

Underground Infrastructure Research Conference



# UIR 2001

Kitchener,  
Ontario, Canada



**WITH REHAB ROAD SHOW**



**June 10-13, 2001**



**Four Points Sheraton, Kitchener**



National Research  
Council Canada

Conseil national  
de recherches Canada



## General Information

### Conference Registration

Please complete the registration form and return it to the address indicated on the form. Full conference details, including directions and accommodations, are available on the UIR 2001 website. Registrations will be confirmed by email once full payment has been received. The Registration form and full conference details are available on the UIR 2001 website at: [www.civil.uwaterloo.ca/uir2001](http://www.civil.uwaterloo.ca/uir2001).

Register  
Online!

### Conference Registration and Information Desk

The Conference Registration and Information Desk will be located in the 2nd Floor Lobby:

Sunday 2:00 pm - 8:00 pm  
Monday 7:45 am - 6:00 pm  
Tuesday 8:00 am - 7:00 pm  
Wednesday 8:00 am - 12:00 noon

### Students

Students qualify for discounted registration rates. Please include your student identification number on your registration form and attach a photocopy of your valid student identification or proof of full-time studies. See registration form for rates.

### Early-Bird Registration Rates

Register by May 11, 2001 to qualify for the discounted Early-Bird Registration Rates. See registration form for details.

### Special Rates for CATT Members

CATT Members qualify for the Early-Bird Registration Rates until May 31, 2001. For all registrations received on or after June 1, 2001, On-Site Registration Rates will apply.

### On-Site Registration Rate

The On-Site Registration Rate will apply to all registrations received on or after June 1, 2001, including walk-on registrations (space permitting). Registrations received on or after June 1, 2001 will be processed on-site (confirmations will not be sent prior to the conference).

### Meals, Breaks & Receptions

Full conference registration includes continental breakfast and refreshment breaks, lunch on Monday and Tuesday, and admittance to the evening receptions and the Tuesday evening banquet. One-day registrations include continental breakfast, lunch, and refreshment breaks only. Exhibit Hall & Field Demo registrations do not include any meals, breaks or receptions.

### Evening Entertainment

Meet and mingle on Sunday evening at the Welcome Reception, hosted by the Centre for Advancement of Trenchless Technologies (CATT) and Trenchless Technology, Inc.

Join us in the Exhibit Hall on Monday evening for a Wine & Cheese Reception, while visiting displays highlighting the latest advances in the field.

Tuesday evening's banquet will feature a presentation by Dr. James Raffan - writer, consultant, canoeist. Dr. Raffan has traveled throughout Canada by canoe, bicycle, horse, ski, snowshoe, dogsled, snowmobile, sea kayak, coastal steamer and on foot.

All evening activities are licensed.

### UIR 2001 Proceedings

Attendees of the UIR Sessions (full-conference registrants only) will receive a copy of the hard-bound UIR 2001 Proceedings.

### Rehab Road Show Materials

Attendees of the Rehab Road Show Seminars will receive the following material:

- ✓ One-Year Free Subscription to Trenchless Technology Magazine
- ✓ The Directory of the North American Trenchless Technology Industry Rehab Showcase
- ✓ Trenchless Field Seminar Binder (full-conference registrants only)
- ✓ NASSCO Specification Guidelines (full-conference registrants only)
- ✓ A Trenchless Technology Hard Hat (full-conference registrants only)

### Dietary / Special Requirements

Please indicate any dietary requirements (food allergies, vegetarian, etc.) or other special requirements on your registration form. Please note that all rooms at the Four Points Sheraton Kitchener are wheelchair accessible.

### Registration Contact

**UIR 2001 Organizing Committee**  
c/o CATT, Department of Civil Engineering  
University of Waterloo  
200 University Avenue West  
Waterloo, Ontario, Canada N2L 3G1  
Phone: (519) 888-4770  
Fax: (519) 746-6556  
Email: [uir2001@sunburn.uwaterloo.ca](mailto:uir2001@sunburn.uwaterloo.ca)

Or contact the UIR 2001 Conference Coordinator directly:

**UIR 2001 Conference Coordinator**  
c/o Event Horizons  
2706 – 10 Yonge Street  
Toronto, Ontario, Canada M5E 1R4  
Phone: (416) 864-9027  
Fax: (416) 864-9047  
Email: [uir2001@event-horizons.com](mailto:uir2001@event-horizons.com)

## Air Travel

Air Canada is proud to be the Official Airline of UIR 2001. Call Air Canada directly to take advantage of special discounted rates and other savings, including:

- ✓ Savings of up to 35% on Full Hospitality Class Fares and 5% on regularly low Published Excursion Fares.
- ✓ Early Bird savings bonus to and from the USA - an additional 5% on all Air Canada Published Fares, including Air Canada / United Airlines joint fares, when tickets purchased at least 60 days in advance.
- ✓ International discounts of 10% on all Air Canada Published Fares and Interline Published Fares between Air Canada and Star Alliance Airlines.
- ✓ Frequent flyer mileage accumulation on Air Canada's Aeroplan, United Airlines Mileage Plus, or any other Star Alliance frequent flyer program.
- ✓ Hertz Rental Cars offers special rates to Air Canada delegates.

For details regarding your travel arrangements and applicable savings, call Air Canada at 1-800-361-7585 or 514-393-9494. Please quote the UIR 2001 Special Event Number: CV817204.

## Rail Travel

VIA Rail offers service to Kitchener from most major cities, including Windsor, London, Toronto, Ottawa and Montreal.

