



# Sustainable Municipal Pipelines

## Centre for Advancement of Trenchless Technologies

Sustainable Buried Infrastructure for Livable Communities

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Centre of Advancement of Trenchless Technologies  
 University of Waterloo  
 200 University Ave. W  
 Waterloo ON N2L 3G1  
 P: 519-888-4770  
 F: 519-746-6556

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### Message from the Board of Directors

With summer finally on the horizon and the construction season just around the corner, there are a lot of municipalities out there anxious to get their infrastructure projects underway. Never has trenchless technology been as viable a solution for these rehabilitation/replacement projects as it is today. Whether it's a Public Works manager who's just heard of pipe bursting for the first time or a Consulting Engineer who's looking for advice on a micro-tunneling specification, CATT is Canada's "go to" source for trenchless information. At CATT, we endeavor to educate everyone and anyone who has an interest in becoming more knowledgeable about trenchless technology.

With more than 15 technical courses offered annually, CATT is the local industry leader for education and research in trenchless technology. We continue to offer our base 101 courses for people new to the technology, while continuing to develop new cutting edge courses about the latest trenchless technologies, construction techniques and methods for industry professionals. Our upcoming courses focus on leak detection and asset management.

I'm very excited about our upcoming trenchless roadshow to be held in Richmond, B.C., from November 17 to 19, 2015. With over 300 industry members expected to attend, this will continue the tradition of the fabulous roadshows we've had in the past, here in Ontario. And don't worry, we'll be back in Niagara Falls in 2016 for another great show!

Lastly, I want to tell you about our online Canadian Trenchless Directory. Created to meet the needs of the Canadian Trenchless Industry, the directory provides a comprehensive listing of all businesses who provide products and services in Canada. For a limited time, non-CATT members are offered a free subscription to the trenchless directory. Take advantage of this opportunity and help spread the word about this wonderful industry.

Jason Johnson, Chair, Membership Committee

**News Release:** the results of the 2014 Canadian Municipal Buried Infrastructure Survey are here. Conducted last year, the survey collected information from the Canadian municipalities on construction, renewal, and financing of water, wastewater and storm water pipelines. Over 120 respondents from Alberta, British Columbia, Manitoba, New Brunswick, Nova Scotia, Saskatchewan, Quebec, Prince Edward and Ontario participated in the survey. See page 4 for more information.

## **Project Highlight: Trenchless Sewer Laterals Rehabilitation Program can Save Millions of Dollars for Municipalities, by Mike Near**

Aging wastewater infrastructure throughout North America has been a growing concern for decades. Inflow and infiltration due to aging and system decay have been a historic concern for many municipalities, especially in areas where infrastructure is more than 50 years old. As North American infrastructure ages, laterals are becoming an increasing target of concern. As Cities aiming to stretch taxpayer's dollars even further and with environmentally friendly solutions, the City of Hamilton, Ontario mandated that the rehabilitation of laterals and mainline sewers should be "Totally Trenchless".

While considering the ability to deal with this mandate the practical and financial distinction between open-cut replacement and trenchless rehabilitation techniques became evermore evident. Since open-cut replacement of every defective lateral and mainline sewer in a time and cost effective manner would be extremely difficult, both physically and politically, rehabilitation methods became the chosen method for the City of Hamilton sewer rehabilitation programs.

The City of Hamilton requested qualified contractors to submit a proposal with a rehabilitation process that used a Cured in Place Pipe (CIPP) liner. The proposed rehabilitation method was required to provide the much-needed structural support for laterals, connections and mainline rehabilitation. Hamilton's program was to rehabilitate all deficient laterals and mains in specific areas with a solution designed to at least 50 years of life.

The City sent out the terms of reference to be used and directed all proponents that the submission should combine acceptable Engineering Practices along with the best use of resources, be cost effective, and provide products that are both operationally and maintenance friendly.

LiquiForce responded to the Request for Proposal, and submitted a proposal that earned the highest technical points out of all submissions. The solution presented in the proposal worked well to address Hamilton's lateral/ mainline deficiencies with the installation of the LiquiForce Junction Liner. Insituform partnered with the LiquiForce who were responsible for the CIPP lining of the mainline sewers. The Patented process inspects, measures and cleans the lateral without a cleanout. The final step is to install a new liner that attaches to the main (lined or unlined) and lines up the lateral as far as required. The LiquiForce Junction Liner does not require any digging or any access to homes or businesses and thus saves significant amount of time and money with minimal social disruption. It is truly, a "green" improvement, and the program provides a 50 year engineered solution.

