



# NASTT's *Trenchless Today*

Educate - Train - Research - Publish



Winter 2013 | Volume 3 | Issue No. 1



## Meet Our 2013 Officers and Board of Directors!

*Also Inside This Issue:*

**2013 No-Dig Show Preview**  
**NASTT's 2013 Hall of  
Fame Inductees**



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# WINTER 2013 EDITION

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# MESSAGE FROM THE EXECUTIVE DIRECTOR



## Going Global: North Meets South!



São Paulo, Brazil was the hottest place on the planet for trenchless this past November when the International Society for Trenchless Technology (ISTT) held their 30th International No-Dig Show.

This was the first time that the international trenchless show was held in South America and considering that São Paulo will host the 2014 FIFA World Cup and 2016 Summer Olympic Games, what better place for trenchless to showcase its many advantages? One massive undertaking is the construction of a world-class metro line from the São Paulo International Airport to downtown and to the new sports facilities. With the increasing use of light rail worldwide, trenchless technologies are ready-made for both ground level and tunneling applications.



North American attendees gather for a photo at the International No-Dig Conference, held in São Paulo, Brazil in November.

Many North American trenchless companies are actively engaged with infrastructure challenges in South America which complimented the educational importance of ISTT's 2012 International No-Dig Show. The event was co-hosted by the Brazil Association for Trenchless Technology (ABRATT), one of the 27 affiliated societies of ISTT. Formed in 1998, ABRATT has built a strong corporate membership and many of those companies are based in North America. The trenchless business network and dynamics of material supply is truly global and knows no borders.

The annual ISTT Board meeting, held prior to the conference, proved to be a lengthy but productive session. The assembly of so many diverse trenchless champions from around the world is an inspirational occasion. I am very proud to say that as a member of this international family of societies, NASTT stands very tall in our membership role and in our many accomplishments. Every day I get to see first-hand the quality of our volunteer membership and the remarkably positive affect that trenchless technology can have worldwide. It truly amazes me.

In conclusion, I'd like to close out my message by thanking George Ragula for the past two years of expert leadership as NASTT Chair. His tireless dedication and altruistic commitment is truly inspirational. With the turning of the page, we welcome as the new NASTT Chair, Derek Potvin. Be assured that you have the unwavering support of our staff as you pilot NASTT to new heights.

Mike Willmets  
NASTT Executive Director

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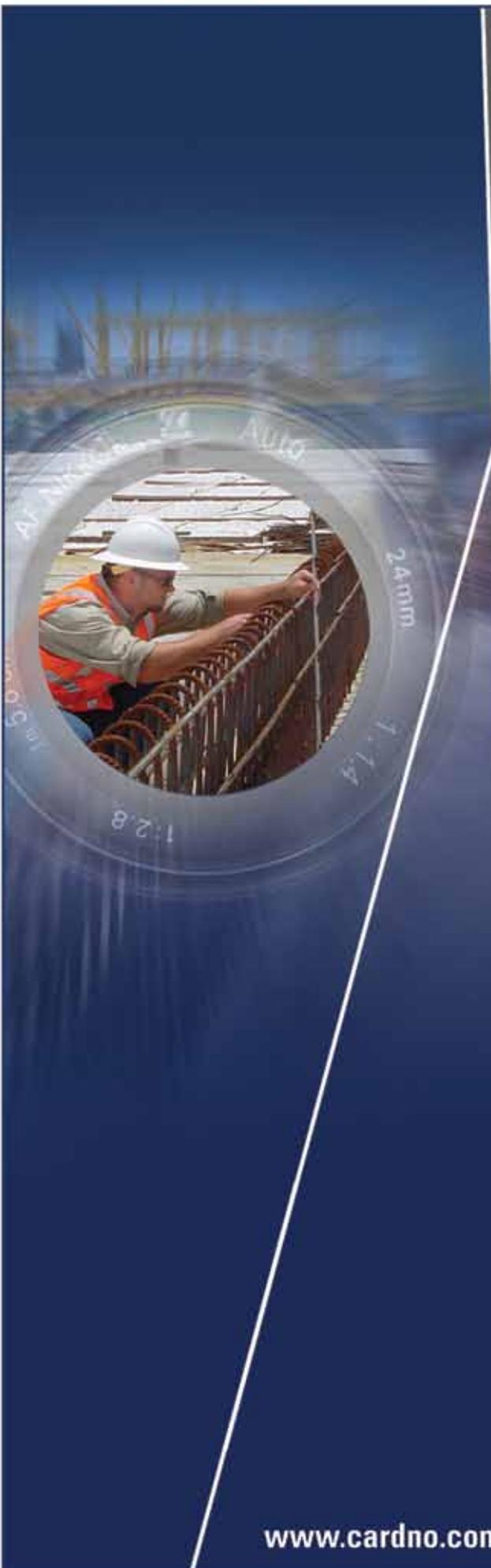
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# CHAIR MESSAGE

## Happy New Year!



I am eager to start 2013 as the NASTT Chair, and I look forward to enhancing and expanding the current NASTT mandates. NASTT has had a significant impact in 2012 and I am eager to achieve current and new NASTT goals.

One of the first orders of business is to congratulate and welcome our three new members to the Board of Directors: Erez Allouche, Larry Kiest Jr. and Tony Hranicka. I am excited to share new ideas with these industry leaders. I would also like to take this opportunity to introduce the 2013 Executive Officers. Kim Staheli has graciously accepted the Vice Chair position, Jennifer Glynn will step up to be the NASTT Secretary and Dave Krywiak will continue as the NASTT Treasurer.

I also want to thank those board members and officers whose terms ended in December 2012 for their invaluable service to NASTT. Ben Cote was the NASTT Secretary for two years and served as the Chair of the Carbon Calculator committee. Alan Atalah served on the Education Committee and was a long-term champion for our Student Program.

Special attention is certainly in order for our outgoing Chair, George Ragula. George selflessly volunteered his time as a devoted leader and advocate of trenchless technology. Under the leadership of George, the Board was able to develop strong working relationships with the American Public Works Association (APWA) and the American Gas Association (AGA). George recognized our common goals and created partnerships focusing on various education efforts and training to benefit all parties. These collaborations enhanced and expanded our training and education programs by giving members and potential members the best trenchless information available. NASTT relies on strong leaders and we have been lucky to have George serve on our Board. I look forward to his continued advice to help keep NASTT moving forward in a positive direction.

## NASTT's 2012 Accomplishments

Phase II is underway with the development of a web-based and user-friendly carbon calculator. In October 2012, the NASTT Board of Directors approved this second phase as a standalone NASTT initiative. A working model is anticipated for review and testing this year. I believe the carbon calculator will be extremely valuable to our members, as it is intended to reinforce an image of trenchless technology as a "green" alternative to traditional piping installation methods.

## NASTT's No-Dig Show Municipal & Public Utility Scholarship Program

One of the biggest challenges NASTT faces is making sure people have access to the education we provide. Under the leadership of Kim Staheli, the Board of Directors put their heads together and created NASTT's No-Dig Show Municipal & Public Utility Scholarship Program. This scholarship was established to provide a source of funds for North American municipalities, government agencies and utility owners so they could attend NASTT's No-Dig Show. Selected applicants will be awarded conference registrations and hotel accommodations enabling them to take part in the largest trenchless education event of the year. We hope that this scholarship will not only increase the attendance at NASTT's 2013 No-Dig Show, but also grow the public interest for the trenchless industry.

## Education

Education and training is the core of NASTT's initiatives, and the achievements in 2012 are unprecedented. In the last year, we were able to expand our education through our virtual webinar series. This tool has allowed us to reach an even greater audience than we could achieve with on-site courses. The combination of our four complementary webinars and our growing relationships with partnering associations has increased participation in our education programs by 378 percent since 2011. That's a number of which our Communications & Training Manager, Michelle Hill, should be very proud!

## NASTT's 2013 Goals

There is no doubt that expanding our training and education will continue to be a goal in 2013. Be sure to keep an eye open for our continuing trenchless webinar series. We will certainly maintain this form of educational training, allowing us to access the public who are faced with the challenge of having limited travel funds.

Another goal for NASTT this year is to expand our trenchless bookstore. We currently have two publications for sale ([www.nastt.org/bookstore](http://www.nastt.org/bookstore)), and we are in the process of increasing the

availability of manuals based on our Good Practices courses.

Our third goal is to continue to increase trenchless technology awareness in North America by developing relationships with other agencies. We are already committed to provide training to the American Public Works Association (APWA) and the American Gas Association (AGA), and we are currently discussing training opportunities with other associations. I look forward to giving you an update on those partnerships in the next issue of *NASTT's Trenchless Today*.

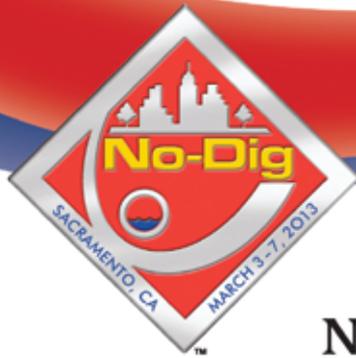
## No-Dig Show Goes to Sacramento

I'm incredibly excited to join you all in Sacramento this March for NASTT's 2013 No-Dig Show. Program Chair Kim Staheli, and Program Vice Chair Kevin Nagle, have been hard at work putting together what will be an unforgettable event. Our show would not be possible without the volunteer members of the Program Committee who have hand selected more than 150 papers that will be presented this year. I would also like to recognize that 35 of those Program Committee members have stepped up to serve as session leaders. This group of individuals peer reviewed the papers and PowerPoint presentations to make sure the material presented at the conference is non-commercial and relevant. This is a huge task and we could not sustain such a top-notch show without the dedication of our session leaders.

In my opinion, the main feature at the show this year is the 12th annual Educational Fund Auction and Reception. Last year we raised more than \$100,000 between our various auctions and our new vacation raffle. NASTT is able to sponsor students' attendance at the No-Dig Show, award scholarships and ensure ongoing development of NASTT's Good Practices training courses with these auction funds. This is a very important event, but above all, it's tremendous fun! This year, Jim Rankin, Brian Avon and the rest of the Auction Committee are challenging us to dress up in our 1960's gear to help celebrate the love, peace and charity theme. I plan to raid Mike Willmets' closet and win the "Best Dressed" contest.

There are so many elements of NASTT's 2013 No-Dig Show and it's hard to highlight just a few in this message. One thing I know for sure is that I'll be sitting in on a special session called "Legends of HDD: From an Idea to an Industry." Kim Staheli is assembling an incredible group of pioneers and icons of the horizontal directional drilling industry to talk about the early years of the industry. This panel of distinguished guests has made a significant contribution to the HDD industry, and will offer our attendees a unique perspective on how HDD has evolved and matured. You won't want to miss this featured event.

Derek Potvin  
NASTT Chair



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## NASTT's 2013 No-Dig Show Municipal & Public Utility Scholarship Program

### ***Congratulations to the following scholarship recipients!***

- Anchorage Water and Wastewater Utility, Alaska
- Aurora Water, Colorado
- Bureau of Environmental Services, City of Portland, Oregon
- Central Contra Costa Sanitary District, California
- Cheyenne Board of Public Utilities, Wyoming
- City of Alameda, California
- City of Aurora, Colorado
- City of Azusa, California
- City of Belmont, California
- City of Bend, Oregon
- City of Borger, Texas
- City of Bowling Green, Ohio
- City of Brighton, Colorado
- City of Casper, Wyoming
- City of Elmhurst, Illinois
- City of Everett, Washington
- City of Hamilton, Ontario
- City of Hayward, California
- City of Lake Oswego, Oregon
- City of Lancaster, California
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- City of London, Ontario
- City of Lovington, New Mexico
- City of Memphis, Tennessee
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- City of Regina, Saskatchewan
- City of Richland, Washington
- City of San Diego, California
- City of Santa Cruz, California
- City of St. Albert, Alberta
- City of Thornton, Colorado
- City of Vancouver, British Columbia
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- City of Winston, Oregon
- City of Yorkton, Saskatchewan
- Contractors State License Board, California
- D.C. WATER, District of Columbia
- District of Columbia Housing Authority, District of Columbia
- District of Saanich, British Columbia
- El Dorado Irrigation District, California
- Fayette County Board of Commissioners, Georgia
- Halifax Water, Nova Scotia
- Island County Public Works, Washington
- King County, Washington
- Metro Wastewater Reclamation District, Colorado
- Metropolitan Water Reclamation District of Greater Chicago, Illinois
- New York City Department of Environmental Protection Agency, New York
- North Hudson Sewerage Authority, New Jersey
- Orange County, California
- Pajaro Valley Water Management Agency, California
- Sammamish Plateau Water and Sewer District, Washington
- Santa Cruz County Sanitation District, California
- Sarasota County, Florida
- Seattle Public Utilities, Washington
- Salt Lake City Public Utilities, Utah
- South Coast Water District, California
- South Tahoe Public Utility District, California
- The Regional Municipality of York, Ontario
- Town of Dundee, Florida
- Town of Canmore, Alberta
- Town of Cary, North Carolina
- Town of Framingham, Massachusetts
- Town of Kindersley, Saskatchewan
- Town of Plymouth, Massachusetts
- Union Sanitary District, California
- Washington Suburban Sanitary Commission, Maryland
- Water Research Foundation, Colorado

These organizations will be attending NASTT's 2013 No-Dig Show, March 3-7 in Sacramento, California. Plan to join them by registering at [www.nodigshow.com](http://www.nodigshow.com).





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## NASTT's WEBINAR Series

### "Introduction to Trenchless Technology Short Course"

#### Innovative Technology at Your Fingertips!

NASTT is offering a free webinar series to assist public works and the underground utility community to expand on their trenchless technology knowledge. This four-part archived training series features both Trenchless Rehabilitation and New Installations techniques and is presented by industry experts. These archives are available 24/7, so you can log on at your convenience from your office or home. Stay tuned for an announcement about NASTT's live 2013 webinar series!

#### Benefits of the NASTT Webinar Series:

- Accurate and objective
- No-commercial content
- Convenient on-line access
- Free to both members and non-members of NASTT

### Rehabilitation

#### Trenchless Rehabilitation Part 1

*Presenter: Derek Potvin, Robinson Consultants Inc.*

- Cured in Place Pipe (CIPP) Lining
- Lateral Lining
- Spray-on Systems
- Tight Fit Lining Systems

#### Trenchless Rehabilitation Part 2

*Presenters: Ian Doherty, Trenchless Design and Jennifer Glynn, RMC Water and Environment*

- Pipe Bursting
- Sliplining
- Spiral Liners
- Spot Repairs
- Grout in Place Lining Systems
- Manhole Rehabilitation

### New Installation

#### Trenchless New Installations Part 1

*Presenters: Sam Ariaratnam, Arizona State University and Dave Bennett, Bennett Trenchless Engineers*

- Horizontal Directional Drilling (HDD)
- Microtunneling
- Open Shield Pipe Jacking

#### Trenchless New Installations Part 2

*Presenters: Don Del Nero, CH2M HILL and Kim Staheli, Staheli Trenchless Consultants Inc.*

- Auger Boring
- Pipe Ramming
- Molding / Piercing
- Pilot Tube
- Guided Boring

View our archives at: [www.nastt.org/webinars](http://www.nastt.org/webinars)



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## NASTT Breaks Training Records in 2012



It's rare for an organization to say they've increased something by 387 percent – that's a really big number! I'm proud to announce that NASTT increased training attendees by 387 percent in 2012. I guess that means NASTT is pretty special.