### Rates start from:

Windsor	\$78.00 CDN	(approx. \$52.00 US)
London	\$28.00 CDN	(approx. \$18.00 US)
Toronto	\$30.00 CDN	(approx. \$20.00 US)
Ottawa	\$140.00 CDN	(approx. \$94.00 US)
Montreal	\$160.00 CDN	(approx. \$107.00 US)

For complete details on schedules, fares, and reservations, please contact VIA Rail toll-free by phone at 1-800-VIA-RAIL (842-7245) or visit their website at: [www.viarail.ca](http://www.viarail.ca).

## Kitchener-Waterloo Tourism

Kitchener is located approximately 100 km west of Toronto, Ontario. For more information on the region, please contact **Kitchener-Waterloo Tourism directly**:

**Phone: (519) 745-3536**  
**Toll-Free Phone: (800) 265-6959**  
**Fax: (519) 742-4760**  
**Web: [www.kw-visitor.on.ca](http://www.kw-visitor.on.ca)**

## Driving Directions

From Hwy 401: Follow Hwy 401 to Hwy 8 West (to Kitchener-Waterloo/Stratford). Follow Hwy 8 until it becomes King Street. Follow King Street to Benton Street. Turn left on Benton Street.

## Transit from Airport

Airways Transit offers direct service between Toronto's Lester B. Pearson International Airport and the Four Points Sheraton Kitchener, starting from \$29.00 CDN (approx. \$19.00 US).

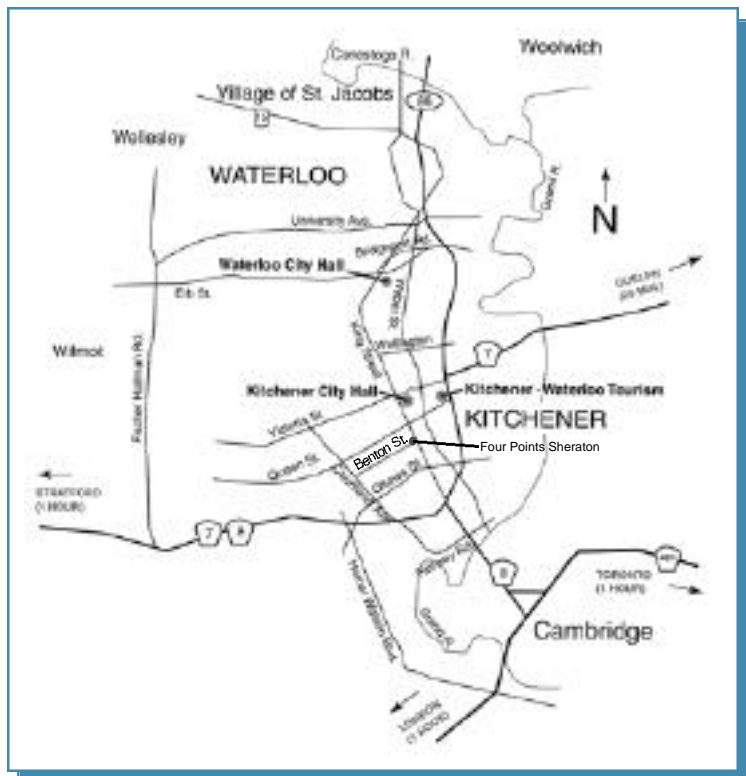
**Reservations, Rates and Inquiries:**  
**Airways Transit Waterloo Division**  
**99A Northland Road**  
**Waterloo, Ontario, Canada**  
**Phone: (519) 886-2121**  
**Fax: (519) 886-2141**  
**Email:**  
**[infowaterloo@airwaystransit.com](mailto:infowaterloo@airwaystransit.com)**  
**Web: [www.airwaystransit.com](http://www.airwaystransit.com)**

## Accommodations

The conference is being held at the Four Points Sheraton Hotel in Kitchener. A block of rooms has been set aside for conference attendees at this hotel. In order to qualify for the special conference room rates, and to ensure availability, you must book your room before May 10, 2001. After this date, rates and availability are not guaranteed. Please contact the hotel directly for reservations and inquiries.

Rate: \$90.00 CDN  
(approx. \$60.00 US)  
(double/twin)  
per room per night.

**Reservations and Inquiries:**  
**Four Points Sheraton Kitchener**  
**105 King Street East**  
**Kitchener, Ontario, Canada**  
**Phone: (519) 744-4141**  
**Toll-Free Phone: (800) 483-7812**  
**Fax: (519) 744-1314**  
**Web: [www.fourpoints.com](http://www.fourpoints.com)**



# Program at a Glance

UIR Conference Sessions

Exhibits

Road Show Seminars

Excursions

## Sunday, June 10

2:00 to 8:00 pm	Registration (UIR Conference Attendees, Rehab Road Show Attendees, Companions)	Niagara Falls 10 am - 8 pm
9:00 pm	Welcome Reception	

