



NASTT's *Trenchless Today*

Educate - Train - Research - Publish



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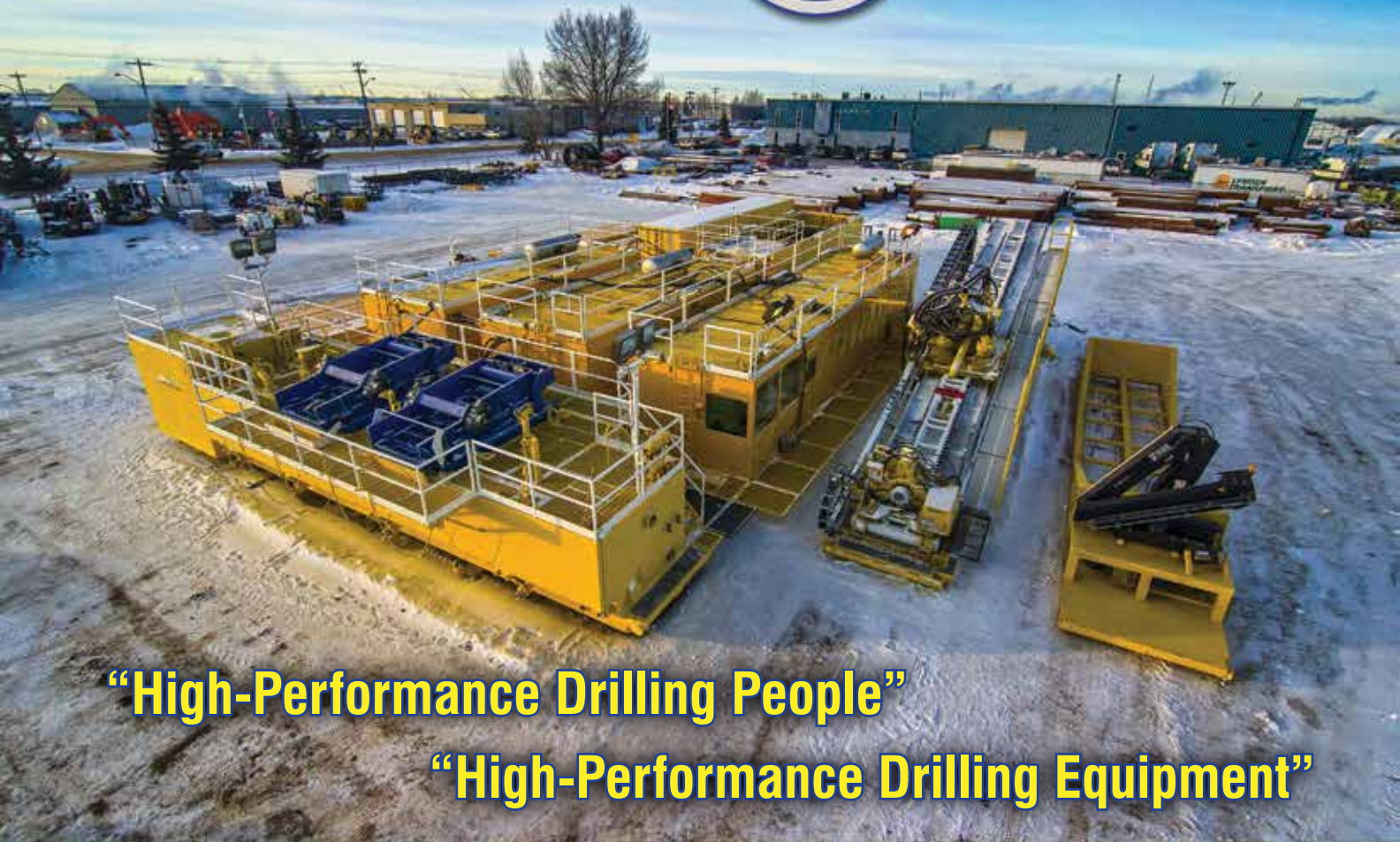
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NASTT's Leadership Team Regroups for an Encore to a Record-Breaking 2015

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Compiled by NTT staff

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Compiled by NTT staff

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NASTT's Growth Reflects the Growth in the Trenchless Industry



Mike Willmets
NASTT Executive
Director

It's going to be another very exciting year for NASTT and the trenchless industry in 2016, nicely transitioning from a truly record-breaking year. As many of you witnessed, NASTT's 2015 No-Dig Show in Denver broke all records for attendance and exhibitors, plus there was an enormously successful technical paper and training program. It was all very fitting as NASTT proudly celebrated our 25th anniversary all year long, looking back over the past decades while focusing on where we came from and where we are headed in the future. We can also celebrate our Regional and Student Chapters increasing and our NASTT membership numbers reaching an all-time high.

We are very excited to welcome our new South Central Chapter into the NASTT family, especially with our 2016 No-Dig Show being held in Dallas. The South Central Chapter currently covers the great state of Texas with future plans to expand north. The new chapter leadership includes Chair Larry Johnson of HOBAS Pipe USA; Vice Chair Alan Goodman of HammerHead Trenchless Equipment; Treasurer Sandie Dudley of CDM Smith; and Secretary Luis Cuellar of RPS Klotz Associates. These fine trenchless professionals are ready to lead the charge in Texas and help us host another record-breaking NASTT's No-Dig Show in March. If you are in the region and would like to get involved, please do not hesitate to contact us at info@nastt.org.

In 2015, we also witnessed the forma-

As more and more municipalities and public utilities turn to trenchless technology to manage their infrastructure needs, NASTT is on the forefront of this growing interest.

tion of another new regional chapter in the Northeast portion of the United States. The Northeast Trenchless Association Inc. (NTA) and NASTT have joined together to form the NASTT Northeast Chapter. This chapter covers Connecticut, Maine, Massachusetts, New Hampshire, New York, Rhode Island and Vermont. An extremely well-attended industry launch event was held in November and Board of Director elections took place in December. Many thanks to the trenchless champions who donated their time and energy to create this new beginning. Well done!

To read more about all of NASTT's Regional Chapters, turn to page 42 and

visit nastt.org/regional_chapters.

Another very exciting growth aspect of 2015 was the addition of Rutgers University in New Jersey to our NASTT Student Chapter roster. This brings the total of NASTT Student Chapters to 15! Chartered in 1766, Rutgers, the state university of New Jersey, is the nation's eighth oldest institution of higher learning — one of only nine colonial colleges established before the American Revolution. We are thrilled to welcome Rutgers to NASTT. Please turn to page 44 to read about all of NASTT's Student Chapters.

As more and more municipalities and public utilities turn to trenchless technology to manage their infrastructure needs, NASTT is on the forefront of this growing interest. In 2015, we published two new First Edition Good Practices Guidelines books: CIPP and Laterals. Many thanks to the two teams of valued authors! Our roster of expert volunteer instructors is also expanding to meet the needs of the demand for our live Good Practices Courses and our involvement with partner organizations continues to increase as well. We all know that trenchless technology is a good news story, and we are excited to continue to spread that news as we grow the influence of our not-for-profit society.

I sincerely hope that you will join us in March in Dallas for NASTT's 2016 No-Dig Show – The Best Trenchless Show on the Planet!



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NASTT Volunteers and Members Key to Our Success



**Dr. Kimberlie
Staheli**
NASTT Chair



In 2015, I began my term as Chair of NASTT's Board of Directors and I was so excited to be a part of that history making year in trenchless technology. Not only did NASTT celebrate 25 years in 2015, but we saw record-breaking numbers at NASTT's 2015 No-Dig Show in Denver.

The success of NASTT's 2015 No-Dig Show had many factors, but most importantly it was the leadership of the Program Chair and Vice Chair that set the tone. Richard (Bo) Botteicher of Underground Solutions served as the 2015 Program Chair and Jeff Maier of C&L Water Solutions served as the Vice Chair. Both of these gentlemen spent countless hours of their own time to produce such a high quality technical program and conference. Thank you both and thank you to the many volunteers of the Program Committee.

Our volunteers are everything to us at NASTT, and the 2016 Board of Directors consists of some of the best and

brightest in our industry. We strive to make sure our Board is comprised of an industry cross-section of trenchless technology segments. I'd like to introduce our newest Board members: Craig Vandaele, Tunneling Manager at Michels Corp. and Michels Canada Co., representing the Contractors category and Matthew Wallin, P.E., Partner and Senior Project Manager with Bennett Trenchless Engineers, representing the Consultants category. We're looking forward to your fresh perspective and leadership.

I'd also like to recognize the outgoing Board members who volunteered for six years to serve on the Board of Directors. Thank you, Jennifer Glynn, senior infrastructure designer at RMC Water & Environment. Jennifer has also served as the Board Secretary for the last three years. And thank you, Cindy Preuss, principal at HydroScience Engineers. We truly ap-

preciate your time and commitment to so many NASTT committees and to the trenchless industry as a whole.

One of the features of our first issue of the New Year is highlighting and thanking our Board members, so please turn to page 20 and read about the new members and the returning 17 members who will continue their service on the Board in 2016.

As we continue to focus on our NASTT Strategic Plan, we are excited to see that our goal of growing our membership is coming to fruition. Our membership continues to expand and we are stronger and larger than ever as a Society. I am excited and honored to serve as your NASTT Chair for the second year, and I know that 2016 is going to continue the trend of record-breaking numbers!

Thank you to all of our members and volunteers for your support. We owe our success to you.

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NASTT Crosses Borders to Provide Trenchless Education Down Under



Michelle Hill
NASTT Program
Director



Among the 27 societies under the International Society for Trenchless Technology (ISTT) umbrella, NASTT is the leader when it comes to trenchless education. In 2015 alone, we hosted 30 training events for more than 2,100 trenchless professionals. We couldn't do this without our 28 volunteer Good Practices instructors and the commitment from their employers who allow them to donate their time.

We are proud to bring top-notch training to North America, so when we heard that other ISTT organizations were looking to provide training in their countries, we wanted to help. NASTT was thrilled to partner with the Australasian Society for Trenchless Technology (ASTT) to bring trenchless education overseas. We signed

a five-year licensing deal with our friends at ASTT and agreed to help them launch their training program.

I was *stoked* (as they say in Australia) to travel this past fall with three of our leading trainers to No-Dig Down Under to conduct ASTT's first training event. ASTT chose to launch the program with our HDD, CIPP and New Installation Good Practices Courses. The courses were very successful and went off without a hitch.

I can't thank Dr. Samuel Ariaratnam, Arizona State University, Chris Macey, AECOM and Dr. Kimberlie Staheli, Staheli Trenchless Consultants enough for donating their time to this important initiative. Not only did Sam, Chris and Kim make the long journey over to Australia,

but they also worked with key ASTT volunteers to update and modify the training material to fit in with Australian practices. Their dedication to NASTT and our training program is truly remarkable.

This partnership wouldn't have been possible without the ASTT instructors Ben Crosby, Chris Frangos and Trevor Gosatti. Trevor, along with Jeff Pace, was instrumental in putting this licensing deal together. I also need to thank my partner in crime, Tori McLennon from Great Southern Press, who helped me coordinate the mass amount of details to get the program up and running.

Working with ASTT was an incredible experience, and I'm inspired by the fact that we've just hit the tip of the world's education iceberg.

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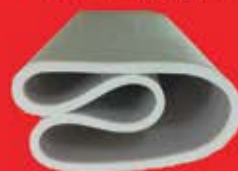


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A Conversation with Glenn Boyce, Ph.D., P.E., Principal, McMillen Jacobs Associates



Glenn Boyce

What first piqued your interest in engineering and construction?

Math was an easy subject for me in elementary and junior high school. My love for math led me to science. Math and science drove me to attend Baltimore Polytechnic Institute, an all-boys high school specializing in engineering. We studied various forms of engineering including electrical, mechanical and civil. Civil engineering is what I enjoyed, with classes in statics, mechanics of materials, and surveying. I graduated high school and went to Drexel University in Philadelphia. By junior/senior year I started to take geotechnical classes and loved the soil and rock classes. The blend of geotechnical, civil structures led to tunnels and underground construction.

Tell us about your introduction to the trenchless industry.

After graduating from Drexel and the University of California, Berkeley with a Ph.D., I went to work for Parsons Brinckerhoff as a tunnel engineer and designer. I worked on large diameter tunnels, such as the bus tunnel in Seattle and water tunnels for the City of San Francisco. One afternoon in 1992, representatives from Herrenknecht came to our office and made a 35-mm slide presentation on their new miniature tunnel boring machine with a method called microtunneling being used in Europe. They provided us a gift – a copy of the proceedings from a microtunneling conference held in Munich. They were looking to get their MTBMs used in the United States and to be specified by tunneling engineers and tunneling firms in the United States. I read the papers and said, “this is pretty cool.” I entered the trenchless industry from the big tunnel side.

What are your thoughts on the current state of the industry? What are the trends? What areas do you see evolving?

I think the development of the pilot tube has revolutionized the trenchless industry. Using the pilot tube as a guide for other trenchless methods like auger boring and pipe ramming has helped reduce cost of the methods. Installing pipe at a precise line and grade is the typical goal of most trench-

less methods, and when we can install the pipe at a lower cost, it will help increase use.

What is the biggest challenge facing the trenchless industry today?

Trenchless methods are more costly than open cut, and when compared directly, open cut will be used. But add in special conditions like a river crossing or a highway crossing and the trenchless method is the best choice. Economics continue to be the first hurdle. The second challenge we face is that trenchless methods are done without seeing the ground in front of the equipment. We need to do our homework to understand the ground conditions before we adventure into the darkness. As a team, (the project owner, engineer and contractor) we cannot cut corners. It means doing the geotechnical borings and literature research needed and not “hoping” the ground conditions are favorable for the selected method.

You've worked on some major pipeline and tunnel projects in both water supply and sewer collection. Can you tell us about some of the projects you're most proud of?

I am very proud of using microtunnels at the San Francisco Zoo in 1998. The zoo was doing a major utility upgrade with new sewer, water and gas lines. The sewers were originally designed using an open-cut trench approach. The problem was that some of the sewers were getting too deep and the open trenches were removing pathways and affecting the animal exhibits. We came up with a hub and spoke layout with the jacking shaft in the middle of the zoo. Five 36-in. diameter microtunnels were launched from the single jacking shaft to various points in the zoo. The design eliminated the deep trenched sewers, shortened the entire length of sewers installed, minimized the effect on the zoo, left pathways open and resulted in a very happy owner. I am also very proud of the City of Portland's West Side CSO project, where we used the first large diameter slurry TBMs in the United States, and installed 10,000 ft of microtunnels. The microtunneled portion won *Trenchless Technology's* Project of the Year in 2005.

