MEMBERSHIP HAS ITS REWARDS

GET ACCESS TO:

- Complimentary Resources
- Members-Only Discounts
- 2,000+ Technical Papers
- Continuing Education
- Industry Networking
- Career Advancement

2,000+ Members
25+ Years Representing the Trenchless Technology Industry
2018 Directory Listings Inside
ANY SIZE. ANY LENGTH. ANYWHERE.

Calgary (403) 269.4998  Edmonton (780) 960.6037  
www.directhorizontal.com

Trenchless solutions from the sharpest minds in the business!
EVERY YEAR IN THE FALL ISSUE OF NASTT’S TRENCHLESS TODAY MAGAZINE we focus on the core of our organization – our membership! One of the best benefits of NASTT membership is the extensive opportunity for networking with your trenchless peers. Sharing ideas, innovations, challenges or just enjoying a laugh with a colleague who speaks your technical language is invaluable. This sharing of ideas is integral to the ongoing education of trenchless professionals and the growth of our industry.

Trenchless education is our focus and can be found in our mission and vision statements: To continuously improve infrastructure management through trenchless technology and to be the premier resource for knowledge and education in trenchless technology. Our members and volunteers make our educational programs so successful.

NASTT’s 2019 No-Dig Show Program Committee recently met in Chicago to plan the technical program for the annual show. The committee is led by the 2019 Program Chair, Cindy Preuss of HydroScience Engineers and Vice Chair, Joe Lane of Aegion’s Insituform Pacific Pipeline Rehabilitation Division. With this guidance, the committee of over 100 volunteers and industry experts, peer reviews each abstract that is submitted and uses their expertise and hands-on project knowledge to build the best possible technical program. Each and every attendee to NASTT’s No-Dig Show will go away with more trenchless knowledge than they came with.

One of our recent initiatives I’m most proud of is our endeavor to develop trenchless method-based Centers of Excellence within the organization. The first Center of Excellence is dedicated to the trenchless pipe bursting method and its full breadth of capabilities for potable water, gas, electrical and sewer applications. The Pipe Bursting Center of Excellence aims to provide leadership in education, standards, training and elevating the profile of the method throughout the construction industry. In addition, the group will work on the refinement of best practices and act as a resource and forum for utilities, contractors and manufacturers to share information and continue to move the pipe bursting method forward.

NASTT’s Pipe Bursting Center of Excellence committee is led by Alan Ambler of AM Trenchless. Alan is passionate about the technology and ready to lead the Center in the coming months. The first major project that the Center is undertaking is authoring and updating NASTT’s Pipe Bursting Good Practices Guidelines, Third Edition. This newest book in NASTT’s technical library will be available at the 2019 Show in Chicago and promises to be a valuable additional to your trenchless toolbox.

We will continue planning for our 2019 conference in Chicago for the next several months, but we also have many regional events, training courses and webinars on tap for the rest of 2018. Visit our online calendar at nastt.org and see what’s coming up in your area!

Michael J. Willmets
NASTT EXECUTIVE DIRECTOR
GOOD DECISIONS START
WITH GOOD INFORMATION

PICA helps Asset Managers who are serious about managing their pipeline assets proactively and fixing leaks before they can actually happen. With PICA’s set of non-destructive testing tools, Asset Managers can know the real condition of their buried pipelines. Good information is powerful: pipelines can be surgically repaired, rehabilitated with liners, or partially replaced, thus extending their useful life while at the same time reducing risk of failure (and sleepless nights).

- Internal (ILI) Tools, such as See Snake, Chimera, RAFT and EMIT
- For pipe sizes 4” to 78” are used in raw water, drinking water, waste water, force mains and siphons to report high-resolution pipe-wall condition.
- Pipe wall thickness directly affects structural strength

PICA’s new external Bracelet Probe can map internal H2S damage and pits
Extensively field tested in 2017, now ready for general deployment

For more information on how PICA can help you keep on top of your critical pipeline assets, see www.picacorp.com or write info@picacorp.com.

Call us at 1-800-661-0127
This is a very special issue of NASTT's Trenchless Today Magazine. That's because it is dedicated to our members and the support system that this industry community has built. Our trenchless organization exists because our members know that a vibrant trenchless association helps keep our industry strong. For that reason, it is important to us to recognize and thank our members for their support and trust.

This past July, NASTT embarked on its second strategic plan. Our first strategic plan, developed in 2014, has proven to be very enduring as an effective roadmap for the society. Many of the initiatives developed for the 2014 plan continue today and have been updated and expanded in scope. We exceeded our goals set four years ago for NASTT membership and attendance at the annual No-Dig Show and have set new, ambitious targets for both in the updated plan. The current Strategic Planning Committee met in Chicago to review our past efforts, as well as the findings of our recent member survey, and to discuss the future of our organization. The feedback from our member survey was invaluable to us in helping to formulate a plan and identify the key initiatives that will help this industry to continue to grow in numbers and strength. We thank the volunteer committee and NASTT Past Chair, Derek Potvin, for serving as the committee's facilitator.