## Monday, June 11

7:45 to 8:30 am	Breakfast & Registration		Exhibit Hall	Companion Excursion to Toronto 8:00 am to 6:00 pm			
8:30 to 8:45 am	Welcoming Address - Dr. Ralph Haas						
8:45 to 9:30 am	Opening Address - Dr. Arthur J. Carty						
9:40 to 10:05 am	Design of Thermoplastic Pipes	Condition Assessment			Level 1 Seminar <b>Overview of Trenchless Rehabilitation</b>	Level 2 Seminar <b>Engineering Design and Specification</b>	Level 3 Seminar <b>Construction Inspection Training</b>
	(A) Paper A1	(B) Paper B1					
10:05 to 10:30 am	(A) Paper A2	(B) Paper B2			Break	Break	Break
10:30 to 11:00 am	Break						
11:00 to 11:25 am	(A) Paper A3	(B) Paper B3			Level 1 Seminar Continued	Level 2 Seminar Continued	Level 3 Seminar Continued
11:25 to 11:50 am	(A) Paper A4	(B) Paper B4			Lunch	Lunch	Lunch
11:50 to 1:00 pm	Lunch						
1:00 to 1:25 pm	Installation, Planning & Monitoring	Buried Pipes			Level 1 Seminar Continued	Level 2 Seminar Continued	Level 3 Seminar Continued
	(C) Paper C1	(D) Paper D1					
1:25 to 1:50 pm	(C) Paper C2	(D) Paper D2			Break	Break	Break
1:50 to 2:15 pm	(C) Paper C3	(D) Paper D3					
2:15 to 2:40 pm	(C) Paper C4	(D) Paper D4			Field Demonstrations	Field Demonstrations	Field Demonstrations
2:40 to 3:05 pm	(C) Paper C5	(D) Paper D5					
3:05 to 3:25 pm	Break				Management Systems I	Soil Analysis	Management Systems I
3:25 to 3:50 pm	(E) Paper E1	(F) Paper F1					
3:50 to 4:15 pm	(E) Paper E2	(F) Paper F2			Break	Break	Break
4:15 to 4:40 pm	(E) Paper E3	(F) Paper F3					
4:40 to 5:05 pm	(E) Paper E4	(F) Paper F4			Field Demonstrations	Field Demonstrations	Field Demonstrations
5:05 to 5:30 pm	(E) Paper E5						
5:30 pm	Exhibit Hall and Reception						

# Program at a Glance

UIR Conference Sessions

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Road Show Seminars

Excursions

## Tuesday, June 12

7:45 to 8:30 am	Breakfast & Registration						
8:30 to 9:30 am	Keynote Address - Dr. Michael Kavvadas		Exhibit Hall	Level 1 Seminar Continued	Level 2 Seminar Continued	Level 3 Seminar Continued	Companion Excursion to St. Jacobs 9:00 am to 6:00 pm
	Management Systems II	Design of Pipe Liners					
9:40 to 10:05 am	(G) Paper G1	(H) Paper H1					
	10:05 to 10:30 am	(G) Paper G2		(H) Paper H2			
10:30 to 11:00 am		Break		Break			
11:00 to 11:25 am	(G) Paper G3	(H) Paper H3		Level 1 Seminar Continued	Level 2 Seminar Continued	Level 3 Seminar Continued	
11:25 to 11:50 am	(G) Paper G4	(H) Paper H4		Lunch			
11:50 to 1:10 pm	Lunch			Lunch			
1:10 to 1:25 pm	Keynote Address - Phillip Coller			Level 1 Seminar Continued	Level 2 Seminar Continued	Level 3 Seminar Continued	
1:25 to 1:50 pm	Environment	Pipe Material Characterization & Design					
	(J) Paper J1	(K) Paper K1					
1:50 to 2:15 pm	(J) Paper J2	(K) Paper K2					
2:15 to 2:40 pm	(J) Paper J3	(K) Paper K3					
2:40 to 3:05 pm	(J) Paper J4	(K) Paper K4					
3:05 to 3:30 pm	Break		Break				
3:30 to 5:00 pm	International Cured in Place Liner Design Workshop	Industry-University Partnerships Workshop	Field Demonstrations				
7:00 pm	Banquet & Guest Speaker - Dr. James Raffan						

## Wednesday, June 13

7:45 to 8:30 am	Breakfast & Registration						
8:30 to 9:30 am	Keynote Address - Dr. Tom Iseley		Exhibit Hall	Joint Trenchless Technology Rehab Sessions for Levels 1, 2 & 3			Companion Program - Free Time for Shopping, Golf, etc.
	Future Directions	Case Histories					
9:40 to 10:05 am	(L) Paper L1	(M) Paper M1					
	10:05 to 10:30 am	(L) Paper L2		(M) Paper M2			
10:30 to 11:00 am		Break		Break			
11:00 to 11:25 am	(L) Paper L3	(M) Paper M3		Joint Trenchless Technology Rehab Sessions Continued			
11:25 to 11:50 am	(L) Paper L4	(M) Paper M4					

# UIR Conference Session Details

## Session A - Design of Thermoplastic Pipes

(A1) A Critical Appraisal of Current Practices for Design of Buried Thermoplastics Pipes including Recommendations for Research

**J.C. Boot, R.S. Sharma & A.J. Thompson**

(A2) Predicting the Behaviour of HDPE Pipes in Horizontal Directional Drilling

**A. Lasheen & M.A. Polak**

(A3) Buckling of HDPE Liners Under External Uniform Pressure

**R.M. Bakeer, S.E. Pechon, J.E. Taylor, S. Chundururu & M.E. Barber**

(A4) Limit States of Buried Thermoplastic Pipes: Laboratory Investigations

**A.S. Dhar & I.D. Moore**

## Session B - Condition Assessment

(B1) Long Water Tunnel Inspections by Remotely Operated Vehicle

**R. Clarke & C. Sferrazza**

(B2) Multiple Classifiers for Automated Classification of Defects in Sewers

**O. Moselhi & T. Shehab-Eldeen**

(B3) Development of an Automated Pipeline Inspection System

**S.K. Sinha & P.W. Fieguth**

(B4) Laboratory Investigation into the Assessment of Concrete Pipes State of Deterioration using Ultrasonic Testing Techniques

**M.C. López, M.A. Knight & G. Cascante**

## Session C - Installation Planning & Monitoring

(C1) Developing Safe Proximity Charts for Impact Miling and Horizontal Directional Drilling Operations