Can you summarize your involvement with NASTT over the years?

I joined NASTT in 1992 and have participated in a number of committees including NASTT's No-Dig Show Program Committee and the Microtunneling Committee. Work on the Program Committee led me to being Program Vice Chair in 1996-1997 and Program Chair in 1998. The work on the Microtunneling Committee led me to the writing of the ASCE Microtunneling Standard, originally published in 2001 and updated in 2015. I joined the NASTT Board of Directors in 1997 and was elected Secretary in 1998. I also went to Hong Kong and started the China Hong Kong Trenchless Society and was the first Chair there. I later returned to the United States and was re-elected to the NASTT Board. I was elected Vice Chair in 2000 and then became Chair from 2001-2002. I have continued work on the Program Committee through the years. I developed the eight-hour New Installation Short Course in 2007 with Craig Camp and still teach the course when given the opportunity.

Education has been a vital part of the trenchless industry's growth, and you've been heavily involved on that end. How has the acceptance of trenchless methods evolved?

Owners have projects. These projects face challenges. And trenchless methods provide cool solutions. The key is identifying the project constraints and picking the right method for the conditions. The first question I tell everyone to ask is “Where is the groundwater table?” Working above the groundwater opens your options. Working below the groundwater table limits your options. Trenchless methods have also evolved over the years. Microtunneling, for example, was a method used in soil only and is now used to mine through rock, too. Any trenchless method that can help solve an owner's project challenge will always be acceptable.

What do you enjoy most about working in the trenchless technology field?

I enjoy receiving a call for help and then coming up with a new and different solution (typically involving trenchless) to solve a project challenge for the owner.

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In the Trenches

South Central Chapter Edition

By Andrew Farr



For this month's In the Trenches, we present the "South Central Chapter Edition," as we feature the Board members of the recently-formed South Central Chapter of NASTT. In many ways, the group of Larry Johnson, Alan Goodman and Luis Cuellar accurately represent what NASTT is all about – members who get involved. Without our members and volunteers, the growth of NASTT would not be possible. With the South Central Chapter of NASTT, the Society is looking to continue that growth by spreading the trenchless word in Texas and the south central region of the United States. Meet the trenchless professionals leading that effort.



Larry Johnson
 HOBAS Pipe USA
 South Central Chapter
 Chair

Although pipe industry veteran Larry Johnson did not start his career in trenchless, he considers himself a trenchless guy. Throughout his career, he's seen the tremendous growth of trenchless technology in perhaps one of its most important aspects – education and acceptance.

Today, Johnson is vice president of sales at HOBAS Pipe USA, working out of the company's corporate headquarters in Houston. Johnson came from the oilfield industry, first working in HOBAS' industrial division. Now he's a 26-year veteran of the company and has helped lead HOBAS through a significant growth period in recent years.

HOBAS manufactures centrifugally cast fiberglass-reinforced polymer mor-

tar pipe systems for trenchless applications such as sliplining rehabilitation, pipe bursting, direct jacking, microtunneling and secondary tunnel lining (waterway carrier) applications.

"When I started at HOBAS, I had to figure out what separated our pipe from other types of pipe – that is, trenchless technology," Johnson says. "Once we figured out that our pipe fit so well with trenchless technology, we started promoting it as a sliplining pipe, a jacking pipe and a pipe for two-pass tunnels. "Once we were able to educate the industry in solving problems and being part of the solution with trenchless technology, we quickly expanded into those three categories, and growth followed to what we have today."

But Johnson says that evolution wasn't instantaneous.

He says that when HOBAS first entered the trenchless market, the com-

pany had to sell its pipe three times, educating the owners, the design engineers and the clients – the contractors. "There were a lot of advantages that owners, engineers and contractors could use," he says. "We were also able to come in with a minimum of a 100-year design life. And that's what taxpayers are looking for."

Johnson admits that he doesn't like to talk about himself, crediting his sales team at HOBAS as employees who are team players who take pride in their longevity and experience in the industry as a source of continued success.

"Fortunately, I've been able to surround myself with a sales staff that has bought into the concept of selling the idea of trenchless technology along with building strong relationships with our clients."

Johnson, along with HOBAS Pipe as a whole, has been involved with NASTT since the Society got started in the early 1990s. Specifically, HOBAS has partici-

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pated in presenting papers at NASTT's No-Dig Show, as well as in other facets. When one of his sales managers brought the creation of NASTT's South Central Chapter to his attention last year, Johnson was encouraged by his HOBAS employees to get involved, knowing that the regional chapter needed someone to step in and lead its efforts. After some thought, he realized there was a need for the kind of focused regional trenchless education that the chapter would aim to provide. Johnson will serve as the first chair of NASTT's South Central Chapter.

"I think there's still room in the state of Texas to educate owners, engineering firms and students in the way of trenchless technology," he says. "That was my roots. No one pointed me that direction, but I knew that was the direction HOBAS had to go to expand its product.

"We're having our kick-off meeting at No-Dig, and that's when we're going to be brainstorming on how we want to move forward in 2016."



Alan Goodman
Hammerhead Trenchless Equipment
South Central Chapter
Vice Chair

The trenchless industry is diverse, and people who are a part of it come from a multitude of backgrounds, sometimes not even directly related to construction. Alan Goodman, global sales manager at HammerHead Trenchless Equipment, came into the trenchless industry with a unique background in international studies that has now led him to an integral position with HammerHead.

Early in his career, Goodman studied abroad in Japan. He says he fell in love with the culture and was even fluent in Japanese. He completed his education with a bachelor's in international busi-

ness from the Stephen F. Austin State University in east Texas. A short time later, Goodman was working for McLaughlin, a distributor of locators for HDD and utility line locating, which were manufactured in Japan. Goodman says he was not only interested in the job at McLaughlin but was also thinking that it could be an avenue to a position in international business for which he could apply his background. That career path never panned out, but it served as his introduction to the trenchless industry.

Today, Goodman has more than 15 years of experience in the underground construction industry and currently works as global sales manager for HammerHead, covering Asia, Australia and North America. Recently, he has moved into a role heading up HammerHead's pipe ramming division in North America.

"We've really had a lot of opportunities come online just recently that deal with culvert replacement," he says, noting the company's overall growth since its acquisition by The Charles Machine Works in 2010. "That is something we see as a large growth opportunity for HammerHead and for the needs and demand taking place throughout the United States as they relate to railroads and DOT."

During his time at HammerHead, Goodman has worked closely with municipalities, engineering firms and contractors around the world providing customer training, technical support, pre-project planning, project specifications and installations for pipe ramming, pipe bursting, cured-in-place pipe (CIPP) and other trenchless projects. He is also an active member of the National Utility Contractor's Association (NUCA), the Alliance for PE Pipe, the National Association of Sewer Service Companies (NASSCO) and its International Pipe Bursting Association, the American Gas Association, Pipe Line Contractors Association Pipe Line Contractors Association of Canada.

Goodman recently joined NASTT's new South Central Chapter and will serve as its first vice chair.

"I've always enjoyed being a part of the NASTT organization," he says. "They have continued to grow and attract a large group of engineers, contractors, and municipalities. As HammerHead looks to grow the trenchless market, we will need to continue educating these groups on the new processes available.

"It seems like every year NASTT is gaining more respect and knowledge within this industry. It appears to be an organization where everyone comes to look for information."



Luis Cuellar
RPS Klotz Associates
South Central Chapter
Secretary

Luis Cuellar says he always knew he wanted to get into engineering.

"I've had a strong inclination toward mathematics since I was in middle school and high school, and that really evolved into engineering," he says. "My father-in-law was a civil engineer and had his own consulting firm, so that really engaged me into that business. My plan, for as long as I can remember, was always to get involved in the engineering industry. Right off the bat, I went straight into engineering school."

After graduating college, Cuellar went to work for a small engineering firm and spent three years working in Louisiana, where he was introduced to trenchless methods doing horizontal direction drilling on a waterline project in Lafayette crossing IH-10. After three years in Louisiana, he relocated to Houston and worked for Claunch & Miller (HDR), where he started to gain exposure to a wider range of trenchless methods such as pipe bursting, CIPP and sliplining. After five years in Houston, Cuellar moved to HDR's San

Antonio office in 2005 and was involved in several projects working with the San Antonio Water System (SAWS), including a \$20 million tunneling project involving five miles of open cut and tunneling 36- to 42-in. FRP utilizing one- and two-pass construction with traditional TBMs, hand tunneling and direct jacking.

Today, Cuellar has more than 18 years of experience in the construction industry and is now the regional manager of RPS Klotz Associates' San Antonio office, a firm that specializes in public works, transportation and environmental and energy services. "For a firm our size, we do a good share of trenchless technology work," says Cuellar, who's in charge of operations and sales at the regional office.

Cuellar's office primarily does work for the City of San Antonio, Bexar County, Texas Department of Transportation, the San Antonio Water System and other

smaller municipalities in the San Antonio area. Cuellar specializes in working directly with city councils, city managers/administrators and directors of public works on the firm's projects.

Cuellar says throughout his career, he has been able to gain significant experience working in a variety of construction areas, but sees a lot of work in underground infrastructure on the horizon. Because of this, he says education will continue to be a critical component going forward, even in the construction-rich state of Texas.

"There are a lot of issues with aging infrastructure in the United States," he says. "What I really like about NASTT is the focus on education," he says. "That's really an advantage and also a 'must' in our industry to have more emphasis on education."

Cuellar decided to join NASTT's South Central Chapter after a suggestion by a

colleague in RPS Klotz's Houston office. With the vast construction opportunities in central Texas, the position seemed worthwhile. Cuellar also says the opportunity to get involved with trenchless technology education and to help grow the acceptance of trenchless methods among smaller municipalities in the San Antonio area is what enticed him to get involved. Cuellar will assume the role of secretary for the chapter.

"One of the things I want to do is get communities around the San Antonio area involved that might not be as up to speed in trenchless technology," he says. "It's getting that information out there to communities that may not be as familiar with technologies that could be cost savings and feasible for some of the work they're doing."

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

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Project of the Year - New Installation

HOUSTON SHIP CHANNEL PROJECT STATISTICS

- Two years of planning
- Two months to complete
- Three days to complete a
WORLD RECORD PULLBACK
- 12,459 feet
- 250-foot maximum depth
under the channel
- 18-inch diameter pipe

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 OIL AND GAS
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... NASTT's 2016 No-Dig Show Preview

By Andrew Farr

A year removed from NASTT's record-breaking 2015 No-Dig Show in Denver, North America's largest trenchless technology organization is looking to keep the momentum going with an encore in Dallas, March 20-24.

In 2015, NASTT's No-Dig Show reaffirmed the growth of the trenchless technology industry with record attendance of nearly 2,400 attendees and a record number of exhibitors with 173. Due to these record numbers and the ever-expanding technical paper session, NASTT leaders and conference organizers considered the 2015 show among the best ever.

This year, NASTT's No-Dig Show heads to the Gaylord Texan Resort & Convention Center in Grapevine, Texas. NASTT expects another well-attended event and more than 150 exhibitors are again slated to fill the exhibit hall, dis-

playing the latest in trenchless equipment and technology.

Additionally, NASTT's No-Dig Show technical paper program brings approximately 160 peer-reviewed technical papers to be presented, focusing on a diverse range of trenchless topics, including horizontal directional drilling (HDD), cured-in-place pipe (CIPP), microtunneling, inspection, case histories, asset management, pipe jacking and ramming, water and sewer rehabilitation, project planning and trenchless research. NASTT's No-Dig Show 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.

Additional show activities, from NASTT's annual No-Dig Show Gala Awards Dinner and technical sessions to short courses and chapter meetings, will all

take place at the Gaylord, which is located just six miles from Dallas-Fort Worth International Airport. With several dining and shopping options on property, attendees don't have to leave the Gaylord, but if they choose to venture out, the resort is within minutes of the 1.6 million-sq-ft Grapevine Mills Mall and several golf courses including Cowboys Golf Club, the only NFL-theme golf course in the country. For more off-site extracurricular adventures, visit grapevinetexasusa.com.

For additional information about the show – and for the first time ever – attendees can also download the mobile app for NASTT's 2016 No-Dig Show. The app can be downloaded through the App Store, Google Play or right to your computer or tablet. Use the mobile app to stay connected throughout the show.



Behind the Scenes

Planning and organizing NASTT's No-Dig Show each year takes hard work and coordination by NASTT staff, NASTT's Board of Directors and the Society's countless volunteers – an effort spearheaded by No-Dig Show Program Chair Jeff Maier and Program Vice Chair Jennifer Glynn.

"The Program Chair position for the 2016 No-Dig Show has certainly been a very interesting and rewarding experience for me," says Maier. "I have en-

joyed working closely with the Program Committee members and NASTT staff in making the 2016 conference a complete success.

"The most challenging part of being the Program Chair, I have to say, is staying on top of the extensive coordination effort that goes into an event like this. There are a lot of moving parts and behind-the-scenes details that go into the planning to ensure that the conference program is of the highest quality. Fortunately, I have had the support of

Michelle Hill and the NASTT staff as well as Jennifer Glynn, who are certainly some of the most talented and hard-working folks in the industry, which has been great."

"I think I am most proud of the amazing technical program that we have put together this year," adds Glynn. "Our roundtable panel discussions promise to be both educational and engaging. For a short time, the audience can become the speakers and the speakers the audience."

See What NASTT Has in Store for Attendees in the Second Act of Its Recording-Breaking Year

Popular Events

The conference gets under way with its annual Kick-Off Breakfast from 7:30 to 9:15 a.m., Monday, March 21. During this event, the formal presentation of the 2016 *Trenchless Technology* Person of the Year will be made. This year's recipient is Lynn Osborn, P.E., an industry professional who has helped to shape and expand the trenchless industry over the last 30 years. Following the Person of the Year presentation, the winners, runners up and honorable mentions for the 2015 *Trenchless Technology* Projects of the Year for Rehabilitation and New Installation will be formally recognized. Rounding out the breakfast awards are NASTT's 2015 Outstanding Papers in Rehabilitation and New Installation Awards.

Later that night, NASTT's 15th annual Educational Fund Auction & Reception will be held from 5:30 to 7:30 p.m. This fundraising event benefits NASTT's educational initiatives. The efforts this year have been coordinated by Auction Chair Joe Lane. The best part? It's a themed event! This year, get ready to channel your inner rock star for NASTT's "Rockin' Auction!" As always, the event will feature the

tropical vacation and 50/50 raffles.

"I am most looking forward to the educational fund auction," says Glynn. "It's going to be a really fun time while raising funds to further trenchless education. And, I'm going to have a killer costume this year. Come out and find your inner rock star for a really good cause."