The first step in identifying our future goals and initiatives is outlining our mission and vision. Our mission tells us why we exist and is an enduring statement of purpose and our reason for existence. Our vision tells us what we want to be. Our mission and vision complement each other. Taken together, they describe the purpose and goals of NASTT which are “to continuously improve infrastructure management through trenchless technology” and “to be the premier resource for knowledge, education and training in trenchless technology.” To support this mission and vision we adhere to our values, which include: integrity, excellence, objectivity, transparency, inclusiveness and passion. We know these values are also important to our membership and we will keep them top of mind as we plan for the future of this member-driven, not-for-profit society.

With education and training as our vision, and a mission to improve infrastructure management, it is crucial that we provide current information that is accessible to our community. One of the best ways we have found to do this is through our free webinar series. It was our seventh year in 2018 for offering complimentary technical webinars to the trenchless industry. This fall, we are excited to offer two webinars that will be great tools for those new to the industry, as well as for those who wish to expand their trenchless knowledge base beyond their current area of involvement. Join us on Wednesday, Oct. 24 for an Introduction to Trenchless Rehabilitation webinar and on Wednesday, Nov. 14 for an Introduction to Trenchless New Installations webinar. Visit nastt.org/training/events for details and registration. As always, our webinar series is free of charge and all of our previous webinars are available in our archive library for immediate download.

NASTT is committed to be the premier resource for trenchless education and networking for all of our members. For more information on member benefits, visit our website at nastt.org and please feel free to contact us at info@nastt.org.

Frank Firsching
NASTT CHAIR
TRENCHLESS INSTALLATION FOR YOUR NEW AND AGING PRESSURE PIPELINES

Fusible PVC® pipe  Tite Liner® HDPE
InsituMain® CIPP  Tyfo® FRP system

SEE AEGION.

CONTACT US NOW
844.619.2927
www.aegion.com/PressurePipe
I, like most Midwesterners, jump at the chance to go to sunny California in March. For the fourth year in a row, we have had more than 2,000 attendees at the No-Dig Show. Of those attendees, nearly 30 percent of them had never attended our annual conference. That’s a lot of new trenchless professionals. I, like most Midwesterners, jump at the chance to go to sunny California in March. That’s a lot of new trenchless professionals.

After I snapped out of my mid-century sunny daydream, I put on my association manager hat. This was not a decision to be taken lightly, or made just because of my need for sunshine. NASTT’s No-Dig Show is the most important outreach initiative for this organization. We need to take every decision with planning this event seriously, starting with the location of the conference.

While there was concern over people being too tempted by the comfortable cabanas to show up to the classroom, we decided to give Palm Springs a shot. It’s one of the better decisions I’ve helped to make in the seven years I’ve worked at NASTT.

First of all, let’s talk about the overall attendance. For the fourth year in a row, we have had more than 2,000 attendees at the No-Dig Show. Of those attendees, nearly 30 percent of them had never attended our annual conference. That’s a lot of new trenchless professionals.

What’s even more impressive is that our attendees showed up in the classrooms despite the tempting, sparkling pool within steps of the sessions. This year we hosted 162 technical presentations and three forums. On average there were 79 professionals in each presentation eager to learn more about trenchless technology. 33 presentations had over 100 attendees, as well as two of our forums.

Many of you help shape our program by filling out our online survey. This information is invaluable when planning for future conferences. The feedback from this year’s paper schedule was overwhelmingly positive, as 96 percent of reviewers highly agreed that our presenters were knowledgeable, 85 percent of the reviewers highly agreed that presenters explained their ideas clearly and 90 percent highly agreed that the content presented was useful and relevant.

There are many people to thank for these impressive stats from NASTT’s 2018 No-Dig Show. It truly is a team effort. At the top of my list are Don Del Nero, Program Chair and Cindy Preuss, Vice Chair. They dedicated many hours to making this show a success. Next, I’d like to thank my loyal Session Leaders who are instrumental in working with the authors to keep our program at the highest quality. The Session Leaders are part of a 100-plus member Program Committee who review all of the submitted abstracts and help plan many of the details of the conference. Finally, I’d like to thank the authors who shared their knowledge and expertise with the rest of the industry. You are an integral part in NASTT fulfilling its mission.

After all this I’m sure you’re wondering...did I ever make it to the pool? I was onsite for nine days and I spent two hours at the pool. Thanks to all of you, it was a glorious two hours with my team celebrating another successful No-Dig Show.
LOOKING FOR SMART ANSWERS ABOUT RELINE?

WITH OVER 15 RELINE PRODUCTS, CONTECH WILL HAVE THE BEST SOLUTION FOR YOUR PROJECT NEEDS.

RELINE DONE RIGHT™

With over 70 years of relining experience, Contech Engineered Solutions provides permanent, fully structural (the way structural and geotechnical engineers use the term) solutions based on time-proven design methods. Since we’ve been around the block a few times, we don’t play games with the hydraulics or structural design. Knowing pipe assessment, structural design & hydraulic analysis is what we do. The result – the right solution for your project needs – done right, on time and under budget.

www.ContechES.com/reline | 800-338-1122
What first piqued your interest in the construction engineering/manufacturing field?

My first exposure to the construction field was actually in concrete at the age of 14. I worked as a summer laborer for five years while finishing high school and entering college. Even at this early age, I always enjoyed seeing all that was involved in the project. From planning to the finished project, it was so interesting to see how the project would take place and evolve. When I finished college, I was hired by Interplastic Corporation. Initially, I worked as a chemist in the laboratory and was involved with many of the different applications and polymer lines we offered. I would often be given the opportunity to consult with our customer base to assist with improvements or modifications they required in their manufacturing process.