**D.N. Chapman & A.E. Hunter**

(C2) Monitoring and Instrumentation of Trenchless Technology Projects

**S.T. Ariaratnam, G. Cyre & R. Harper**

(C3) A Statistically-Based Approach for the Design of HDD Crossings

**M.E. Baumert & E.N. Allouche**

(C4) Horizontal Directional Drilling: Lessons Learned in Conduit Installations

**M.M. Gelinis & D.C. Mathy**

(C5) A Decision Support System for Site Characterization in Linear Excavation Projects

**E.N. Allouche**

## Session D - Buried Pipes

(D1) SIDD Pipe Bedding and Ontario Provincial Standards

**J.Q. Zhao & L. Daigle**

(D2) Full Scale Testing of Concrete Pipe Bedding Design

**E.N. Allouche, S. Wong & M.E. Baumert**

(D3) A Statistical Investigation of Structurally Unsound Sewers

**J.P. Davies, B.A. Clarke,**

**J.T. Whiter &**

**R.J. Cunningham**

(D4) The Considerations of Risks in the Analysis of Urban Buried Pipes Behavior

**Y. Diab & D. Morand**

(D5) Geodynamic Monitoring of the Geoenvironment and Engineering Constructions Interactions

**G.S. Vartanyan**

## Session E - Management Systems I

(E1) Development of an Intelligent System for Pipeline Management

**S.K. Sinha & M.A. Knight**

(E2) Using Trenchless Technology to Save Costs Associated with Traffic Delays

**S.L. Tighe, T. Lee & R.C.G. Haas**

(E3) WARP - Water Mains Renewal Planner

**B.B. Rajani & Y. Kleiner**

(E4) Sanitary Sewer Demand Forecasting using Artificial Neural Networks

**S. Chung, D. Abraham & G. Hwang**

(E5) Special Purpose Simulation for Trenchless Pipe Replacement

**J.S. Lueke & S.T. Ariaratnam**

## Session F - Soil Analysis

(F1) Ground Displacements Caused by Pipe Splitting

**C.D.F. Rogers, D.N. Chapman,**

**F. Wan & P.C.F. Ng**

(F2) Tunnel Face Stability Through Tests Results on Reduced-Scale Model

**M. Esfehiani & H. Di Benedetto**

(F3) Effect of Grouting on Soil Reinforcing and Tunnel Deformation

**S.A. Mazek, K.T. Law & D.T. Lau**

(F4) Development of a Soil Classification Chart for a Miniature Cone Penetrometer

**E.N. Allouche, M. Devaux, M. Sakr and**

**H. El-Naggar**

## Session G - Management Systems II

(G1) Condition Assessment and Rehabilitation of Large Sewers

**S.E. McDonald & J.Q. Zhao**

(G2) Structural Diagnosis of Sewer Networks

**J. Bengassem, J. Loiacono & S. Bennis**

(G3) Evaluation of Underground Pipeline Construction Options

**S. Gokhale, M. Hastak & R.C. Vedder**

(G4) The Impact of Market De-Regulation upon the Management of Potable Water Infrastructure: A UK Perspective

**A. Lowdon & J. Saldarriaga**

## Session H - Design of Pipe Liners

(H1) The Structural Design of Non-Circular Linings

**O. Thépot**

(H2) Structural Design of Linings

**B. Falter**

(H3) The Structural Performance of Flexible Sewer Linings Subject to External Pressure

**J.C. Boot, I.L. Toropova & A.F. Ashour**

(H4) Flexible Interface Materials for Tunnel Linings

**A. Khan, M. Nehdi, K.Y. Lo, &**

**G.J.E. Kramer**

## Session J - Environment

(J1) Aquifer Response to a Horizontal Groundwater Extraction Well

**S.D. Howard, N.R. Thomson & D.L. Rudolph**

(J2) HDD Water Well Installation and Analysis

**D.D. Wilson & V. Rash**

(J3) Evaluation of the Long-Term Energy Costs of Leaks in Buried Pipeline Systems

**A.F. Colombo & B.W. Kamey**

(J4) Guidelines for Selecting Lead Pipe Rehabilitation and Replacement Technologies

**G.R. Boyd, G.J. Kirmeyer & N.K. Tarbet**

## Session K - Pipe Material Characterization & Design

(K1) Horizontal Direction Drilling Research Program - University of Waterloo

**G.M. Duyvestyn, M.A. Knight & M.A. Polak**

(K2) Installation Loads on New Pipelines During Pipe Bursting

**V. Fernando & I.D. Moore**

(K3) Experimental Investigation of Toronto Water Main Samples

**M.V. Seica, J.A. Packer & B.J. Adams**

(K4) Three Dimensional Mapping of Corrosion Pits in Cast Iron Pipe Using the Remote Field Effect

**J.M. Makar & R. Desnoyers**

## Session L - Future Directions

(L1) Smart Pipe Systems-Concepts, Opportunities and Challenges

**M. Pendlebury, B.W. Kamey & K.W. Tang**

(L2) Fiber Optic Distributed Sensor for Condition Monitoring of Underground Concrete Structures

**Y. Zhao, M. Zhao & F. Ansari**

(L3) Determining the Value of Underground Infrastructure Assets

**L.G. Snelgrove & R.C. Haas**

(L4) GIS-Based Risk Analysis of Ferrous Water Mains

**K. Dixon, G. Blakey, J. Whiter & V. Hope**

## Session M - Case Histories

(M1) Elements of Success: Pipe Bursting in a Sensitive Area

**W.D. Sims**

(M2) Sewerage Systems in Polish Historic Cities and Their Rehabilitation

**A. Kolonko & C. Madryas**

(M3) Construction Induced Movements of a Diaphragm Wall in Loose Sand

**V.A.D. de Souza, J.T. Araruna Jr. &**

**T.M.P. de Campos**

(M4) Failure Modes and Mechanisms in Gray Cast Iron Pipes

**J.M. Makar, R. Desnoyers and S.E. McDonald**

## LEVEL 1 SEMINAR

Overview of Trenchless Rehabilitation: Sewer Collection Systems, Water Distribution Systems and Industrial Pipelines