One of NASTT's goals for 2012 was to increase trenchless technology awareness by using a webinar platform to conduct our complementary training. We created a four-part series with two webinars on rehabilitation techniques and two webinars on new installation methods. The rehabilitation webinars covered cured-in-place pipe (CIPP) lining, lateral lining, spray-on systems and tight fit lining systems along with pipe bursting, sliplining, spiral liners, spot repairs, grout-in-place lining systems and manhole rehabilitation. For the new installation webinars, we focused on horizontal directional drilling (HDD), microtunneling, open shield pipe jacking, auger boring, pipe ramming, moling/piercing, pilot-tube and guided boring. Needless to say, these webinars are a wealth of information.

The response was overwhelming. We averaged more than 400 attendees for each webinar, and hundreds more are currently logging in to view the archives. This is truly a record-breaking training effort for NASTT. If you missed one of these webinars, there is still time to check them out. Just go to [www.nastt.org/webinars](http://www.nastt.org/webinars) to log in.

These webinars would not be possible without the dedication of our volunteer instructors. I can't thank these industry experts enough for all the time they put into making our webinar series a success:

- **Derek Potvin, P.Eng.**  
Robinson Consulting Inc.
- **Jennifer Glynn, P.E.**  
RMC Water and Environment
- **Ian Doherty, P.Eng.**  
Trenchless Design Engineering Ltd.
- **Sam Ariaratnam, Ph.D., P.E., P.Eng.**  
Arizona State University
- **David Bennett, Ph.D., P.E.**  
Bennett Trenchless Engineers
- **Don Del Nero, P.E.**  
CH2M HILL
- **Kimberlie Staheli, Ph.D., P.E.**  
Staheli Trenchless Consultants Inc.

I can't let the webinars take all the credit. NASTT also hosted 17 additional in-person training events in 2012. These events were made possible by partnering up with other associations, holding training at our regional chapter conferences and offering our training free of charge to North American municipalities. There will always be a place here at NASTT for in-person training. There is a lot to be learned from face-to-face interaction with the instructors

and peers in a classroom. Again, these events would not be possible without our amazing instructors who volunteer their time to teach trenchless.

Our calendar for 2013 is already filling up, and I'll have more updates for you in the next issue of NASTT's *Trenchless Today*. This is a very exciting time for NASTT and I'm honored to be a part of it.

Michelle Hill  
NASTT Communications & Training Manager

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## Cindy Preuss, Senior Project Manager at HydroScience Engineers, On the State of Trenchless and How the Industry is Flourishing Out West



**NASTT's Trenchless Today (NTT):** Could you tell our readers a little bit about yourself and how you got into the trenchless field?

**Cindy Preuss:** I am a consulting civil engineer registered in the state of California and specialize in pipeline planning and design services for public agencies. After graduating from the University of California,

Berkeley, in the 1990s with a degree in civil and environmental engineering, my first job encompassed a myriad of civil design projects, from roadway and streetscape improvements to pump station and pipeline rehab/replacement and new construction. The bulk of my pump station and pipeline projects targeted sanitary sewer improvements, and it was fascinating to discover alternative ways to rehabilitate failing sewer lines without digging up the entire right of way.

**NTT:** How do you view the current state of the trenchless industry?

**Preuss:** In just this last decade, I've seen the trenchless field blossom with new technologies, equipment and products. With so many newly developed, refined and proven trenchless options now available, construction methods employing trenchless technologies have become more accepted, widely used and often preferred over open-trench construction alternatives – a welcome shift in the municipal market.

Unfortunately, large-diameter water rehabilitation projects are still the exception to the trenchless revolution. Last year, I had the opportunity to work on two such projects. I discovered that trenchless technology is not as developed for this particular trenchless market sector as it is for other wet utilities. As more of our water infrastructure throughout the nation is reaching the end of its useful life, I am seeing that material and equipment manufacturers are intent on developing new technologies and improving existing ones to create additional alternatives for both inspecting and rehabilitating large-diameter water pipelines. I also see a push for better industry standards on construction and pressure testing.

**NTT:** How did you first get involved in NASTT?

**Preuss:** My involvement with NASTT advanced through my involvement with a local non-profit, the Northern California Pipe Users Group (PUG). In serving on the No-Dig Show Program Committee, I was exposed to NASTT's vast resource base and, in 2006, PUG was looking for ways to expand its technical education program for its members at a local venue. When PUG polled its members, it found there was a significant interest in trenchless design and construction. PUG partnered with NASTT to bring one of NASTT's many courses to the northern California area, and the class was so well received, that PUG continued to offer NASTT courses for six years.

**NTT:** How do you think the trenchless community benefits from the No-Dig conferences?

**Preuss:** Speaking from my own experience, my career has benefited tremendously by the knowledge I have gained from attending various technical presentations as well as the education I've received from spending time with vendors at No-Dig. As a consulting engineer seeking to provide the most

cutting-edge, applicable and comprehensive engineering services to my clients, exposure and education are paramount to creating the technical toolbox necessary to achieve this.

When I attended my first No-Dig conference in 2004, I was amazed that my personal knowledge of "all things trenchless" barely grazed the tip of the iceberg. I returned from that conference with a wealth of information that helped guide several of my subsequent design projects, and I was inspired to learn everything I could about trenchless pipeline construction. In fact, when I was asked to serve on the No-Dig Program Committee for the 2005 conference, I accepted wholeheartedly. I knew doing so would broaden my exposure and resource network in the trenchless world. I am now serving my ninth year on the Program Committee and my third year on the NASTT Board of Directors.

**NTT:** Tell us about the trenchless market in California specifically.

**Preuss:** The trenchless market in California is truly booming. In Los Angeles, 1 million ft of its sewers has been replaced or rehabilitated as of 2011. In Sacramento, the Sacramento Regional County Sanitation District (SRCSD) completed an approximately 40-mile interceptor program in 2010, utilizing a significant amount of trenchless technologies to cross large rivers, levees, railroads and high-traffic roads and highways. The San Francisco Public Utilities Commission (SFPUC) has employed trenchless technologies to avoid major traffic impacts to selected streets and major roadways in rebuilding, retrofitting and replacing their aging water infrastructure. Agencies throughout California are turning more frequently to trenchless technology in their effort to balance the financial, environmental and social impacts associated with pipeline construction projects.

**NTT:** Why do you think California has such a thriving trenchless market?

**Preuss:** I suspect California has such a thriving trenchless market due to the state's unique and varying geography, high population density and distribution, high traffic volumes, infrastructure density and strict environmental regulations. New pipeline construction is met with challenges in crossing waterways and the large network of high-traffic roadways and highways, not to mention, railways. The success of many large projects within this region will foster yet more confidence in – and exposure to – the benefits of trenchless construction. From southern to northern California, engineers are capitalizing on trenchless opportunities for constructing and rehabilitating their infrastructure within the geographically complex and crowded environment.

**NTT:** As we move forward into 2013, what outlook do you have for NASTT and the trenchless industry?

**Preuss:** NASTT is listening to its members and responding to industry needs by providing a full suite of courses and materials, educational opportunities through No-Dig and the carbon calculator it's developing, among other initiatives. I feel 2013 will be another excellent year where members ask a question and are able to find the answer through the vast industry resources and networking opportunities NASTT offers. I am proud to be part of this important organization.

# VOLUNTEER

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# WE WANT YOU

You are a member of NASTT. So now what? Take your membership to the next level by joining NASTT's Program Committee! This important group meets three times a year to build the program schedule for NASTT's No-Dig Show. Over 150 papers are selected and developed each year, and we need our members

to pick the best of the best to be represented at this important educational conference.

Contact Michelle Hill, NASTT Communications & Training Manager at [mhill@nastt.org](mailto:mhill@nastt.org) or 440-638-4676 for more information.

## Join these exceptional volunteers today!

### 2013 No-Dig Show Program Chair

**Kimberlie Staheli**, *Staheli Trenchless Consultants*

### 2013 No-Dig Show Program Vice-Chair

**Kevin Nagle**, *TT Technologies, Inc.*

### 2013 No-Dig Show Program Committee Members

**Erez Allouche**, *Trenchless Technology Center*

**Samuel Ariaratnam**, *Arizona State University*

**Alan Atalah**, *Bowling Green State University*

**Brian Avon**, *Carollo Engineers*

**Frank Badinski**, *York Region*

**Joe Barsoom**, *Parsons Brinckerhoff, Inc.*

**David Bennett**, *Bennett Trenchless Engineers*

**Richard (Bo) Botteicher**, *Underground Solutions, Inc.*

**Glenn Boyce**, *Jacobs Associates*

**Chris Brahler**, *TT Technologies, Inc.*

**Mark Brownstein**, *Haley & Aldrich, Inc.*

**Jack Burnam II**, *CH2M HILL*

**Craig Camp**, *Jacobs Associates*

**Ralph Carpenter**, *American Ductile Iron Pipe/American SpiralWeld Pipe*

**Ken Chua**, *City of Edmonton*

**George Cowan**, *HAKS*

**David Crowder**, *R.V. Anderson Associates Limited*

**Don Del Nero**, *CH2M HILL*

**Dennis Doherty**, *Haley & Aldrich, Inc.*

**Brian Dorwart**, *Brierley Associates, LLC*

**Glenn Duyvestyn**, *Hatch Mott MacDonald*

**John English**, *Horizontal Technology, Inc.*

**John Giese**, *JR Giese Operations*

**Jennifer Glynn**, *RMC Water and Environment*

**Greg Goral**, *Michels Directional Crossings*

**Mark Hallett**, *SAERTEX multiCom LP*

**Keith Hanks**, *City of Los Angeles*

**Larry Kiest, Jr.**, *LMK Technologies*

**Brenda Kingsmill**, *Region of Halton*

**David Krywiak**, *Stantec Consulting*

**Bernie Krzys**, *Benjamin Media, Inc.*

**George Kurz**, *Barge, Waggoner, Sumner & Cannon*

**Joe Lane**, *SAK Construction LLC*

**Marc Lehman**, *CDM*

**Joseph Loiacono**, *Sanexen/Aqua-Pipe*

**Jason Lueke**, *Arizona State University*

**John Matthews**, *Battelle Memorial Institute*

**John Messina**, *Boh Bros.*

**Dorian Modjeski**, *Cardno TBE*

**Jim Murphy**, *Cimarron Engineering Ltd.*

**Mohammad Najafi**, *University of Texas at Arlington/CUIRE*

**Peter Oram**, *AECOM*

**Collins Orton**, *TT Technologies, Inc.*

**Matt Pease**, *Staheli Trenchless Consultants*

**Cindy Preuss**, *Hydro Science Engineers*

**George Ragula**, *Public Service Electric & Gas Co.*

**Kaleel Rahaim**, *Interplastic Corp.*

**Michelle Ramos**, *GeoEngineers, Inc.*

**Jeanette Rankin**, *Malone Motorsports*

**Jim Rankin**, *Vermeer Corp.*

**Paul Reilly**, *Rain for Rent*

**Piero Salvo**, *GENIVAR, Inc.*

**John Schroeder**, *CDM*

**Chris Schuler**, *Miller Pipeline Corp.*

**Ariamalar Selvakumar**, *USEPA*

**Sunil Sinha**, *Virginia Tech University*

**Casey Smith**, *SAK Construction LLC*

**Isabel Tardif**, *CERIU*

**Richard Thomasson**, *Malcolm Pirnie*

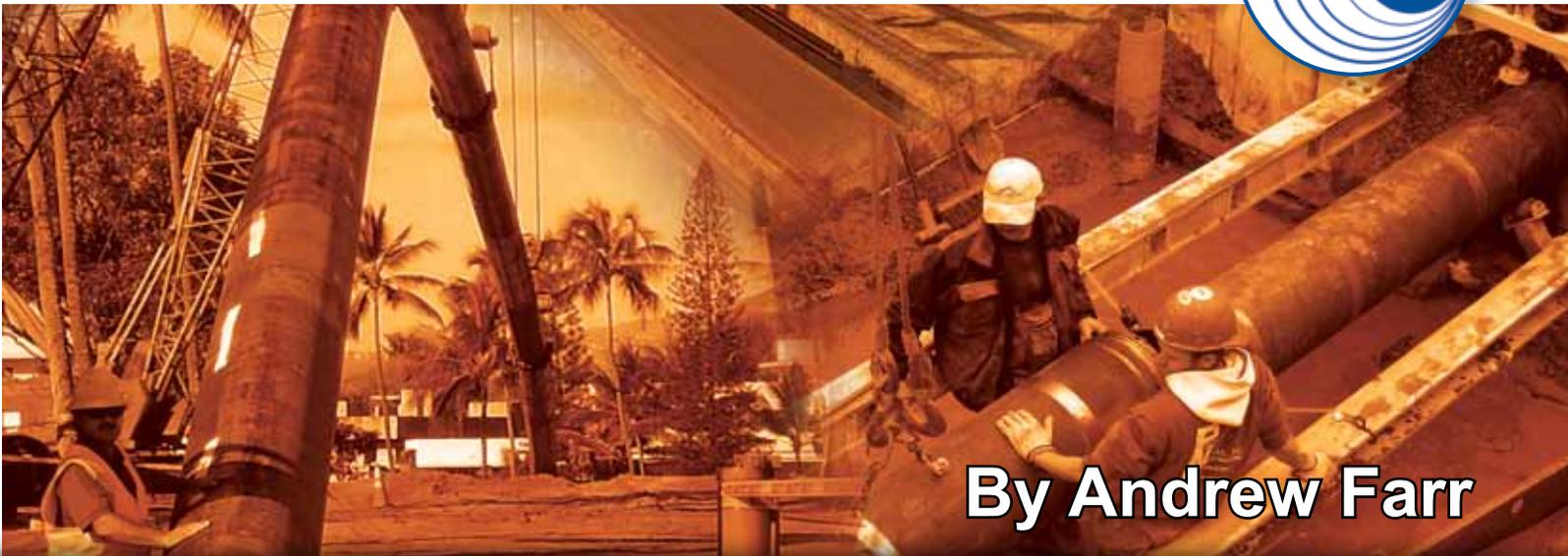
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Michelle Hill, 440-638-4676



## By Andrew Farr

The trenchless community is buzzing with No-Dig talk this time of year, and it's easy to see why. Among the many opportunities the annual No-Dig show offers, getting to know some of the industry's leading professionals can perhaps be the most beneficial and exciting. For this issue of *NTT*, we got in touch with Bo Botteicher, Kaleel Rahaim and Cathy Morley to learn more about their careers in the trenchless industry and their involvement in our organization.

### Bo Botteicher



Richard "Bo" Botteicher said he wanted to get into the engineering field before he really knew it. "I think I was an engineer who was always an engineer," he said.

Initially interested in geotechnical engineering, Botteicher grew up in Pennsylvania and got his start in the underground infrastructure sector after graduating from Bucknell University. He moved to the Denver area around 2000 and

was involved primarily in residential and commercial work before moving into the municipal arena.