Tell us about your first introduction to trenchless technology.

When I was working in the laboratory in the late 1990s, the cured-in-place pipe (CIPP) market was rapidly evolving. It seemed like every day we had the opportunity to work with a new customer entering this market. At the same time, the resins we offered to support this line were becoming more numerous and complex. An opportunity arose for me to specialize in the design and use of CIPP resins for Interplastic, which I readily accepted. This was my first real exposure to the trenchless market.

What are your thoughts on the current state of the trenchless industry? What are the trends on the pipe rehabilitation side?

I think the trenchless industry is strong, and becoming even stronger. As municipalities continue to invest in their infrastructure, trenchless has an expanding role in their projects. On the pipe rehabilitation side, some of the most rapidly growing segments are for pressure pipe applications. We have seen multiple large force main projects completed in recent years. I think we will see this market continue to evolve and have a larger footprint in other areas, such as potable water applications.

What is the biggest challenge facing the trenchless industry today? Has acceptance of the technology improved?

As with many industries, I think the biggest challenge facing the trenchless industry is finding and keeping a skilled workforce. It can be difficult to find skilled employees that are willing to spend a considerable time on the road away from family and friends for an extended period. We are also seeing many seasoned individuals enter into retirement. This group includes some real pioneers in our industry that were involved in the development or standards associated with many of these technologies. The good news is we see many dedicated and talented individuals, often mentored by the individuals entering retirement, willing to take on these roles.

Regarding acceptance of the technology, I would say the short answer is “yes.” This is especially true for some of the real trenchless workhorses such as horizontal directional drilling (HDD) or CIPP. As more unique and complex projects are completed, the acceptance of these technologies continues to expand. However, it is still not uncommon to find individuals that have little knowledge or experience in this technology. It is certainly our role as an industry to help educate and promote this technology.

Briefly summarize your role and responsibilities at Interplastic Corp.

My current position at Interplastic is Product Manager for CIPP and Infrastructure Polymers. In this position I work closely with Interplastic’s Business Manager for Remediation Polymers, Kaleel Rahaim. Together, we are responsible for all aspects of these product lines. This includes everything from working with our R&D Laboratories to identify new product needs and opportunities to supporting our customer base in the use of these products. What is unique about the position is it gives me the opportunity to interact with a wide array of individuals in all different phases of a project. It is common for me to consult with design engineers, work with the crew wetting out a CIPP liner, and then the crew installing a liner, all on the same project. This position also gives me the opportunity to participate in a wide variety of trade shows, technical committees, and organizations that support and influence the trenchless market.

Do you see any particular needs in the way of education/training? Is the industry doing a good job of promoting the benefits of trenchless methods?

Education is so important to our industry, in all phases. It is important we educate the customers/municipalities on the technology currently available along with emerging technology. NASTT’s Municipal and Public Utility Scholarship Program and Trenchless Technologies Center’s (TTC) Municipal Forums are a couple ways that are specifically geared towards helping educate the Public Sector.

There are opportunities for those involved in the industry through organizations such as NASSCO and NASTT. Both offer training through webinars, forums, and in some cases, classroom type training, on many of the different trenchless methods. We are also seeing more Universities offering specialized training focusing on trenchless.

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

The people. I think there are few, if any, markets that have more dedicated individuals. Even with the expanding role of today’s trenchless market, it always surprises me how small it seems. It really is one of these markets where it feels like everyone knows each other. We see people involved in common goals to promote and improve the industry. It is common for individuals to volunteer their personal time to serve on various committees, training roles or task groups.
These Successful Trenchless Jobs have One Thing in Common

TT Technologies

www.tttechnologies.com
1-800-533-2078
When Rory Ball was finishing his master’s degree in geotechnical and structural engineering, he began the process of interviewing at various firms both in consulting and contracting. After talking with senior professionals, he quickly learned that geo-professionals often have the most project influence in tunneling compared to traditional foundation engineering.

“That steered me toward tunneling and trenchless,” he says, noting it became the perfect fit for him as he began his engineering career. “Once I started in the industry, I promptly found that the market was gaining momentum and new methods were continually being developed.”

He also says he quickly found there was a need for more construction projects to ultimately tap into trenchless. “If you are willing to learn about new methods, and willing to travel and take on more responsibilities, there are a lot of opportunities in the market for a young engineer,” he says.

Ball has taken advantage of many of those opportunities, establishing himself as a young leader in both trenchless design and industry development through organizations like NASTT. Ball is a graduate of the University of Illinois and now serves as a senior associate and tunnel design manager in the Cleveland, Ohio, office of Mott MacDonald. He now has more than 14 years of experience in the tunneling and trenchless technology industry on a variety of large-to-small diameter tunnels in four countries and more than a dozen states. Already in his young career, he lectures regularly at national tunneling conferences and training courses.
In 2016, he was a recipient of the Ralston Award for Young Trenchless Achievement at NASTT’s No-Dig Show in Dallas. During his time working in the trenchless industry, Ball says he has been amazed with how nomadic many contractors are, particularly those involved with HDD, microtunneling and Direct Pipe.

