POWER in the Province

Ontario's Trenchless Companies Help Municipalities Resuscitate Water Infrastructure, Save Money

By Dr. Brian Mergelas

In the absence of a reliable stream of government funding, municipalities are required to be creative with their assets. But how can they spend less money and continue to provide the public with affordable levels of service?

As part of our Invest to Save Working Group, WaterTAP encourages investment in technologies that can extend the lives of existing assets and help municipalities avoid or defer the costs of large capital projects. Giving new life to old or failing pipes is an important part of this approach.

The Centre for Advancement of Trenchless Technologies (CATT) recently surveyed 124 Canadian municipalities and found 70 percent were concerned with the state of their watermains, rating reducing leakage and breaks as critical or very critical. An even larger number —7 5 percent of respondents — categorized inflow and infiltration in wastewater pipelines as a critical or very critical issue. About 40 percent rate surcharging, pipe collapses and flow capacity issues as critical or very critical.

As municipalities work to address these critical issues in the face of tight budgets and competing priorities, top trenchless companies in Ontario are reporting revenue increasing up to 150 percent over previous years. Many have expanded to include new markets, adding offices and employees to accommodate this growth.

Interested in learning about what companies in Ontario offer? The province is home to many worth watching and below is a sample.

Monitor, Inspect and Assess

The North American industry often looks north for the latest and greatest in trenchless technology innovation, particularly when it comes to leak detection. Trade website Water Online, for example, recently identified a real-time acoustic detection and monitoring technology for transmission mains from Mississauga-based Echologics (a division of Mueller Co.) as one of the "top finds" of the American Water Works Association's annual conference, ACE.

The province is also home to a few tried, tested and true technologies that have stayed ahead of the curve to enjoy continued success. The Pipeline Inspection and Condition Analysis Corp. (PICA), for instance, remains the only company that can inspect metallic pipes from 3 to 36 in. in diameter. But the company's biggest differentiating factor is a tool that can navigate 90-degree bends in pipelines.

PICA director of sales and marketing Bill Jappy says the company's SeeSnake tool can find weaknesses through liners and cement, whether the pipe is ductile, cast or steel. The tool works by sending a signal throughout the pipe and reporting a time lapse that indicates thinning and thickening pipe walls.

A recent inspection for BC Hydro involved a 12-in. diameter raw water line that is 6.8 km in length. PICA's technology identified three at-risk pipes within inches of the holes, saving the client the hassle and cost associated with potential breaks.

"This pipe delivered water to cool a natural gas-powered plant," Jappy says. "Imagine the social and financial cost involved with a lapse in production if the pipe had failed."

Clean and Clear

Making the decision to line, rather than replace a pipe is one thing, but then there is the difficult job of removing tuberculation.

"It is not enough to clean the pipe — it has to be cleaned properly, and this is no small task," says Randall Cooper, president of Envirologics Engineering, a company based in Bracebridge, Ontario. "The outcome should be a consistent, prepared, bondable surface."

As part of the Ontario Ministry of the Environment's Showcasing Water Innovation (SWI) program, the Town of Greater Napanee received just under $240,000 for a watermain rehabilitation demonstration project, which included the validation of Envirologics' innovative Tomahawk pipe cleaning and preparation system.

The SWI program helps municipalities address infrastructure challenges with funding for demonstration projects in drinking water treatment, wa-

ter conservation and efficiency, and watermain rehabilitation. The funding also gives companies developing new technologies some much-needed testing ground.

"Development is very costly," says Envirologics project manager Brian Thorogood, P.Eng. "It is often cost-prohibitive for start-up companies to demonstrate new equipment and processes in the field, such as cleaning and preparing municipal watermains, without some form of compensation. These funding programs that cover costs are crucial to new technology development and commercialization."

This project allowed Envirologics to develop its patent-pending Tomahawk TR1 pipe-cleaning system, which it is bringing to market this year after four years of research and development. The system is unique because it's a dry process that cleans the pipe in a closed system. By using negative rather than positive pressure to blast stone through the pipe, Envirologics is able to contain the debris that is removed.

"Instead of blowing all the junk out the back of the pipe, we use a vac truck — something all municipalities have—and it pulls the air and abrasives through the pipe and the truck captures the debris," says Thorogood. This dry system, which uses an airstream instead of water, conserves the tens of thousands of gallons of water that older technologies require.

The project wrapped up in 2012 and deemed a success. The cleaning and lining of these watermains has extended their life by up to 70 years.

The R&D accomplished through this project was invaluable, says Thorogood. "As a result of this project, our technology has changed dramatically. Now we could do that same job in half the time."

These photos represent the before and after images of a watermain cleaned with Envirologics Engineering's Tomahawk TR1 pipe-cleaning system. (Courtesy Envirologics)

A Longer Life for Pipes

Adding decades to the useful lives of existing infrastructure assets through trenchless rehabilitation is another rapidly growing area for Ontario companies.

Toronto-based FER-PAL Construction Ltd. focuses on water pipe rehabilitation and services the municipal sector, but with a twist — the company also develops and builds its own robotics, making continual improvement of its offerings a major priority.

"We use investment in R&D to put our company ahead of competitors," says FER-PAL CEO Shaun McKaigue. "We aim to perform difficult jobs with efficiency."

A recent job in a Toronto neighbourhood helped the City gain 100 years of useful life from a watermain that, 30 to 40 years ago, had already been through one round of revitalization. With a cutting-edge approach, FER-PAL removed the cement mortar lining that remained from that effort and installed CIPP to further exploit the pipe's lasting structure.

Another contract, which involved a 500-m watermain running through the rear lots of townhomes with individual service in Elmhurst, Ill., provided FER-PAL the chance to use new technology to clear out and reinstate those services with robotics. "We were successful in 81 of 83 connections — only two had to be externally reinstated," McKaigue explains. He estimates the city saved $1,000 per metre using FER-PAL's method.

There's a big market for trenchless rehab, but FER-PAL's ambitions don't stop there. McKaigue says FER-PAL is exploring the boundaries of rehabilitation for larger watermains. "The flooding in July at UCLA demonstrates catastrophic loss due to breaks in these mains," he says. "We're working on solutions that mitigate risk and minimize disruption."

The company's R&D department is exploring different products for manufacturing solutions, as well as new technologies for installation. "Our focus on quality control is paramount," McKaigue says. "Industry has to push to ensure there is never a problem with a liner installed on a main of this size."

With recently opened offices in Taylor, Mich. and Elgin, Ill., the company is seeing a great deal of interest from municipalities in the American Midwest, but it continues to conduct the majority of its manufacturing and R&D in Ontario.

These Ontario companies — and many others involved in trenchless innovation —continue to experience uptake of their products and services.

Dr. Brian Mergelas is CEO of WaterTAP.

PICA's SeeSnake tool can find weaknesses through liners and cement, whether the pipe is ductile, cast, or steel. The tool works by sending a signal throughout the pipe and reporting a time lapse that indicates thinning and thickening pipe walls. (Photo Courtesy of Bill Jappy)