**Moderator - Dick Krzys**  
**Monday, June 11th, 2001**  
**8:00 AM - 10:00 AM**

**Morning Classroom Sessions:**

- Trenchless Pipeline Rehab Methods Overview - 30 minutes
- Video/TV Inspection & Analysis - 50 minutes
- Pipe Cleaning & Root Control Methods - 40 minutes

**1:00 PM - 3:30 PM**

**Afternoon Classroom Sessions:**

- Grouting Systems for Mainline & Lateral Rehab - 50 minutes
- Manhole Inspection, Rehabilitation & Testing Methods - 60 minutes
- Internal Pipe Seal Applications - 20 minutes
- Pipe Fusion Applications & Methods - 20 minutes

**Tuesday, June 12th, 2001**  
**8:00 AM - 10:00 AM**

**Morning Classroom Sessions:**

- Sliplining Rehab Methods - Continuous & Segmented - 40 minutes
- CIPP Pipe Relining Process - 40 minutes
- Fold and Formed, Deformed/Reformed Pipe Relining - 40 minutes

**1:00 PM - 3:00 PM**

**Afternoon Classroom Sessions:**

- Lateral Lining Methods - 40 minutes
- Pipe Bursting as a Rehab Process - 40 minutes
- Point Repair Methods - 40 minutes

## LEVEL 2 SEMINAR

Engineering Design & Specification for Trenchless Rehabilitation Projects: Case Studies, Project Reviews, Trenchless Methodology

**Moderator - Mel Young**  
**Monday, June 11th, 2001**  
**8:00 AM - 10:00 AM**

**Morning Classroom Sessions:**

- Total Trenchless Rehabilitation Approach - 60 minutes
- Data Collection and Management - 60 minutes

**1:00 PM - 3:30 PM**

**Afternoon Classroom Sessions:**

- Trenchless Pipeline Design Parameters - 60 minutes
- ASTM Standards - 60 minutes
- Analyzing Problems and Identifying Solutions for the Rehabilitation of Pressurized Water Lines - 30 minutes

**Tuesday, June 12th, 2001**  
**8:00 AM - 10:00 AM**

**Morning Classroom Sessions:**

- Pipeline Evaluation - GPS, SSES, I&I Studies & Hydraulic Modeling - 60 minutes
- Design Build Options for Selected Rehab Projects - 60 minutes

**1:00 PM - 3:00 PM**

**Afternoon Classroom Sessions:**

- Round Table Discussion of Trenchless Design Approaches and Trenchless Specifications by Industry Professionals - 120 minutes
- Moderator and Panel of Trenchless Industry Experts

## LEVEL 3 SEMINAR

Construction Inspection Training for Trenchless Rehabilitation Projects

**Moderator - John Jurgens**  
**Monday, June 11th, 2001**  
**8:00 AM - 10:00 AM**

**Morning Classroom Sessions:**

- Trenchless Rehab Awareness Training
- Evolution of Standards
- Pipe Cleaning
- CCTV Inspection

**1:00 PM - 3:30 PM**

**Afternoon Classroom Sessions:**

- Chemical Grouts
- Sliplining
- Annular Space Grouting of Slipline Projects

**Tuesday, June 12th, 2001**  
**8:00 AM - 10:00 AM**

**Morning Classroom Sessions:**

- Reflective Processes
  1. CIPP (Cured in Place Pipe)
  2. FF (Fold and Formed Pipe or Deformed/Reformed Pipe)
- Non-Reflective Processes
  1. Pipe Bursting
- Spot Repair Methods
  1. Chemical Methods (Soft Repairs)
  2. Mechanical Methods

**1:00 PM - 3:00 PM**

**Afternoon Classroom Sessions:**

- Manhole Rehabilitation
- Glossary & Additional Readings
- Questions & Answers/Rehab Sessions for Levels 1,2 & 3

## JOINT SEMINAR

Joint Trenchless Technology Rehab Sessions for Levels 1,2 & 3

**Moderators - Dick Krzys & Mel Young**  
**Wednesday, June 13th, 2001**  
**Morning Classroom Sessions:**

- Case Studies - Local Area Trenchless Projects
- Design Issues
- Installation Issues
- Trenchless Process Selection
- Governmental Regulation Updates
- Trenchless Association News & Updates
- NASTT
- CATT
- NASSCO
- CERIU
- Trenchless Technology and the Internet

## Exhibit Hall & Field Demos

**Attendees** are encouraged to spend quality time in the exhibit hall and field demo areas. Exhibitors will be displaying and demonstrating their latest and most innovative products and services for rebuilding, repairing and maintaining aging underground infrastructure. Not only will attendees learn through informative classroom sessions about various trenchless construction alternatives, they will also have the opportunity to meet with and speak directly to many industry professionals who can help them make educated decisions on what products and services are best suited for their needs.

Join us to see state-of-the-art trenchless construction products and services being demonstrated and on display, including:

- CCTV Inspection
- Manhole Rehab
- Grouting
- Vacuum Excavation
- Cured-In-Place Pipe Relining
- Pipe, Seals & Plugs
- Fold & Form Pipe Relining
- GPR
- Sliplining
- By-Pass Pumping
- Pipe Bursting
- Pipe Fusion
- Directional Drilling
- Root Control

Come see industry professionals in many aspects of the trenchless construction field. Exhibitors include:

- Insituform Technologies
- Prime Resins
- Perma-Liner Industries
- Avanti International
- Vermeer Mfg.
- RS Technical
- Sensors & Software
- Plug-It Products
- Root X
- Cobra Technologies
- Sewer Depot
- CreteX Specialty Products
- IHC Rehabilitation Products
- Liquiforce Services

## General Registration Information

Students Please Note: Student registration rates DO NOT include admission to the Receptions or Banquet. Please purchase reception or banquet tickets if you would like to attend these functions. Student rates are available to undergraduate and graduate students. In order to qualify for student rates, you must include a photocopy of valid student identification or proof of full-time studies with your registration (fax to 416-864-9047).