“They are chasing projects all across North America, and this is mainly due to the fact that there are very few markets that can support back-to-back-to-back projects for these contractors,” he says. “As a result, they go where the jobs are. The positive thing for the industry is these traveling contractors have vast experience and know how to build in different geologies using different techniques, including curved microtunnels, which are more commonplace now in the United States.”

Ball adds that finding cost-effective learning opportunities for owners in all sectors will continue to help them realize what risk mitigation strategies lead to the most successful projects. “A bad project could turn off an inexperienced owner from pursuing trenchless in the future,” he notes.

On the education front, Ball has also been quite involved. He serves as a member of NASTT’s No-Dig Show Program Committee and regularly presents papers at No-Dig Show technical sessions and other tunneling and trenchless industry events. He is serving as a microtunneling track leader at NASTT’s 2019 No-Dig Show in Chicago.

Ball says that while internships and hands-on project experience are key for students looking to break into the trenchless market, young professionals don’t generally get exposed to trenchless at the university level because it’s a niche market. “It is hard to really get a sense of the community and the cool things going on in this industry until you are involved in it,” he says. “We need to highlight those aspects as best we can.”

Ball also has some interesting thoughts on how to better brand the fascinating engineering aspects of underground construction to young people.

“I think we can market the industry using exciting videos shot from drones or using 360-degree visualizations from 3D renderings and real 360-degree photos,” he says. “This creates a ‘wow factor’ for all ages. Combining this media with short interview videos of people involved in the trenchless industry from all aspects of consulting, marketing and contracting can provide millennials insight into what it is
like to be involved with the trenchless industry.

Ball says that despite all the talent in the trenchless engineering field, there is a strong need for engineers who are well-rounded and have the chops to design constructible solutions while balancing field work, jobsite and office work, and who can also communicate well with owners, contractors, stakeholders and young staff.

“Hiring experienced trenchless engineers is difficult – very difficult,” he says. “Young professionals need to realize that there is a tremendous amount of opportunity available in the trenchless market. Trenchless projects are often faster-paced using smaller teams. This industry will continue to provide amazing opportunities and allow for advancement at a younger age if you are willing to put in the work.”

Aaron Cohen
ARIZONA STATE UNIVERSITY

Like many in construction, Aaron Cohen was first introduced to the industry at a young age thanks to his father’s work with Tires N Tracks Inc., the family’s contracting business.

Cohen fondly recalls his love of going to work with his dad and operating some of the smaller pieces of equipment. It is at these sites that he realized how cool the trenchless industry was.

“Our family business did a lot of utility construction and specialized in boring and ramming using pneumatic tools (hole hogs). We bought one of the first Guided Hole Hogs from Allied back in the late 80s,” Cohen says. “It enabled the operator to control the direction of the tool by manipulating the rotation of adjustable tail fins protruding from the body on the back of the tool and the operators console was giant targeting screen that looked like the something you would find in a Star Wars space ship.”

From those early days as a contractor in the trenchless industry Cohen, now a lecturer at Arizona State University, has seen these space-aged technologies and equipment evolve to a point where many of these trenchless methods are now industry standards.

“I remember attempting to grow our business as one of the first directional drilling contractors in our area, before the process was well understood. We had to find applicable projects and attempt to convince the general contractors that there was a better way to cross that street or creek and have them be willing to give us a try. Good jobs meant you might get another opportunity, but when a job went bad, you had people vowing ‘they would never try that again’ and it felt like bad jobs would set the whole industry back years,” he says.

“Fast forward to today and now our firm is the general contractor on primarily trenchless projects where we subcontract out the open cut work to the same contractors we subcontracted for years ago. Many agencies are even to the point of publishing standard specifications for trenchless scopes of work. We’ve definitely come a long way.”

Even with the sky still being the limit for the trenchless industry, Cohen acknowledges there are hurdles that must be overcome, and like the rest of the construction industry, that points squarely at a lack of qualified workers.

“Finding and retaining quality people is crucial for any company to be successful. Technology continues to drive the complexity of our business and owners have become more sophisticated and more demanding. They are increasingly shifting more risk onto contractors and generally expecting more out of the construction and engineering community,” he says. “Companies that can figure out how to attract and cultivate the top talent will be in the best position to capitalize on the opportunities that a growing economy will present to us.”

Part of attracting top talent to the industry is through organizations like NASTT, and Cohen, like many, first became involved through frequent attendance at NASTT’s No-Dig Show. “No-Dig is how we kept up to date with the latest industry trends and forged new relationships,” he says. “It is the one place you can go to get access to all the brightest minds in our field.”

He recalls that very often, he would be able to leave the show with new ideas or potential solutions to problems that were seemingly unsolvable prior to attending the show. Like many, Cohen has also given back to the industry through his involvement with NASTT as a No-Dig Show moderator, a speaker and a co-instructor for Good Practices Courses.

And even though he has transitioned from the contracting side to the academic side, he still retains his membership to maintain a network of close friends and colleagues through NASTT.

“The industry is filled with people who are incredibly determined, extremely good at what they do and are relentlessly hard working. The people specifically involved with
the trenchless technology industry tend to be all that plus
some,” Cohen says. “It’s a very down-to-earth family of vi-
sionaries and entrepreneurs who are determined to change
the way our world is built and I feel fortunate that I’ve been
able to play a small part in the tremendous growth that this
great industry has experienced over the years.”

