Message from the Board of Directors

This year has certainly been a growing year for CATT with several new undertakings in the works.

Expanding upon the success of The Trenchless Technology Road-Show in Ontario, CATT has partnered with the B.C. NASST Chapter and Benjamin Media for the first Trenchless Technology Road Show in British Columbia. This show consists of two full days of technical presentations and exhibits on November 18-19, 2015 introducing the latest advances in trenchless technology. Moreover, industry-leading experts will conduct three pre-event technical workshops on November 17, 2015. Although the exhibit hall is already sold out, there are still sponsorship opportunities available.

If you are looking for Director-Approved CEUs, CATT has developed full day courses that can be offered in house. These courses can be tailored to fit your training needs and scheduled to fit your team’s availability.

Continuing initiatives include the first Canadian Annual Municipal Infrastructure Survey, which was launched in 2013 to review Canada’s water and wastewater buried infrastructure sector and trenchless technology use and needs. The survey collects information from Canadian municipalities and receives input from larger, medium and smaller sized municipalities to identify the critical issues facing the industry. Results from the 2014/2015 survey are expected to be available soon.

As always, CATT invites applicants to volunteer to be part of our many committees. Please check our website for a list of our committees or join us at our AGM on October 22, 2015 at the Mississauga Grand (Mississauga). In addition to the usual networking opportunities, our keynote speaker is Philip Wildbore, who will speak on “Sustaining the Service: Making Water and Wastewater Systems Fit for Service for Another 200 Years.” Philip is the primary developer of NASSCO’s condition rating system for sewers (PACP), the WRe’s Manual of Sewer Classification Codes (MSCC) and the Sewer Rehabilitation Manual (SRM).

We will also be announcing our new “CATT Award of Excellence” program at the AGM this year. CATT is the leading organization for the trenchless industry in Canada and is focused on recognizing outstanding people, organizations, technologies and projects that are instrumental in advancing our industry locally and internationally. Contact us to learn how you can recommend a trenchless technology contributor for this award.

Sonya Semanuik, Chair, Seminar Committee

News Release: Construction under the Runway at Pearson Airport Begins: CRS Tunnelling and Dibco Join Forces Underground

Twinning of Etobicoke Creek Trunk Sanitary Sewer under Runway 23 at Pearson International Airport was awarded to Dibco-CRS, A Joint Venture. The $16.9 Million Project for the Region of Peel/GTAA is underway; it involves the construction of 612m of 1,800mm ID trunk sanitary sewer underneath active operating surfaces at the Airport using MTBM tunnelling methods with the inclusion of compressed air intervention and access from within the MTBM. Tunnelling activities are expected to commence the end of August 2015.
Research Highlight: Framework for the Development of Watermain Condition Classification System

Rizwan Younis, Centre for Advancement of Trenchless Technologies

The WRc’s MSCC (Manual of Sewer Condition Classification) and SRM (Sewerage Rehabilitation Manual), and NASSCO’s PACP provide a systematic, standardized methodology to code structural and operational defects, construction and miscellaneous features, and to assign condition grades based on severity of various defects. However, no such standard defect coding and condition classification system exists for potable water pipelines. Keeping in view the industry need for a standardized watermain condition classification system, the Centre for Advancement of Trenchless Technology is working on a Water Research Foundation funded project for the development of a watermain defect coding and condition classification framework. The watermain standard defect coding system is being developed in collaboration with over a dozen municipalities and water utilities from Canada and the USA, as well as water main condition assessment technology providers and international water experts.

Figure 1 shows that the proposed framework consists of three main components that include: (1) estimation of pipe criticality and priority ranking; (2) watermain condition classification; and (3) watermain rehabilitation or replacement decision making.