### Full Conference Registrations Include:

- admission to all Conference & Rehab Road Show sessions
- admission to Exhibit Hall and Field Demos
- continental breakfasts, lunches and refreshment breaks
- Sunday Evening Reception (not included in student rate)
- Monday Evening Reception (not included in student rate)
- Tuesday Evening Reception and Banquet (not included in student rate)
- 7% Goods and Services Tax

### Plus, for UIR Conference Attendees:

- hard-bound conference proceedings

### Plus, for Rehab Road Show Attendees:

- one year free subscription to Trenchless Technology Magazine
- the directory of the North American Trenchless Technology Industry Rehab Showcase
- trenchless field seminar binder

- NASSCO specification guidelines
- a trenchless technology hard hat

### One-Day Registrations Include:

- admission to all Conference & Rehab Road Show sessions on that day
- admission to Exhibit Hall and Field Demos on that day
- continental breakfast, lunch and refreshment breaks on that day
- 7% Goods and Services Tax

### Plus, for Rehab Road Show Attendees:

- one year free subscription to Trenchless Technology Magazine
- the directory of the North American Trenchless Technology Industry Rehab Showcase

### Cancellations & Refunds

Full refunds, less a \$75 Cdn (\$50 US) processing fee, will be granted for all cancellation requests received in writing by May 25, 2001. No refunds will be issued after that date. Refunds will be mailed following the Conference. Substitutions are allowed if received in writing.

### Registration Contact & Inquiries

For inquiries regarding registrations, please contact:

UIR 2001 Organizing Committee  
c/o CATT - Department of Civil Engineering  
University of Waterloo  
Waterloo, ON N2L 3G1 CANADA

Phone: (519) 888-4770  
Fax: (519) 746-6556  
Email: uir2001@sunburn.uwaterloo.ca

Registration forms and accompanying documents may be faxed directly to (416) 864-9047 (attn: UIR 2001 Conference Coordinator). You may also contact the UIR 2001 Conference Coordinator directly by phone at (416) 864-9027.

Note: Registration fees in **bold** (full conference registrations, excluding students) include admission to the Receptions & Tuesday Evening Banquet. All other registrants (including companions, students, one-day registrants, and "exhibits & field demos only" registrants) must purchase reception and banquet tickets for admission to these functions. All registrations include admission to the Exhibit Hall and Field Demos. On-site rates are subject to availability, particularly for Social Excursions - space is not guaranteed.

**Special Rate for CATT Members:** CATT Members qualify for the Early-Bird Rate until May 31, 2001. For all registrations received on or after June 01, 2001, On-Site Rates will apply.

**Special Rate for Multiple Registrations:** For all full-conference registrations after the first one received from your organization, receive a \$40 CDN (\$25 US) discount! (Multiple registrations from universities/colleges are excluded from this discount).



# Registration Form

**Please** type or print clearly. Include your name as you would like it to appear on your name badge. This form is for UIR Conference attendees and Road Show Seminar attendees. Use a separate form for each registrant and complete the companion section for spouses, companions and any other guests who will not be attending the conference sessions and seminars, but who will be accompanying you. In order to qualify for the student rate, you must include your student identification number and attach a copy of your valid student identification or other proof of full-time studies.

Dr  Mr  Mrs  Ms  Miss

First Name \_\_\_\_\_

Surname \_\_\_\_\_

Title / Position \_\_\_\_\_

Organization / Institution \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Province / State \_\_\_\_\_

Country \_\_\_\_\_ Postal / Zip Code \_\_\_\_\_

Business Phone \_\_\_\_\_ Business Fax \_\_\_\_\_

Email Address \_\_\_\_\_

Student?  NO  YES

Dietary / Special Requirements \_\_\_\_\_

## 5 EASY WAYS TO REGISTER!

### Register ONLINE at:

[www.civil.uwaterloo.ca/uir2001](http://www.civil.uwaterloo.ca/uir2001)

### FAX your completed form to:

(519) 746-6556

(UIR 2001 Organizing Committee)

Or (416) 864-9047

(UIR 2001 Conference Coordinator)

### CALL your registration in by phone at:

(519) 888-4770

(UIR 2001 Organizing Committee)

Or (416) 864-9027

(UIR 2001 Conference Coordinator)

### MAIL your completed form to:

UIR 2001 Organizing Committee

CATT, Department of Civil Engineering

University of Waterloo

Waterloo, ON N2L 3G1 Canada

Or UIR 2001 Conference Coordinator

c/o Event Horizons

2706 – 10 Yonge Street

Toronto, ON M5E 1R4 Canada

Register ON-SITE (space permitting)

**Companions**  Dr  Mr  Mrs  Ms  Miss

First Name \_\_\_\_\_ Surname \_\_\_\_\_

Organization / Institution \_\_\_\_\_ Dietary / Special Requirements \_\_\_\_\_

Your full-conference or one-day-only registration at UIR 2001 allows you access to both the UIR Conference Sessions and Rehab Road Show Seminars. However, we ask that you register for either the UIR Conference Sessions or the Road Show Seminars. This selection will represent your primary session/seminar schedule. You will still be able to attend the other sessions/seminars. Please select one option:

I will attend the...  UIR Conference Sessions  Rehab Road

	Early-Bird Rates*		Regular Rates*		On-Site Rates*		Student Rates	
Full Conference Registration	\$495 CDN	\$325 US	\$555 CDN	\$365 US	\$595 CDN	\$390 US	\$255 CDN	\$170 US
One-Day Registration	\$200 CDN	\$133 US	\$225 CDN	\$150 US	\$240 CDN	\$160 US		
Exhibits & Field Demos Only			\$30 CDN	\$20 US	\$45 CDN	\$30 US		
Banquet Tickets			\$60 CDN	\$40 US	\$75 CDN	\$50 US		
Reception Tickets			\$20 CDN	\$15 US	\$30 CDN	\$20 US		
Additional UIR Proceedings			\$75 CDN	\$50 US	\$75 CDN	\$50 US		
Niagara Excursion			\$150 CDN	\$100 US	\$200 CDN	\$135 US		
Toronto Excursion			\$135 CDN	\$90 US	\$185 CDN	\$125 US		
St Jacobs Excursion			\$80 CDN	\$55 US	\$130 CDN	\$90 US		

\* Early-Bird Rate - Register by May 11, 2001

\* Regular Rate - Register by May 31, 2001

\* On-Site Rate - Register on or after June 1, 2001

# Registration Form

## DELEGATE REGISTRATION Please select your registration level:

	Early-Bird Rates* (by May 11)		Regular Rates* (by May 31)		On-Site Rates* (on/after June 01)		Student Rates		TOTAL DUE
<input type="checkbox"/> Full Conference	\$495 CDN	\$325 US	\$555 CDN	\$365 US	\$595 CDN	\$390 US	\$255 CDN	\$170 US	\$
<input type="checkbox"/> One-Day Only (Monday)	\$200 CDN	\$133 US	\$225 CDN	\$150 US	\$240 CDN	\$160 US			\$
<input type="checkbox"/> One-Day Only (Tuesday)	\$200 CDN	\$133 US	\$225 CDN	\$150 US	\$240 CDN	\$160 US			\$
<input type="checkbox"/> One-Day Only (Wednesday)	\$200 CDN	\$133 US	\$225 CDN	\$150 US	\$240 CDN	\$160 US			\$
<input type="checkbox"/> Exhibits & Field Demos Only			\$30 CDN	\$20 US	\$45 CDN	\$30 US			\$

**SUBTOTAL A** \$ \_\_\_\_\_

## SOCIAL FUNCTION REGISTRATION In order to help us order an accurate number of meals and refreshments, please indicate whether or not you (and your companion, if applicable) will attend the following social functions. You must purchase tickets for these functions by pre-registering here if you wish to attend.

	Delegate		Companion		Regular Rate (by May 31)		On-Site Rate (on/after June 01)		Full-Conference Registrant Rate	TOTAL DUE
Sunday Reception	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> YES	<input type="checkbox"/> NO	\$20 CDN	\$15 US	\$30 CDN	\$20 US	\$0.00	\$
Monday Reception	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> YES	<input type="checkbox"/> NO	\$20 CDN	\$15 US	\$30 CDN	\$20 US	\$0.00	\$
Tuesday Banquet	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> YES	<input type="checkbox"/> NO	\$60 CDN	\$40 US	\$75 CDN	\$50 US	\$0.00	\$

**SUBTOTAL B** \$ \_\_\_\_\_

\* Note: For Full-Conference Registrants (excluding students), the Receptions & Banquet are included in your registration at no additional charge. However, in order to attend, you must still pre-register for these functions by indicating here whether or not you will attend and by entering \$0.00 as your subtotal.

## SOCIAL EXCURSIONS Please indicate here whether or not you wish to purchase tickets for the Sunday Excursion to Niagara, the Monday Excursion to Toronto, or the Tuesday Excursion to St Jacobs. Please note: space is only guaranteed until the Early-Bird Deadline (May 11, 2001) for Social Excursions. After this deadline (May 11, 2001), space is not guaranteed and full On-Site Rates apply.

	Delegate		Companion		Early-Bird Rate (by May 11)		On-Site Rate (on/after May 12)		TOTAL DUE
Niagara Excursion	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> YES	<input type="checkbox"/> NO	\$150 CDN	\$100 US	\$200 CDN	\$135 US	\$
Toronto Excursion			<input type="checkbox"/> YES	<input type="checkbox"/> NO	\$135 CDN	\$90 US	\$185 CDN	\$125 US	\$
St. Jacobs Excursion			<input type="checkbox"/> YES	<input type="checkbox"/> NO	\$80 CDN	\$55 US	\$130 CDN	\$90 US	\$

**SUBTOTAL C** \$ \_\_\_\_\_

**ADDITIONAL PROCEEDINGS** Full-Conference Registrants (including students) for the UIR Conference Sessions only will receive a complimentary copy of the hard-bound UIR 2001 Proceedings. If you are not a Full-Conference Registrant for the UIR Conference Sessions, or if you are and would like more than one copy of the Proceedings, please indicate the number of additional copies you would like to order below. If you would only like to receive your single complimentary copy, please leave the following "Proceedings" section blank.

Additional Proceedings # Copies: \_\_\_\_\_ x \$75 CDN = \$ \_\_\_\_\_  
 # Copies: \_\_\_\_\_ x \$50 US = \$ \_\_\_\_\_

**SUBTOTAL D** \$ \_\_\_\_\_

**TOTAL AMOUNT DUE (A + B + C + D)**

\$ \_\_\_\_\_

### METHOD OF PAYMENT

Cheque / Money Order Enclosed (payable to CATT – University of Waterloo)

VISA  MasterCard  American Express

Name on Card \_\_\_\_\_

Card Number \_\_\_\_\_

Expiry Date \_\_\_\_\_ Signature \_\_\_\_\_

Bank Transfer Bank #010 (Bank Name: CIBC)  
 Transit #02102 (Branch Name: One Yonge Street)  
 Account #02-14418 (Account Name: CATT - University of Waterloo)

Total Amount of Payment \$ \_\_\_\_\_

Comments \_\_\_\_\_

Check here if you do not wish to have your address and email address included in the participants' listing.