Steve Donovan
SHN CONSULTING ENGINEERS &
GEOLOGISTS INC.

Steve Donovan recalls watching
a news segment in the 1980s about
Times Beach, Missouri, where the
residents of a small rural town had
a disproportionate occurrence of cancers. The story implied
that the frequency and type of cancers were linked to dioxin
contaminated water used by a local waste hauler for “dust
control” on the gravel roads in the community.

The local hauling contractor was accused of taking con-
taminated liquids hauled from an industrial client, add-
ing the contaminated materials to waste oils used for dust
suppressant and applying the dust suppressant to the
roads in Times Beach.

“I remember seeing a man in a white cleanup suit pick-
ing up a child playing with a Tonka Toy truck in the con-
taminated dirt and thinking it would be better to be the
guy in the white suit than one of those residents,” he says.
“That’s when I became interested in environmental engi-
neering as a career choice.”

Donovan’s introduction to trenchless technologies also
came early in his career when he worked on a sewer relief
project for the City of Portland. The project required inves-
tigating how to repair and relieve a combined sewer system that had overflow, basement flooding and bypass issues. Options involved trenchless methods employing man entry and non-man entry technologies. The use of cured-in-place pipe, grouting technologies, slippining, etc., were all under consideration. Donovan was tasked with investigating various technologies, reporting on their applications and then developing an estimate of costs for various rehab and restoration scenarios.

“The data and information convinced me that trenchless technologies were the way of the future,” he says. “After I acquired my [engineering] license, the first project under my care involved a waterline crossing of a pristine river in Oregon. I chose HDD as the method of construction because it represented a lower impact to the waterway than conventional construction.”

Today, Donovan has more than 25 years of civil and environmental engineering experience primarily in the public works sector, though he now serves as a principal engineer with SHN Consulting Engineers & Geologists in its Coos Bay, Oregon office. Throughout his career, Donovan has gained extensive experience in trenchless technologies for both new installations and rehabilitated facilities. He specializes in evaluating sewer and water pipeline systems, horizontal directional drilling, sewer rehabilitation techniques, water and wastewater pumping systems and small community wastewater treatment facilities. Donovan’s public-sector projects have ranged in size from 0.05 MGD to 100 MGD systems.

He’s also been involved in designing and constructing ocean outfalls and cable landings in the Pacific Northwest. “The installation of a structure on the floor of the Pacific Ocean, a harsh and unforgiving environment, creates a sense of challenge and uniqueness that I find satisfying,” he says. “These projects are only possible because of advances in trenchless construction.”
Donovan says one of the biggest challenges facing the underground construction sector is misplaced concerns by government agencies who believe that the energy and public works construction industry have a general disregard for the environment or public inconveniences. On that note, he adds that a major challenge for trenchless applications are differentiating the trenchless industry as the preferred construction method because of reduced public inconvenience and minimized environmental concerns.

“The novelty of trenchless technologies is intriguing to contractors and engineers, causing some to jump in without fully understanding what they are getting involved in,” he says. “In some cases, this has resulted in ‘bad’ projects that misrepresent the industry.”

Ultimately, Donovan says trenchless technology is going to continue to expand as existing and new construction methods gain acceptance and are adopted as the preferred method for new or rehabilitation construction. He notes that some owners are already demanding trenchless methods over traditional construction methods because of the reduced impact on the built and natural environments, and in many cases, reduced costs.

“Overall, the industry is one of the better affiliations that provide education to owners and engineers,” he says. “I think the scholarship program for municipalities interested in attending the No-Dig Show is a great program and an example of the NASTT commitment to education and training.

“My favorite part about the industry is working with some of the pioneers who brought the industry out of its infancy and into the mainstream, especially learning about the challenges they overcame to prove various technologies and techniques and mold the standard of practice into what it is today.”

MIKE KEZDI and ANDREW FARR are associate editors of NASTT’s Trenchless Today.
THE NORTH AMERICAN SOCIETY FOR TRENCHLESS TECHNOLOGY is THE go-to resource for education and information for professionals working in the underground construction field. At NASTT, connecting industry professionals with those resources is our passion.

Trenchless industry professionals know that there’s one thing the industry always needs - more education and greater awareness of trenchless options. Making these needed opportunities available requires effective outreach and communication among various industry segments. This annual directory will provide you with a resource for connecting with engineers, contractors, manufacturers, professional service providers and municipal representatives who are NASTT members. Make sure to keep it close by, as it may prove to be helpful when planning your next trenchless project. For more, visit nastt.org to access real-time directory information day or night.