The LiquiForce Project Team is very proud of what they have been able to collectively accomplish within the City of Hamilton. The innovative products and approaches have allowed the team to rehabilitate a vast amount of infrastructure with minimal impact to residents and business owners. By combining all elements of CIPP sewer rehabilitation into one 5 year - \$50,000,000 trenchless technology project, the City of Hamilton estimates savings of more than 50% when compared to traditional open-cut replacement.

The City of Hamilton is very satisfied with the trenchless technology and service. Harry Krinas, Acting Senior Project Manager says "this program greatly reduces the disruption to our residents while allowing the city to accomplish a lot more work with the money available for water and wastewater collection systems."

Mike Near, [mnear@liquiforce.com](mailto:mnear@liquiforce.com)

## Research News

CATT's researchers and graduate students continued to work on a number of important research initiatives including the development of **Water Main Condition Classification System** which will produce a standard protocol for water pipeline coding and condition classification following an inspection survey. The **Creep Testing of Nine New CIPP Systems** is in progress. The graduate students continued to work on the **Asset Management System Dynamics and Financial Sustainability Model(s)** for water and wastewater buried networks. A new research proposal for **Field Assessment of Watertight Manhole Cover System** is under review. Furthermore, lab testing of a **New Joint System for PVC Pipes** for trenchless applications will commence shortly. A number of abstracts and manuscripts have been accepted to be presented at national and international conferences and technical forums that include, for example, OWWA's 2015 Water Conference in Toronto, AWWA's ACE 2015 in Anaheim, and ASCE Pipelines 2015

## Upcoming Conferences

### 2015 Trenchless Technology Road Show | Vancouver, BC | November 17-19, 2015

The exhibit hall is nearly sold out, and the technical program features internationally renowned industry experts. Plan to attend! For more information and to register, visit

[www.trenchlessroadshow.ca](http://www.trenchlessroadshow.ca)



### 2016 Trenchless Technology Road Show | Niagara Falls, ON | May 17-19, 2016

Call for Abstracts (deadline May 29, 2015). Please visit <http://catttrenchlessroadshow.ca/> to submit abstract and view sponsorship and exhibition opportunities.



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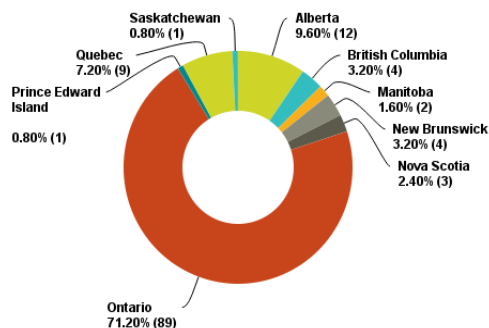
### Asset Management of Buried Infrastructure | Mississauga, ON | Nov. 23-27, 2015

CATT in partnership with the Ontario Good Roads Association is pleased to announce the asset management of buried water and wastewater pipelines infrastructure course. Topics will include asset inventory, valuation, PSAB 3150 reporting, pipeline condition assessment, risk-based criticality and prioritization techniques, pipe failure modes and mechanisms, rehabilitation and replacement techniques and decision making, capital budgeting and financial planning. For more information, please contact CATT or visit <http://www.ogracademy.org/Portals/2/Academy%20Asset%20Mgmt%20of%20Buried%20Infrastructure.pdf>

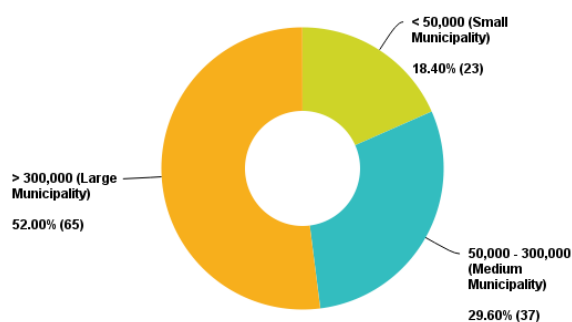
### 2014 Canadian Municipal Buried Infrastructure Survey

Rizwan Younis, Mark Knight, and Jai K. Jung

CATT conducted the second Canadian Annual Municipal Infrastructure Survey from February through May 2014. The survey collected information from the Canadian municipalities on construction, renewal, and financing of water, wastewater and storm water pipelines. In total, 125 respondents from Alberta, British Columbia, Manitoba, New Brunswick, Nova Scotia, Saskatchewan, Quebec, Prince Edward and Ontario participated in the survey.