Estimation of pipe criticality and priority ranking: Pipe criticality is determined by estimating failure likelihood and consequences. Based on pipe criticality and priority ranking, pipes are classified into one the four tiers. Tier 1 includes the lowest criticality pipes that are identified by a quick, simple desktop assessment using inferential indicators. Tier 2 includes pipes that have relatively higher criticality and priority ranking compared to Tier 1 pipes and for which some historical failure data are available. Statistical analysis can be used to estimate remaining life for these pipes. Tier 3 pipes go through low cost inspection surveys (e.g., leak detection, acoustics) for: (a) critical pipes whose condition is rather uncertain for which some concern exists but expensive full-length inspection cannot yet be justified; and (b) lower criticality pipes with a relatively long remaining life but strong evidence of past leakage. Tier 4 is the most detailed full length assessment applied to high-criticality pipes using visual or Non-Destructive Evaluation techniques.

Watermain Condition Classification System: The condition and performance of watermains deteri-
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 standardized protocol for water pipeline coding and condition classification following an inspection survey. The **Creep Testing of Nine New CIPP Systems** has been completed. 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. The CATT’s researchers and students presented their research on water main breaks and water main condition classification system at the OWWA’s 2015 Water Conference in Toronto, AWWA’s ACE 2015 in Anaheim, and ASCE Pipelines 2015 in Baltimore.

Upcoming Conferences

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

The response to this event has been tremendous. The exhibit is sold out, and attendance is on track to exceed expectations. For more information on the technical presentations by world renowned experts, and to register, visit [www.trenchlessroadshow.ca](http://www.trenchlessroadshow.ca)

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

The technical program has been finalized and the exhibit hall is selling out fast. Please visit [www.catttrenchlessroadshow.ca](http://www.catttrenchlessroadshow.ca/) to view sponsorship and exhibit opportunities.

CATT Trenchless Directory

List your company. It's free!

CATT is pleased to announce the online Canadian Trenchless Directory - a comprehensive source of information about the Canadian trenchless industry. Please visit [www.canadiantrenchlesdirectory.ca](http://www.canadiantrenchlesdirectory.ca/)

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 [www.ograacademy.org/courses.html](http://www.ograacademy.org/courses.html)
On-site Training

In its continuing effort to meet the industry needs, CATT is now able to provide on-site training courses. These courses are tailored to fit your training needs and scheduled to fit your employees’ availability. Director-Approved CEUs can be granted, if required. Contact the CATT office for additional information: catt@uwaterloo.ca.

Currently CATT is providing the city of Markham and the city of Toronto with the following customized training courses:

- **Introduction to Trenchless Technologies:**
  This customized course for the City of Markham provides a broad overview of trenchless installation (horizontal directional drilling, pipe jacking, microtunnelling, and pipe bursting) and rehabilitation techniques (spray-on coatings, non-structural, semi-structural and structural liners).

- **Horizontal Directional Drilling (HDD), Cured-In-Place-Pipe (CIPP), and Sliplining:**
  This four-day course for the City of Toronto covers planning, detailed design, and quality assurance, quality control procedure for HDD, CIPP and Sliplining projects for installation and renewal of water and wastewater pipelines.

Upcoming Events - Visit www.catt.ca for more details

October 22: CATT Annual General Meeting and Dinner featuring keynote speaker Philip Wildbore, UK Department of Environment, Food and Rural Affairs, Mississauga Grand
November 5: Condition Assessment and Rehabilitation of Drainage Culverts, Mississauga Grand
November 10: Role and Importance of Geotechnical Engineer in Trenchless Projects, CHSI
November 17-19: Trenchless Technology Road Show, Richmond BC
January 27: Trenchless Low Tech Condition Assessment Options, Mississauga Grand
February 9: Microtunnelling for Trenchless Construction Projects, Mississauga Grand
February 23: Pipe Materials for Watermains and Sewers, Mississauga Grand
March 2: Condition Assessment and Rehab of Asbestos Cement Pipelines, Mississauga Grand

2014/15 Municipal Infrastructure Survey Results-Coming Soon

The Centre for Advancement of Trenchless Technologies (CATT) conducted the second annual Canadian Municipal Infrastructure survey from September 2014 through April 2015. The objective of the survey was to assess the market conditions related to construction, renewal, and financing of water, wastewater and storm water pipelines. Please visit www.catt.ca to learn about what are critical issues faced by the municipalities? how the respondents rate various options to get rid of infrastructure backlog? how useful and effective various trenchless technologies are for water? and much more!
orate over time because of a number of factors and complex physical processes that can include, for example: changes in operational conditions; environmental degradation and wear; mechanical, biological or chemical degradation processes; accidental or intentional interference; flaws during pipe manufacturing process; poor choice of pipe material; faulty design; poor installation; and natural events. The failure modes and mechanisms for metallic (cast iron, ductile iron and steel), plastic (PVC and PE) and asbestos cement watermains have been identified. The definitions and codes for various anomalies, defects, and construction features are specified along with appropriate measurement parameters (e.g., length, width, depth, orientation, etc.). Figure 2 shows the measurement procedure for metal loss anomaly.