This directory is current as of Aug. 31, 2018. If your information has changed, please contact NASTT’s Membership Manager Molly Gallagher at mgallagher@nastt.org. You can also log on to nastt.org/directory to update your information.
Individual Members

Robert Carpenter ........................................... Underground Construction
Joanne Carroll .............................................. Subtegic Group Inc.
David Case ........................................................ Trenchless Professional
Jinsung Cho .............................................. CA State Polytechnic University Pomona
Elaine Choinard ................................................ PTR Communications Inc.
Heather Christensen ......................................... Geneva Pipe & Precast
Greg Christensen ............................................. MPE Engineering Ltd.
Jan Chwiedosiuk ............................................... Middlesex Water
Bob Clarke ........................................................ ASI Group Ltd.
Scott Cline ........................................................ Ruby-Collins Inc.
Aaron Cohen ............................................. Arizona State University
Randy Cooper .................................................. Emanco Environmental Technologies
Paul Cooper ........................................................ Pipe Spy Inc.
Leif Coponen .................................................... Schaal & Wheeler
David Crowder ............................................. R.V. Anderson Associates Ltd.
Jake Crowe ........................................................ IPR Southeast LLC
Matthew Cruz .................................................. JRCRUCZ Corp.
Luis Cuellar .................................................... RPS Klotz Associates
Keverly Daniel ................................................. Montgomery Water Works & Sanitary Sewer Board
Craig Danielson ................................................ Danielson Inc.
Gayleen Darting ........................................... Sacramento Regional County Sanitation District
Michael de Hart .............................................. Trenchless Professional
Denis Demers .................................................... Aqua Data Inc.
Aaron Dennis ..................................................... Enbridge Inc.
Lee Dester ............................................................. Copperhead Industries LLC
Philip Dieckmann ............................................ AECOM
Christopher Dillon ......................................... JCDillon Inc.
Ted Dimitroff .................................................. Trenchless Consulting LLC
Ian Doherty ........................................................ Trenchless Design Engineering Ltd.
Jesse Doolin ..................................................... MJP & Associates
Brian Dorwart ................................................... Brierley Associates
Jackson Dove ................................................ Sammamish Plateau Water & Sewer District
Brendan Doyle .................................................... BLD Services LLC
Darlene Dudyck ............................................. Cambrian Excavators Ltd.
Erik Durshepek ................................................. City of Portland, Bureau of Environmental Services
Todd Eising ........................................................ City of Folsom
Jack Ellinwood ............................................... City of Roanoke, Virginia - Stormwater Division
Michael Emerson ............................................. JCDillon Inc.
Jeff Enyard ................................................................ Geneva Pipe & Precast
Chantal Evans .................................................. Aegion Corp.
Chris Everton .................................................. Hampton Roads Sanitation District
Garth Fallis ........................................................ Visitor
Joseph Federico ................................................ Beta Group Inc.
Siri Fernado ........................................................ D’Annunzio & Sons Inc.
Luis Figueiredo ................................................... D’Annunzio & Sons Inc.
Tony Fisher ........................................................ BHC Consultants LLC
Joseph Fleming ................................................ D.M. Wills Associates Ltd.
Jon Ford ........................................................ Highfill Infrastructure Engineering, PC
Wyatt Franks ........................................................ Doosan Portable Power
Kevin Fredley .................................................. Parkhill, Smith & Cooper Inc.
Walter Fromm ..................................................... National Grid
Gord Gajich .............................................................. Forterra
Don Gallucci ..................................................... Trenchless Professional
Margaret Ganse ................................................ Shannon & Wilson Inc.
Brian Gastrock ................................................... Coffman Engineers Inc.
David Gellings ................................................... Trenchless Resources Inc.
Michael Gipsav ................................................... Washington Suburban Sanitary Commission
Jennifer Glynn ................................................... RMC Water and Environment
Victor Godfrey ................................................. Project Engineering Consultants Ltd.
Sean Goin .............................................................. Town of Devon
Sanjiv Gokhale ........................................... Vanderbilt University
Joseph Graham ................................................... Dibble Engineering
John Greenman .............................................. Ward and Burke Microtunnelling Ltd.
Roberto Guardia ................................................ Shanon & Wilson Inc.
Nenad Gucunski ............................................. Rutgers University, Department of Civil and Environmental Engineering
Saul Gutierrez .................................................. Project Engineering Consultants Ltd.
Scott Hancock .................................................. Trenchless Professional
Firas Hanna .............................................................. Opus Stewart Weir
Richard Harada .............................................. Wilson Okamoto Corp.
Glenn Harrah ..................................................... Terracon
Mark Harris ...................................................... Layne Inliner LLC
Jason Hartley .................................................... City of Campbell River
Larry Hartsell ..................................................... Pacific Gas and Electric Co.
David Haug ............................................................ Woodard & Curran
Ashley Heckman ............................................. Aldea Services LLC
Michael Helsen ..................................................... Pembina
John Hemphill .................................................. ISIT
Thomas Hessler ..................................................... DLZ Corp.
Steve Hibbeler .................................................. Muller Engineering
Kim Hill ................................................................. Charleston Water System
Bob Hogg ............................................................ Enbridge Inc.
Kevin Hoheisel ............................................... Akzo Nobel - International Paint
Jorge Holguin ..................................................... City of Fort Lauderdale
Marc Howard .................................................. City of Waterkiwin
Angela Huang ................................................... Andrews Infrastructure
Geoffrey Hughes ......................................................... JCK Underground
David Hutton ..................................................... Trenchless Professional
Patrick Illeswich ............................................... AECOM
Leonard Ingram ............................................... MAST, MSST & SESTT
Kourosh Iranpour ............................................... Harris & Associates
Jeff Jaeger ..................................................... Kerry T. Howe Engineering Ltd.
Sarah Johnson ................................................... Johnson Consulting
Aliyson Jones ..................................................... IPR Southeast LLC
Sheila Joy ............................................................... NASSCO
Norman Kambell ............................................ Rehabilitation Resource Solutions LLC
Clifford Kassouf .............................................. Triad Engineering & Contracting Co.
Hartley Katz ..................................................... Morrison Hershfield
Michael Keane ................................................... M. Keane Excavating Inc.
Bob Kennedy ................................................ MarTech Underground Services Ltd.
James Kercher ............................................... ISL Engineering & Land Services Ltd.
Joshua Kercho ...................................................... Kimley-Horn and Associates
Siham Khajehpour ................................................ Trenchless Professional
William Kiger ..................................................... PA One Call System Inc.
Todd Kilduff ..................................................... Colorado School of Mines
Paul Kilkenny ..................................................... Tetra Tech EBA
Ryan King ................................................................. AECOM
Fritz Klingler ................................................... FK Engineering Associates
Gabriel Kloet ..................................................... Trenchless Professional
James Kohne ..................................................... RMC, a Woodard & Curran Co.
Individual Members