Soon after, while working with Brown and Caldwell, Botteicher worked on a pipe rehabilitation project involving a large concrete cylinder pipe to be sliplined using fusible PVC pipe. Botteicher said it was his first introduction into the trenchless world and also his first project implementing fusible PVC. Today, Botteicher has 13 years of experience working in the water and wastewater industries, specializing in horizontal directional drilling, pipe bursting, sliplining and trenchless methodologies for fusible PVC pipe installations.

Botteicher is currently a senior product engineer for Underground Solutions, Inc., makers of fusible PVC pipe, where he has worked for the past six years. He has worked previously as a consulting engineer in Denver, Colo., for seven years and is a licensed professional engineer in the state of Colorado. Botteicher has served on the No-Dig Show Program Committee and has co-authored a technical paper to be presented at this year's show in Sacramento.

"Horizontal directional drilling has always been the predominant trenchless method that we work with," he said. "We are always looking at bigger jobs and it seems like [contractors] are always getting a little bigger with installs. Hopefully we can continue to be a part of that."

"The first sliplining job really opened my eyes to a whole new

industry," he said. "It's really been wonderful to work with people at NASTT and you'd like to think you've had a hand in growing the organization."

### Kaleel Rahaim



Kaleel Rahaim got involved in trenchless engineering just as one of the most predominant methods of trenchless pipe rehabilitation – the cured in place pipe (CIPP) process – was evolving in the early 1990s. At the time, the CIPP process was gaining traction in the industry as more contractors were getting involved in trenchless remediation. Felt suppliers were also coming into the market and engineers involved in thermoset resin applications,

such as Rahaim, were making a push for significant changes in resin technology and making sure felt material and resins were compatible with the processes contractors were using.

Rahaim has been involved in the thermoset polymer industry for almost 30 years and his experience includes process improvements for many thermoset resin applications with a significant focus on CIPP. He received his chemical engineering degree from Mississippi State University and has experience in many different aspects of civil and chemical engineering in both process and projects.

"I have an advantage and disadvantage of working in both chemical and civil engineering," Rahaim said. "I have the advantage of understanding the chemistry that goes into resin applications but a disadvantage as a civil engineer with not being [initially] familiar with the design process. But I think I've done a good job over the course of my career in educating myself on working in both ends."

Today, Rahaim is a business manager of remediation polymers for the Thermoset Resins Division of Interplastic Corp. He is a former board member and treasurer of NASTT and is involved in other trade organizations for the trenchless remediation industry.

He is a voting member of the America Society for Testing and Materials (ASTM), a member of the National Association of Sewer Service Companies (NASSCO) and a co-author of the upcoming manual for CIPP Good Practices.

As a former board member of NASTT, Rahaim knows full well the extent of NASTT's involvement in advancing the state of the trenchless industry for more than 20 years.

"I've been very fortunate in seeing the evolution of NASTT," he said. "It has moved from being a very small organization with little direction to being the premier organization for trenchless technology. It has also evolved from an association with little resources and struggling to get people to join, to an association that is now very technically and financially-sound."

### Cathy Morley



Cathy Morley says you often learn more from a project when things go wrong than when things go right. With more than 30 years of experience in the municipal engineering field, both in the U.S. and internationally, she would know.

Morley graduated from Imperial College in London with an honors degree in civil engineering and has a post graduate degree in environmental engineering from the Asian Institute of Technology in Bangkok,

Thailand. Since then, she has worked extensively in the study, design and construction of sanitary sewer and water systems and is currently a senior project manager with RJN Group.

Morley completed her first lining project in the U.K. in 1978 when pipe lining was a new method. "That was probably about five years before anything like that was being done over here in the U.S. and it was very much the new thing at that point," she said.

Morley moved to the United States in 1984 and later joined RJN in 1987 where she began to work extensively in inflow/infiltration (I/I) studies, flow reduction, sewer monitoring and force main replacement. Recently, her focus has been on the rehabilitation of existing collection and water distribution systems with a particular emphasis on trenchless construction techniques. Her projects have included the design, construction and rehabilitation of sewers and water mains using microtunneling, pipe bursting, directional drilling, pipe jacking and lining methods.

She has presented at numerous seminars and conferences including APWA, CSWEA, WEF and No-Dig. Morley serves on the education committee for No-Dig and will serve as a presenter and moderator of all the inflow/infiltration papers that will be presented at this year's show in Sacramento. She has presented papers in each of her three times attending the conference.

"My No-Dig experience has a lot to do with unusual sewer construction," she said. "The one [paper] I'm doing this year is a drilled force main sewer. Last year, the one I did was an on-grade sanitary sewer and the year before that was a pipe bursting project. So I've done a drill, a burst and an on-grade. So I'm an I/I specialist, but all my papers at No-Dig have all had to do with different types of unusual drills we've had to do."

"I think No-Dig benefits the industry enormously," she said. "One of the things is not only about the new and cutting edge techniques, but also learning from when things go wrong [on projects]. Kim Staheli did a fantastic paper last year on a forensic analysis of what had happened on a drill that went very wrong. Kim and I talked afterwards about how you often learn as much, if not more, from things that go wrong on projects than when things go right. I think that's one thing at No-Dig, is that not all the papers are great, slapping yourself on the back, but they serve as a learning tool."

Andrew Farr is assistant editor of NASTT's *Trenchless Today*.

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# GOING TO CALIFORNIA



## TRENCHLESS PROFESSIONALS HEAD WEST TO SACRAMENTO FOR ANNUAL GATHERING

By Sharon Bueno

The NASTT No-Dig Show is heading West in 2013, setting up its annual trenchless pilgrimage in Sacramento, Calif., where the underground infrastructure has benefited over the last decade from all the trenchless industry has to offer.

For the first time since 2007, the No-Dig Show is coming back to California, March 3-7 at the Sacramento Convention Center, bringing together, public works officials, engineers, contractors, academicians and manufacturers from around the globe. The theme for this year's event is "The Great Trenchless Gold Rush."

Sponsored by the North American Society of Trenchless Technology (NASTT), this annual event draws trenchless professionals from around the world to the only conference and tradeshow in North America dedicated solely to the promotion of trenchless technology. Through exhibits, educational seminars and fun networking events, the No-Dig Show is a must-attend event for the trenchless professional.

The trenchless industry continues to grow and reach more engineers, contractors and municipalities each year and the 2013 conference organizers hope to capitalize on that momentum with a strong No-Dig Show. Next month, more than 140 exhibitors are expected to fill the 84,000-sq ft exhibit hall at the Sacramento Convention Center, displaying the latest in trenchless equipment and technology and be on hand to answer attendees' questions.

Along with the jam-packed exhibit hall, the No-Dig technical paper program is also an important part of the show's success and stature — the true heart and soul of the conference. This year brings 155-peer-reviewed technical papers to be presented, focusing on a diverse range of trenchless topics, including horizontal directional drilling, cured-in-place pipe (CIPP), microtunneling, inspection, case histories, asset management, pipe jacking and ramming,

water and sewer rehabilitation, project planning, inspection and trenchless research.

New to the program is "Trenchless in the City," which features papers from different trenchless projects happening on the West Coast. Be sure to check out the program schedule for the specific papers highlighted in these sessions: Trenchless in Northern California; Trenchless in Oregon; Trenchless in Southern California; Trenchless in Washington; and Trenchless in the Rockies.

Attendees can choose among what peer-reviewed paper presentations they want to see. The papers are evaluated based on relevance, usefulness and non-commercialism. The No-Dig papers are presented in a six-track schedule and are grouped mostly by subject matter so attendees can choose to attend five paper presentations at any given time.

Pre- and post-conference seminars are also on the schedule for attendees at an additional cost. On Sunday, March 3, NASTT's Trenchless Technology Short Courses-New Construction and Rehabilitation will be held. The course is ideally suited for both newcomers to the industry and for anyone who is interested in seeking a refresher course on trenchless technology methods. This year, the program is divided into two courses — New Installation and Rehabilitation — so that the material can be covered in a one-day course.

On March 6-7, several informative courses are slated, presented by NASTT and NASSCO. From NASTT: Cured-in-Place Pipe Good Practices Course; Laterals Rehabilitation & Replacement Good Practices Course; Horizontal Directional Drilling Good Practices Guidelines Course; Pipe Bursting Good Practices Course; and New Installation Methods Good Practices. From NASSCO: PACP Trainer Recertification.

Also new this year at No-Dig will be the special session "Legends of HDD: From an Idea to an Industry." Program Chair Kim Staheli has invited Martin Cherrington, Ron Halderman, Dick Melsheimer, Lon Brisco, Bill Riel and Tom Tibor - six icons and "legends" of the horizontal directional drilling field to talk about the early years in the industry. Attendees will be able to gain a unique perspective on how HDD has evolved out of the significant contributions from this panel of distinguished guests.

Although the No-Dig Show is the conduit to promote and advance the trenchless marketplace through education and exhibits, there's also the social aspect of the conference that fosters networking opportunities for attendees, as well as just some fun and good times.

The conference gets under way with its annual Kick-off Breakfast on Monday, March 4. During this event, the formal presentation of the 2013 Trenchless Technology Person of the Year will be made. Also at this event, the winners, runners up and honorable mentions for the 2012 Trenchless Technology Projects of the Year for Rehabilitation and New Installation will be formally recognized, as well as NASTT's 2012 Outstanding Papers in Rehabilitation and New Installation Awards. Entertainment for this event will be comedian and magician Dana Daniels.

Also on March 4, NASTT will hold its 12th annual Educational Fund Auction & Reception. This annual event is the perfect opportunity for attendees to mingle and relax, as well as bid on items for an excellent cause — the Educational Fund, which supports student chapters, target research, training modules and other trenchless education. Since 2001, this auction has raised more than \$533,000. The Program Committee invites you to revisit your '60s "Flower Child" days, asking you to don your best bell bottoms, tie-dye shirts and peace symbols to compete for best costume.

Also making his famed appearance during the Educational Fund Auction will be Mortimer the Sewer Rat, who will once again be up for auction.

Mortimer has been auctioned off to different companies for the past six years at No-Dig and has been with Vermeer since last year's show in Nashville.

On Tuesday, March 5, NASTT will host its annual Gala Awards Dinner. During this popular event, the trenchless community gathers for a night of fun, food and dancing. Also, NASTT will present several awards and will induct its second class into the NASTT Hall of Fame: the late Eric Wood, founder of Insituform; Dr. David Bennett, P.E., founder of Bennett Trenchless Engineers; and Ed Malzahn, founder of The Charles Machine Works. The evening's entertainment will be presented by Circo Magnifico — an amazing show featuring extraordinary feats of human ability and exhilarating music.

To close out the 2013 No-Dig event is the annual Closing Luncheon on Wednesday, March 6. Here, attendees can enjoy lunch, entertainment and say good-bye to their fellow trenchless professionals before heading home. This event will also feature the comic talents of Jack Gallagher.

For more information about the 2013 No-Dig Show, visit [www.nodigshow.com](http://www.nodigshow.com) or contact Benjamin Media, which handles the show's management, at (330) 467-7588.

Sharon M. Bueno is managing editor of *NASTT's Trenchless Today*.



As you can see, Mortimer is already looking forward to the '60s Flower Child theme.

## NASTT'S 2013 NO-DIG SHOW SCHEDULE OF EVENTS

### SUNDAY, MARCH 3, 2013

Attendee & Exhibitor Registration .....	7:00 AM - 5:00 PM
Trenchless Technology Short Course – Rehabilitation .....	8:00 AM - 12:00 PM
Trenchless Technology Short Course – New Installation .....	8:00 AM - 12:00 PM
Student Orientation Meeting .....	11:30 AM - 3:00 PM
NASTT Chapter Meetings .....	1:00 PM - 5:30 PM

### MONDAY, MARCH 4, 2013

Attendee & Exhibitor Registration .....	7:00 AM - 5:00 PM
<b>NASTT's No-Dig Show Kick-Off Breakfast &amp; Entertainment</b> .....	7:30 AM - 9:15 AM
<b>NASTT's Silent Auction Items Viewing</b> .....	9:30 AM - 6:15 PM
Technical Paper Sessions (Track 1 - Track 6) .....	9:30 AM - 11:35 AM
<b>Exhibit Hall Ribbon Cutting Ceremony</b> .....	11:40 AM - 11:45 AM
<b>Exhibit Hall Open</b> .....	11:45 AM - 3:45 PM
Lunch Concessions .....	11:45 AM - 2:00 PM
Let's Make A Deal .....	3:45 PM - 5:30 PM
Technical Paper Sessions (Track 1 - Track 6) .....	3:45 PM - 5:25 PM
<b>Pre-Auction Reception</b> .....	5:30 PM - 6:15 PM
<b>NASTT's 12th Annual Educational Fund Auction</b> .....	6:15 PM - 7:30 PM

### TUESDAY, MARCH 5, 2013

Attendee & Exhibitor Registration .....	7:00 AM - 5:00 PM
Coffee Break .....	7:15 AM - 8:00 AM
Technical Paper Sessions (Track 1 - Track 6) .....	8:00 AM - 10:05 AM
Coffee Break .....	10:05 AM - 10:20 AM
Technical Paper Sessions (Track 1 - Track 6) .....	10:20 AM - 12:00 PM
<b>Exhibit Hall Open</b> .....	12:00 PM - 3:30 PM
Lunch Concessions .....	12:00 PM - 2:00 PM
NASTT's Innovative Product Review .....	2:00 PM - 3:00 PM
Let's Make A Deal .....	3:30 PM - 5:30 PM

Technical Paper Sessions (Track 1 - Track 6) .....	3:30 PM - 5:35 PM
<b>Pre-Gala Awards Dinner Reception (ticketed event)</b> .....	6:00 PM - 7:00 PM
<b>NASTT's No-Dig Show Gala Awards Dinner (ticketed event)</b> .....	7:00 PM - 11:00 PM

### WEDNESDAY, MARCH 6, 2013

Attendee & Exhibitor Registration .....	7:00 AM - 1:00 PM
Coffee Break .....	7:15 AM - 8:00 AM
Technical Paper Sessions (Track 1 - Track 5) .....	8:00 AM - 10:05 AM
<b>Exhibit Hall Open</b> .....	10:00 AM - 12:30 PM
Student Poster Competition .....	10:30 AM - 12:30 PM
<b>NASTT's No-Dig Show Closing Luncheon &amp; Entertainment</b> .....	12:30 PM - 2:00 PM
NASTT's Pipe Bursting Good Practices Course (Day 1) .....	2:30 PM - 5:30 PM
NASTT's Sewer Laterals Good Practices Course (Day 1) .....	2:30 PM - 5:30 PM
NASTT's Cured-In-Place Pipe (CIPP) .....	
Good Practices Course (Day 1) .....	2:30 PM - 5:30 PM
NASTT's Horizontal Directional Drilling .....	
Good Practices Course (Day 1) .....	2:30 PM - 5:30 PM
NASTT's New Installation Methods .....	
Good Practices Course (Day 1) .....	2:30 PM - 5:30 PM

### THURSDAY, MARCH 7, 2013

NASTT's Pipe Bursting Good Practices Course (Day 2) .....	8:30 AM - 12:00 PM
NASTT's Sewer Laterals Good Practices Course (Day 2) .....	8:30 AM - 12:00 PM
NASTT's Cured-In-Place Pipe (CIPP) .....	
Good Practices Course (Day 2) .....	8:30 AM - 1:00 PM
NASTT's Horizontal Directional Drilling .....	
Good Practices Course (Day 2) .....	8:30 AM - 2:30 PM
NASTT's New Installation Methods .....	
Good Practices Course (Day 2) .....	8:30 AM - 1:00 PM
NAASCO Pipeline Assessment User Recertification Course .....	8:00 AM - 6:00 PM

## LEGENDS OF HDD ~ FROM AN IDEA TO AN INDUSTRY



Tuesday, March 5, 2013 | 10:20 AM - 12:00 PM

This is truly a one-of-kind opportunity for our attendees! We are assembling an incredible group of pioneers and icons of the horizontal directional drilling industry who were there in HDD's infancy.