On Tuesday, March 22, NASTT will host its annual Gala Awards Dinner. Over the past several years, this event has been considered the headlining act to the No-Dig Show as NASTT will induct its fifth Hall of Fame Class: Martin Cherrington, Ken Foster and Richard Thomasson. The event will also feature additional awards presentations, notably NASTT's Abbott Innovative Product Awards and NASTT's Chair Award for Outstanding Lifetime Service, among others.

Wednesday, March 23 is Gas Industry Day and will feature a full day of education and networking specifically for the gas industry. This popular track is a recent area of focus for NASTT as the Society continues to educate the industry not only on the benefits of trenchless construction but also its various applications across multiple industry segments.



New Roundtable Sessions

This year's conference will feature special roundtable sessions covering a variety of trenchless topics. Each roundtable will be 50 minutes long and will be moderated by either Program Chair Jeff Maier or Program Vice Chair Jennifer Glynn. Be sure to check out one or more of these roundtables for a unique educational experience.



Monday roundtables on New Installation:

- Monday Morning (MM-T2) = HDD
- Monday Afternoon (MA-T5) = Microtunneling

Tuesday roundtables on Rehabilitation:

- Tuesday Morning, 1st Session (TM1-T6) = Water main rehabilitation
- Tuesday Morning, 2nd Session (TM2-T3) = Manhole rehabilitation
- Tuesday Afternoon (TA-T1) = Stormwater/Condition Assessment/Rehabilitation

Wednesday roundtable on Project Planning:

- Wednesday Morning (WM-T4) = Alternative Project Delivery

The 2016 No-Dig Show closes with a luncheon and keynote address on Wednesday, March 23. The luncheon also serves as a look ahead to NASTT's 2017 No-Dig Show in Washington, D.C.

"I am very proud of the momentum that NASTT and the No-Dig Show have generated over the past several years, and to play an instrumental role in the success of the 2016 conference," says Maier. "I am very excited for the six new trenchless roundtable forums scheduled for this year's show, with

a unique interactive format that gets an entire room involved and our industry talking. Overall, it is great to see how much the trenchless industry is growing and directly benefitting from the No-Dig Conference and the efforts of the NASTT organization."

Andrew Farr is associate editor of NASTT's Trenchless Today.

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NASTT's 2016 Officers & Board of Directors

Diversity in Leadership Reflects NASTT's Expanding Focus Across Multiple Industry Segments

NASTT's Board of Directors coordinates the activities and events of the organization on behalf of the membership. The Board is made up of 20 officers and directors from across North America who are elected by the society's members each fall. Ending their tenure on the Board in 2015 were Jennifer Glynn of RMC Water & Environment, and a past secretary, and Cindy Preuss of HydroScience Engineers. NASTT thanks Jen and Cindy for their outstanding contributions to the Board and looks forward to continuing to work with them in other facets of the society. At the same time, NASTT is very excited to welcome Craig Vandaele of Michels Corp. and Michels Canada Co., and Matthew Wallin of Bennett Trenchless Engineers to the Board. Meet NASTT's Board of Directors for 2016!

**NASTT
represents more
than 2,000
members**

Move Ahead 3 Spaces

NASTT's 2016 Officers

**Chair and
International
Representative:**



Kimberlie Staheli, Ph.D., P.E.
President,
Staheli Trenchless Consultants

Kimberlie Staheli, Ph.D., P.E.

Dr. Kimberlie Staheli is 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.

Frank Firsching

Frank Firsching is executive vice president and general manager of Underground Solutions (UGSI). Prior to his current role, he served as executive vice president of sales for UGSI. Before joining UGSI in 2006, Frank worked for USFilter Corp. as president of the \$1 billion 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 manager and general manager during his 13 years at USFilter. Prior to joining USFilter, he worked at Deloitte & Touch Management Consulting and at GE Corp. He received an MBA at the Wharton School Business and a B.S. in Mechanical Engineering from the University of Virginia.

Vice Chair:



Frank Firsching
Executive Vice President &
General Manager,
Underground Solutions Inc.

Secretary:



Joe Lane
President,
HEBNA Corp.

Joe Lane

Joe Lane is President of HEBNA Corp., a global pipeline rehabilitation company specializing in the rehabilitation and protection of new and existing pipelines from internal corrosion and abrasion through the fabrication and installation of high-density polyethylene (HDPE) pipe liners custom engineered to fit specific project needs.

Joe holds a bachelor's degree in Biology from the University of Northern Colorado and is a graduate of the University Of Michigan School Of Business Management and the Leadership Program of the Rockies. Prior to joining HEBNA in 2014, he spent more than 23 years with SAK and Insituform Technologies, Inc., in progressively increasing roles of responsibility in business development, training, operations and executive management.

Joe is a regular speaker and instructor at numerous industry and educational associations such as WEF, APWA and NASTT where he works to advance the knowledge and use of trenchless technologies. He is a Board Member for the Rocky Mountain Chapter of NASTT, sits on NASTT's No-Dig Show Program Committee and is also a session leader.

**In 2015, NASTT
celebrated 25
years!**

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Treasurer:



Kevin Nagle
National Accounts Manager,
TT Technologies Inc.

Kevin Nagle

Kevin Nagle is a civil engineering graduate from the University of Illinois, earning his B.S. in Civil Engineering in 1997. He worked for six years as a design engineer for a structural engineering firm before moving on to work for TT Technologies in 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 (No-Dig Show Program Committee), the 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.

Derek Potvin, P.Eng.

Derek Potvin, P.Eng., is 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 a paper 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 Road Show. Derek is the treasurer for the Great Lakes, St. Lawrence & Atlantic Chapter (GLSLA) of NASTT.

**Immediate Past
Chair:**



Derek Potvin, P.Eng.
President,
Robinson Consultants Inc.

NASTT's 2016 Board of Directors



Erez Allouche, Ph. D., P.Eng.
Tunneling and Trenchless
Technology Practice Leader,
Stantec

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

Dr. Erez Allouche is the trenchless technology leader for the Tunneling and Trenchless Technology Practice at Stantec, specializing in the condition assessment and rehabilitation of large diameter pipes, as well as the design of complex HDD crossings. Prior to joining Stantec, he was 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.

For the past 15 years, Allouche served as the PI and Co-PI of research projects in buried infrastructure totaling more than \$14 million. He supervised 50 graduate students in this field, many of whom are practicing professionals or educators in the fields of municipal engineering or construction management. Allouche is the inventor or co-inventor of 17 patents in the area of trenchless technology and the author or co-author of more than 260 publications in the fields of buried infrastructure management and trenchless techniques, including 64 peer-reviewed journal papers. He is also the co-founder of two start-up companies based in Ruston, La. He is also an associate editor of the ASCE Journal of Pipeline Systems.



NASTT's 2015 No-Dig Show broke records for both attendance and exhibitors!



Michael Davison, P.Eng.
Product Director,
Aqua-Pipe Division, Sanexen
Environmental Services Inc.

Michael Davison, P.Eng.

Michael Davison, P.Eng., is product director for the Aqua-Pipe division at Sanexen Environmental Services Inc. in Montreal, Canada. Since 2002, he has been involved in the design and manufacturing of the Aqua-Pipe product, the creation and maintenance of installation operation procedures, training of operators and licensees, development of QA/QC procedures, planning and management of the largest Aqua-Pipe projects to date and improvements through research and development. Mike is currently the lead for all technical aspects within the Aqua-Pipe team.

A graduate of McGill University in civil engineering, Mike is an active member of the NASTT No-Dig Show Program Committee and is a technical session leader. He is also involved in ASTM International standard committees and is the Chair of the AWWA standards and M28 CIPP subcommittees. Mike is a member of ASCE and also works locally to improve the trenchless industry with the Bureau de Normalisation du Québec (BNQ). Outside of the office, Mike is an avid hockey player, coach and fan.



Don Del Nero, P.E., C.D.T
Tunneling & Trenchless
Practice Leader, Vice
President,
Stantec

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

Don Del Nero has more than 25 years of experience including planning, studies, design and construction management in the areas of tunnel and trenchless engineering. Don obtained his master's in geotechnical engineering from Syracuse University and his bachelor's in civil engineering from Clarkson University. His project experience covers more than 60 projects and over 50 miles of tunnel and trenchless



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installations worth more than \$1.8 billion in construction value.

He has been involved in a variety of trenchless technologies for sanitary sewer, storm sewer, raw water, finished water, and recycled water, SSO and CSO wastewater tunnels, highway tunnels, pedestrian tunnels, caverns, raw water intake tunnels, raw water tunnels and large diameter piping in sensitive areas. His tunneling experience is in a wide-array of geotechnical conditions across the US, Canada, and abroad, is heavily involved in client and project risk mitigation, has provided dispute resolution services for several clients, and has developed expertise in mining in cobbles and boulders.

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 written several articles for *Trenchless Technology* magazine.



Tony Hranicka, P.E.
Senior Vice President,
Progressive Pipeline Man-
agement (PPM)

Tony Hranicka, P.E.

Tony Hranicka currently works for PPM interacting with gas utilities and other pipeline industries. His primary responsibility is to manage cured-in-place lining (CIPL) projects from initiating quotes through layouts and engineering design to field installations focused on pressure pipeline trenchless rehabilitation. Duties also include technical presentations throughout the pipeline trades, as well as overseeing new R&D projects championed by the end user both to advance CIPL.

Tony previously worked at the Gas Technology Institute (GTI) as a senior engineer in the Delivery Sector working on infrastructure improvement research projects. Prior to that, he was project manager responsible for evaluating and implementing new technologies that increase the efficiency and effectiveness for Gas Operations within the Con Edison service territory in and around the New York City area.

Tony has a very diverse background in gas distribution engineering and operations during his 34-year career in the utility industry. He has been a member of the American Society of Mechanical Engineers since college and has held a professional engineering license in New York State 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. He also completed a master's in engineering from Manhattan College 1985 and a second from the New York Institute of Technology in 1997.

Larry Kiest, Jr.

Larry Kiest Jr. is an innovator, inventor and entrepreneur who has worked in the underground and trenchless utility industry for more than 30 years. Larry started his career as a Licensed Master Plumber in Ottawa, Ill., in the early 1980s, and in 1993, founded LMK Technologies. Throughout his career, Larry has grown as an internationally respected leader and speaker in the trenchless industry and holds 117 patents issued throughout North America, Europe and Australia for the innovative solutions and products he has developed. He is personally responsible for the issuance of ASTM standards F2561 and F2599 and is currently balloting two additional ASTM standards.

In 2013, Larry was honored as the *Trenchless Technology* Person of the Year. In 2014, LMK was named a top 10 winner of the prestigious Chicago Innovation Awards, and Larry was featured on "Bootstrapping in America," a live online TV interview in October. Larry is a member of NASTT's No-Dig Show Program Committee and an Advisory Board member for the Trenchless Technology Center at Louisiana Tech University. He is also involved in other industry associations like NASSCO, ASCE, ASTM and WEF. Larry has had technical papers published in ASCE Pipelines Journal, *NASTT's Trenchless Today* and in NASTT, ISTT and UCT conference proceedings.



Larry Kiest, Jr.
President,
LMK Technologies, LLC

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Brenda Kingsmill
Project Manager,
Regional Municipality of Halton

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 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 many No-Dig Shows.

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

Jason has 18 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. During his first tenure with Associated Engineering, he was an infrastructure engineer and trenchless discipline lead in the company's Edmonton office. 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 Lueke, Ph.D., P.Eng.
National Practice Leader,
Trenchless Services,
Associated Engineering

MARCH 21, 2016 | 5:30 PM - 7:30 PM | DALLAS, TX

NASTT'S 15TH ANNUAL EDUCATIONAL FUND AUCTION AND RECEPTION

In conjunction with NASTT's No-Dig Show





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MARCH 21, 2016





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**In 2015, NASTT
celebrated 25
years!**

Move Ahead 6 Spaces

Jason is an instructor for NASTT's Lateral Sewer Rehabilitation, HDD and Pipe Bursting Best Practices Courses. He has published more than 50 journal and conference papers related to trenchless design, construction and research and has presented across North America and internationally at many conferences and trade shows. In 2010, Jason was selected by NASTT as the inaugural recipient of the Trent Ralston Award for Early Career Achievement in the field of trenchless technology.



Gerard P. Lundquist, P.E.
Director of Gas Construction
for the New York State,
National Grid

Gerard P. Lundquist, P.E.

Gerry is currently employed by National Grid, an international electric and natural gas utility, where he works as director of gas construction for New York State. Gerry has more than 30 years of experience in construction, engineering and project management. His responsibilities include the execution of the capital work plan while also ensuring the safety, security and reliability of the natural gas distribution system.

Gerry has a bachelor's in civil engineering from The Cooper Union, a master's in business administration from Adelphi University and a master's in economics and finance from NYU. He is a registered professional engineer in New York State.

His affiliations include serving on the on the Board of Directors for the (NEGDC) Northeast Gas Distribution Council consisting of utilities throughout the northeast, and he is an active member of the National Society of Professional Engineers and American Society of Civil Engineers. He is a member of the American Public Works Association and serves on the Utility and Public Right of Way Technical Committee and is also Chair of the Construction Practices Subcommittee. He is also part of NASTT's No-Dig Show Program Committee as was a judge at the 2014 No-Dig Show for the innovative product awards.

Jeff Maier, P.E.

Jeff Maier, P.E., is the director of engineering at C&L Water Solutions in Littleton, Colo. Prior to joining C&L, Jeff worked for more than 10 years as an engineer with the Metro Wastewater Reclamation District (MWRD) in Denver and was most recently the owner/principal of Colorado Trenchless Consulting LLC, a niche engineering firm that specialized in water/wastewater infrastructure condition assessment, inspection and trenchless corrosion rehabilitation solutions. He is a Colorado registered professional engineer and a graduate of the University of Michigan – College of Civil & Environmental Engineering.

Jeff has more than 16 years of project management and engineering design experience, primarily in the water and wastewater industry. He is recognized as an expert in the fields of condition assessment and trenchless rehabilitation of pipelines, manholes and wastewater facility structures. He developed and successfully managed wastewater pipeline and manhole condition assessment and rehabilitation programs for the MWRD and was the co-founder of the MWRD Concrete Rehabilitation Product Evaluation Program.

Jeff is actively involved in NASTT's Rocky Mountain Chapter and is the Program Chair for the upcoming 2016 No-Dig Show in Dallas. Jeff is NASSCO PACP/MACP/LACP certified, a NACE Certified Coating Inspector – Level 3, and is a certified NASSCO CIPP rehabilitation inspector. In his free time, Jeff enjoys skiing, cycling, hiking and playing golf.