To determine defect severity and assign scores, and to compute watermain condition grade, simple screening tools to more sophisticated methods based on advanced statistical analyses, soft computing and machine learning techniques, and mechanistic models can be used. Additional work is needed to develop a consistent approach to assess the significance of defects and to develop weighting criteria for various types of defects.

**Watermain Rehabilitation and Replacement Decision Making:** The decision support process determines when to rehabilitate or replace a pipe or to follow-up with one of the four evaluation tiers at another time depending on defects’ severity and pipe condition grade. To determine renewal priority, risk-based (likelihood and consequence of failure) approach used by many water utilities can be used. The result provides three options for managing a pipe that include: (1) no renewal and re-assign the pipe to one of the four inspection tiers; (2) renewal by rehabilitation; and (3) renewal by replacement. The renewal options include: (1) open cut replacement; (2) in-line replacement with or without upsizing; (3) structural or semi-structural spot repair; and (4) structural or semi-structural lining system.

The development of a standard coding and condition classification system for water distribution mains is challenging because there is no single inspection technology that can detect and characterize all pipeline flaws, defects and features. Therefore, the codes and classification protocol ought to be independent of inspection technology. The proposed framework will provide a common nomenclature and language for water main defects and features. Other benefits will include facilitation of effective and efficient asset management, support for benchmarking and establishment of minimum acceptable condition levels or levels of service, and improved operation, maintenance and renewal of water distribution systems.

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**Welcome New Members:**

**Corporate Silver:** Channeline
Featured Products:

- **Portable Lateral and Mini-Mainline Push System**

  The CUES MPlus+ offers the most flexible and feature packed lateral and mini-mainline push system on the market. The MPlus+ system with stainless steel frame enables easy operation with its refined All-In-One set up, but additionally offers flexibility by facilitating quick removal of the control unit to be used separately for off road or remote jobsites or to accommodate compact storage.

  The advanced MPlus+ system stands out by integrating all of the most sought after features including video titling, video observation coding, digital recording, and optional line tracing into an easy to use and intuitive package. This lightweight system includes large and durable wheels for easy portability and a balanced footprint for stability. Manufactured for rugged reliability and designed to handle rigorous field use, the MPlus+ is the most versatile Push system available in the market today.

  For more information, please contact salesinfo@cuesinc.com.

- **Vactor HXX Prodigy**

  If you have a tough job that your trailer-mounted Excavator doesn’t have enough suction power to handle and you can’t maneuver a full size Vacuum Truck around tight corners to get where you need to be, look no further than the Vactor HXX Prodigy.

  Prodigy customers appreciate the compact and maneuverable Vacuum Excavator as a true multi-purpose tool that has three times more suction power compared to trailers, is equipped with a 16’ hydraulic boom and can dig with air or water. Excavating using either air or water as a digging medium is an added advantage for utility contractors performing locates and line repairs. The Prodigy digs trenches and can pothole and daylight with ease, and it is also capable of towing up to 40,000 lbs to haul HDD drills or job supply trailers. A high pressure hot water supply allows for efficient jobsite and equipment cleanup.

  Based on the increasing demand for this versatile power house, North-American infrastructure equipment specialist, Joe Johnson Equipment (JJE), just added six new Prodigy trucks to its ever-growing rentals fleet. In addition to over 50 full-size HXX units, the ready-for-work Prodigy can be rented from JJE to fill a short-term emergency need, temporarily expand your fleet or test this new equipment before making a purchase decision.

  For more information, please contact salescanada@jjei.com.