Martin Cherrington, who is known as the "Father of HDD", will start the program with a 20 minute presentation highlighting the early days of HDD's evolution. After the presentation, Martin, Ron Halderman, Dick Melsheimer, Lon Brisco, Bill Riel and Tom Tibor will participate in a roundtable discussion.

**YOU WILL NOT WANT TO MISS THIS SESSION!**  
**(OPEN TO ALL ATTENDEES)**



# TRENCHLESS IN THE CITY



New this year at NASTT's No-Dig Show, we will feature papers from different trenchless projects happening in the west. Each new session is kicked off with an invited paper by Owners who will share their trenchless experiences and the lessons that they have learned in their cities. Check out the program schedule for the specific papers highlighted in these sessions:

- ◆ Trenchless in Northern California
- ◆ Trenchless in Oregon
- ◆ Trenchless in Southern California

- ◆ Trenchless in Washington
- ◆ Trenchless in the Rockies



# CALL FOR ABSTRACTS

## NASTT'S 2014 NO-DIG SHOW THE MAGIC OF TRENCHLESS

APRIL 13-17 - GAYLORD PALMS - ORLANDO, FLORIDA

[WWW.NODIGSHOW.COM](http://WWW.NODIGSHOW.COM)



The North American Society for Trenchless Technology (NASTT) is now accepting abstracts for its 2014 No-Dig Show in Orlando, Florida. The conference will take place at the Gaylord Palms on April 13-17, 2014.

Prospective authors are invited to submit a 250-word abstract outlining the scope of their paper and the principal points of benefit to the trenchless industry. The abstracts must be submitted electronically at NASTT's website by June 30, 2013: <http://www.nastt.org/abstractsubmission>.

NASTT's 2014 No-Dig Show Program Committee will review abstracts and notify the primary authors of acceptance in August. To ensure meaningful and commercial free technical content, all papers will be peer-reviewed. Final papers will be published in the conference proceedings.

### ABSTRACTS FROM THE FOLLOWING SUBJECT AREAS ARE OF INTEREST TO THE NO-DIG SHOW PROGRAM COMMITTEE:

#### HDD

- Pipeline Inspection and Locating
- Condition Assessment
- Subsurface Utility Engineering
- I&I and Leak Detection

#### Cutting-Edge Advances in Pipeline and Manhole Rehabilitation

- Cured-in-Place Pipe Lining
- Sliplining
- Pipe Bursting
- Laterals Rehabilitation
- Grouting
- Lining Materials and Application Methods

#### New Installations

- New Concepts for Trenchless Equipment, Materials and Methods
- Horizontal Directional Drilling (HDD)
- Microtunneling
- New Applications for Boring Techniques (Auger Boring and Pipe Ramming)
- Pilot Tube Boring (Tunneling)

#### Trenchless Research and Development

- University and Industry Initiatives
- Education and Training

#### Environmental Incentives, Challenges and Sustainability

- Carbon Reduction
- Sustainable Construction Practices

#### Municipal Issues

- Selection Criteria for Contractors
- Development of Submittal Requirements
- Measuring Quality Assurance/Quality Control
- Project Budgeting and Prioritization
- Selection Criteria for Materials
- Funding for "Green" Technologies
- Lessons Learned

#### Industry Issues

- Social Costs and Impacts
- Carbon Footprint Reduction
- Industry Trends, Issues and Concerns

### QUESTIONS? PLEASE CONTACT:

Michelle Hill  
NASTT Communications  
& Training Manager  
E: [mhill@nastt.org](mailto:mhill@nastt.org)  
P: 440-638-4676



## SUBMISSION DEADLINE: JUNE 30, 2013

# MEET

# *the*

# BOARD



On Board for 2013: The NASTT Board of Directors is ready to take on a much-anticipated year for the organization and the trenchless industry.



The NASTT Board of Directors leads the affairs of the society on behalf of the membership. The Board is comprised of 19 directors from across the United States and Canada who are elected by the society's members. The election of this year's Board of Directors was held last fall throughout the month of October, as three new Board members were added. Read more about NASTT's leadership team in the brief introductions that follow.

# 2013 NASTT OFFICERS



**Derek Potvin, P.Eng.**  
*Chair & International Representative*

Derek Potvin, P.Eng., is the president of the multidisciplinary engineering firm, Robinson Consultants Inc. He obtained his Bachelor of Applied Sciences with a minor in business administration from the University of Ottawa. Derek has been providing trenchless rehabilitation solutions to his clients for more than 20 years, including a trenchless technology project that won a Canadian Consulting Engineering Award.

Derek is actively involved with NASTT's No-Dig Show where he has authored many papers including one that won an award for Outstanding Paper, and for several years, he has been an instructor of NASTT's Introduction to Trenchless Technology Short Course (sewer and water main trenchless rehabilitation). Derek has also been involved as an organizer and instructor of NASTT's Good Practices Courses and regional trenchless conferences, such as the *Trenchless Technology Road Shows*. Derek is the Treasurer for the Great Lakes St. Lawrence and Atlantic Chapter (GLSLA).



**Jennifer Glynn, P.E.**  
*Secretary*

Jennifer Glynn, P.E. is a senior project manager for RMC Water and Environment in its Walnut Creek, Calif. office. She earned her B.S. in Civil Engineering from the University of New Hampshire and then headed west to California. Jennifer has 17 years of experience in municipal infrastructure planning, permitting, design and construction management with an emphasis on pipeline design and the use of trenchless technology. She has published and presented papers on projects she designed using trenchless technology at conferences across the country.

Jennifer has been a member of the No-Dig Show Program Committee for the past seven years and is one of the founding members of the Western Chapter (WESTT). She currently serves as past chair of WESTT and is a volunteer NASTT Pipe Bursting Good Practices Course and Introduction to Trenchless Technology instructor. Jennifer is also a member of the American Water Works Association's Water Pipeline Rehabilitation Committee and a past vice president of the Northern California Pipe User's Group (PUG).



**Kimberlie Staheli, Ph.D., P.E.**  
*Vice Chair & NASTT's 2013 No-Dig Show Program Chair*

Kimberlie Staheli is the president and founder of Staheli Trenchless Consultants in Seattle, Wash., a trenchless engineering consulting firm specializing in the design and construction management of all types of high risk trenchless projects for more than 20 years.

Kim has a B.S. in Mechanical Engineering from Rensselaer Polytechnic Institute, a M.S. in Civil Engineering from Mississippi State University and a Ph.D. in Geotechnical Engineering from Georgia Institute of Technology. She is a registered professional engineer in Washington, Oregon, California, Colorado, Ohio and Florida.

Kim has specialized in trenchless design and construction, working for contractors, performing trenchless research and working as a consultant. She is particularly interested in minimizing the risks of installation techniques including microtunneling, directional drilling, pipe ramming, auger boring and large diameter tunneling. Kim has focused on risk reduction through the development of geotechnical baseline reports as well as pro-active construction risk management. She has vast experience in trenchless forensics and post construction claims analysis and provides expert testimony.

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### Dave Krywiak, P.Eng.

*Treasurer*

Dave Krywiak is a principal and project manager with Stantec Consulting Ltd. in its Edmonton, Alberta office. He obtained a B.S. degree in Civil Engineering from the University of Alberta in 1977

and has been employed in the consulting industry since that time. Many of the projects Dave has been involved with have included significant trenchless technology components, such as conventional and microtunneling, HDD and CIPP relining. He is one of the founding members of the Northwest Chapter (NASTT-NW) and has served on the Chapter Board for a number of terms, including a term as the Chapter Chair.



### George Ragula

*Immediate Past Chair*

George Ragula is responsible for evaluating cutting-edge technologies that increase efficiency and effectiveness of operations for Public Service Electric & Gas (PSE&G). Responsibilities include planning, coordinating,

managing and implementing procedural and equipment technology transfer with particular emphasis on increased use of various trenchless technologies. He has spent the last 18 years committed to the ever-growing technologies in trenchless construction.

George has a very diverse background in gas distribution engineering and operations. Prior to joining PSE&G in 1988, he held various positions at Brooklyn Union Gas responsible for project estimating, field engineering/construction, system planning and network analysis, design, codes and standards, contract administration, gas leak detection including emergency response as well as drafting.

He is a member of the American Gas Association, American Society of Mechanical Engineers, NASTT, Society of Gas Operators and the New Jersey Society of Asphalt Technologists. He serves as Treasurer of the Northeast Gas Distribution Council and is actively involved as a project advisor for the Gas Technology Institute Operations Technology Development Program and Sustaining Membership Program. In addition, he serves as Chairman of the NYSEARCH - Northeast Gas Association R&D Committee. He received his B.S. in Mechanical Engineering from Polytechnic Institute of Brooklyn in New York.

## 2013 NASTT BOARD OF DIRECTORS



### Erez Allouche, Ph.D., P.Eng.

Dr. Erez Allouche is an associate professor of Civil Engineering at Louisiana Tech University, the Director of the Trenchless Technology Center and the holder of the T.L. James Eminent Scholar Chair in Civil Engineering. He is a licensed professional engineer

registered at the Province of Alberta, Canada. His work focuses on the development of new technologies as well as design and analysis models for various underground construction methods and condition assessment techniques. He is the recipient of the Ontario Premier Research Excellence Award (2001), University Research Award (2005, 2008), the Engineering and Science Foundation's Award (2006), Louisiana Engineering Foundation Professional Award (2010), Best Technical Paper – NASTT No-Dig Show (2011) and the Governor of Louisiana Technology Product of the Year Award (2012).

Over the past 12 years, Allouche served as the PI and Co-PI of research projects in the area of buried infrastructure totaling over \$12 million, and supervised 50 graduate students in this field. Many of these students are practicing professionals or educators in the fields of municipal engineering or construction management. He is the inventor (or co-inventor) of 14 patents in the area of trenchless technologies and the author (and co-author)

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of more than 200 publications in the fields of buried infrastructure management and trenchless techniques, including 60 peer-reviewed journal papers. He is also the co-founder of two start-up companies based in Ruston, La. Allouche teaches undergraduate and graduate courses in the areas of infrastructure management, construction management, construction equipment and methods and trenchless technology. He is an associate editor of the recently launched ASCE Journal of Pipeline Systems.



**Don Del Nero, P.E., C.D.T**

Don Del Nero has more than 23 years of experience including planning, studies, design and construction management in the areas of tunnel and trenchless engineering. Don obtained his M.S. in Geotechnical Engineering from Syracuse University and his B.S.

in Civil Engineering from Clarkson University. His project experience covers more than 50 projects and 40 miles of tunnel and trenchless installations, worth more than \$1.3 billion in construction value. He has been involved in a variety of trenchless technologies for sanitary sewer, storm sewer, raw water, finished and recycled water, SSO and CSO wastewater tunnels, highway tunnels, pedestrian tunnels, caverns, raw water intake tunnels and large diameter piping

in sensitive areas. His tunneling experience is in a wide-array of geotechnical conditions across the U.S., Canada and abroad. He is heavily involved in client and project risk mitigation, has engaged in several differing site condition claims, and has developed expertise in mining in cobbles and boulders. His project experience has included tunneling from 8-in. pilot-tube microtunneling to 36-in. directional drills to 30-ft diameter hard rock tunnel boring machines.

Don is a member of and/or involved in the Dispute Review Board Foundation, Underground Construction Association of the Society for Mining, Metallurgy and Exploration, Tunneling Association of Canada, and the British Tunneling Society. He has been very active on the NASTT No-Dig Conference Program Committee for several years and has contributed several articles for *Trenchless Technology* magazine.



**Frank Firsching**

As the executive vice president for UGSI, Frank Firsching oversees the UGSI regional sales managers and coordinates all domestic and international sales activities. He has extensive engineering, sales and management experience. He received a MBA at the Wharton

School Business and a B.S. in Mechanical Engineering

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**Rick King**  
Trenchless Technology Leader,  
US East  
(214) 855-5511  
rick.king@stantec.com

As a specialist in water and sewer assessments of up to 104-inch diameter pipes and flow bypass design (up to 225 mgd), I have helped clients rehabilitate over 130 miles of pipelines.



**Dave Krywiak**  
Trenchless Technology Leader,  
Canada West  
(780) 917-7101  
dave.krywiak@stantec.com

For the crossing of the environmentally sensitive Athabasca River in Fort McMurray, Alberta, we used horizontal directional drilling for twin 900 mm, 1,200 m long forcemains.



**Gerald Bauer**  
Trenchless Technology Leader,  
Canada East  
(613) 722-4420  
gerald.bauer@stantec.com

Working with the City of Ottawa, Ontario, we are performing specialized investigations and condition assessments of their medium to large diameter CSP culverts located under major roadways.



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from the University of Virginia. Before joining UGSI, Frank worked for USFilter as president of the Water and Wastewater Systems Group with responsibility for USFilter's global process equipment and technology divisions. Frank also held the positions of executive vice president of the Process Water Group, West Regional and general manager in USFilter. In addition, he has worked for Deloitte & Touche Management Consulting and GE.



### Jamie Hannam, MBA, P.Eng.

Jamie Hannam is the director of engineering and information services for Halifax Water, a position he obtained in 2007. Prior to this, he was the Chief Engineer with the Halifax Regional Water Commission from 1994 to 2007.

A graduate of Acadia University (B.S. 1983), Technical University of Nova Scotia (B.Eng. 1985) and Dalhousie (MBA 1990), he spent the earlier years of his career in municipal government in both Halifax and Dartmouth working on a variety of engineering tasks. In his role as manager of engineering and information services, he is responsible for water and wastewater infrastructure master planning, asset management and capital project delivery with an annual capital budget of \$50 million.

Halifax Water, the first regulated water, wastewater and stormwater utility in Canada and the largest utility in Atlantic Canada, serving 350,000, with pipes as old as 1856, has utilized trenchless technologies and NASTT resources as key components of their system rehabilitation program for the past 15 years.