Jeff Maier, P.E.
Director of Engineering,
C&L Water Solutions Inc.



Jim Rankin
Application Engineer,
Vermeer Corp.

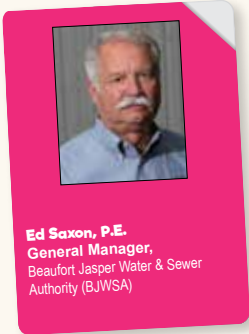
Jim Rankin

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 25 years, Jim's focus has been on Vermeer's horizontal directional drills. Jim 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. He and his wife, Jeanette, have three daughters, one son and five grandchildren. Jim spends his free time boating and woodworking.

NASTT's diverse Board comprises experts in the water, wastewater, gas and energy industries



Ed Saxon, P.E.

Ed Saxon, P.E., is the general manager of the Beaufort Jasper Water & Sewer Authority (BJWSA) in South Carolina. A native of South Carolina, Ed earned a bachelor's and master's in mechanical engineering from the University of South Carolina. He worked for DuPont and Conoco for 13 years before moving to Beaufort in 1989 to join BJWSA as the chief engineer. He is active in many water/wastewater and engineering professional organizations and is the current president of the South Carolina Water Quality Association. Ed is also extremely community minded as past president of the local Rotary Club, former Board Member and Campaign Chair for the United Way and former member of Beaufort Chamber Board and Economic Alliance Board. Ed enjoys golfing, boating and fishing in the local saltwater creeks.

BJWSA is the regional supplier of water and wastewater services for a two-county area along the southeast coast of South Carolina. Its service area encompasses over 1,300 square miles and has a service population of over 170,000 residents. This area is known for its pristine water resources. Beaufort County has more islands than any county along the U.S. east coast with a surface area that consists of 40 percent water. BJWSA has been utilizing trenchless technologies since the late 1980s to expand service to the island communities and to rehabilitate aging sewer system. BJWSA has employed different contracting methods to share risk as innovations in the trenchless technology industry are introduced.



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years!**

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Craig Vandaele
Tunneling Manager,
Michels Corp. & Michels Canada Co.

Craig Vandaele

Craig Vandaele is the tunneling manager for Michels Corp. and Michels Canada Co. In his current role, he oversees business development, estimating and assists with the overall management of the tunnel operations in the United States and Canada. Craig has more than 16 years of experience in the North American tunneling and trenchless technology industries. His vast experience includes design, inspection, construction and construction management of trenchless projects throughout North America.

Craig has a deep understanding of the complexities of trenchless projects. In his eight years at Michels, he has served as the project manager on many significant tunneling, HDD and cured-in-place pipe (CIPP) rehabilitation projects. Among them are the McOrmond Drive Sanitary and Storm Sewer Trunks in Saskatoon, Saskatchewan, Canada; Big Lake Offsite Gravity Portion (W14) in Edmonton, Alberta, Canada; Vancouver City Central Transmission Project, Vancouver, British Columbia, Canada; and Upper Northwest Interceptor Sections 3 & 4 in Sacramento, Calif. He has worked on projects that include conventional tunneling, microtunneling, slurry shield tunneling, pipe jacking, pipe bursting, CIPP and shaft construction of various types and sizes.

Craig is also active in many industry organizations, including North American Society for Trenchless Technology's Northwest Chapter as the chair. He has co-authored papers for several No-Dig conferences and has won awards for his projects and papers.

Matthew Wallin, P.E.

Matthew Wallin is a partner and senior project manager with Bennett Trenchless Engineers (BTE) in Folsom, California. BTEs' engineering practice is focused entirely on trenchless technology design, construction management, and claims assistance with clients and projects located throughout California, as well as Texas, Florida, Nebraska, Iowa, South Dakota and Tennessee.

Matthew holds both a bachelor's and a master's degree in civil engineering from Case Western Reserve University in Cleveland, Ohio. He began his career working for URS in Oakland, California in 2001 in its geotechnical group. Since that time, Matthew has focused his practice on geotechnical engineering and the design and construction management of new pipeline projects using horizontal directional drilling, microtunneling, open-shield pipe jacking, pipe ramming and auger boring.

Matthew has been a member of NASTT since 2002 and has participated in the organization in many capacities. He has been an active member in the Western Chapter (WESTT) since 2003 and has served as a member of the Board of Directors and as the Chapter Treasurer since 2008. He joined NASTT's No-Dig Show Program Committee in 2010 and has acted as a session leader for NASTT's No-Dig Show since that time. Matthew is also an instructor for NASTT's HDD Good Practices Course as well as the Introduction to New Trenchless Methods Course, each of which are taught annually at the No Dig Show and at other off-site venues throughout the year.



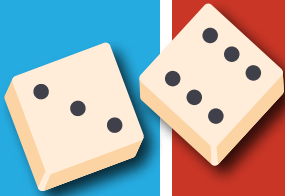
Matthew Wallin, P.E.
Partner and Senior Project
Manager,
Bennett Trenchless Engineers



Dennis Walsh, P.E.
Senior Project Manager and
Associate,
Woodard & Curran

Dennis Walsh, P.E.

Dennis M. Walsh, P.E., is a senior project manager and associate for Woodard & Curran and leads the Natural Gas Service Line, based in East Windsor, N.J. Dennis is a 1972 graduate of the University of Dayton, Ohio, with a bachelor's in civil engineering and a 2002 graduate of the Polytechnic University of New York with a master's in technology. He retired from KeySpan Energy Co. in 2005 after a 28-year career in the gas utility field with a background in engineering, operations, construction, quality assurance and HVAC. He led KeySpan's efforts to expand the use of trenchless technology in the early 1990's to decrease its main and service installation costs.



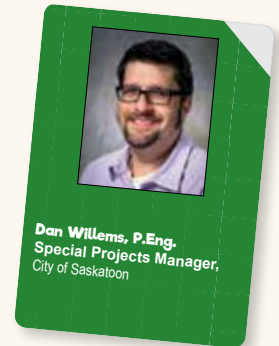
NASTT represents more than 2,000 members

Dennis is a member of the American Gas Association, the Society of Gas Operators in addition to NASTT. He is a Board Member for NASTT's Mid-Atlantic Chapter and serves on the annual No-Dig Show Program Committee. He has designed numerous HDD installations for various utilities including a 1,800-ft, 30-in. steel HDD project under a tidal basin in Brooklyn, N.Y.; a 2,000-ft, 12-in. HDD project under an environmental sound in south New Jersey; and a 400-ft jack and bore installation in Newark, N.J. When he is not involved in trenchless projects, he consults on gas engineering and other utility projects. His spare time is spent traveling and playing golf.

Dan Willems, P.Eng.

Dan Willems is currently the special projects manager with the City of Saskatoon Transportation & Utilities Department's Major Projects division. Dan holds a bachelor's in civil engineering from the University of Saskatchewan in Saskatoon. Since 2001, he has worked for various municipal government and private consulting organizations across the Canadian Prairie Provinces. Throughout 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 NASTT's annual No-Dig Show. He 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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MARK DIMICHELE,
Owner, D & D Water & Sewer, Canton MI

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NASTT'S

2016



HALL OF FAME INDUCTEES

A NEW CLASS OF TRENCHLESS ICONS TO TAKE CENTER STAGE AT NO-DIG SHOW

In March, the North American Society for Trenchless Technology (NASTT) will induct its fifth Hall of Fame class at NASTT's 2016 No-Dig Show in Dallas. This year, NASTT is proud to welcome into the hall: Martin Cherrington, widely considered to be the "Father of Horizontal Directional Drilling"; Ken Foster, president of Insituform Technologies; and Richard Thomasson, the first Chair of NASTT and one of the society's five founding members.

The new Hall of Fame class will join an already elite group of industry pioneers who helped pave the way for the current growth of the trenchless technology marketplace. The 2016 class will be formally inducted at the NASTT No-Dig Show Gala Awards Dinner on March 22.

"The lifelong dedication of these individuals has made innovative trenchless technology practices acceptable and sustainable, not only for today's infrastructure solutions but

for those of the future," said NASTT Executive Director Mike Willmets. "Their commitment to trenchless technology has been pivotal to the growth of the entire industry and has impacted infrastructure management in countless communities throughout North America."

NASTT's Hall of Fame was created 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. The Hall of Fame allows the outstanding work and dedication of these members to be recognized, honored and preserved. Members may be elected from all five NASTT membership categories: Manufacturers and Suppliers; Engineers and Consultants; Municipal and Utility Employees; Contractors; and Academia. The NASTT Board of Directors met last year and voted these trenchless icons as members of the 2016 class. Congratulations to our new inductees!

MARTIN CHERRINGTON



Martin Cherrington was born and raised in Redding, a small city in Northern California. He received a wealth of knowledge and experience by first working with a heavy construction contractor, which coincidentally was Martin's mentor, best friend and father, Dee Cherrington. Additional formative experiences came from working amongst many other industries

including land surveying, logging, telecom construction and heavy civil construction of dams, tunnels and pipelines.

In 1964, Martin founded Titan Contractors, a utility horizontal drilling and boring contracting service. In 1971, Martin was the first to drill an inverted arc under a river from the ground surface from one side of the river to the ground surface on the other side of the river. This event would eventually revolutionize the way pipelines were installed under rivers and waterways. Today it's a process referred to as horizontal directional drilling (HDD).

There are many firsts and milestones in a career that spans more than 52 years by Martin and the team members of Titan Contractors, TiDril and Cherrington Corp. Today, Martin holds 27 U.S. Patents related to horizontal drilling and boring, spanning from April 1975 to April 2015.

Martin resides with his wife, Joy, in Fair Oaks, Calif., where he continues his research and development of methods and equipment to improve and expand upon the application and capabilities of horizontal directional drilling and boring.

KEN FOSTER



For decades, Ken Foster has been a leading presence in the trenchless industry in Canada, the western United States and the United Kingdom. He has been a major contributor in the field of asset management, providing expertise to countless municipal rehabilitation programs, as well as being on the cutting edge of product and procedural

development. Always the ambassador, Ken has tirelessly promoted trenchless technologies, particularly across Canada.

Ken graduated from the University of Liverpool with a first class honours degree in civil engineering. Prior to his arrival in Canada, he worked for municipalities in England. After immigrating to Canada he worked as a consulting engineer undertaking municipal and transportation engineering projects. Ken became president of that consulting company in 1976. In

the early 1980s he was involved in several infrastructure rehabilitation projects but left the company in 1988 to join Insituform. Since that time he has been involved in all the Canadian operations as well as assisting with the Western U.S. and European operations.

Ken and his wife, Ann, moved to Edmonton from England in 1970 and have two children and four grandchildren. He still maintains his interest in soccer and coached for many years culminating in his under-18 team winning the Canada National Championship.

RICHARD O. THOMASSON



Richard Thomasson was the first Chair of NASTT and is one of the five individuals who founded the society in 1990. He has been a longtime member of the program committee and has served on various other committees for the society. He also has contributed to NASTT's No-Dig Show technical program numerous times.

Richard received a bachelor's degree in

civil engineering from Virginia Polytechnic Institute in 1969, a master's in civil engineering from the University of Maryland in 1979, and a master's in public policy from the University of Maryland in 1990. Working with the Washington Suburban Sanitary Commission (WSSC) for 31 years, Richard was instrumental in developing the use of many trenchless technologies but was one of the first to develop the CIPP lining of sewers with Insituform. While with WSSC, there was the establishment of a comprehensive

and very effective reconstruction program which focused on trenchless technology. After retiring from WSSC, Richard continued his passion for his work with Parsons Brinckerhoff for eight years and with Arcadis for seven years and counting.

Richard loves family, church and all of the colleagues he has met and worked with for more than 46 years. He has a passion for the water and sewer industry because he believes it is essential to the quality of life for all people.

NASTT Hall of Fame Inductees 2012 - 2016

2012

Frank Canon
Bernie Krzys
Gary Vermeer (1918-2009)

2013

Dr. David Bennett
Ed Malzahn (1921-2015)
Eric Wood (1935-1994)

2014

Bob Affholder
Joe Loiacono
Dr. Ray Sterling

2015

David Magill, Jr.
(1943-2014)
Ron Halderman
Kaleel Rahaim

2016

Martin Cherrington
Ken Foster
Richard Thomasson

ED MALZAHN 1921-2015

NASTT was deeply saddened by the recent passing of an industry icon. Ed Malzahn, founder of The Charles Machine Works Inc., perhaps better known to the trenchless industry as Ditch Witch, passed away on Dec. 11. He was 94.

An NASTT Hall of Fame inductee in 2013, Malzahn is considered one of the trenchless industry's pioneers. He created his company in 1949 and remained at the forefront of the horizontal directional drilling industry throughout his career, developing drilling rigs and equipment that pushed the fledgling HDD industry forward through his vision and innovation.

"Ed was the inspirational leader of the Ditch Witch

and the Charles Machine Works family for over 65 years," said Rick Johnson, CEO of Charles Machine Works. "He possessed a sharp mind, strong rural work ethic and generous spirit – all of which he used to better those around him."

As a family man, Malzahn's family life extended to his work life. Charles Machine Works has remained a family business since its creation, even after global success. Malzahn's granddaughter Tiffany Sewell-Howard, who represents the fifth-generation of the Malzahn family, now serves as the executive chair of the company.

Malzahn is survived by his three children, nine grandchildren and 13 great-grandchildren.

Frederick Duncan: A Trenchless Visionary

By Anna Porter

Frederick Duncan was a man ahead of his time.

It is difficult to think about how things were done before industry existed as we know it; back to a time before municipalities were designed with regulated systems and standard contingency plans.

In this buried history, inventions lay like coals, containing the sparks that fed the fires we have grown so accustomed to.

In the 1930s, industry was being shaped by necessity and invention, hard-times were plentiful, and Frederick Duncan was a young man laboring wherever he could find work. In everything Duncan did, he would take a detailed look at the steps and procedures of his endeavors and identify how they could be done more efficiently.

One of the jobs Duncan spent the most time on – and was most influenced by – was laying pipe for the City of Ottawa, Ontario. It was during this time that he developed an invention to advance underground pipework in a way that had not been documented before.



**Frederick Duncan **
circa 1935.

In 1935, Duncan submitted this invention for patent with the Dominion Patent Office (the predecessor of the Canadian Intellectual Property Office). The submission he was requesting a patent for was titled, “Conduit Structure for Underground Installation and the Method and Means for Installing the Same,” also known now as trenchless technology.

