



Trenchless Technology Center *Newsletter*

S e p t e m b e r 2 0 0 8

New IAB Industry Members

2008 has been a banner year for the growth of the TTC's Industry Advisory Board. In addition to the six new members announced in the March 2008 newsletter, the center would like to acknowledge and thank the following companies that have joined the IAB Board or become a TTC sponsor during 2008. A full list of the existing IAB members is provided in the sidebar.

AOC is headquartered in Collierville, Tenn., and is a leading global supplier of resins, gel coats, colorants and additives for composites and cast polymers. AOC has been a leading supplier of resins to the CIPP industry. It helped pioneer the development of isophthalic polyester resin technology in the 1970s and also offers vinyl ester resin chemistries. Representing AOC on the TTC Industry Advisory Board is AOC Development Specialist Ben Bogner.

Carollo Engineers is a 75-year old consulting company that has completed more than 15,000 projects for public sector clients. Carollo provides only water and wastewater engineering services and is currently ranked within *Engineering News Record's* top 100 design firms. The TTC is pleased also to welcome back Dr. Andy Dettmer, a TTC Ph.D. program graduate, as the Carollo representative on the IAB.

A new sponsor for 2008 is the firm Innovative Painting and Waterproofing Inc. from California. Innovative is one of the largest and most technically-advanced applicators and installers of specialty protective coatings systems in the United States, with a focus on application of polyurea coatings systems. Innovative has established a Louisiana corporation as part of the Louisiana Tech University enterprise center to pursue the pipe rehabilitation market.

New IAB Public Works Members

2008 has also seen some changing faces in the public works membership of the TTC IAB. The TTC wishes to express its deep appreciation for the service and advice provided by George Cowan (City of New York), Bob Johnson (City of Dallas), Troy Norris (City of Atlanta) and Gunars Sreibers (King County). Replacements and new members are: Sean Benton (City of Monroe), John Griffin (City of Atlanta), James Gross (City of Columbus), Michael Hines (City of Dallas) and Dino Ng (City of New York).

CIP Lining Systems for High Temperature Applications

Quoting the *New York Times* of July 19, 2007 – "... a 24-in. steam pipe that was laid in 1924 exploded in Midtown near Grand Central Terminal, leaving one person dead and more than 30 injured. ... cold water apparently got into the pipe, producing a change in pressure and caused the blast. ... chief executive of Consolidated Edison, which operates the city's steam network, said that during rainstorms pipes could have been surrounded by cold water, causing dangerous condensation. ... Only a handful of steam pipes have exploded in the past decade, but the threat remains because the 105 miles of steam mains and service pipes that pump steam beneath the streets of Manhattan are near other utilities, including gas and electrical equipment. Buried so close together, problems with one system can often affect others, infrastructure experts say. ..."

This interaction between the city's steam network and other utilities presents many difficult issues. Steam condensate and steam leaks often enter sewer lines causing high and/or varying temperature conditions in the sewer pipes. When the sewer pipes need rehabilitation or replacement, open-cut replacement of the old and deep sewer lines buried beneath many other layers of utilities would pose major costs and disruption to traffic and commerce. However, many trenchless rehabilitation solutions use polymer liners that are not designed to withstand continuous or intermittent high temperatures and humidity. In response to the danger posed and the lack of proven rehabilitation options, the City of New York and ConEd has contracted with the TTC and the Urban Infrastructure Institute & Urban Utility Center of the Polytechnic University in New York to research candidate lining systems and to provide experimental verification of their performance at high temperatures. The project is titled "Experimental Evaluation of CIP Lining Systems for High Temperature Applications in Sewer Pipes" and is due for completion in 2009. Dr. Erez Allouche at the TTC and Dr. Ilan Juan, Professor at the Polytechnic University, are the Principal Investigators. To conduct the project, the TTC has expanded and streamlined its liner testing capabilities to characterize and test candidate materials at elevated temperatures. In addition, the custom-built oven will enable the testing of 18 specimens simultaneously under combined external pressure and elevated temperature conditions (six



Construction of the special oven.

specimens per oven). The candidate lining systems from vendors will be selected on the basis of material characterization tests. The simulation of the effects of rapid and uneven changes in liner temperature due to intermittent steam release and changing levels of effluent flow is also being carried out as part of the project. TTC graduate

student, Shaurav Alam, is undertaking this research as part of his Ph.D. dissertation.

NCHRP Project on Culvert Rehabilitation

Earlier this year, the TTC signed a three-year contract for \$750,000 with the National Cooperative Highway Research Program (NCHRP) to carry out Project 14-19 Culvert Rehabilitation to Maximize Service Life While Minimizing Direct Costs and Traffic Disruption. The project is a cooperative effort among the TTC, Queen's University, Kingston, Ontario and CNA Engineering, Minneapolis, Minn. Principal Investigators are Dr. Erez Allouche, Associate Director of the TTC, Dr. Ian Moore, Canada Research Chair at Queen's University, and Dr. Lee Petersen, Senior Partner with CNA.