### Tom Hayes

Tom Hayes is the president of Haywood Associates, LLC. He is also vice president and general manager of Murphy Pipeline Contractors, Inc., specializing in water line pipe bursting and

swagelining. Previously, he was vice president of the North American Rehabilitation Division for Insituform Technologies, where he worked for 24 years. Tom has more than 30 years of experience in underground pipeline infrastructure. Before joining Insituform he was a partner at Utility Surveys, Inc., a utility construction firm. Prior to that, he worked for McCullough Environmental, a firm specializing in sewer system evaluation surveys (SSES) for municipal and federal utility systems. An Atlanta, Ga. resident, Tom holds a bachelor's in psychology from the University of South Carolina and a MBA from Jacksonville University. Tom is a member of the American Public Works Association and the American Water Works Association.



### Tony Hranicka, P.E.

Tony is currently responsible for evaluating and implementing new technologies that increase the efficiency and effectiveness of gas operations within the Con Edison service territory within and around New York City. His

activities include planning, coordinating, managing and putting into place new technologies, both procedural and equipment-focused, with particular emphasis on increased use of various trenchless technologies. He has spent the last 12 years committed to gas main and service rehabilitation, and in certain cases water main rehabilitation, all by trenchless construction.

Tony has a diverse background in gas distribution engineering and operations over his 31-year career in the utility industry. Starting as a management intern on the engineering track, his assignments have grown with enhancing responsibilities through gas engineering, gas distribution services, contract administration and inspection, purchasing of mechanical supplies, until currently in gas operations research and development.

He has been a member of the American Society of Mechanical Engineers since college, and is a licensed P.E. in New York since 1989. Tony is the recipient of the American Gas Association 2007 Gas Industry Research Award for commercialization of the CISBOT program (Cast Iron Joint Sealing live robotic system). He received his bachelor's in mechanical engineering from Manhattan College in 1980, and a master's in engineering from the same school in 1985. He also has a master's from the New York Institute of Technology, which he completed in 1997.



### Larry Keist, Jr.

Larry is a third-generation master plumber who has used his skills to promote trenchless technologies for 23 years. His experience includes auger boring as well as installing and repairing potable water mains, service leads,

sewer mains, sewer service laterals and manholes. In 1993, he founded LMK Technologies based in Ottawa, Ill. The need for renewing and sealing service lateral pipes has been a major focus of LMK through innovative and unique CIPP products. LMK drives innovation in the trenchless industry by playing a major role in education, setting standards and continually taking measures to protect our environment, one lateral at a time. Moreover, Larry has developed multiple trenchless systems resulting in more than 80 patents issued throughout North America, Europe and Australia. Additionally, he is responsible for the issuance of two ASTM standards.

Larry is a long-term member of the NASTT No-Dig Show

Program Committee and an Advisory Board member for the Trenchless Technology Center at Louisiana Tech University. Larry's industry involvement includes vice president of the Midwest Society of Trenchless Technology (2008-2011), National Association of Sewer Service Companies (NASSCO) Board member (2008-2011), Chairman of NASSCO Lateral Committee (2008-2011) plus, a contributing member of American Society of Civil Engineers (ASCE), American Society of Testing Materials (ASTM) and Water Environment Federation (WEF).

Larry has published numerous technical papers in ASCE Pipelines Journal, *NASTT's Trenchless Today* and in NASTT, ISTT and UCT conference proceedings.

projects utilizing pipe ramming, tunneling, HDD and structural lining of wastewater systems using a UV curing system. Always a willing volunteer, Brenda is a long-term member of the NASTT No-Dig Show Program Committee and has served as a session leader and moderator for the last five No-Dig shows.



### Brenda Kingsmill

Brenda is a graduate of Sault College and the British Columbia Institute of Technology. Initially working in the private sector for eight years, Brenda joined Halton Region 1986 where she became a design supervisor. Now a project manager, Brenda is responsible for

environmental assessment plus design and construction administration of numerous linear and facility projects. Aside from traditional open-cut methods for both potable water and wastewater systems, Brenda is currently managing



### Jason Lueke, Ph.D., P.Eng.

Jason has 15 years of experience in consulting, construction, education and research focusing specifically on trenchless engineering and construction. Prior to rejoining Associated Engineering in 2012, he served three and a half years as an assistant professor and

senior sustainability scientist in the Del E. Webb School of Construction at Arizona State University, teaching soil mechanics and researching trenchless methods, infrastructure utility design and buried infrastructure management. During his first tenure with Associated Engineering, he was an infrastructure engineer and trenchless discipline lead in the company's Edmonton office. In that role, he coordinated, designed and managed various trenchless projects, including: performing construction feasibility assessments and facilitated value engineering workshops; performing conceptual design

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studies; conducting preliminary and detailed designs; and supporting AE's other offices with various trenchless specific projects. Jason has participated as an engineer or contractor on a variety of trenchless projects involving pipe bursting, HDD, CIPP relining, auger boring, pipe ramming and tunneling.

Jason serves on the Board of Directors for NASTT and is an instructor for its Lateral Sewer Rehabilitation, Horizontal Directional Drilling, and Pipe Bursting Best Practices Courses. He has published more than 50 papers for journals and conferences to trenchless design, construction and research; and has presented across North America and internationally at many conferences and trade shows. Jason also co-authored the NASTT Good Practices Manual for trenchless rehabilitation of lateral sewers. He has extensive, unique knowledge rated to HDD and pipe bursting through his research activities and professional experience as a construction manager and engineer. His impact in the trenchless industry in North America was recognized in 2010 when he was selected by NASTT as the inaugural recipient of the Trent Ralston Award for Early Career Achievement in the field of trenchless technology.



### Tracy J. Lyman, P.E., P.G.

Tracy Lyman is a senior consultant for Brierley Associates, LLC. He holds a master of engineering from the Colorado School of Mines and has more than 39 years of experience in geology, geotechnical engineering and tunnel engineering for heavy civil infrastructure projects. Lyman

has provided design and construction management services for more than 250 tunnel and trenchless projects in the United States and overseas. He is a registered professional engineer in eight states and a registered geologist in Idaho and California. He is active in ACEC, ASCE, NASTT and AEG and has lectured extensively on geotechnical and tunnel engineering topics throughout his career. Tracy is the Founding Chairperson for NASTT's Rocky Mountain Chapter.



### Kevin Nagle *NASTT's 2013 No-Dig Show Program Vice Chair*

Kevin Nagle is a civil engineering graduate from the University of Illinois, earning his bachelor's in civil engineering in 1997. He worked for six years as a design engineer for a structural engineer

firm before moving on to work for TT Technologies, Aurora, Ill., a manufacturer of a wide range of trenchless tools and equipment. As part of the TT team, Kevin works in and out of the office in an effort to grow the trenchless market through education, training and marketing. He has worked at an industry level to help move the trenchless industry forward through organizations such as NASTT

(member of the Program Committee), Midwest Society of Trenchless Technology (board member), International Pipe Bursting Association (member of Marketing Committee) and UCA (member of the Construction Materials Methods and Specifications Committee). Kevin has gained firsthand trenchless field experience in the pipe bursting, pipe ramming, horizontal directional drilling and horizontal boring processes.



### Cindy Preuss, P.E.

Cindy Preuss graduated with a bachelor's in civil and environmental engineering from the University of California at Berkeley and is a licensed professional civil engineer in the State of California. Cindy has 15 years of experience

in the industry with a focus on infrastructure design including collection system, water and recycled water pipeline rehabilitation and new installations.

Cindy is currently serving a second two-year term as chairman for the Board of Directors for the Northern California Pipe User's Group (PUG), an association of public agencies, private consultants, contractors, vendors and suppliers that study current, conventional and trenchless pipe technologies. PUG sponsors attendance to and scholarships for NASTT's No-Dig Show and regional WESTT No-Dig conferences, and offers NASTT Good Practices courses to PUG members on various trenchless technologies. Cindy also serves as vice chairman for the WESTT Chapter Board of Directors and as a volunteer on the No-Dig Show Program Committee for her eighth year running.



### Jim Rankin

Jim Rankin has been with the Vermeer Corp. for more than 35 years and has amassed a vast array of knowledge of industrial equipment and trenchless technology applications. For the past 24 years, Jim's focus has been on Vermeer's horizontal directional drills. He

was the project leader for the team that developed the first drill commercially marketed by the Vermeer Corp. Prior to working with HDD equipment, he was involved with the development of Vermeer's Utility Products (formerly Rubber Tire) and track equipment.

Jim has demonstrated his innovation abilities and technical skills by earning 15 industrial patents. He delivers the Vermeer vision of "Taking Care of Customers Worldwide with Better Solutions" through extensive domestic and international travel and by meeting the business needs of the Vermeer customers and dealers.

Jim is a long-term member of NASTT's No-Dig Show Program Committee and serves as the Chair of NASTT's Educational Fund Auction Committee. Jim and his wife Jeanette have

three daughters, one son and five grandchildren. Jim spends his free time boating and woodworking.



**Isabel Tardif, B.Eng., LL.B., M.P.M.**

Isabel Tardif holds bachelor's in civil engineering from McGill University and a law degree from the University du Quebec in Montreal. She also earned a masters in project management from the University

du Quebec en Outaouais.

Isabel is currently the director of technical services at the Town of Mount-Royal, supervising both the engineering and public works departments. Prior the Town of Mount-Royal, she was a director of underground infrastructures for the Centre for Expertise and Research on Infrastructure in Urban Areas (CERIU). She has also held the position of operations manager – potable water and sewer networks – for the City of Aylmer and as well as coordinator – potable water and sewer rehabilitation – for the engineering department for the City of Gatineau.

She has been involved in several INFRAGuide Committees; NASTT's No-Dig Program Committee, NASTT's GLSLA Chapter, National Association for Sewer Service Companies (NASSCO), and CERIU. Isabel has moderated and has given

conferences in Africa, Europe, the Middle East and in North America on different topics pertaining to potable water, sewer and trenchless technologies. She also gives courses and lectures on trenchless technologies to engineers, technicians, as well as university students.



**Dan Willems, P.Eng.**

Dan Willems is currently preservation manager with the City of Saskatoon Infrastructure Services department's strategic services branch. Dan holds a bachelor's in civil engineering from the University of Saskatchewan in Saskatoon. Since

2001, Dan has worked for various municipal government and private consulting organizations across the Canadian Prairie Provinces. Over his career, Dan has been involved in several trenchless construction projects, including CIPP lining, microtunneling, case boring, tunneling, directional drilling and pilot tube microtunneling. Dan has been heavily involved in the Northwest Chapter of NASTT since 2005 and has also been a regular contributor at the annual No-Dig Show conferences. Dan is actively working with the Northwest Chapter and local industry in Saskatchewan and Manitoba to expand NASTT's presence across the Prairie Provinces.



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# 2013 HALL OF FAME



## NASTT Inducts 2013 Hall of Fame Class

The North American Society for Trenchless Technology (NASTT) has announced the members of the organization's 2013 Hall of Fame class: Insituform founder, the late Eric Wood; The Charles Machine Works Inc. founder, Edward Malzahn; and trenchless engineer, Dr. David Bennett.

Like NASTT's inaugural class of 2012, these three pioneers of the industry paved the way for the modern generation of trenchless professionals and have helped shape the field of underground construction. NASTT's 2013 Hall of Fame class will be formally inducted at the Gala Awards Dinner on March 5 at the 2013 No-Dig Show in Sacramento, Calif.

"These inductees epitomize innovation, which is one of the key tenants of the trenchless technology industry," says NASTT Executive Director Mike Willmets. "I could not be more proud and honored to have these individuals inducted into NASTT's Hall of Fame. Their contributions to trenchless technology have been paramount to the industry's success and evolution to its current position in the infrastructure market."

NASTT's Hall of Fame was created in 2010 by the NASTT Board of Directors to celebrate the Society's most outstanding and accomplished members who have made a lasting impact on the trenchless industry. NASTT is a preeminent affiliate of the International Society for Trenchless Technology (ISTT), and many of its members are innovators of trenchless technology. The Hall of Fame forever honors the leaders and trailblazers of trenchless technology.

The NASTT Board of Directors met in July and voted these trenchless icons as members of the 2013 class. Congratulations to our new inductees!

### Eric Wood (1935-1994)

**Inventor of CIPP Process;  
Co-founder, Insituform**



Eric Wood was the inventor of the cured-in-place (CIPP) process and co-founder of the company Insituform, which revolutionized pipeline repair. Wood developed his unique process in 1971, bringing it to North America from the United Kingdom. The technology has since developed into the preeminent method for municipalities and cities to rehabilitate their aging and deteriorating pipelines. Wood was tragically killed in a plane crash in January 1994 at the age of 59 – just as the age of the CIPP process was opening to a competitive market.



*In 2008-2009, Insituform rehabilitated 10,000 ft of a 48-in. water main running beneath Madison Avenue in Manhattan, N.Y.*

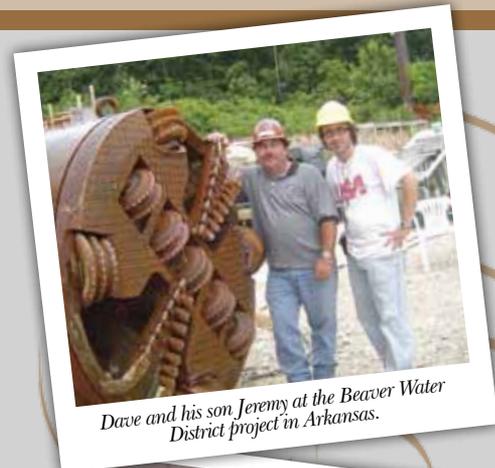


*Insituform facility in the U.K. circa early 1970s.*



### Dr. David Bennett

David Bennett is one the industry's first true trenchless engineers, actively involved in trenchless technology since the late 1980s. He is currently the owner and president of Bennett Trenchless Engineers and has been a staunch and aggressive advocate of the industry, promoting it through training, academics and research. He has authored more than 50 technical papers on aspects of trenchless technology tunneling and geotechnical engineering. He is the co-author of the HDD Good Practices Guidelines and the Pipe Bursting Good Practices Guidelines and continues to teach both courses for NASTT.



*Dave and his son Jeremy at the Beaver Water District project in Arkansas.*



*Trenchless Technology 2005 Person of the Year*

*Bennett gives back to the trenchless community, teaching both the HDD Good Practices and Pipe Bursting Good Practices courses for NASTT.*

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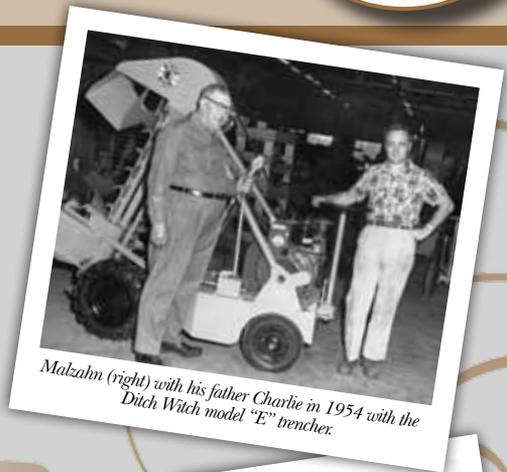
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# 2013 HALL OF FAME

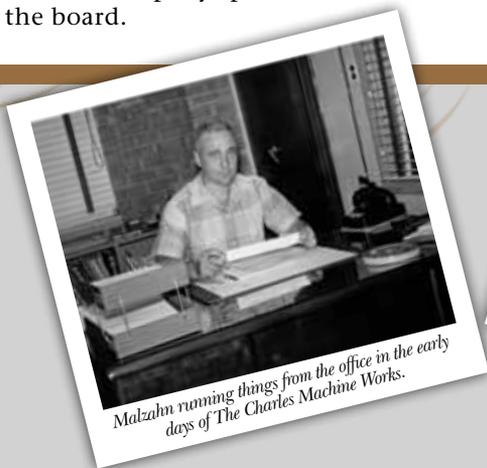


## Edward Malzahn

Ed Malzahn is the founder of The Charles Machine Works Inc., perhaps better known to the trenchless industry as Ditch Witch, creating his company in 1949. Considered one of the trenchless industry's pioneers, Malzahn was at the forefront of the horizontal directional drilling industry, developing drilling rigs and equipment that pushed the fledgling HDD industry forward through his vision and innovation. Now in his mid-80s, Malzahn still serves as company president and chairman of the board.