Although he was unable to pursue his invention due to funding, it was nevertheless an idea that revealed itself to many engineers over the next few decades. The idea he tried to patent evolved into the trenchless construction method we are so familiar with today.

One of Duncan’s grandchildren,

Heather Knox, knew his story well and knew that it was a story the trenchless construction community would be interested in hearing. Along with her cousins, she brought this information about her grandfather and his trenchless ideas to the North American Society for Trenchless Technology – an association he would have likely been a part of, had the timing been right.

Raised in rural Quebec in the early 1900s, there were not many standardized educational opportunities for Duncan and his eight brothers and sisters. With no formal education and a family to support, he worked wherever and however he could, from threshing



Certification showing Duncan’s pending patent in 1935 from the Dominion Patent Office in Canada.

crews and mechanic shops, to carpentry and construction.

His family would say that “Everybody is good at something,” and Duncan was good at tinkering and understanding the processes behind everything. He was a self-taught craftsman with an inventive nature.

On July 6, 1935, Duncan received a caveat – the document which initiated the patent process – for his invention called “Conduit Structure for Underground Installation and the Method and Means for Installing the Same.” However, at that time the patent office would only hold on to a pending patent for a certain number of months. After that, without funding, there was no path to move forward. Caveats that were not funded fell into redundancy and were destroyed, including many of the unique (hand-drawn) illustrations accompanying them.

Duncan’s invention introduced wall support braces which moved forward as tunneling progressed with pipe progressively laid, complete with detailed parts lists. He described exactly what the process of existing excavation entailed and how his new method and means were a viable alternative to the problems of the standard invasive practice.

As he had no formal training in excavation and infrastructure, and he didn’t hold to any ascribed conventions, Duncan simply created designs that made sense to him. The detail with which he laid out problems and solutions alongside step-by-step objectives and methods clearly showcased his innovative thinking.

He incorporated comparisons of requirements for manual labor and time for project completion, along with costs

incurred through disruption of traffic and the environment. Also included were considerations for obstacles that could be encountered with various site

As the tunneling progresses then, the wall 34 is moved forwardly the required distance and when this is accomplished, a second wall is lowered through opening 20 and placed in position with the narrow width or lesser axial diameter in a horizontal plane. With the tunnelled walls protected then during the advancement and progressive laying of the conduit sections, the tunnel proper is protected from cave-in and this is particularly essential where sandy or like conditions are encountered.

Snapshot of Duncan’s typed submission to the patent office, describing his proposed new methodology.

Separate the proposed section through a pipe or tunnel of section or smaller diameter and to extend pipes or tunnels already constructed. This principle is practicable during a portion of a project, and during the same operation. Various other objects of the present invention are described in the accompanying drawings in which

Snapshot of Duncan’s handwritten notes describing his illustrations.

conditions. The specifications carefully examined all the basics, including tunneling with shaft wall support units that eliminated the need for standard shoring or cribbing; rollers, brackets and supports for moving conduit sup-



Duncan with his granddaughter, Heather, 1961.

port wedges; jacks, various tamping needs, and dirt removal; connections, couplings and flanges; along with hooks and rings for light cords and air hoses.

To overcome objections or perceived flaws, Duncan’s submissions referenced his hand-drawn pictures and comparative figures that detailed the

advantages of his method versus traditional methods. Procedures were captured in these one-off illustrations which were submitted with the request for patent but sadly are no longer available, lost to time.

His goal and accomplishment was to clarify a new method with ample substantiated description so that it could be replicated with scientific precision. Excerpts from Mr. Duncan’s patent can be seen below.

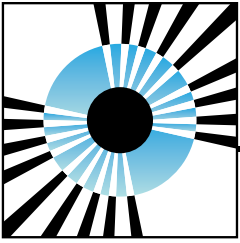
With no investors or funding, he was unable to pursue the next steps of taking his caveat from “patent pending” to officially “patented.” Although there may have been interest among his peers, we don’t know if they were able to apply this technology to the subsequent city pipe jobs.

Over the years, Duncan continued tinkering and submitted patent requests for a few smaller inventions, but his boundless energies remained devoted to working alongside and spending quality time with his family.

Duncan had three sons, two of whom were deployed overseas during World War II. Upon their safe return to Canada, the Canadian Department of Veterans Affairs provided low-interest land to his sons, and he helped them to build their own homes, from the ground up – most likely with excellent pipework and plumbing systems.



Anna Porter is a freelance writer specializing in human interest pieces and short stories. She has worked in the infrastructure industry for more than 10 years and currently lives near Mt. Hood in Oregon.



NASTT'S EYE ON THE INDUSTRY

OUR MEMBERS IN ACTION

Hobas Pipe USA

Turcot Interchange Project
Montreal, Quebec



In 2015, Hobas Pipe USA began supplying pipe for the rebuilding of the 40-year-old Turcot Interchange, southwest of downtown Montreal. This project will continue for several years and is estimated to cost \$3 billion (CAD). Hobas plans to provide more than 2,000 ft of 110-in. diameter pressure pipe for this project. This is the second Hobas project in Montreal to date. Hobas pipe sizes range from 18 to 126 in. and larger for both pressure and gravity applications. Hobas Pipe USA is also certified by the International Organization for Standardization to ISO 14001 and 9001. For more information about this project, please contact Hobas Quebec. Additional details are also available at www.Hobaspipe.com and www.Hobas.ca.

The Robbins Company

Tunneling
Halton Region, Ontario

In July 2015, a 3.5 m (11.5 ft) Robbins Main Beam TBM began a new chapter in its storied 32-year career. Including its new 6.3 km (4.0 mi) long tunnel for the Mid-Halton Outfall in Ontario, Canada, the machine will have bored nearly 30 km (18.6 mi) of tunnels since 1983.

The rebuilt TBM has been beefed up for high-capacity tunneling in hard rock. Geology is expected to consist of laminated shale

with interbedded limestone and siltstone layers and maximum rock strength of 120 MPa UCS. In addition, the TBM was outfitted with fully modernized VFDs, electronics, and high-capacity gearing and motors. The back-up system was also modified to make it more mobile through two 130 m (427 ft) radius curves that the TBM will have to navigate, one in each direction.



Contractor STRABAG, who has had several projects in Canada including the epic Niagara Tunnel project, is in charge of the works. In addition to the tunnel, STRABAG had to construct two deep shafts for the launch and exit of the TBM. The scheme involves two sections of tunnel designed to carry treated effluent water from a treatment plant in Oakville into Lake Ontario. The completed system will upgrade water treatment capacity in the Halton Region of Ontario. The TBM was launched from a 12 m (39 ft) diameter, 62 m (203 ft) deep shaft and is ramping up production, having excavated over 300 m by early September 2015.

Underground Solutions Inc.

Water Main Rehabilitation
Elyria, Ohio

Fusible PVC pipe supplied by Underground Solutions was used for the Pikewood Water Main Rehabilitation project in Elyria, Ohio. The City of Elyria is believed to be the first inland city in the United States to pump treated water from the Great Lakes. Today, Elyria owns and operates a Class IV surface water treatment plant utilizing modern water treatment practices and a state of the art computer system to monitor its plant operations and distribution system.



Within Elyria's system, a 30-in. spiral wound steel water transmission main, one of several responsible for supplying potable water into the city's water distribution system, passes under paved streets and a manufactured home community named Pikewood Manor. The main lies beneath the Pikewood Manor community and continues to be a primary transmission main for the Elyria Water Treatment Plant. In recent years, the main has experienced pin-hole leaks and failures at the pipe joints. Servicing and accessing the main has been very difficult since it is now underneath a 400-unit modular home community.

Engineer Burgess & Niple worked directly with the city's engineering department to select the optimal trenchless method to renew the failing main. Execution of the project required an initial assessment of the host pipe. This was accomplished with video inspection and a "test-pull" using a 40-ft proof stick of 24-in. Fusible C-905 pipe to confirm that pull-in could be accomplished without encountering obstructions or offsets. Pipe fusion and inser-



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PALTEM: Japan's choice for trenchless rehabilitation. Over the last 30 years, more than 1,800 miles of pipeline have been rehabilitated using the PALTEM system in Japan.

The PALTEM family of technologies can be used to rehabilitate virtually any type of pipe, including water, sewer, gas, oil, electricity and telecommunications.



PALTEM Flow-Ring (FR) forms a new structure inside existing pipes. The Flow-Ring (FR) can rehabilitate virtually any shape or size of pipe from 800 to 5,000 mm (31 – 197 inch)

The new structure consists of steel rings as frame work, plastic strips making the surface, and a special mortar to grout the space between the existing wall and the new structure.



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tion into the host pipe were completed within a week. The contractor, Speer Brothers of Sandusky, Ohio, utilized a 60,000-lb drill rig to pull the 2,000-ft, fused pipe string through the old transmission main. Drilling fluid was injected through the drill rods during pull-in to lubricate the host pipe. Once in place and tested, the annular space between the new 24-in. Fusible C-905 carrier pipe and the host pipe was filled with grout.

Just outside the developed areas of the of the project site, installation transitioned to conventional open-cut construction using bell-and-spigot PVC pipe. The open-cut and slipline sections were connected using standard mechanical joint fittings.

LMK Technologies

Sewer System Rehabilitation

Montgomery County; Prince George County, Maryland

The Washington Suburban Sanitary Commission (WSSC), one of the largest water and wastewater utilities in the United States, has approved two infrastructure repair solutions from LMK Technologies for use in WSSC's sewer systems. LMK's Insignia End Seals and LMT (Lined Main Tap) Saddle were evaluated by the WSSC's Materials Evaluation Committee (MEC) and approved for applications in Maryland's Montgomery and Prince George's counties, a region representing 1.8 million people.

Since 1993, LMK Technologies has been a leader in the development of trenchless CIPP and sewer rehabilitation technologies. The LMT (Lined Main Tap) Saddle is designed to connect lateral pipes to mainline liners and mainline pipes that have not yet been rehabilitated. It is compatible with a variety of lining materials including polyethylene pipe commonly used in fold & form liners and pipe bursting, cured-in-place liners and PVC folded liners.

The Insignia End Seal Sleeve was developed by LMK to ensure seamless and uniform water-tight seals at the end of rehabilitated pipe lining at the manhole penetrations. When used in conjunction with mainline CIPP lining, the Insignia gasket forms a watertight seal in the annular space between the liner and the host pipe. An annular space is always created between the host pipe and the liner because CIPP resins do not bond to the host pipe. Without the

compression gasket, water will track behind the liner and re-enter the collection system.

For more information on this project, visit www.lmktechnologies.com.

Aqua-Pipe Sanexen

Water Main Rehabilitation

Jersey City, New Jersey

Jersey City has the fastest growing population of any municipality in New Jersey since 2010. Like many other American cities, Jersey City is also facing the challenges of aging water mains. From the intersection of Summit Avenue to James Street, Newark Avenue required much needed work on all of its underground infrastructures on that section of approximately 4,000 ft.

The Jersey City Municipal Utilities Authority knew that the replacement of the water main would have required digging another trench. Considering the previous inconveniences to the residents and business owners of Newark Avenue and the presence of other utilities adjacent to the water main, a traditional replacement by open-trench was not an option. He considered trenchless options for the water main renewal. The Aqua-Pipe system from Sanexen was chosen by the city and the engineer – Hatch Mott MacDonald – as the most viable option for structural rehabilitation of the main.

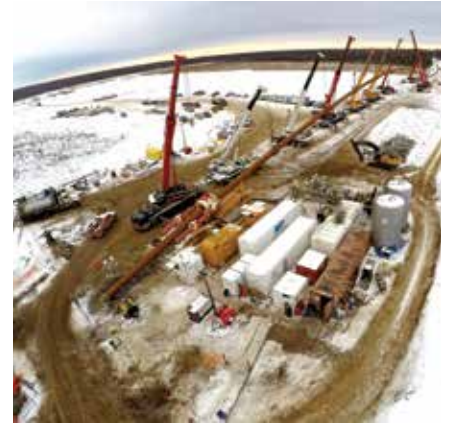


The rehabilitation of the Newark Avenue water main was completed in two phases – one covering the structural lining of 2,000 lf of 6- to 8-in. from Summit Avenue to Tonnelle Avenue (including the Indian Square neighborhood) while another phase covered the remaining 2,000 lf of 6-in. water main from Tonnelle Avenue to James Avenue.

Michels Canada

Direct Pipe; HDD

Toronto, Ontario; Fort McMurray, Alberta



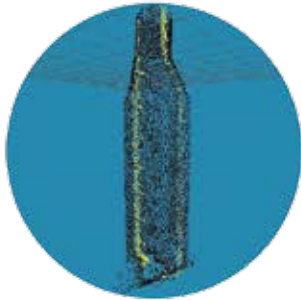
Michels Corp. closed out 2015 on a strong note in regards to Direct Pipe installations and milestone HDD crossings – both of which took place on projects in Canada.

According to Michels, with the completion of its eleventh and twelfth Direct Pipe installations, the Wisconsin-based company now leads the world with Direct Pipe installations. The work, completed Dec. 11, in Toronto involved 1,300 ft of a 42-in. pipe and 823 ft of a 36-in. pipe. Michels is capable of using Direct Pipe on diameters that range between 36 and 60 in. and to lengths of more than 4,000 ft.

Direct Pipe is a one-pass system for trenchless installations that combines a thruster with a steerable microtunneling machine. Michels has the experience and equipment to simultaneously complete multiple Direct Pipe projects throughout North America. In addition to completing the longest Direct Pipe installation in North America, Michels has successfully used Direct Pipe on projects that cross under levees, rivers, rail lines and international borders.

In November, Michels Canada and Michels Directional Crossings reached a horizontal directional drilling (HDD) milestone as part of TransCanada's Northern Courier Pipeline project.

Michels used HDD to drill beneath the Athabasca River and completed the HDD milestone on Nov. 21, a 42-in., 7,200-ft (2,195 m) crossing near Fort MacKay, about one hour north of Fort McMurray, Alberta. The 1.36-mile installation is a new record for Michels and according to Michels it is the longest in North America for a pipe with a 42-in. diameter.



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NASTT CHAPTER NEWS

British Columbia



It was another great year for the trenchless industry in British Columbia in 2015.

We were all very pleased with the success our first roadshow in November – so pleased that we’re already planning the next one in 2017! Two points have already been decided by the roadshow’s organization committee: It’s going to be bigger and it’s going to be better! In addition, 2015 was also the first year of our academic bursary, which was awarded to a local post-secondary student in British Columbia. We will be continuing this into 2016 and beyond.