The research is divided into three phases. Phase 1 involves synthesizing existing culvert repair practices from foreign and domestic resources, documenting the characteristics and capabilities of non-destructive methods for assessing the condition of culverts, evaluating existing procedures for assessing remaining culvert service life, identifying current and emerging culvert repair methodologies and the development of a Culvert Rehabilitation Decision Process. Phase 2 involves developing a draft of the *Culvert Rehabilitation Handbook*, which will include a decision-making process, guidance on available culvert evaluation techniques, a brief description of applicable rehabilitation systems, design and analysis methods, construction procedures and QC/QA methods and techniques.

The proposed specifications will be tested and evaluated in the context of actual culvert rehabilitation projects planned, designed and/or constructed in Louisiana, Minnesota and Ontario — providing a wide range of climate and geological conditions. In addition, 10 highly instrumented loading tests will be conducted at the large-scale soil-structure interaction testing facilities at the TTC and at Queen's University and compared with the results of numerical modeling and the proposed culvert design procedures. Phase 3 will involve the beta-testing of the proposed guidelines and handbook among public agencies and the industry.

CMP Culvert State-of-the-Practice Review

In the increasingly important culvert rehabilitation area, the TTC also recently completed a small project for the U.S. Department of Agriculture Forest Service titled Condition Assessment, Rehabilitation and Replacement of Corrugated Metal Pipe Culverts: State-of-the-Practice Review. The draft report reviews existing condition rating systems developed by different agencies and the currently available rehabilitation/replacement options specifically for CMP culverts. Jadranka Simicevic was the principal author of the report and Dr. Erez Allouche was the Principal Investigator. Once the report is accepted and finalized, the TTC will provide the information on how to obtain the report.

Industry Advisory Board

| | |
|--|--|
| Ben R. Bogner AOC LLC | Richard St. Aubin IPEX Inc. |
| Bernie Krzyz Benjamin Media | Glenn M. Boyce Jacobs Associates |
| Irene McSweeney Boston Water & Sewer Commission | Robert Morrison Jason Consultants |
| David Ellett BRH-Garver Construction LP | Mac Bakri KBR - Kellogg Brown & Root Inc |
| Richard Nelson CH2M HILL | Vic Weston LA Contractors' Educ. Trust Fund |
| Wayne Query City and County of Denver | Cliff Tubbs Laughlin Thyssen Inc. |
| John Griffin City of Atlanta | Lembit Maimets Link-Pipe Inc. |
| Bob Johnson City of Dallas | Larry Kiest, Jr LMK Enterprises, Inc. |
| Joe L. Smith City of Houston | Irvin Gemora NASSCO |
| John Morgan City of Indianapolis | Robert McKim Parsons Brinckerhoff |
| Keith Hanks City of Los Angeles | James H. Forbes, Jr. Pipeline Analysis, LLC |
| George Cowan City of New York - DDC | Norman E. Kampbell Rehabilitation Resource Solutions, LLC |
| Richard Aillet City of Ruston | Michael Burkhard Relne America, Inc |
| Ali Mustapha City of Shreveport | Denise McClanahan Reynolds Inliner, LLC |
| Robert Cannon Composites One | John J. Struzziery S E A Consultants Inc. |
| Joe Purtell CUES Inc | Joseph W. Barsoom TTC Municipal Users Forum |
| Dennis Jarnecke Gas Technology Institute (GTI) | L. Grant Whittle UltraIner, Inc. |
| Terry Anderson GCTA | Robert Carpenter Underground Construction |
| Brian C. Dorwart Haley & Aldrich Inc. | Tom Marti Underground Solutions, Inc. |
| Rick Turkopp Hobas Pipe USA Inc. | Steve Cooper Uni-Bell PVC Pipe Assoc. |
| Lynn Osborn Instatorm Technologies Inc. | |

Trenchless Technology Center **Newsletter**

September 2008

Trenchless Technology Center

Louisiana Tech University
Director: Dr. Ray Sterling

Associate Director:
Dr. Erez Allouche

Research Engineer:
Jadranka Simicevic

Laboratory Technician:
Nathan Pettit

Secretarial Staff:
Sandi Perry (administrative secretary)

Mailing address:
P.O. Box 10348
Ruston, LA 71272-0046 USA

Phone: (318) 257-4072
Toll Free: (800) 626-8659
Fax: (318) 257-2777

E-mail: ttc@latech.edu
Web site for TTC:
www.ttc.latech.edu

The TTC Newsletter is published as a department within *Trenchless Technology*. All newsletter materials are prepared by TTC. Communications should be directed to the center.