Malzahn (right) with his father Charlie in 1954 with the Ditch Witch model "E" trencher.



Malzahn running things from the office in the early days of The Charles Machine Works.



The original Charles Machine Works facility.



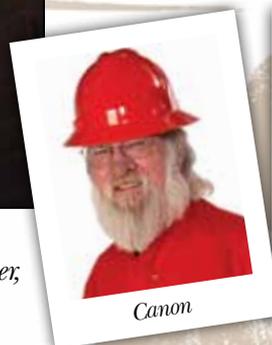
Malzahn digs a 4-in. wide trench with his original "DW" model trencher in 1949.

ll of Fame • NASTT's Inaugural Hall of Fame



(left to right) Trenchless Technology publisher Bernie Krzys, Mary Andringa on behalf of her father, the late Gary Vermeer, founder of Vermeer, and Frank Canon, Bariod IDP.

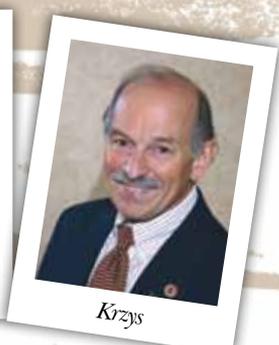
This is NASTT's second Hall of Fame class. The inaugural class, the late Gary Vermeer, Frank Canon and Bernard P. Krzys, was inducted in 2012 and was the featured event at NASTT's 2012 No-Dig Show. NASTT's 2013 No-Dig Show takes place March 3-7 at the Sacramento Convention Center in Sacramento, Calif. For more information on the No-Dig Show, visit [www.nodigshow.com](http://www.nodigshow.com).



Canon



Vermeer



Krzys



NORTH AMERICAN SOCIETY FOR TRENCHLESS TECHNOLOGY

# NOMINATIONS BEING ACCEPTED FOR NASTT'S HALL of FAME CLASS OF 2014

In 2010, the NASTT Board of Directors voted to create a Hall of Fame in order to ensure that the Society's most outstanding and praiseworthy members received due recognition. The intent of NASTT's Hall of Fame is to preserve the outstanding accomplishments of these exceptional individuals and to honor their contributions to the advancement of both the trenchless industry and the Society. Members may be elected from all NASTT membership categories: Manufacturers and Suppliers; Engineers and Consultants; Municipal and Utility Employees; Contractors; and Academia.

Nominee \_\_\_\_\_

Birth Date \_\_\_\_\_ Year NASTT Membership Started \_\_\_\_\_

### Nominee or Next-of-Kin Contact Information

Name \_\_\_\_\_

Business Name (if applicable) \_\_\_\_\_ Business Phone \_\_\_\_\_

Business Address \_\_\_\_\_

Home Address \_\_\_\_\_

Home Phone \_\_\_\_\_ Email Address \_\_\_\_\_

### Summary of Outstanding Achievements

Please state in 3-4 sentences the contribution(s) made by this nominee that justifies his/her induction. You may also attach a document to this application if you need more space.

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

### Contact Information for the Principal Nominator

Name \_\_\_\_\_

Business Phone \_\_\_\_\_ Email Address \_\_\_\_\_

Completed applications along with (3) letters of recommendation and biographical information on the nominee should be directed electronically to Michael Willmets, NASTT Executive Director at [mwillmets@nastt.org](mailto:mwillmets@nastt.org) and must be received by no later than July 1, 2013.



[www.nastt.org](http://www.nastt.org)

North American Society for Trenchless Technology  
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 7445 Morgan Rd. • Liverpool, NY 13090 USA  
 Phone: 315-409-7552



The North American Society for Trenchless Technology (NASTT) takes pride in the fact that so many of its members are key players in the trenchless industry. Whether on the engineering, contracting or manufacturing end, NASTT members are involved in countless projects each year that continue to break barriers and drive underground construction forward. In this issue of *NASTT's Trenchless Today*, we introduce this new project updates section, highlighting a handful of these members and some of the recent projects they have been involved in.

## Orange County, California – Sliplining

Akkerman, Inc., HOBAS Pipe USA



Akkerman, Inc. and HOBAS Pipe USA were involved in the Magnolia Trunk Sewer Rehabilitation. The project was named 2012 *Trenchless Technology* Project of the Year for Rehabilitation and included sliplining 2,600 ft of a 78-in. pipe and 23,810 ft of a

48-in. pipeline along Magnolia Street in Orange County, Calif.

The rehab was performed using 13 access pits where placement of HOBAS low-profile bell vinyl ester pipe was inserted in sizes ranging from 36 to 48 in. in diameter with runs as long as 3,000 ft. In addition to traditional excavation sliplining, the contractor chose to use an Akkerman Hydraulic Pushing Machine to push the new pipe into the existing line, with the annular space filled with grout afterward.



## Saskatoon, Saskatchewan – CIPP

Insituform Technologies, Inc.



Insituform Technologies Inc. was the contractor on the Saskatoon Interceptor Trunk Sewer Rehabilitation project, which included the cleaning and CIPP lining of 1,007 ft of 84-in. reinforced concrete pipe. The project was completed with the largest sanitary sewer bypass pumping project in Western Canada.

## St. Louis, Missouri – CIPP

Insituform, LMK Technologies

Insituform recently used cured-in-place pipe (CIPP) to renew and seal lateral connections on large diameter trunk sewers for the St. Louis Metropolitan Sanitary District (MSD). The project included the renewal of mainline sewers



ranging from 8 to 24 in. and the sealing of lateral connections. Insituform had sub-contracted Performance Pipelining Inc. (PPI) the oldest original licensed installer of the T-Liner lateral renewal system manufactured by LMK Technologies LLC. The T-Liner process is a cured-in-place pipe that consist of a short (18-in. long) full-hoop mainline liner tube and a lateral tube that is resin saturated and inserted robotically from within the main pipe. The LMK engineering department was working around the clock to make modifications to the installation equipment and designing custom-tailored main/lateral CIP-liner assemblies to fit the unique lateral pipe connections.

## Pasco, Washington – CIPP

Michels Pipe Services

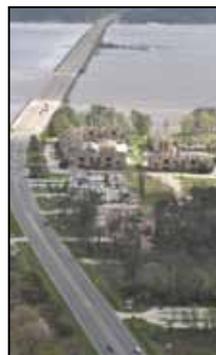
Michels Pipe Services, a division of Michels Corp., was contracted to complete structural rehab of 66-year-old lead-joint, ductile iron pipe that had developed cracks in Pasco, Wash. The rehab included two 275-ft sections of the 12-in. pipe that ran 8



ft under six sets of active railroad tracks and had to be done without taking the tracks out of service. Michels installed a NSF 61-approved Class IV fully structural Nordipipe liner. A pressure vessel was used to invert the tube and it was cured with steam to a statically self-supporting pipe within a pipe. Each installation took 12 hours.

## Harris County, Texas – HDD

Laney Directional Drilling



Last year, Laney Directional Drilling completed a record-setting drilling distance of 10,971 ft. The Lake Houston HDD project was recognized as the 2012 *Trenchless Technology* Project of the Year for New Installation. The project was for the installation of a 6-in. diameter steel gas pipeline running parallel to the FM1960 bridge crossing Lake Houston in northeast Harris County, Texas. Laney, the HDD subcontractor drilled a length of more than two miles, 120 ft below the lake's bottom.

## Orange Beach, Alabama – HDD

Southeast Directional Drilling

Southeast Directional Drilling was the contractor on the Wolf Bay Crossing Project in Orange Beach, Ala. – now the longest HDD installation of underground electrical transmission lines in the United States. The installation involved approximately 6,200



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ft of 36-in. diameter steel casing pipe installed by Southeast Directional Drilling using HDD pilot hole intersect and HDD-assist methods under Wolf Bay in Alabama. The bore included crossing under an intracoastal waterway channel while reaching depths of up to 110 ft. Once the 36-in. steel casing was installed, multiple HDPE pipes were bundled and pulled together into the casing with stainless steel bands spaced throughout the length of the bundle.

## Shively, Kentucky – Pilot-tube Microtunneling

Midwest Mole, Inc., Akkerman, Can Clay Corp.



The Shively Interceptor Project in Shively, Ky., is the third largest pilot-tube microtunneling (PTM) project ever completed in the United States. Midwest Mole was the contractor on the project that consisted of the installation of more than 10,678 lf of vitrified clay pipe (VCP)

ranging in diameter from 15 to 27 in. The trenchless crossings required (three each) 12-ft diameter shafts (two secant pile, one internally braced sheet pile cell), and (34 each) 9-ft diameter shafts ranging from 17 to 35 ft deep. Akkerman and Can Clay Corp. were also involved in the project as an equipment manufacturer and pipe supplier, respectively.

## Tolono, Illinois – Pilot-tube Microtunneling

Midwest Mole

Midwest Mole, Inc. recently completed a railroad crossing project using auger boring in the Town of Tolono, Ill. The project consisted of 128 ft of 60-in. steel casing to serve as a storm water carrier as part of a new main trunk line storm water system. For this project, Midwest Mole designed and fabricated a 24-in. by 60-in. “rocket ship” reaming head adapter. This would allow the use of a typical pilot tube installation, followed by a pilot tube to 24-in. diameter reaming head (common), then a short length of 24-in. casing, and then the 24- to 60-in. rocket ship.

## Waterford, Connecticut – Sliplining

Mission Clay Products

For the first time that anyone involved in the project was aware of, clay pipe was used to rehabilitate a sewer pipe through sliplining for the Logger Hill Road Sewer Main Rehabilitation Project recently completed in Waterford, Conn. Mission Clay Products supplied the 18-in. clay pipe used in the project,



which required a 1,400-ft section of the total 2,400 lf of sewer pipeline to be sliplined. The section consisted of manhole drop connections and elevation changes, creating a hill that would require extensive excavation for insertion pits, making it difficult to avoid public disruption. It was determined that sliplining was the best option for the section.

## Los Alamos, New Mexico – HDD

Digital Control, Inc.

Locating equipment for Digital Control Inc. was employed extensively on a recent HDD project for the Los Alamos National Laboratory (LANL) in New Mexico. Because the HDPE pipe to be installed would contain two RLW lines, the LANL technical representatives emphasized the need to ensure that the pipe was not compromised during installation. Given these concerns, the project subcontractor, Kelly Utility Services, contacted Digital Control Inc. (DCI) for assistance. In an effort to ensure there was no disruption to utilities and to provide detailed information on the pilot hole, a DigiTrak Fluid Pressure Transmitter (FPT) was selected for use. Additionally, in an effort to prevent excessive force on the HDPE during installation, a DigiTrak F5 TensiTrak Pullback and Pressure Monitoring System was used with a DigiTrak F5 locating system. This combination of equipment, along with a DigiTrak Log-While-Drilling (LWD) PC software, provided an accurate as-built of the bore, the annular drilling fluid pressure and the pull force data. This is the first time these new technologies have been used together to complete a project.

## Hillsborough County, Florida – Microtunneling

Cardno TBE



Cardno TBE recently completed the design of two major projects that included four trenchless crossings for Hillsborough County, Fla. The Duck Pond Phase I included microtunneling 350 ft of 60-in. steel casing pipe under SR582; and horizontal auger boring and pipe jacking 200 ft of 60-in. steel casing pipe under CSX RR. The SR 674 FM Phase 2 included two microtunnels of 450 ft and 300 ft of 48-in. steel casing pipe under I-75 and SR674.

## Northville, Michigan – HDD Pipe Install

Underground Solutions, Inc., Stantec Consulting Ltd.

Underground Solutions, Inc., a manufacturer of fusible PVC pipe products including the Fusible C-900, Fusible C-905, FPVC and Duraliner, has been involved in several recent installations of potable water mains using HDD in the state of Michigan, most notably, the installation of 7,520 lf of 8-in. and 12-in. DR18 Fusible C-900 and 16-in. DR21 Fusible C-905 in Northville Township, Mich. Stantec Consulting Ltd. was the engineer on the project.

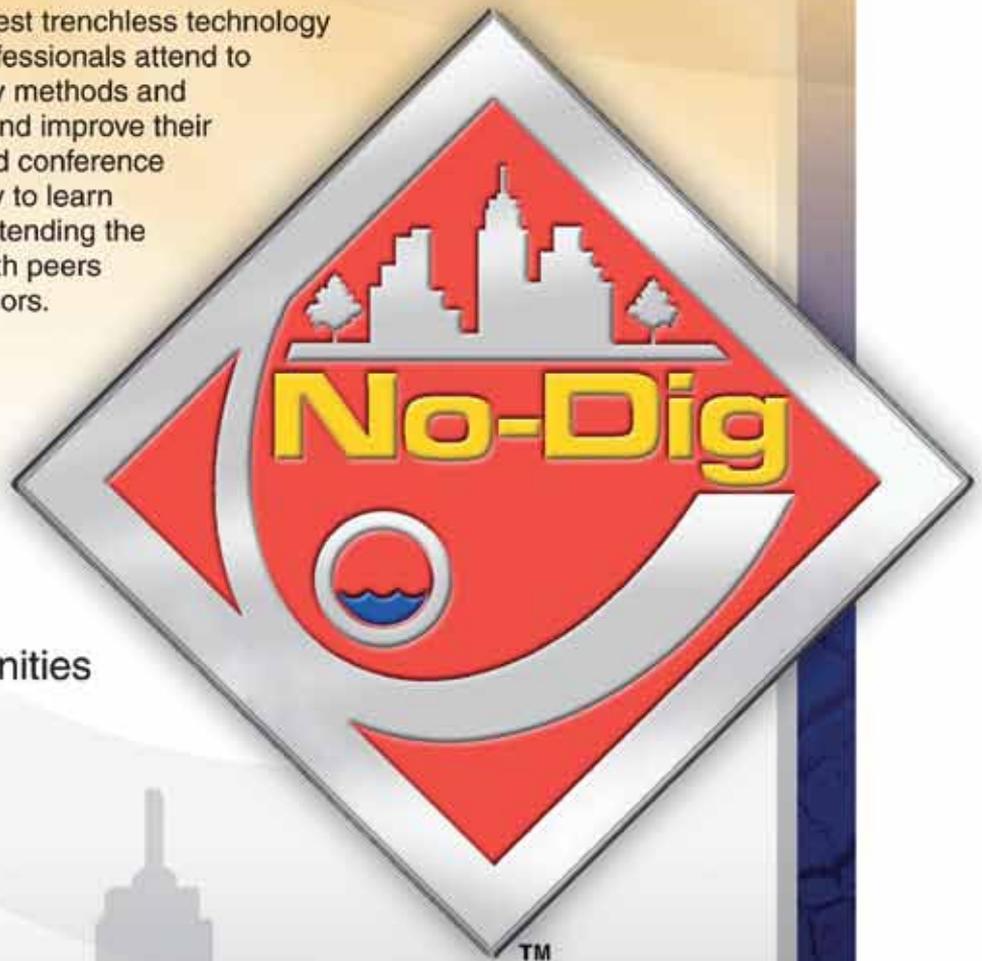
## Note to Members:

To see your project highlighted here, please send a 100-word write-up and high-resolution photos to assistant editor Andrew Farr at [afarr@benjaminmedia.com](mailto:afarr@benjaminmedia.com) or NASTT Communications and Training Manager Michelle Hill at [mhill@nastt.org](mailto:mhill@nastt.org) with the subject line “NASTT Project Updates.”