The British Columbia Chapter will be hosting two full-day workshops in June on pipe bursting (one in BC’s interior and one on Vancouver Island) and discussions have begun to host some HDD or tunnel boring seminars later in the year. If you want more information on our chapter and events please visit nasttbc@gmail.com.

Great Lakes, St. Lawrence & Atlantic



The GLSLA board of directors and member volunteers are continuing to work to

provide value to our members through training, publications and our website. We have a number of activities currently ongoing. For more information on GLSLA, our events, and our training sessions, please visit our website at glsla.ca.

Mid Atlantic



The Mid Atlantic Chapter (MASTT) is planning “Trenchless Technology, SSES and Buried Asset Management” seminars

for Baltimore, Maryland and Newark, New Jersey, in 2016. Please plan to support and attend the seminars to enjoy the networking and learning.

MASTT will have its Annual Membership and Board of Directors meeting at NASTT’s 2016 No-Dig Show on March 20, 1 to 2:30 p.m. CST, at the Texan Gaylord Resort and Convention Center in Grapevine, Texas. The meeting room will be announced at a later date and 2016 officers will be elected at this meeting.

MASTT plans to publish its second annual issue of the *Mid Atlantic Journal of Trenchless Technology* in mid-May. Please contact Andrew Pattison, A to B Publishing at (204) 275-6946 to participate with an article or advertising. The publication will be distributed to more than 4,000 water and sewer decision makers in the MASTT area.

Midwest



The Midwest Chapter (MSTT) will have its Annual Membership and Board of Directors meeting at NASTT’s 2016 No-Dig Show, March 20, 2:30 to 4 p.m. CST. The meeting room will be announced at a later date and 2016 officers will be elected.

MSTT conducted a “Trenchless Technology, SSES and Buried Asset Management” seminar on Oct. 7-8, 2015, at the new Miller Pipeline Facility in Indianapolis, Indiana. The guest presenter was Mike Miller, manager of construction, Citizens Energy Group (Sewer and Water). ASCE Metropolitan Indianapolis Branch was the co-sponsor for the seminar. MSTT wants to thank Chris Schuler and Miller Pipeline for their wonderful support for this great seminar.

MSTT is planning seminars for Detroit, Michigan, and St. Louis, Missouri, in 2016. Please plan to support and attend the seminars to enjoy the networking and learning.

MSTT is planning seminars for Detroit, Michigan, and St. Louis, Missouri, in 2016. Please plan to support and attend the seminars to enjoy the networking and learning.

Northeast



Recently, NASTT formed its brand new Northeast Regional Chapter. The chapter

covers all six New England states plus the state of New York. It was created from the formerly independent Northeast Trenchless Association (NTA), originally formed in the mid-2000s. To expand its efforts, NTA has joined forces with NASTT to grow its education network and to expand its membership inclusive of owners and engineers.

The Northeast Chapter is not only NASTT’s newest regional chapter, but also its oldest. In the mid-1990s, under the encouragement of Trenchless Emeritus William S. Gray, the first NASTT regional chapter was formed. The geographical area not only included the current member states, but also Pennsylvania and New Jersey. Unfortunately, trenchless was still in its infancy and not widely accepted yet, and interest in the regional chapter floundered. Today, trenchless work in the Northeast United States is growing rapidly due to expansion in the energy market and needed repairs for aging infrastructure. The new Northeast Chapter will become a resource for owners, engineers and contractors to improve the execution of all trenchless projects from conception to completion.

Northwest



The Northwest Chapter continued its annual activities in 2015, including technical lunches, a short course and its 19th annual Northwest Chapter Trenchless Conference and Tradeshow. The short course was held in conjunction with the conference, held Nov. 18-19 in Calgary. The short course was a combination of the Rehabilitation and New Installations Good Practices Short

course was held in conjunction with the conference, held Nov. 18-19 in Calgary. The short course was a combination of the Rehabilitation and New Installations Good Practices Short



NASTT'S 2016 NO-DIG SHOW MUNICIPAL & PUBLIC UTILITY SCHOLARSHIP PROGRAM



Congratulations to the following scholarship recipients!

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- Castro Valley Sanitary District
- Central Contra Costa Sanitary District
- Charlotte Water
- City of Winnipeg - Water & Waste Department
- City of Aiken
- City of Aurora / Aurora Water
- City of Bend
- City of Bonner Springs
- City of Broken Arrow
- City of Calgary
- City of Casselberry
- City of Columbus
- City of Dollard-des-Ormeaux
- City of Edmonton
- City of Eugene
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- City of Farmington
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- City of Portland
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- City of Sumter
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- City of Vancouver
- City of Venice
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- City of Vista
- City of Waterloo
- City of Winnipeg
- Clearwater Gas System- City of Clearwater
- Colorado Department of Transportation
- Colorado Springs Utilities
- County of San Gilmore
- DC Water
- DeKalb County Government, Department of Watershed Management
- Denver Water
- East Bay Municipal Utility District (EBMUD)
- Garden City Park Water District
- Gourmet Grass
- Halifax Regional Water Commission (Halifax Water)
- Independence National Historical Park, National Park Service
- Johnson County Wastewater
- King County
- King County Department of Natural Resources and Parks
- King County Waste Water Treatment Division
- Long Beach Water Department
- Metro Wastewater Reclamation District
- Miami-Dade County, Water & Sewer Dept.
- Navajo Tribal Utility Authority
- Norman Utilities Authority
- North Davis Sewer District
- Norwich Public Utilities
- Orange County Sanitation District
- Pacific Gas and Electric Company
- Pinellas County
- Pleasant Grove City
- Port of Seattle
- Salt Lake City Department of Public Utilities
- Sanitation District No.1 of NKY
- South Coast Water District
- Texas Water Development Board
- The Regional Municipality of Niagara Number
- Town of Devon
- Town of Lincoln
- Trinity River Authority of Texas
- Village of Bellwood
- Waterford DPW

These organizations will be attending NASTT's 2016 No-Dig Show, March 20-24 in Dallas, Texas. Plan to join them by registering at nodigshow.com.



Courses held Nov. 18. The chapter was very pleased to see an attendance of 45 for the short course. The conference and tradeshow was held on Nov. 19 and also had great attendance and generous support from the trenchless community. This included 170 attendees, 15 exhibitors and special event and general sponsorship.

Also as part of the conference, the chapter presented its Project of the Year Award for 2015. This year the award went to the Bowness Sanitary Offload Trunk project. The owner was the City of Calgary, the consulting engineer was AECOM, and the trenchless contractor was Ward and Burke Microtunneling Ltd. from Calgary. Congratulations to all involved on this project! The chapter also honored three long-serving NASTT members deserving of recognition for all they have done for the trenchless industry: Bill Boyes, City of Calgary, Glen Hume, IPEX and Alex Varro, Thuro Inc.

Thanks to all who supported the Northwest Chapter in 2015. Whether through participation in the planning of an event or through attending events, all support is appreciated. We look forward to your continued support in 2016.

Pacific Northwest



The Pacific Northwest Chapter will be meeting at NASTT's 2016 No-Dig Show in

Grapevine, Texas in March, with a follow-up meeting in June to begin planning its two-day symposium for January 2017. The dates will be discussed, as well as which short course(s) we will be provided. The Board is looking forward to getting everyone together and moving the Chapter forward in 2016.

Rocky Mountain



The Rocky Mountain Chapter was very active this winter, hosting two major events.

In November, the Chapter was pleased to return to a regular yearly conference following NASTT's 2015 No-Dig Show in Denver in March. The conference was held at the In-

verness Hotel and Convention Center at the Denver Tech Center (south Denver) Nov. 4-5. It featured a full day of technical presentations dealing with trenchless subject matter of regional significance, as well as two half-day NASTT promulgated short courses with introduction to both new trenchless installations and rehabilitation techniques. The conference drew a full room and the short courses had more attendees than any other year. The Chapter would like to thank the sponsors and exhibitors that helped make this event possible. In concert with the annual conference, The Rocky Mountain Chapter produced the 2015 edition of the Rocky Mountain Trenchless Journal, which featured many of the technical presentations in article format.

The Chapter also hosted its second annual Utah Training Day on Jan. 21 in Sandy, Utah. The seminar included a full day of paper presentations by regional trenchless experts discussing trenchless techniques and unique case studies from across the region. The Chapter would like to thank the tireless volunteers in Utah for assembling another successful event. Looking ahead, the Chapter will be planning activities and events to better serve its members and region, as well as anchor its yearly activities with the annual regional conference. For more information about upcoming chapter events and how to get involved, please visit rmnastt.org, or contact Bo Botteicher at bbotteicher@ugsi.us.

Southeast



The Southeast Chapter conducted a "Trenchless Technology, SSES and Buried

Asset Management" seminar in Shreveport, Louisiana, at the Louisiana Tech University Shreveport Center, Dec. 16-17, 2015. Tyler Comeaux, P.E., project manager, Burk-Kleinpeter, Inc., was the guest presenter and gave a talk on "The City of Shreveport Consent Decree Program and the Trenchless Technology Program." ASCE Shreveport Branch was co-sponsor for the seminar. The Southeast Chapter would like to thank Dr. Tom Iseley, P.E., PWAM, Louisiana Tech

University, for helping make the seminar a great success with networking and learning.

The Chapter is currently planning "Trenchless Technology, SSES and Buried Asset Management" seminars for Nashville and Miami in 2016.

Please visit mstt.org, mstt.org or sestt.org to view the proposed seminar schedules for the Mid Atlantic, Midwest and Southeast chapters, respectively. Seminar locations and dates will be updated as the seminar dates, venues and programs are finalized. To participate in any of the seminars, please contact Leonard Ingram, Mid Atlantic, Midwest and Southeast Chapter executive director, at leonard@engconco.com for more information or call (888) 817-3788.

South Central



The South Central Chapter was established in 2015 to serve the members of

NASTT from Texas and the south central area of the United States. The South Central Chapter Board is planning its first meeting at NASTT's 2016 No-Dig Show in March and will discuss the direction of the chapter and upcoming activities and initiatives.

Western



The Western Chapter of NASTT promotes the NASTT mission within the western

region of Arizona, California, Hawaii, Nevada and New Mexico. This past October, the chapter held its annual conference in beautiful San Diego, California. The event consisted of a day-long conference with presentations, exhibits and networking opportunities. Attendees from all over the region were able to come together to learn about new projects and technologies and meet with their peers in a great setting. The second day featured NASTT's CIPP Good Practices Course. Taught by industry expert, volunteer instructors, attendees were able to expand their knowledge and earn CEUs. More information on the chapter and upcoming events can be found on the website at westt.org.

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NASTT has a network of 11 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 Kieran Field, Chair Phone: (604) 990-4800 E-mail: kieran.field@opusdaytonknight.com Website: nastt-bc.org	Elected Officers Chair - Kieran Field Vice Chair - Rod Loewen Secretary - vacant Treasurer - Preston Creelman
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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.

Chapter Contact Kevin Bainbridge, Chair Phone: (905) 304-0080 E-mail: kbainbridge@rcii.com Website: glsla.ca	Elected Officers Chair - Kevin Bainbridge Vice Chair - Anna Polito 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 Richard Thomasson, Chair Phone: (703) 842-5621 E-mail: rthomasson@pirnie.com Website: mastt.org	Elected Officers Chair - Richard Thomasson Vice Chair - Michael Delzinger Secretary - Dennis Walsh Treasurer - Tom Wyatt
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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 Jeff Boschert, Chair Phone: (314) 229-3789 E-mail: jeffboschert@yahoo.com Website: mstt.org	Elected Officers President - Jeff Boschert Vice President - Chris Schuler Secretary - John Milligan Treasurer - Gary Smolinski
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Northeast

The Northeast Chapter was established in 2015 by members in the states of Connecticut, Maine, Massachusetts, New Hampshire, New York, Rhode Island and Vermont.

Chapter Contact Dennis Doherty, Chair Phone: (603) 320-6331 E-mail: ddoherty@haleyaldrich.com Website coming soon!	Elected Officers Chair - Dennis Doherty Vice Chair - Ian Mead Secretary - Walter Fromm Treasurer - Babs Marquis
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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 Alan Miller, Chair E-mail: amiller@nastt-nw.com Website: nastt-nw.com	Elected Officers Chair - Alan Miller Secretary - Ben Campbell Treasurer - Keith Moggach Past Chair - Dan Willems
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Pacific Northwest

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

Chapter Contact Chris Sivesind, Chair Phone: (507) 567-2261 x155 E-mail: csivesind@akkerman.com Website: pnwnastt.org	Elected Officers Chair - Chris Sivesind Vice Chair - Brendan O'Sullivan Secretary - Brandon Simonds Treasurer - Matt Pease
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Rocky Mountain

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

Chapter Contact Bo Botteicher, Chair Phone: (303) 521-2618 E-mail: bbotteicher@undergroundolutions.com Website: rmnastt.org	Elected Officers Chair - Bo Botteicher Vice Chair - Ken Matthews Secretary - Chris Larson Treasurer - Joe Lane
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South Central

The South Central Chapter was established in 2015 to serve the members of NASTT from Texas and the south central area of the United States.

Chapter Contact Larry Johnson, Chair Phone: (800) 856-7473 E-mail: ljohnson@hobaspipe.com Website coming soon!	Elected Officers Chair - Larry Johnson Vice Chair - Alan Goodman Secretary - Luis Cuellar Treasurer - vacant
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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.

Chapter Contact Jerry Trevino, Chair Phone: (877) 462-6465 E-mail: jerry@mechanicaljobbers.com Website: sestt.org	Elected Officers Chair - Jerry Trevino Vice Chair - Ed Paradis Secretary - J. Chris Ford Treasurer - Kelly Derr
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Western

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

Chapter Contact Craig Camp Phone: (619) 881-0407 Email: craig.camp@hatchmott.com Website: westt.org	*Directors: Cindy Preuss, Matt Wallin, Brian Avon, Noel Guercio, Mo Ehsani, Mike Rocco, Jennifer Glynn, Normal Joyal, Lisa Arroyo, Craig Camp *2016 Officer elections to occur March 20.
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NOMINATIONS BEING ACCEPTED FOR NASTT'S HALL of FAME Class of 2017

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 and must be received by no later than July 1, 2016.



NASTT Student chapters are involved in a number of activities throughout the academic year including field trips, seminars and fundraisers. Members of student chapters also attend and participate in NASTT's No-Dig Show where they present trenchless research posters, participate in competitions and provide event support monitoring the technical paper sessions. There are many benefits for students who belong to a NASTT student chapter – scholarships, networking opportunities, education and career opportunities to name a few. To learn more about NASTT's student chapters, visit www.nastt.org/student_chapters.