### Niagara Falls

**Sunday, June 10, 2001 (10:00 am to 8:00 pm)**

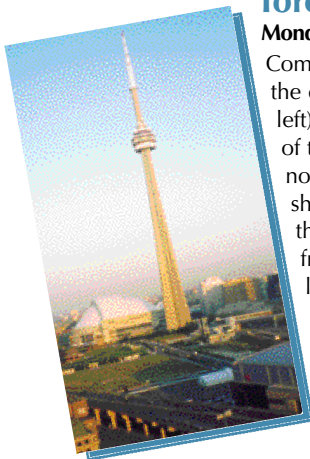
Travel to Niagara Falls, Ontario for a day of breathtaking scenery, adventure, shopping and wine tastings. Experience an exhilarating boat ride that takes you right up to the base of the falls! Clad in a hooded raincoat (provided), feel the spray on your face and absorb the mighty thunder of the falls as the ship heaves and bucks against the current, approaching closer and closer to the magnificent cascade. Afterwards, catch your breath as you continue your Niagara tour by motor coach to the picturesque town of Niagara-on-the-Lake. Enjoy the peaceful lakeside view of this charming theatre town and lunch at a cozy inn. Next, tour the lovely vineyards of Niagara for a taste of its distinctive regional wines, and savour Niagara's world-famous ice-wine as a superb finish to a perfect day. Each guest will receive a gift of delectable ice-wine chocolates. Niagara Falls is about 2 hours by bus from Kitchener. Cost: CDN \$150 (US \$100) per person when booked by May 11, 2001. Space is limited, so book early! For all bookings after May 11th (includes on-site bookings), cost is CDN \$200 (US \$135), however, space is not guaranteed. Package includes transportation, tour with tour guide, continental breakfast, lunch and gift. Guests may purchase the following at their own expense: alcoholic beverages with meals, souvenirs, food and beverages other than the meals provided, any other items not included in the tour package. Don't miss this chance to see one of the great wonders of the world!



### Toronto

**Monday, June 11, 2001 (8:00 am to 6:00 pm)**

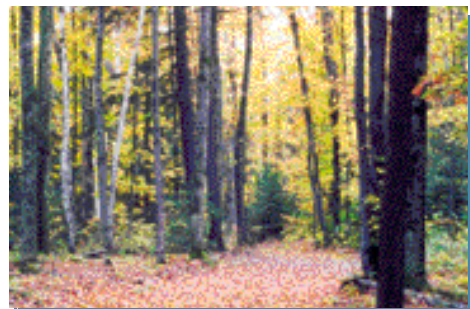
Companions will enjoy this day in Ontario's capital city, Toronto. Enjoy a panoramic birds-eye view of the city from the observation deck of the world's tallest freestanding structure, the CN Tower (pictured left). Then ride the glass-sided elevator down to take a closer look at Toronto on a neighbourhood tour of the city. Browse a teashop, complete with a tea tasting in bustling Chinatown; pause for a cappuccino and gelato in Little Italy; then lunch at a popular College West café. Afterwards, browse the designer shops of elegant Yorkville/Hazelton, formerly a hippie village. Finish your tour with a sojourn through the fascinating exhibits of the beautiful Royal Ontario Museum. Toronto is about 80 minutes by bus from Kitchener. Cost: CDN \$135 (US \$90) per person when booked by May 11, 2001. Space is limited, so book early! For all bookings after May 11th (includes on-site bookings), cost is CDN \$185 (US \$125), however, space is not guaranteed. Package includes transportation, tour with tour guide, continental breakfast, lunch coupon and admission to the museum. Guests may purchase the following at their own expense: alcoholic beverages with meals, souvenirs, food and beverages other than the meals provided, any other items not included in the tour package. Don't miss this opportunity to see a beautiful, diverse city!



### St. Jacobs

**Tuesday, June 12, 2001 (9:00 am to 6:00 pm)**

Companions will enjoy a day of shopping and picturesque scenery in the charming countryside of St. Jacobs. Start your day with a visit to Canada's largest Farmers Market and then browse the flea market and outlet mall. Take a horse-drawn trolley tour through an old-order Mennonite farm and enjoy a trip to a sugar shanty. Learn about maple syrup production as you drive and stop in a peaceful maple sugar bush. The tour will also include an opportunity to purchase maple products, quilts and crafts. After the Mennonite farm tour, travel by motor coach to the delightful town of St. Jacobs, where you can choose your favorite lunch spot from among the many local restaurants. Rendezvous with your tour guide for a 15-minute horse-drawn look at the historic sights of the village. Afterwards, browse through the village shops and watch the craftspeople at work! Cost: CDN \$80 (US \$55) per person when booked by May 11, 2001. Space is limited, so book early! For all bookings after May 11th (includes on-site bookings), cost is CDN \$130 (US \$90), however, space is not guaranteed. Package includes only transportation and tour with guide. All other expenses (meals, beverages, souvenirs, etc.) are at the expense of each guest. Don't miss this look at Ontario's beautiful countryside!



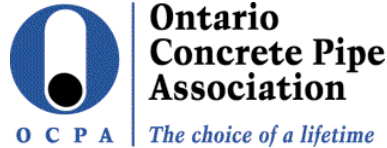


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# UIR 2001 Conference & Rehab Road Show

Kitchener, Ontario, Canada  
June 10-13, 2001

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