# NASTT's No-Dig Show

NASTT's No-Dig Show is the largest trenchless technology conference in North America. Professionals attend to learn new environmentally friendly methods and techniques that will save money and improve their infrastructure. This trade show and conference provides attendees an opportunity to learn about trenchless technology by attending the technical sessions, networking with peers and meeting with exhibit hall vendors.

- Peer-Reviewed Technical Papers
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## NASTT's **2014** No-Dig Show

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Orlando, Florida

## NASTT's **2015** No-Dig Show

March 15-19  
Denver  
Convention Center  
Denver, Colorado

## NASTT's **2016** No-Dig Show

March 20-24  
Gaylord Texan  
Dallas, Texas

## NASTT's **2017** No-Dig Show

April 9-13  
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## REGIONAL CHAPTER NEWS

### British Columbia

In 2012, the British Columbia Chapter had three very successful one-day seminars, held around the region. Five presenters from the chapter provided brief overviews of condition assessment of A/C and metallic water main breaks, options for rehabbing these water main breaks, pipe bursting, Q/A and Q/C for CIPP, issues of testing trenchless materials and culvert inspection/rehab. Many owners, designers and contractors attended, and sessions averaged more than 50 attendees each. In addition, an impromptu lunch session featured an engineer from New Zealand describing the use of several trenchless processes that were chosen to rehab and repair utilities in Christchurch, New Zealand after their two devastating earthquakes in 2011.

Proposed activities for 2013 feature repeating the very popular one-day seminars, again to be held around the province; one each in the Okanagan, Vancouver Island and Lower Mainland areas. Topics planned include "TT101," asset management, grouting, pipe fusion and live water main inspection. Papers are also being submitted to other organizations as topics for presentation at their conferences – BCWWA, APEGBC, PWA-MSA, and MED-MMCD. The chapter also plans to host a one-day workshop utilizing one of the NASTT modules; module, date and location TBD.

### Great Lakes St. Lawrence & Atlantic

The GLSLA Chapter has been busy over the past several months planning for 2013. The first training session, "NASTT Sewer Laterals Rehabilitation Best Practices" will be held in Hamilton, Ontario on April 25, 2013. Further training sessions are being planned for the fall and we encourage members to contact the chapter should they require specific trenchless technology training.

GLSLA are proud supporters of the 2013 NASTT Municipal & Public Utility Scholarship Program. This new program will provide the opportunity for government agencies facing economic challenges to obtain training and education at NASTT's annual No-Dig Show in Sacramento, Calif. We believe the participation and knowledge growth of government agencies in the trenchless industry is a vital component in the management of buried infrastructure and we encourage government employees to apply.

GLSLA will once again be promoting trenchless technology at the ACWWA to be held Sept. 29 – Oct. 1, 2013 in Fredericton, New Brunswick. The conference provides an opportunity to learn about and discuss water and wastewater industry issues with peers in both a technical and social atmosphere.

For more information on GLSLA, our events and our training sessions, please visit our website at [www.glsla.ca](http://www.glsla.ca).

### Mid Atlantic

The Mid Atlantic Chapter had a very successful "Trenchless Technology, SSES and Buried Asset Management" two-day seminar in Virginia Beach, Va., Dec. 14-15, 2011 at the Wyndham Virginia Beach Oceanfront Hotel, Virginia Beach Va. Bruce W. Husselbee, P.E., and director of engineering of Hampton Roads Sanitation District (HRSD) was the guest presenter with the presentation "HRSD Trenchless Technology Program."

The Mid Atlantic Chapter also had a very successful 2012 and is currently planning possible 2013 seminar locations in Baltimore Md., Williamsburg, Va., Philadelphia, Pa. and/or Newark, N.J.

### Midwest

The Midwest Chapter held a "Trenchless Technology, SSES and Buried Asset Management" seminar at the Doubletree by Hilton Hotel Detroit Downtown on Sept. 19, 2012. The guest presenter was George Nichols, P.E., of the Contract Management Department of the Oakland County Water Resources Commissioner with the presentation "Oakland County Trenchless Program." The chapter is currently planning possible 2013 seminar locations for Kansas City Mo., St. Paul, Minn. and/or Louisville, Ky.

### Pacific Northwest

The Pacific Northwest Chapter held its biennial Pacific Northwest Trenchless Symposium Jan. 23-24 at the Cedarbrook Lodge in SeaTac, Wash. This year's trenchless symposium included two wonderful days of educational programs, trenchless vendors and opportunities to connect with fellow trenchless owners, contractors and professionals in the Pacific Northwest Region. We also held a Trenchless Good Practices Course provided by NASTT on the first day of the symposium. This year's Good Practices Course for New Installations was taught by our very own Kim Staheli from Staheli Trenchless Consultants. Additional details on the PNW Chapter Biennial Symposium can be found on our chapter website at [www.pnwnastt.org](http://www.pnwnastt.org).

We are very excited that the 2013 No-Dig Show is coming to Sacramento in March. This is the closest we have had the national conference to our region and we will be working with our local chapter members to help spread the word to other owners, contractors and professionals, the importance of attending the No-Dig conference to learn the latest and greatest innovations in the trenchless industry.

### Northwest

The Northwest Chapter had a very busy and successful year in 2012. The Chapter's Calgary and Edmonton sections continue to host regular technical luncheons as Edmonton's technical luncheon in September broke our past luncheon attendance record with 57 participants for a



# NASTT CHAPTER NEWS

presentation on pilot-tube microtunneling by Ray Davies of the City of Edmonton.



The 7th annual presentation of the Northwest Trenchless Project of the Year was presented to the City of Saskatoon, Insituform Technologies, Sunbelt and Hamm Construction in November for the city's Interceptor Trunk Sewer Rehabilitation project.

In September, the Northwest Chapter sponsored a trenchless track at Western Canada Water's annual conference in Winnipeg. The three-paper track was

moderated by Hartley Katz of our Board of Directors and was very well received by conference attendees.

Our annual chapter conference was held in Edmonton, Nov. 14-15. We had amazing attendance for the NASTT Laterals Good Practices Short Course on Nov. 14, with 60 people registered. More than 190 people registered for the technical conference on Nov. 15 which included 12 presentations, 25 trade show exhibitors, 12 general sponsors and six special event sponsors. Special thanks to our sponsors, exhibitors, presenters and particularly, the efforts of our conference organizing committee, led by Alan Miller.

Finally, the 7th annual presentation of the Northwest Trenchless Project of the Year was presented to the City of Saskatoon, Insituform Technologies, Sunbelt and Hamm Construction in November for the city's Interceptor Trunk Sewer Rehabilitation project. Special congratulations to the project team on an incredible project! Details are available on our website at [nastt-nw.com](http://nastt-nw.com).

## Rocky Mountain



Rocky Mountain Conference Committee Chair Bo Botteicher, Underground Solutions, Inc. with Rocky Mountain Chapter Chair Al Paquet, CH2M HILL.

The Rocky Mountain Chapter (RMC) successfully planned and conducted its third consecutive annual conference on Nov. 8, 2012. The one-day conference had 90 attendees – the best attendance to date. In addition to 12 regionally appropriate technical sessions, the conference included a Municipal Round Table discussion on the application of trenchless technology by area utilities, including Denver Water, the City of Aurora, Metro Wastewater and Colorado Spring Utilities. Operator Training Units and Continuing Education Units were provided to attendees of the course and the conference. The feedback from attendees was very positive regarding the content of the trenchless technology program and sessions. The conference was supported by 17 sponsors. This support not only contributed to the financial success of the conference, but offered attendees valuable

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# NASTT CHAPTER NEWS



information on a wide range of products and services.

In conjunction with the conference, an NASTT Short Course was offered the day before the conference. This year's course subject was the Horizontal Directional Drilling Good Practices Guidelines course. There were 20 attendees for the short course. The combination of the short course and annual conference furthered the mission of the RMC Chapter Board:

"To advance the science and practice of trenchless technology for the public benefit by promoting education, training, research, development, information; and to disseminate, through public forums, the improvements and status of trenchless technology."

The RMC Board meets on a monthly basis, typically the second Monday of each month. Meeting and chapter information can be found on the chapter website at [www.rmnnastt.org](http://www.rmnnastt.org). The chapter is currently refining goals for 2013. The 2013 annual conference and NASTT Short Course is scheduled to occur the week of Nov. 4, 2013 at the Double Tree Hotel in Westminster, Colo. We are now accepting presentation topic abstracts for the 2013 fall conference.

## Southeast

The Southeast Chapter (SESTT) held a successful "Trenchless Technology, SSES and Buried Asset Management" two-day

seminar at the Greensboro Marriott Hotel Downtown on Dec. 19-20, 2012 in Greensboro, N.C. The guest presenter was Robbie Bald, P.E. and Engineering Supervisor of the City of Greensboro Water Resource Department with the presentation "Greensboro's Trenchless Program."

Possible 2013 seminar locations being studied are Savannah Ga., Jacksonville Fla. and/or Baton Rouge La.

## Western

The Western Chapter of NASTT hosted its 8th annual Western Regional No-Dig Conference and Exhibition on Oct. 29 at the Ayres Hotel and Suites in Ontario, Calif.

The conference included a one-day technical program and product exhibit area devoted entirely to trenchless technology, including new installation, rehabilitation and condition assessment. The conference attracted public officials, engineers, utility company personnel, designers and contractors alike who are involved with designing, constructing, rehabilitating and managing underground infrastructure. The Western Chapter is committed to promoting trenchless technology education in the public sector and is therefore offering a significant discount for public employees. For more information on upcoming events, please visit [www.westt.org](http://www.westt.org).

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<b>Benjamin Media Inc.</b> Full Page, 4-Color Advertisement in Trenchless Technology Magazine	<b>Michels Corp.</b> A Trip to Las Vegas Including Lodging at The Bellagio and Airfare
<b>Digital Control Inc.</b> F5 Locating System	<b>TT Technologies</b> 3" Grundomat Boring Tool Package
<b>Ditch Witch</b> 830R/T Locator	
<b>HammerHead Trenchless Equipment</b> 2.5" Catamount Debris Free Piercing Tool Package	

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# NASTT REGIONAL CHAPTERS



NASTT has a network of nine regional chapters throughout the United States and Canada. With a single NASTT membership, you're automatically enrolled in the national organization, the international organization (ISTT) and also in your regional chapter. Regional chapters offer valuable educational and networking opportunities in your local area. Share your ideas, network with colleagues and find solutions to your everyday challenges.



## British Columbia

The British Columbia (NASTT-BC) Chapter was established in 2005 by members in the province of British Columbia, Canada.

**Chapter Contact**  
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**Elected Officers**  
Chair - Preston Creelman  
Vice Chair - Gloria Grill  
Secretary - vacant  
Treasurer - Gurjit Sangha



## Great Lakes, St. Lawrence & Atlantic

The Great Lakes, St. Lawrence & Atlantic (GLSLA) Chapter was established in 1995 and represents the Eastern Canadian perspective of the trenchless technology marketplace. GLSLA members are from Ontario, Quebec and the four Atlantic provinces.

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Website: [www.nasttgsln.ca](http://www.nasttgsln.ca)

**Elected Officers**  
Chair - Kevin Bainbridge  
Vice Chair - Frank Badinski  
Secretary - Gerald Bauer  
Treasurer - Derek Potvin



## Mid Atlantic

The Mid Atlantic (MASTT) Chapter was established in 2004 by members from the states of Delaware, Maryland, New Jersey, Pennsylvania, Virginia, West Virginia and the District of Columbia.

**Chapter Contact**  
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Website: [www.mastt.org](http://www.mastt.org)

**Elected Officers**  
Chair - Richard Thomasson  
Vice Chair - Michael Delzingaro  
Secretary - Dennis Walsh  
Treasurer - Tom Wyatt



## Midwest

The Midwest (MSTT) Chapter was established in 1998 to promote trenchless technology education and development for public benefit in Illinois, Indiana, Iowa, Kentucky, Michigan, Minnesota, Missouri, Ohio and Wisconsin.

**Chapter Contact**  
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Website: [www.mstt.org](http://www.mstt.org)

**Elected Officers**  
Chair - Jeff Boschert  
Vice Chair - Larry Kiest, Jr.  
Secretary - Randy Fries  
Treasurer - Bill Shook



## Northwest

The Northwest Chapter was established in 1988 by members in the Canadian provinces of Alberta and British Columbia, Canada, and in Washington state. In 2009, the Chapter adjusted the geographic area to include the members in the provinces of Manitoba and Saskatchewan, Canada.

**Chapter Contact**  
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**Elected Officers**  
Chair - Dan Willems  
Vice Chair - vacant  
Secretary - Mark Brand  
Treasurer - Keith Moggach



## Pacific Northwest

The Pacific Northwest Chapter was established in 2009 by members in the states of Alaska, Idaho, Oregon and Washington.

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**Elected Officers**  
Chair - Erik Waligorski  
Vice Chair - Chris Price  
Secretary - Chris Sivesind  
Treasurer - Matt Pease



## Rocky Mountain

The Rocky Mountain Chapter was established in 2009 by members in the states of Colorado, Utah and Wyoming.

**Chapter Contact**  
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Website: [www.rmnnastt.org](http://www.rmnnastt.org)

**Elected Officers**  
Chair - Al Paquet  
Vice Chair - Bo Botteicher  
Secretary - Andrew Lockman  
Treasurer - Ken Matthews



## Southeast

The Southeast (SESTT) Chapter was established in 2001 to serve the members of NASTT from Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee and Puerto Rico.

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Website: [www.sestt.org](http://www.sestt.org)

**Elected Officers**  
Chair - Jerry Trevino  
Vice Chair - Ed Paradis  
Secretary - J. Chris Ford  
Treasurer - Kelly Derr



## Western

The Western (WESTT) Chapter was established in 2003 by members from the states of Arizona, California, New Mexico, Nevada and Hawaii.