Arizona State University

Tempe, Arizona
 Advisor: Dr. Samuel T. Ariaratnam
 E-mail: samuel.ariaratnam@asu.edu



Bowling Green State University

Bowling Green, Ohio
 Advisor: Dr. Alan Atalah
 E-mail: aatalah@bgnnet.bgsu.edu



California State Polytechnic University, Pomona

Pomona, California
 Advisor: Dr. Jinsung Cho
 E-mail: jinsungcho@cpp.edu



Clemson University

Clemson, South Carolina
 Advisor: Dr. Kalyan Piratla
 E-mail: kpiratl@clemson.edu



Concordia University

Montreal, Quebec
 Advisor: Dr. Tarek Zayed
 E-mail: zayed@bcee.concordia.ca



Indiana University - Purdue University Indianapolis

Indianapolis, Indiana
 Advisor: Dr. Dae-Hyun (Dan) Koo, P.E.
 E-mail: dankoo@iupui.edu



Laval University

Quebec City, Quebec
 Advisor: Dr. Geneviève Pelletier, ing.
 E-mail: Genevieve.Pelletier@gci.ulaval.ca



Trenchless Technology Center/Louisiana Tech University

Ruston, Louisiana
 Advisor: Dr. Shaurav Alam
 E-mail: shaurav@latech.edu



McGill University

Montreal, Quebec
 Advisor: Dr. Mohamad A. Meguid
 E-mail: mohamed.meguid@mcgill.ca



Queen's University

Kingston, Ontario
 Advisor: Dr. Ian D. Moore
 E-mail: moore@civil.queensu.ca



Rutgers University

New Brunswick, New Jersey
 Advisor: Dr. Nenad Gucunski
 Email: gucunski@rci.rutgers.edu



CUARE/University of Texas at Arlington

Arlington, Texas
 Advisor: Dr. Mo Najafi
 E-mail: najafi@uta.edu



Vanderbilt University

Nashville, Tennessee
 Advisor: Dr. Sanjiv Gokhale
 E-mail: s.gokhale@vanderbilt.edu



Virginia Tech University

Blacksburg, Virginia
 Advisor: Dr. Sunil Sinha
 E-mail: ssinha@vt.edu



University of Alberta

Edmonton, Alberta
 Advisor: Dr. Alieza Bayat
 E-mail: abayat@ualberta.ca

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Battelle Memorial Institute, Columbus, Ohio

Introduction

The City of Casselberry started its major asbestos cement pipe bursting project in 2009 in response to the American Recovery and Reinvestment Act's call for Shovel Ready projects. The project started as a \$3 million project and grew to \$10.3 million as the success of the project continued. The City of Casselberry, its contractor Killebrew, Inc., and construction inspection engineer, CPH Engineers, Inc., worked very closely with regulators from the local and federal governments as well scientific agencies, such as the Water Research Foundation and Battelle Memorial Institute, to fully understand the applicability of the National Emissions Standards for Hazardous Air Pollutants (NESHAP) to pipe bursting of asbestos cement pipe. Understanding how the Clean Air Act that was written in the early 1970s applied to pipe bursting was not an easy task. Many regulators and other people not familiar with pipe bursting envisioned the airborne release of asbestos particles during the pipe bursting process. This is simply not what happens while the pipe bursting work is occurring and the project team worked diligently to dispel the myths.

The project team understood the importance of successfully implementing what would become the largest AC pipe bursting project in North America and working closely with all regulatory agencies to meet every aspect of regulations that controlled the work. The project was federally funded and would be required to stand up to scrutiny through a comprehensive audit at the close of the project. The project could also serve as a guideline to other projects that could build on the progress made by the project team fully understanding the complicated regulations and applying them to pipe bursting of AC pipe. The project team consistently volunteered the project for scientific study and analysis and routinely spoke about the project. EPA officials have recognized the need for additional research into the environmental impacts of AC pipe rehabilitation methods. They tasked the Water Research Foundation and the Battelle Memorial Institute through WRF Project #4465 to analyze the available methods of AC pipe rehabilitation and their environmental impacts. The project team quickly volunteered the Casselberry project as a pilot project for the Battelle Memorial Institute's study and the pilot project began.

The Battelle Memorial Institute, in conjunction with the project team, planned a week of on-site field research to witness rehabilitation of a 775-ft section of AC pipe and to collect air, soil and water samples during the process. The Battelle Memorial Institute followed key EPA sampling guidelines, such as ISO Method 10312, EPA

Method 600/R-93/116 and EPA Method 100.2, during the pilot study sampling activities. Air sampling limits for asbestos fibers came back well under the established Occupational Safety and Health Administration's (OSHA) established limits for permissible asbestos fiber limits. The result in soil sampling pre and post levels show almost no change in presence of asbestos fibers in the soil after pipe bursting. Post pipe bursting water samples showed no levels of asbestos fibers that exceeded EPA MCL's in the water although one pre pipe bursting sample exceeded the EPA MCL but the sample appeared to be faulty. In general, the Battelle Memorial Institute's work summarized that there is no evidence to support that the bursting of AC pipe has any negative impacts on the environment or the workers performing the work.

Project History

The City of Casselberry is a medium-size town in suburban Orlando that is considered to be 95 percent developed. Much of the development occurred between 1950 and 1980. This time frame occurs with the increased popularity of installing AC water mains within the United States. There are widely varying estimates as to the amount of AC pipe installed within the United States and Canada but some estimates conclude there could be as much as 630,000 miles installed (Von Aspern, 2009). Almost 50 percent of the potable water distribution network within the City of Casselberry was AC pipe prior to the start of the Water Quality Improvement Project. The majority of this pipe is smaller diameter AC pipe (under 12-in.) that displays higher rates of failure than the larger diameter AC pipe (AWWA, 2012).

Prior to 2009, the city was appropriating \$300,000 per year to replace existing potable water mains throughout the city. The city owns and maintains 215 miles of potable water main in its distribution network. The \$300,000 previously appropriated replaced approximately one mile per year and this replacement schedule would require 215 years to replace the potable water distribution network. The anticipated fifty year service life of the existing asbestos cement pipe was almost over as the pipe was already forty years old and the current replacement schedule was not sustainable (Ambler, et. Al, 2014). Funding for replacing the AC pipe did not generate a new source of revenue for the city of Casselberry, which further complicated replacement of the existing AC pipe. Luckily, the city applied for and received grant and loan funding through the Florida Department of Environmental Protection (FDEP) State Revolving Loan Fund (SRF) program and the American Recovery and Reinvestment Act (ARRA) to support the project. In development of the project, the city identified the locations of AC pipe within their network that suffered significant pipe failures and were nearing the end of their predicted service life and the city then designed the comprehensive Casselberry Water Quality Improvement Projects.

The American Reinvestment and Recovery Act (ARRA) was adopted as law on Feb. 17, 2009. ARRA provided \$816.3 billion in federal funds for economic stimulus of which \$103 Billion was aimed at providing infrastructure investment (transportation, infrastructure, and energy/environment) to generate economic growth and reinvest in the nations' infrastructure (www.recovery.gov). Initially, ARRA funds were set aside for projects that were considered Shovel Ready or immediately ready for construction. Many government agencies

(such as FDEP SRF) that were tasked with implementing the ARRA funds were frantically searching for projects that were ready to go to construction. The Casselberry Water Quality Improvement Projects was a pipe bursting project that did not require a permit from FDEP and typically no right-of-way acquisition, which made it Shovel Ready. To date, the project has received a total of \$10.3 million in construction, engineering and administrative costs, of which \$6.55 million was considered as principle forgiveness, or grant money (Ambler, et. Al, 2014.)

City staff utilized the city’s extensive geographical information system (GIS) files to identify the distribution pipes that were nearing the end of their service life. City staff also compared these areas with historical failure rates to prioritize pipe replacement areas. The AC pipe within the distribution system was nearing the end of its service life and suffered higher failure rates so the city implemented a comprehensive program targeting the AC pipe. The city selected pipe bursting as the most rapid and effective trenchless technology pipe rehabilitation method with the least environmental and social impacts. The city also realized significant economic benefits by minimizing construction schedule, resident/customer impacts and environmental impacts. Unfortunately, pipe bursting of AC pipe has not been widely accepted throughout the United States. This is primarily due to existing regulations that do not accommodate technological development, dramatic variation of the application of these regulations and ignorance and fear of the actual hazards of asbestos (Ambler, et. Al, 2014.)

NESHAP Synopsis & How to Meet Regulations While Bursting Pipe

Much of the confusion surrounding regulatory control of pipe bursting of AC pipe is the pipe bursting work is not addressed by the Drinking Water Act (DWA) but rather the Clean Air Act (CAA). Many people would not correlate the CAA with governing rehabilitation work on a buried pipeline. However, EPA has determined that demolition of the existing AC pipe during the process of pipe bursting triggers the National Emissions Standards for Hazardous Air Pollutants (NESHAP). NESHAP is a sub section of the CAA that is aimed at controlling release of hazardous industrial chemicals into the air or work environments. Asbestos was one of the first industrial chemicals as regulated by NESHAP. Asbestos was considered to be a “magic” mineral during the first part of the 20th century due to its flexible, non-destructible and heat resistant nature. This perception changed dramatically as the adverse health effects of occupational asbestos exposure started being known (Ambler, 2014).



Figure 1 - Fractured AC pipe resulting from pipe bursting as it will remain in the ground.

The EPA defines two categories of non-friable asbestos containing material (ACM), Category I and Category II non-friable ACM. Category I non-friable ACM is any asbestos-containing packing, gasket, resilient floor covering or asphalt roofing product that contains

more than 1 percent asbestos as determined using polarized light microscopy (PLM) according to the method specified in Appendix A, Subpart F, 40 CFR Part 763 (Sec. 61.141). Category II non-friable ACM is any material, excluding Category I non-friable ACM, containing more than 1 percent asbestos as determined using PLM according to the methods specified in Appendix A, Subpart F, 40 CFR Part 763 that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure (Sec. 61.141) (Ambler, et. Al, 2012).

In 1990, EPA issued clarification that AC pipe that has undergone pipe bursting (see Figure 1) is considered regulated asbestos containing material (RACM) and is governed by NESHAP. RACM is directly defined as friable asbestos material or non-friable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading or has crumbled, pulverized or reduced to powder in the course of demolition or renovation operations (www.epa.gov). It is arguable that AC pipe that has undergone the pipe bursting process cannot be further crushed by hand to release asbestos fibers (Ambler, et. Al, 2014).

Many engineers, contractors and utility providers strongly disagree that pipe bursting AC pipe converts the previously non-RACM AC pipe into friable RACM. The EPA maintains that pipe bursting AC pipe does convert the AC pipe into friable RACM. However, a working procedure has been developed in Florida that regulators and industry members (Municipalities, engineers, and contractors) are utilizing. This procedure complies with each element of NESHAP (40 CFR part 61, subpart M (61.140-61.157)) and is described below (Ambler, et. Al, 2012):

- File a Notice to EPA or Its Designee (61.145(b)) NESHAP specifies salient information that must be included on the notice. FDEP has an available form 62-257.900(1) that requires this information. The form is a one-page form that has to be signed only by the utility owner (Ambler, et. Al, 2012).
- Provide for Emission Control during Renovation and Disposal (61.145(c) / 61.150). There can be no visible emissions from the work [pipe bursting] per 61.150(a). With pipe bursting, this can be accomplished because the AC pipe is wetted within any excavation, and non-power saw tools are used to cut the pipe (chain cutter, handsaw) (Ambler, et. Al, 2012).
- Comply with Inactive/Active Waste Disposal Site Requirements (61.151 / 61.154). NESHAP provides for disposing of RACM on the site of the demolition/renovation work or at a waste disposal site. Currently regulators interpret NESHAP such that the work site is considered a waste disposal site for pipe bursting projects. Numerous options are provided in NESHAP to prevent asbestos exposure. These options include: no visible emissions from the site, fencing and posting signs around the site, have a natural barrier (cliffs, lakes or other large bodies of water, deep and wide ravines, and mountains) around the site, or cover the RACM with 2 ft of compacted non-asbestos containing material. With pipe bursting, the 2 ft of cover is virtually always provided because most all buried AC pipeline maintain greater than 2 ft depth of cover (Ambler, et. Al, 2012).
- Comply with Inactive Waste Disposal Site Deed Notation and Alternative (61.151(e)). NESHAP requires that a notation to the deed of a facility property be recorded within 60 days of a waste disposal site becoming inactive. A site is deemed inactive when disposal of RACM is completed. Applying this to pipe bursting projects, a site is deemed inactive when the project is completed. The notation is to contain the following information (Ambler, et. Al, 2012):
 1. The land has been used for the disposal of asbestos-containing waste material;
 2. The survey plot and record of the location and quantity of asbestos-containing waste disposed of within the disposal site required in Sec. 61.154(f) have been filed with the Administrator; and
 3. The site is subject to 40 CFR part 61, subpart M (Ambler, et. Al, 2012.)

Most of the buried AC pipeline infrastructure owned by the majority of utility providers within the United States lies within public right-of-ways. However, public right-of-ways do not maintain a property deed where the restrictions NESHAP references can be directly met. This conflict brought many industry members and the contractor for the Casselberry Water Quality Improvement projects to Washington, D.C. to meet with top EPA staff to discuss pipe bursting and the applicability of NESHAP to pipe burst AC pipe. EPA officials embraced the environmental, social and economic benefits of pipe bursting AC pipe and understood the risks of asbestos exposure due to pipe bursting AC pipe would be mitigated over traditional pipe removal methods.

While pipe bursting was met with a positive response, modification of the existing NESHAP regulations would require an Act of Congress to complete. EPA officials recommended industry representatives present the EPA Administrator with an "Administrator Approved Alternate" process that can cover AC pipe bursting. To date, there has never been an Administrator Approved Alternate process approved to supersede NESHAP nor has any guidance been given to prepare the Administrator Approved Alternate. Industry representatives are currently working through the Administrator Approved Alternate Task Force to develop a suitable document to submit to EPA (Ambler, et al., 2012).

EPA's Study of Environmental Impact of AC Pipe Renewal Technologies

The Water Research Foundation (WaterRF) and EPA's Office of Research Development recently funded a study of the environmental impact of various AC pipe renewal technologies, including pipe bursting among others. The results of the study are set to be published in the fall of 2015 via a WaterRF project report and 1 to 3 peer-reviewed journal articles, which will be valuable when preparing the Administrator Approved Alternate. One AC pipe bursting demonstration was completed with air, water, and soil samples being collected. The water and soil samples were collected prior to the demonstration and post-pipe bursting samples will be collected for comparison to determine the impacts of the project on water quality and soil contamination. Initial results show no adverse impacts to either the soil or water. (Ambler, et al., 2014).