Trevor Moore ........................................... Pinnacle Engineering Ltd.
Ian Moore ................................................... Queen’s University
Brian Moreau ............................................. CBCL LTD
Catherine Morley .......................... RJN Group
Steve Mortensen ............................................... Project Engineering Consultants Ltd.
Brad Morton .......................................................... Nelson River Construction Inc.
Patrick Moskwa ................................................ Robinson Consultants Inc.
Paul Mourt .......................................................... Mott MacDonald
Karl Mueller .......................................................... Kerr Wood Leidal Associates Ltd.
Gerhard Muenchmeyer ................... Muenchmeyer Associates LLC
Gary Munroe ..................................................... Liberty Utilities
Jeffery Murphy ..................................................... DLZ Corp.
Jim Murphy ..................................................... Universal Pegasus International
Howard Murrell ............................................ Earthview LLC
Mamood Majafi ............................................. University of Texas at Arlington
Paul Nicholas .................................................... AECOM
Jon Nishimura ............................................. Fukunaga & Associates Inc.
Kyle Obermiller ................................................ Trenchless Professional
Stephen O’Connell ......................................................... Black & Veatch
Jeff O’Donnell ..................................................... CHA Consulting Inc.
Raymond Offman ..................................................... KGS Group
Ryan Oldham .................................................... Campos EPC
Lameck Onsariro ........................................ Kent State University
Peter Oran ...................................................... Gresham, Smith and Partners
David O’Sullivan .............................................. PW Trenchless Construction Inc.
Nosh Pectang ..................................................... Select Trenchless Pipeline
Keivan Pak Iman ..................................................... DiBco Underground Ltd.
Marty Paris ...................................................... Kimley-Horn and Associates
James Parrish ...................................................... Urban Contractors
Paul Pasko .............................................................. SEH Inc.
Andrew Pattison ..................................................... A to B Publishing
Genevieve Pelletier ............................................. University Laval
Brian Pena ...................................................... City of Lawrence
Steve Peterson ..................................................... SEH Inc.
Vern Phillips ..................................................... Harris & Associates
Simon Pianarosa ......................................................... Saloc
Andrew Pinello .............................................. Colorado Springs Utilities
Kalyan Piratla ...................................................... Clemson University
Steve Porter ......................................................... Greenville Utilities Commission
Derek Potvin ..................................................... Robinson Consultants Inc.
Cindy Preuss ...................................................... HydroScience Engineers
Ajay Puri ...................................................... The Regional Municipality of Peel
Jordan Quick ...................................................... ISL Engineering & Land Services Ltd.
Montazar Rabiei ..................................................... Mott MacDonald
George Ragula ............................................. Public Service Electric & Gas Co.
Owen Randall ..................................................... City of Fort Collins Utilities
Michael Reardon ..................................................... California Boring Inc.
Jeremy Recklein ..................................................... IPR Great Lakes
Philip Reeve ...................................................... J. L. Richards & Associates Ltd.
Greg Regier ...................................................... Maple Leaf Construction
Anthony Rice ..................................................... Geosyntec Consultants Inc.
Michael Richins ..................................................... Campos EPC
Donna Roberts ..................................................... Q Solutions Inc.
Brent Robertson .................................................... MPE Engineering Ltd.
Robert Robinson ..................................................... Bob Robinson Construction
Michael Rocco ...................................................... AUI Inc.
Mathew Roder ..................................................... Gleeley and Hansen LLC
Russell Russell ...................................................... Fairfax County
Sinisa Saric ...................................................... Krieger & Stewart Inc.