**Chapter Contact**  
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**Elected Officers**  
Chair - Craig Camp  
Vice Chair - Cindy Preuss  
Secretary - Cory Street  
Treasurer - Matt Wallin

# NASTT Regional Chapters

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### REGIONAL CHAPTERS

#### British Columbia

[www.nastt-bc.org](http://www.nastt-bc.org)

*British Columbia*

#### Great Lakes, St. Lawrence & Atlantic

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

*Ontario, Quebec, New Brunswick,  
Prince Edward Island, Nova Scotia,  
Newfoundland and Labrador*

#### Mid-Atlantic

[www.masst.org](http://www.masst.org)

*Delaware, Maryland, New Jersey,  
Pennsylvania, Virginia, West Virginia  
and District of Columbia*

#### Midwest

[www.mstt.org](http://www.mstt.org)

*Illinois, Indiana, Iowa, Kentucky,  
Michigan, Minnesota, Missouri, Ohio  
and Wisconsin*

#### Northwest

[www.nastt-nw.com](http://www.nastt-nw.com)

*Alberta, Manitoba and Saskatchewan*

#### Pacific Northwest

*Alaska, Idaho, Oregon  
and Washington*

#### Rocky Mountain

[www.rmnastt.org](http://www.rmnastt.org)

*Colorado, Utah and Wyoming*

#### Southeast

[www.sestt.org](http://www.sestt.org)

*Alabama, Arkansas, Florida,  
Georgia, Louisiana, Mississippi,  
North Carolina, South Carolina,  
Tennessee and Puerto Rico*

#### Western

[www.westt.org](http://www.westt.org)

*Arizona, California, New Mexico,  
Nevada and Hawaii*

[www.nastt.org](http://www.nastt.org)

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# NASTT STUDENT CHAPTERS



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- Horizontal Directional Drilling (HDD)
- Laterals
- New Installation Methods
- Pipe Bursting

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March 3-7 **NASTT's 2013 No-Dig Show**  
Sacramento, California

March 3 **NASTT's Introduction to Trenchless Technology Short Course**  
Sacramento, California

March 6-7 **NASTT's Horizontal Directional Drilling Good Practices Course**  
Sacramento, California

March 6-7 **NASTT's Pipe Bursting Good Practices Course**  
Sacramento, California

March 6-7 **NASTT's Cured-in-Place-Pipe Good Practices Course**  
Sacramento, California

March 6-7 **NASTT's New Installation Methods Good Practices Course**  
Sacramento, California

March 6-7 **NASTT's Laterals Good Practices Course**  
Sacramento, California

March 12 **Alberta Water & Wastewater Operator's Association (AWWOA) NASTT's Laterals Good Practices Course**  
Banff, Alberta

For More Information and the Latest Course List Visit

[www.nastt.org/calendar](http://www.nastt.org/calendar)

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## San Diego Pipeline Rehabilitation: Landing a 747 on a Sewer

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While making plans to expand the San Diego International Airport with construction of a new 10-gate terminal, engineers for the San Diego County Regional Airport Authority identified nearly 1,700 ft of a 96-in. sanitary sewer trunk main that runs 25 ft directly below the site of the planned terminal.

While structurally adequate for existing conditions, the 20-year-old concrete pipe was not designed to handle the load of an airport terminal or the aircraft that would be landing on the adjacent runways and apron. The Authority was tasked not only with the challenge of increasing the load-bearing capacity of this critical pipe without digging it up, but also maximizing the pipe's flow capacity.

In order to achieve its goals, the Airport Authority considered three trenchless options for the project including sliplining, traditional cured-in-place pipe (CIPP) and fiber-reinforced CIPP. To accommodate current and projected flow requirements, the pipe rehabilitation thickness was specified not to exceed 32mm (1.26 in.), which quickly ruled out the use of sliplining and traditional CIPP technology.

A fiber-reinforced CIPP was chosen because of its ability to meet the prescribed load-bearing capacity and 32 mm thickness requirement and achieve the Airport Authority's flow and strength criteria. Located on the site of a former landfill, the 96-in. diameter sewer rehabilitation involved two separate installations of 300 ft and 1,393 ft.

When completed, this project represented the largest composite CIPP installation, considering diameter and single shot length, ever attempted. It also marked the first time the technology had been installed using an "over-the-hole" wet out process. This paper highlights both the materials and construction of the fiber-reinforced CIPP product and provides detailed installation information of the airport rehabilitation project.

### INTRODUCTION

While making plans to expand the San Diego International Airport with the construction of a new 10-gate terminal, engineers for San Diego County Regional Airport Authority identified the need to reinforce nearly 1,700 ft of a 96-in. sanitary sewer trunk main running 25 ft (7.62m) directly below the site of the planned terminal.

While structurally adequate for existing conditions,

the 20-year-old concrete pipe was not originally designed to handle the loading of an airport terminal or the aircraft that would be landing on the runways and apron adjacent to it. The Authority was tasked with the challenge of increasing the load-bearing capacity of this critical pipe without digging it up, while also maximizing the pipe's flow capacity. All of this was required without causing disruption to the airport.

### SOLUTION

In order to achieve its goals, the Airport Authority considered three trenchless options for the project including sliplining, traditional CIPP and fiber-reinforced CIPP. To accommodate current and projected flow requirements, the specifications indicated that the pipe rehabilitation thickness could not exceed 32mm (1.26 in.). This ruled out the use of sliplining technology as it would have reduced the pipe thickness by nearly 12 in. Traditional CIPP technology was also eliminated as an option on this project because it required a minimum CIPP thickness of 52.5 mm at the design loads.



**Figure 1 – Schematic of the pipe rehabilitation segments and access point.**

It was deemed possible to achieve both the prescribed load-bearing capacity of 19.6 psi at the crown of the sewer (total of groundwater, soil and aircraft loads) and reduce traditional CIPP thickness



by approximately 40 percent to 32 mm by using a fiber-reinforced CIPP solution, thereby meeting the Airport Authority's flow and strength criteria. However, a project using a fiber-reinforced CIPP installed with the water inversion method had never before been completed in a pipe larger than 72 in. in diameter. This project consisted of two separate installations of 96-in. CIPP tube totaling close to 1,700 ft. There was only one access point available for both installation shots. The first installation measured 300 ft, and the second shot was almost 1,400 ft (see Figure 1).

## COMPOSITE TECHNOLOGY

Large-diameter CIPP installations such as the San Diego Airport Project present a variety of special challenges, including an increase in wall thickness proportionate to diameter, more weight due to the large amount of resin needed, extended cure time, large installation equipment and the probability of on-site wet out. Using fiber reinforced technology can address many of these issues. The improved physical properties of fiber-reinforced composites applied to cured-in-place pipe reduce the wall thickness required to withstand the design loads.

Cured-in-place pipes with thinner walls require less resin and weigh less. Thinner tubes also reduce the difficulties associated with handling the dry tube during manufacturing. Further, the challenges during resin impregnation are reduced due to the smaller volume of resin to be processed and the reduced weight to be handled at the impregnation facility. Fiber-reinforcement allows a reduction in the wall thickness of the CIPP without a reduction in pipe stiffness.

The reduced wall thickness and weight of fiber-reinforced CIPP tubes helps to avoid the increased logistical difficulties and risks associated with an on-site resin impregnation. Lighter tubes also reduce installation equipment requirements and lower many of the aforementioned risks associated with the installation process.

Fiber-reinforced sandwich composites are commonly used in industries such as sporting goods and aerospace to produce equipment and structures with high stiffness and low weight. Familiar examples include tennis rackets, golf clubs, military aircraft, bicycles and sailboats.

These high performance products make use of laminated beams that have been engineered to take advantage of the material properties offered by fiber-reinforced plastics. The stiffness of a laminated, or sandwich beam, is determined by the material properties and second moment of inertia of each layer - its area times the square of the distance from the neutral plane. A sandwich composite beam is constructed by bonding a layer of very stiff material

to each side of a "core" layer with relatively low material properties (Hahn, 2007).

In fiber-reinforce CIPP, the core material is most commonly polyester resin and felt, with a flexural modulus of 250,000 to 400,000 psi. Layers of a cured-in-place pipe with increased strength are produced by incorporating reinforcing fiber into the polymer matrix. Glass or carbon fibers are commonly used as reinforcement in sandwich composite beams. By way of comparison, a skin-layer reinforced with glass fiber may have a flexural modulus as high as 10 million psi, and one with carbon fiber flexural modulus may be 20 million psi. In practice, the optimum amount of fiber is designed into the composite beam to achieve the stiffness required.

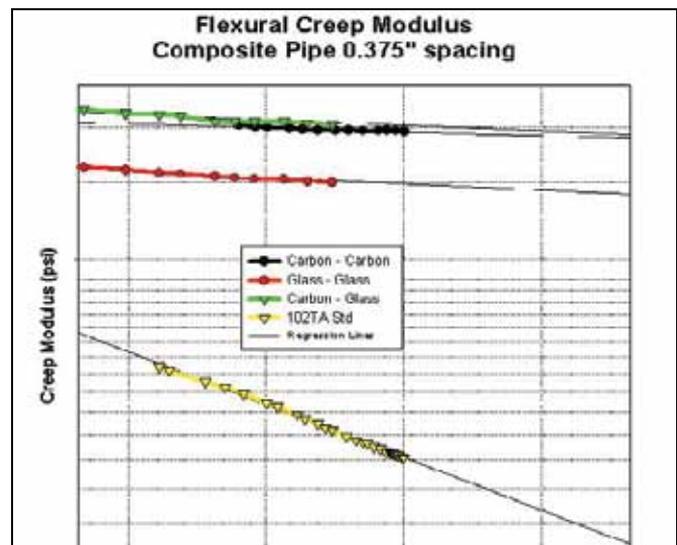


Figure 2 – Creep modulus testing results for fiber reinforced pipe.

One layer of reinforcement is situated close to the surface of the host pipe with the other layer close to the inner surface of the CIPP. One method of incorporating the reinforcing fiber into the CIPP tubes is to produce fabrics and then layer them with polyester felt. These fabrics are added to the construction of the tubes during the normal manufacturing process.

As with conventional CIPP, standard ASTM testing gives fiber reinforced pipe a useful life of over 50 years. Tests that have been performed on fiber reinforced pipe include creep tests for a total of 10,000 hours (see Figure 2). The samples are subjected to a constant load and the amount of deflection is then measured at regular time intervals over the test period. The regression curve is then extrapolated out to 50-years for long-term input values. It should be noted that testing shows fiber



reinforced CIPP to have a substantially greater percent creep modulus retention when compared to conventional CIPP. Figure 5 demonstrates that pipes reinforced with carbon fiber have slightly higher physical properties than those reinforced with glass or those with a mixture of carbon fiber and glass reinforcement. However, glass fibers are commonly used because of the low cost of glass.

Wall thickness design of fiber-reinforced CIPP is by the equations listed in Appendix X1: Design Considerations of ASTM F 1216-09, the same design model used for conventional CIPP. However, with conventional CIPP, typically one variable is minimized, and that is thickness. Known physical properties are entered into the equations, and a minimum thickness is determined. This design approach is not practical with large diameter, fiber-reinforced CIPP where there are no standard design physical properties. Design flexural strength and modulus vary with the type and amount of fibers used and with the thickness of the laminate. Thus it is not practical to enter design physical properties to determine the minimum wall thickness because the physical properties are not known until the thickness is known and vice versa.

This conundrum is solved by a computer program that uses an iterative design process to optimize the cost of the product. Wall thickness is calculated using assumed fiber type and amount and representative physical properties. Using the calculated thickness, the product cost is determined. This iterative process is repeated hundreds of times until the optimum product cost is determined and input physical properties match the actual physical properties. Using this design tool, different variables can be minimized, including thickness, weight and cost. The conventional “one calculation” method can be used if low physical properties are used for input parameters. However, the resulting laminate design most likely will not be the most cost-effective available.

In order to take advantage of the physical properties of reinforcing fibers in cured-in-place pipes, the composite materials must pass the corrosion requirements set forth in ASTM F 1216 (Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube) and ASTM D 5813 (Standard Specification for Cured-in-Place Thermosetting Resin Sewer Piping Systems). Both carbon fiber and ECR glass fiber perform well in this industry-standard corrosion tests.

## INSTALLATION

Located on the site of a former landfill, the 96-

in. diameter sewer is owned by the City of San Diego (a separate entity from the Airport Authority), which uses it for both storage during storm events and to carry sanitary sewer flow to a pump station before directing the flow to the Point Loma Wastewater Treatment Plant. Because there were no properly located manholes at the site, an access pit was excavated over the 96-in. sewer and used for both installations. The two shots were in opposite directions, one 300 ft in length and the other 1,393 ft.

Wastewater also had to be temporarily diverted to a parallel 114-in. diameter line using badly deteriorated diversion structures that required continual dewatering. Additionally, because the construction site was located within one-quarter mile of San Diego Bay, heavy dewatering was required at the installation pit location.

The first 300-ft installation was a “blind shot” with no available termination manhole or pit due to its proximity to an existing runway. Once the 96 in. tube was inverted and cured, workers entered the sewer and walked to the termination point of the CIPP. The end of the tube was then removed and the cut edges neatly trimmed. At the time of installations, the second shot, a length of 1,393 ft, was the longest installation ever completed using a large diameter (greater than 48 in. in diameter), fiber-reinforced tube. More than 640,000 gallons of water were required to install and cure both tubes.

Crews worked around the clock for approximately four days in 12-hour shifts to complete each installation, vacuum-impregnating the fiber-reinforced tube with polyester resin at the site before installing it via a conveyor into the 96-in. diameter pipe. It took more than 260,000 pounds of resin—just shy of six tankers—to impregnate the 1,700-footlong fiber-reinforced CIPP tube. Because the fiber-reinforced tube is thinner than traditional CIPP, this figure amounts to 40 percent less resin than would have been required with traditional CIPP technology. However, even though the tube and resin were shipped separately prior to the wet out in the field, the sheer size of the tube still made it necessary to obtain a special DOT permit in order to transport the large tube.

The wet out tube (see Figure 3) was installed using the standard over-the-hole wet out and inversion process and then cured using hot water. In September 2009 the project was completed and tested, and the sewer line – now with 32 mm fiber-reinforced CIPP – was returned to service according to plan.

Complicating, unique features of this project site included its visibility from a runway in a secure airport location, its location on the site of an old

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landfill with possible soil contaminants and its location adjacent San Diego Bay resulting in large quantities of groundwater.

When completed, this project represented the largest of its kind when both diameter and single installation length were taken into account. It also marked the first time the technology had been installed using an “over-the-hole” wet out process. This project demonstrates a new structural rehabilitation option for owners of large-diameter sewers. Crews successfully installed the fiber reinforced CIPP, working with the Airport Authority and the general contractor, Charles King Company, to ensure that the challenges of this project were addressed and the Airport Authority’s expectations were met. The success of the project resulted in the project being named as the 2010 Rehabilitation Project of the Year for *Trenchless Technology* magazine.

The composite CIPP resulted in a structural gravity solution for nearly 2,000 ft of pipeline running beneath a new terminal at the San Diego Airport. The use of glass and carbon fiber-reinforced CIPP helped minimize the inside diameter reduction while still meeting the new load-bearing requirements set forth by the Airport

Authority. The finished product is projected to have a useful life at least 50 years.

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Figure 3 – Over-the-hole wet out.

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