As part of Phase 2 (i.e., Technology Demonstration and Evaluation) of Water Research Foundation (WaterRF) Project No. 4465, Environmental Impact of Asbestos Cement (AC) Pipe Renewal Technologies, the City of Casselberry was identified as one of the only municipalities in the United States actively performing pipe bursting on AC pipe. For this reason, the City of Casselberry was selected as a site where the technology of pipe bursting could be adequately demonstrated and its impacts on the environment could be properly evaluated.

In the summer of 2013, Battelle was onsite in Casselberry, Fla., to observe the renewal of a 775-ft section of AC pipe (ca. 1972) and to collect air, soil, and water samples during of the process. Over the course of a week, five bursting runs ranging from 125 to 190 ft in length were performed to replace 450 ft of 8-in. and 325 ft of 12-in. AC pipe. The AC pipe was replaced with 12-in. high-density polyethylene (HDPE) pipe.

To determine the impact to the environmental as a result of pipe bursting AC pipe, air, soil, and water samples were collected while onsite. Six air samples were collected during all major activities using two SKC AirChek XR5000 personal air sampling pumps with approximate flow rates of two 2 liters per min (LPM). Six soil samples were collected from the side walls of access pits following excavation of the pit but prior to any pipe related activities. Six post-renewal soil samples were collected from the same pit wall locations months after the completion of the renewal work and compared to the pre-renewal soil samples. A total of four water samples were collected – two pre-renewal and two post-renewal – from a residential water service line and fire hydrant. A summary of the sampling results is presented in Table 1. Note that all samples were only analyzed for asbestos and no other contaminants.

Table 1. Summary of Asbestos Sampling Results for Air, Soil, and Water

Sample Type	No. of Samples	Analytical Sensitivity Range	Sample Result Range	Analytical Method
Air	6	0.0036 - 0.0042 s/cc	BAS	ISO Method 10312
Soil (Pre-renewal)	6	NA	ND - Trace (<0.25% visual estimate)	EPA Method 600/R-93/116
Soil (Post-renewal)	6	NA	ND - Trace (<0.25% visual estimate)	
Water (Pre-renewal)	2	0.17 - 0.35 million structure/L	0.87 - 20.07 million structure/L	EPA Method 100.2
Water (Post-renewal)	2	0.08 - 0.09 million structure/L	0.09 - 0.94 million structure/L	

s/cc = structure per cubic centimeter (mL)

BAS = below analytical sensitivity

NA = not applicable

The asbestos concentration of each air sample (see Table 1) is below the analytical sensitivity. The analytical sensitivity of each sample is below the eight-hour time-weighted average (TWA) permissible exposure limit (PEL) of 0.1 s/cc set by the Occupational Health and Safety Administration (OSHA). This indicates the workers were not exposed to dangerous levels of airborne asbestos throughout the duration of the project.

The results from the pre- and post-renewal soil samples (see Table 1) show essentially no change in asbestos levels within the soil. Although some locations saw an increase of asbestos by trace amounts, other locations saw a decrease in asbestos concentration by trace amounts or saw no change at all. With no significant change in the asbestos concentration between the pre- and post-renewal samples, there is no evidence of upward migration of the asbestos fibers within the soil column.

Water sample results for the pre-renewal samples show one sample with an asbestos concentration of approximately 20 million structures/L, which is almost three times the USEPA maximum contaminate level (MCL) for asbestos in drinking water (i.e., 7 million structure/L). The sample was collected from a fire hydrant prior to any pipe related activities and is believed to have been inadequately flushed prior to collection. The post-renewal water samples show a dramatic decrease in asbestos concentration, especially the sample from the hydrant, which saw a reduction in asbestos of nearly 90 percent. Both post-renewal samples were below the EPA MCL, therefore, posing no health risk to consumers. Note that the new HDPE line is still connected to AC lines at three locations and the presence of asbestos in the drinking water is likely to continue, albeit at lower concentrations than before.

Based upon the results from the air, soil, and water samples collected from the Casselberry site there is no evidence to support that the bursting of AC pipe has any negative impacts on the environment or the workers performing the work.

Field Observations

The Casselberry Water Quality Improvement Projects lasted well over four years and installed almost 35 miles of HDPE through pipe bursting. Key construction engineering inspection field staff executing the day to day operations has made significant key observations. The original project documents as bid required a Bursting Plan be submitted prior to mobilizing to the new project area and starting bursting operations. A Bursting Plan is a modification of the original plan sheets. Similar to the original plans, a Bursting Plan should be based on the GIS information supplied by the owner or client of the project, available survey information, as-built information and/or field verified information. These plans should depict all entrance and exit pits, service connection pits, fire hydrants, blow-off connections and any other miscellaneous appurtenances that are proposed to be replaced or added.

Each section of pipe, or, Burst Section, should be labeled with the approximate length, size of existing pipe, size of proposed pipe that will be used to replace the existing pipe and the associated pipe materials. The plan should indicate all existing isolation points such as valves and dead end lines and any existing infrastructure that may have been installed on the system, such as line stop sleeves, aban-

done valves, fittings, repair clamps, concrete restraints, etc. Other important information that should be noted on the Bursting Plan should be the approved pipe bursting procedures for the project, all of the standard project information such as general project area locations, street names, etc.

A Bursting Plan is useful information that can be used to satisfy the regulatory requirements of NESHAP previously outlined. However, the Bursting Plan is critical for the contractor when estimating how much preparation is required within the pipe replacement project area prior to starting work within the area. The Bursting Plan allows the contractor to layout the project area with the appropriate number of burst segments with appropriate burst lengths in order to accommodate for all known isolation points, utility crossings, naturally and mechanical limitations. There are limitations as to how much pipe a work crew can reasonably install in a work day and these limitations should resonate throughout the Bursting Plan. The Bursting Plan also informs the contractor of what existing infrastructure needs to be located and tested prior to commencement of any of the pipe replacement activities. If the existing distribution system does not have enough isolation valves to meet maximum water outage limits required for the project, the contractor must provide for temporary components such as line stops, valves, services.

A Bursting Plan is used by the contractor, engineers and owner in developing a bursting schedule and tracking submittals. The bursting schedule can then be used to coordinate fusion of each of the burst sections. The replacement HDPE pipe can be staged in a long linear staging area and fused in sections to make one longer section of pipe that will be pulled into place for each Burst Section. After the final pipe is fused, hydrostatic pressure testing and bacteriological sampling can be performed on the final pipe.

The bursting schedule helps minimize redundant bacteriological sampling for samples that have short expiration requirements. A 30-day expiration schedule for the bacteriological sample regulates how long a fused section remains on the staging area before the pipe is installed. These three steps are part of the pre-chlorinated potable water main pipe bursting process approved by the Florida Department of Environmental Protection (FDEP). FDEP considers this work to be rehabilitation of the existing pipeline and allows the pre-chlorinated potable water main pipe bursting work to occur without a permit for up to two pipe sizes larger than the existing pipe. Proper management of fusing, hydrostatic pressure testing and bacteriological sampling can result in direct cost savings to the contractor. A well-developed Bursting Plan is not only critical to the organization and coordination of the construction activities but critical to helping the project owner stay in compliance with the governing agencies and minimizing the costs of the project.

Moving Forward

It's been more than four years since industry representatives met with Washington, D.C. EPA staff to discuss the applicability of NESHAP to pipe bursting AC pipelines and work towards developing a reasonable and practical solution to accommodating new technological developments, such as pipe bursting, within the existing NESHAP framework. EPA staff had acknowledged the potential difficulty in applying NESHAP Deed Notation requirements to AC pipe bursting within public rights-of-way. During the meeting with EPA, a video of several physical demonstrations of AC pipe bursting were shown that clearly indicated the minimal environmental impacts of pipe bursting and dispelled myths that AC pipe bursting released an explosion of asbestos fibers into the air. It is possible that AC pipe bursting has been given a bad reputation specifically because of the misconceptions of AC pipe bursting. EPA staff in attendance of the meeting with industry representatives expressed a positive attitude towards pipe bursting of AC pipe after being presented with video demonstrations of the process. EPA staff suggested industry representatives submit an Administrator Approved Alternate for the EPA Administrator considers as an alternate process to existing NESHAP regulations.

An Administrator Approved Alternate is intended to allow the EPA Administrator and staff to approve alternate technology or practices without having to modify NESHAP, which is federally codified. Industry members that have been following the pipe bursting of AC pipe issue are pleased with the opportunity to pursue an Administrator Approved Alternate and are working toward this objective. However, at this time, there does not appear to be any guidance documents or previous examples of an EPA Administrator Approved Alternate to reference. To date, an Administrator Approved Alternate has not been developed for any technology or practice. An AC Pipe Bursting Task Force has been assembled to develop this document. (Ambler, et. Al, 2012.)

The Administrator Approved Alternate and it is intended to provide procedures for working with buried AC pipelines. The exemptions and clarifications listed early will be included so that one, comprehensive document, specific to buried AC pipelines, will be available for use nationwide and that any type of work on buried AC pipelines will be uniformly practiced and regulated, regardless of which State the work may be located in. (Ambler, et. Al, 2012.) Collaborative efforts among industry members have been on-going since November 2010 to draft the Administrator Approved Alternate. Once the first draft is prepared, it will be submitted to EPA's Washington, D.C. office for review and consideration. In the meantime, to satisfy the deed notation requirement, a notice is being recorded to public records that contain all required information for ongoing projects in the State of Florida. (Ambler, et. Al, 2012.)

EPA's Office of Research and Development has set a goal to generate the science and engineering needed to improve and evaluate promising innovative technologies and techniques that will reduce the cost and improve the effectiveness of operation, maintenance and replacement of aging and failing drinking water and wastewater treatment and conveyance systems. Existing technologies need to be applied in unconventional ways. Emerging technologies and innovative thinking will be at the forefront of creating a powerful, secure, cost-effective and reliable water infrastructure (EPA Addressing the Challenge through Science and Innovation, 2010). Industry believes application of pipe bursting for AC pipe is a prime example of an emerging technology that should be approved and utilized to mitigate the accelerating costs of AC pipe replacement. (Ambler, et al., 2012.)

Conclusion

Scientific research and testing of direct field implementation of asbestos cement pipe bursting by both utility owners and EPA commissioned scientists has clearly illustrated the asbestos cement pipe bursting is a safe and environmentally friendly method for rehabilitation asbestos cement pipe. The City of Casselberry, in conjunction with its contractor, Killebrew, Inc. has performed Negative Exposure Assessments on pipe bursting work confirming no asbestos fibers are released during rehabilitation activities above established OSHA limits for asbestos work. Water Research Foundation Project #4465 has come to the conclusion that "there is no evidence to support that the bursting of AC pipe has any negative impacts on the environment or the workers performing the work."

A safe, simple method for executing an asbestos cement pipe bursting project while meeting all existing regulations has been established by industry and the City of Casselberry. This safe, simple method for asbestos cement pipe bursting has been validated by scientists hired by EPA. There should be no hesitation by owners of asbestos cement pipe to move forward in rehabilitating their failing asbestos cement pipe via the pipe bursting method.

This paper was edited for style and space for publication in *NASTT's Trenchless Today*. To view the full version of Paper MM-T4-03, please visit nastt.org/technicalpapers.



March

20-24
 NASTT's 2016 No-Dig Show
 Dallas, Texas

20
 NASTT's Trenchless Technology
 Short Course – New Installations
 8:00 am - 12:00 pm
 Dallas, Texas

20
 NASTT's Trenchless Technology
 Short Course – Rehabilitation
 8:00 am - 12:00 pm
 Dallas, Texas

23
 NASTT's Gas Industry Day
 8:00 am - 6:30 pm
 Dallas, Texas

23-24
 NASTT's Cured-In-Place Pipe (CIPP)
 Good Practices Course
 March 23: 2:30 pm - 6:00 pm
 March 24: 8:00 am - 12:00 pm
 Dallas, Texas

23-24
 NASTT's Sewer Laterals Good
 Practices Course
 March 23: 2:30 pm - 5:30 pm
 March 24: 8:30 am - 12:00 pm
 Dallas, Texas

23-24
 NASTT's Horizontal Directional
 Drilling (HDD) Good Practices
 Course
 March 23: 2:30 pm - 6:30 pm
 March 24: 7:30 am - 12:00 pm
 Dallas, Texas

23-24
 NASTT's Pipe Bursting Good
 Practices Course
 March 23: 2:30 pm - 5:30 pm
 March 24: 8:30 am - 12:00 pm
 Dallas, Texas

23-24
 NASTT's New Installation Methods
 Good Practices Course
 March 23: 2:30 pm - 6:00 pm
 March 24: 8:00 am - 12:00 pm
 Dallas, Texas

June

14
 NASTT's Pipe Bursting Good
 Practices Course
 Hosted by NASTT's British
 Columbia Chapter
 8:00 am - 5:00 pm
 Vernon, British Columbia

16
 NASTT's Pipe Bursting Good
 Practices Course
 Hosted by NASTT's British
 Columbia Chapter
 8:00 am - 5:00 pm
 Victoria, British Columbia

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 Palm Springs, California

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Abstracts from the following subject areas are of interest to the No-Dig Show Program Committee:

Potable Water and Pressure Systems

- Pipeline Inspection, Locating, and Condition Assessment
- Pipe Rehabilitation
- Pipe Bursting
- Emerging Technologies
- Case Studies

Wastewater, Storm water, and Non-pressure Systems

- Advanced Pipeline Condition Assessment
- I&I and Leak Detection
- Pipeline and Laterals Rehabilitation
- Pipeline Inspection, Locating, and Condition Assessment
- Cured-in-Place Pipe Lining
- Sliplining
- Pipe Bursting
- Spray Applied Linings
- Grouting
- Manhole Rehabilitation
- Case Studies

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- Aging System Rehabilitation
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- Social Costs and Impacts
- Carbon Footprint Reduction
- Sustainable Construction Practices
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New Installations - Tunneling, Boring and Pipe Ramming

- New Concepts or Trenchless Equipment, Materials and Methods
- New Applications for Boring Techniques (Auger Boring and Pipe Ramming)
- Pilot Tube Boring (Tunneling)
- Case Studies

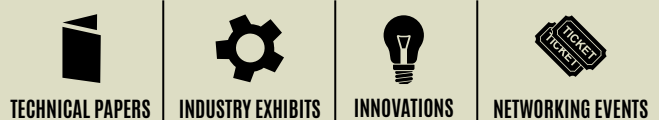
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- New Concepts and Applications for Horizontal Directional Drilling Equipment, Materials and Methods
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