**Survey participants:** Close to 72% respondents were from Ontario.



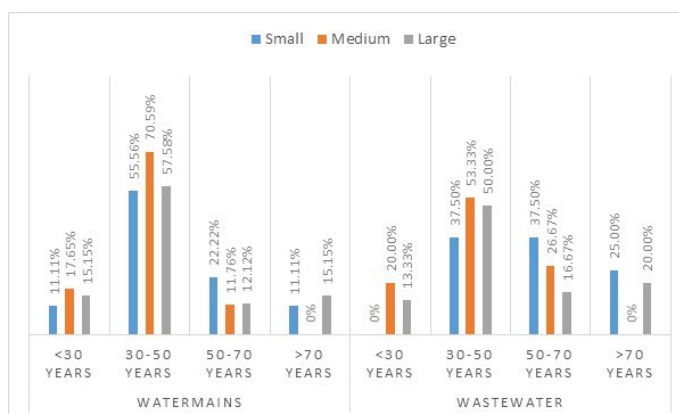
**Survey participants:** About 30% of the respondents were from municipalities with population 50,000~300,000 and 52% with population >300,000.

### Critical Issues

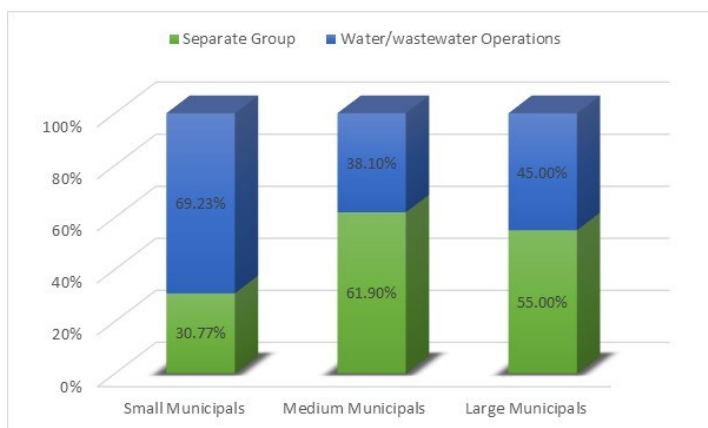
**Watermains:** Close to 67% of the respondents from small municipalities reported improving water quality as critical or very critical issues whereas about 70% of the respondents from medium and large municipals indicated reducing the number of annual watermain breaks as critical or very critical issues.

**Wastewater Pipelines:** 100% of the respondents from small municipalities categorized inflow/infiltration as the critical or very critical issue. About 70% of the respondents from medium municipals reported infiltration/pipe collapse issues as critical or very critical. Close to 67% of the respondents from large municipals indicated infiltration/inflows/flow capacity as critical or very critical issues.

**Storm Water Pipelines:** About 63% of the respondents from small municipalities reported infiltration as the critical or very critical issues while more than 55% of the respondents from medium municipals indicated flow capacity/pipe collapse issues as critical or very critical. About 74% of the respondents from large municipals reported flow capacity issue and about 62% of them indicated surcharging issue as critical or very critical.



**Aging infrastructure:** Based on age profile, about 25% of watermains pipelines and about 42% of wastewater pipelines (belonging to > 50 year cohort) need intervention such as inspection and renewal. The cities need to make adequate plans for the 30-50 year cohort that makes up about 61% of the watermains pipelines and about 47% of the wastewater pipelines.



**Asset management:** Close to 70% small municipalities do not have a separate asset management group while more than 55% of medium and large municipals have a separate asset management group.

