, support our customers and bring ideas to life so we can offer solutions that may not always be the least expensive, but are high caliber and long lasting," said Kiest. "Our success comes from the drive to conquer challenges and a team that lives and breathes this pipe dream." **TT**

Keith Gribbins is assistant editor of *Trenchless Technology*.

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LMK Enterprises, Inc.
1779 Chessie Lane, Ottawa, IL 61350
Ph: (815) 433-1275 Fax: (815) 433-0107
linerbylrm@aol.com
www.performanceliner.com