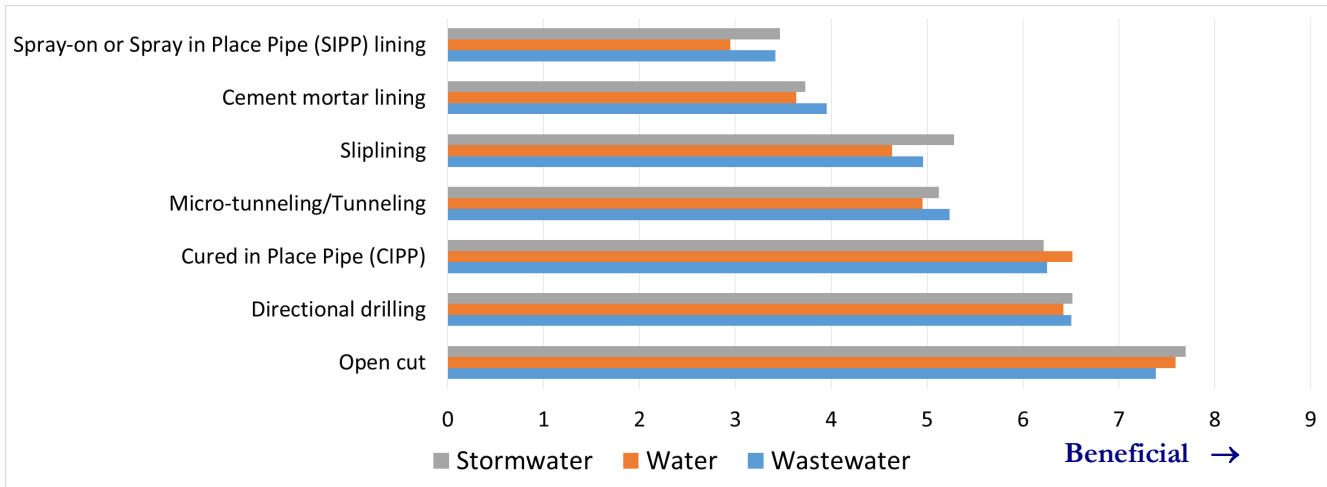
### Importance of Removing Water and Sewer Infrastructure Backlog

**Small Municipalities:** About 75% of the respondents considered that government regulations are important or very important followed by about 67% of them indicated professional education is important or very important. About 62% of them reported access to government grants is important or very important.

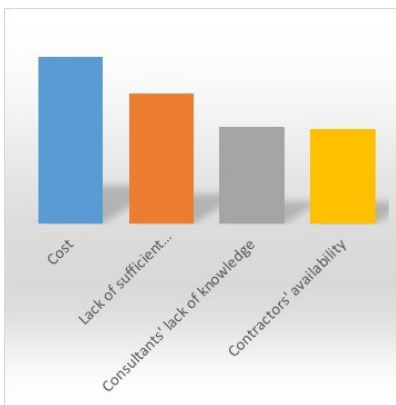
**Medium Municipalities:** About 53% of the respondents reported public education is important or very important. About 47% of them indicated access to long-term financing is important or very important.

**Large Municipalities:** More than 64% of the respondents indicated access to long-term financing and public education are important or very important. About 57% of the respondents reported government regulations are important or very important.

2014 Canadian Municipal Buried Infrastructure Survey (cont'd. from page 4)



**Pipe renovation/construction methods:** Trenchless industry has a huge potential and room to grow.



**Barriers to the use of trenchless methods**

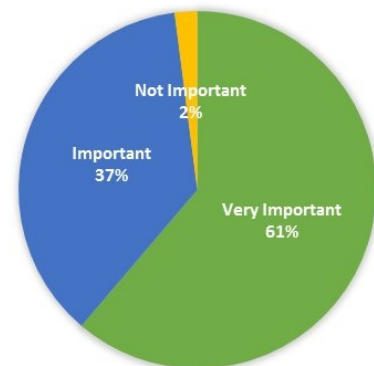
**Usefulness of Trenchless Technologies**

**Cost Effectiveness:** About 66% of the respondents from the large municipals reported trenchless construction to be cost effective or very cost effective while only 30% of the respondents from the small and medium municipals indicated it to be cost effective or very cost effective

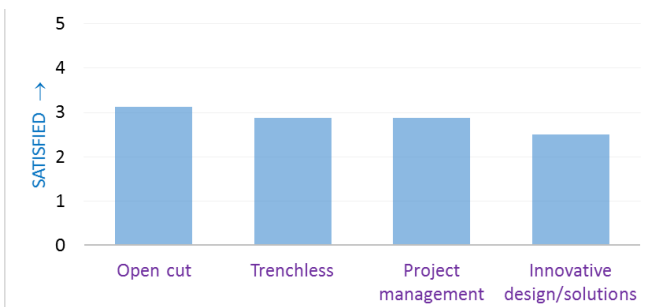
**Depth of Pipeline:** 69% of the respondents from the large municipals found trenchless construction to be effective or very effective for depth of pipeline whereas 55% of the respondents from the small and medium municipals reported it to be effective or very effective for depth of pipeline

**Reducing Urban Congestion:** About 69% of the respondents from the large municipals categorized trenchless methods to be effective or very effective in reducing urban congestion while only 40% of the respondents from the small and medium municipals indicated it to be effective or very effective for reducing urban congestion

**Environmental Impact:** 75% of the respondents from the large municipals consider trenchless construction to be effective or very effective in regards to environmental impact whereas 55% of them from the small and medium municipals reported it to be effective or very effective regarding environmental impact



**Staff education and training**



**Satisfaction with consulting engineers' performance**



**Satisfaction with contractors' performance**

**Research News:** The CATT is pleased to announce that our research team has been successful in securing the NSERC-CRD (Natural Sciences and Engineering Research Council of Canada—Collaborative Research and Development) grant to advance the water and wastewater infrastructure asset management research. Further information will be available on CATT website.



Platinum Members



Canada Pipe Company ULC



Inversa SYSTEMS



AQUAREHAB



INTERPLASTIC CORPORATION



LiquiForce No-Dig Pipeline Rehabilitation



Insituform an AEGION company



Royal Pipe Systems

Gold Members



EVANGELINE EXCAVATORS



Feature Product - Ice Pigging: Advanced Pipe Cleaning Technology

Ice pigging pipeline cleaning method for potable water and wastewater was developed in the United Kingdom, and introduced in the U.S. in 2012.

The method involves pumping a slurry of ice into a main through a hydrant, or a 2-in. fitting, and using system pressure to push the ice pig downstream to exit through a hydrant or fitting. The ice slurry cleans with shear forces up to 1,000 times greater than with water alone, provides more effective cleaning, and uses significantly less water than traditional flushing methods. Because the ice pig enters and exits through a hydrant, specialized launch and retrieval stations aren't required as with mechanical pigging or swabbing. Customer service isolation usually isn't necessary either. Because the pig is an ice slurry, not a solid pig, it will not stuck like traditional mechanical pigs or soft swabs. An ice pig can negotiate pipe bends, diameter changes, broken gate valves, and in-line butterfly valves without affecting the cleaning process.



Ice pigging technology was successfully implemented in several projects. For example, the 30-year-old, 18,000 ft of 6-in.-diameter PCV distribution system in Stokes County, NC was cleaned without excavation. In the City of Keene, NH, it solved a discolored water problem that had persisted for more than 5 years despite several flushing programs. The city used the ice pigging technology and removed more than 2,400 pounds of sediment. Other example is in Dallastown Borough, PA. About 1,200 ft of 4-in. cast iron force main at a pump station was cleaned using the ice pigging technology. It was the first attempt in the U.S. to clean a sewer force main and as a result, the average discharge rate increased by 29 %.

As these projects demonstrate, ice pigging technology has the potential to become a sustainable best practice for potable water distribution mains and sewer force main cleaning in Canada.

For more details contact Paul Treloar, PTreloar@UtilityService.com.

Upcoming Events

September 17: Geotechnical Investigations for Trenchless Projects

October 15: Condition Assessment and Rehabilitation of Drainage Culverts

October 22: CATT Annual General Meeting and Dinner

November 5: Stormwater and Climate Change

November 17-19: Trenchless Technology Road Show-BC

Welcome New Members:

Platinum: Insituform, Royal Pipe Systems

Silver: OHESI G-Tel, Cues Canada, RaedLinger Primus Line, Corix Water Products, Jack Control AG, Canadian Cutting & Coring

Municipal: Town of Greater Napanee