Dan Koo .................................................................. IUPUI - Purdue School of Engineering & Technology
Andrea Kozak ........................................................ Canadian Concrete Pipe and Precast Association
Todd Kramer ......................................................... CTI Engineers Inc.
Steven Kramer ......................................................... Trenchless Professional
Nick Kravitch ........................................................ Kravitch Machine Co.
James Kriss .......................................................... Carollo Engineers Inc.
Neil Kucharski ........................................................ WSP Canada
George Kurz .......................................................... Sewer Capacity Management
William C. Kwasny .................................................. CRL Associates LLC
Jim Kyiuk ................................................................. TransCanada Pipelines
Robert Lamb .......................................................... City of Austin
Rick Landino ........................................................ Silver State Boring
Dustin Langston ........................................................ WL Plastics
Jon Larsen ........................................................... Holland Engineering Inc.
Frank Lau ................................................................. EPCOR Utilities Inc.
Carlos Lazarte ........................................................ Carlos Lazarte
Tom Leavitt ............................................................. MPE Engineering Ltd.
Mark Lee ................................................................. Project Engineering Consultants Ltd.
Stephen Leitch ......................................................... CJS Conveyance
Luis Leon ................................................................ HDR
Johnny Leverette ...................................................... Wade Trim
Tiong Liem ............................................................... Allied Geotechnical Engineers Inc.
Darren Litke .......................................................... NorthStar Fluid Solutions
Samantha Long .......................................................... ELI Directional Drilling
Cody Long .............................................................. SHN
David Longin ........................................................... City of Sitka
Gerard Lundquist ........................................................ National Grid
Andrew Lytvychenko ................................................... Scheffer Andrew Ltd.
Michelle Macauley ........................................................ Macauley Trenchless
Chris Macey ............................................................. AECOM
Brendan MacFarlane ........................................ Revive Pipe Restoration Inc.
David Machado ......................................................... Advanced Trenchless Inc.
Cameron Magnus ..................................................... ISL Engineering & Land Services Ltd.
Mirko Maher ........................................................ Hazen and Sawyer
Kurt Mai ............................................................... Harris & Associates
Danielle Martin ......................................................... Henniker Directional Drilling
Lee Martin ................................................................ Higher Ground Consulting
Tim Martin ............................................................... National Gunit
Dale Mathison ........................................................ Ayres Associates
David Mathy ............................................................. DCM Consulting Inc.
Ken Matthews ......................................................... Merrick and Co.
Travis McCartney ....................................................... CCI Inc.
Stephen McCauley ..................................................... Trenchless Professional
Joe Medvitt ............................................................. South Coast Water District
Kathy McKune ............................................................ Cherry Hills Village Sanitation District
Aaron McMullen ....................................................... Insituform Technologies Ltd.
Jan Mead ................................................................. Tighe & Bond
Charles Menhous .......................................................... CME Services
Alex Merletti ......................................................... Merletti Construction (1999) Ltd.
Steven Meyer .......................................................... Bowen, Collins & Associates
Keith Meyer .......................................................... Ditesco
Brett Mickelson ........................................................... IGES Inc.
Patrick Minger ......................................................... Minger Construction Company Inc.
Christopher Mitchell ........................................................ AECOM
Terence Mitchell ........................................................ Metrolinx
Serge Moalli ............................................................... EBC
Dorian Modjeski ....................................................... Modjeski Engineering LLC
## Individual Members

<table>
<thead>
<tr>
<th>Name</th>
<th>Company/Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Robert Saunders</td>
<td>Thurber Engineering Ltd.</td>
</tr>
<tr>
<td>Gary Savanyu</td>
<td>Trinity River Authority of Texas</td>
</tr>
<tr>
<td>Paul Savard</td>
<td>Parsons Transportation Group</td>
</tr>
<tr>
<td>Jim Schill</td>
<td>Lime Valley Advertising Inc.</td>
</tr>
<tr>
<td>Ray Schmeldt</td>
<td>D.R.S. Enterprises Inc.</td>
</tr>
<tr>
<td>Jeffrey Schneider</td>
<td>Golder Associates Inc.</td>
</tr>
<tr>
<td>Jeffrey Scholl</td>
<td>J. D. Hair &amp; Associates Inc.</td>
</tr>
<tr>
<td>Eric Schuler</td>
<td>Barton &amp; Loguidice, D.P.C.</td>
</tr>
<tr>
<td>Ryan Schuster</td>
<td>MS Consultants</td>
</tr>
<tr>
<td>David Scott</td>
<td>Bay State Piping Co.</td>
</tr>
<tr>
<td>Gerald Seki</td>
<td>Geolabs Inc.</td>
</tr>
<tr>
<td>Firat Sever</td>
<td>American Structurepoint</td>
</tr>
<tr>
<td>Joshua Shackelford</td>
<td>ECOM</td>
</tr>
<tr>
<td>Hiren Shah</td>
<td>Mueser Rutledge Consulting Engineers</td>
</tr>
<tr>
<td>Jigar Shah</td>
<td>Stantec Consulting</td>
</tr>
<tr>
<td>Benny Siljenberg</td>
<td>Lithos Engineering</td>
</tr>
<tr>
<td>Dennis Simpson</td>
<td>Pinellas County Department of Environment &amp; Infrastructure</td>
</tr>
<tr>
<td>Sunil Sinha</td>
<td>Virginia Tech University</td>
</tr>
<tr>
<td>William Skerpan</td>
<td>Beta Group Inc.</td>
</tr>
<tr>
<td>Jeffrey Smaka</td>
<td>City of Farmington Public Works</td>
</tr>
<tr>
<td>Larry Smith</td>
<td>Engineering Development Inc.</td>
</tr>
<tr>
<td>A.J. Smith</td>
<td>H.R. Gray</td>
</tr>
<tr>
<td>Gary Smolinski</td>
<td>OHIM Advisors</td>
</tr>
<tr>
<td>Martin Soma</td>
<td>City of Glendale</td>
</tr>
<tr>
<td>Alison St. Clair</td>
<td>Gibson-Thomas Engineering Company Inc.</td>
</tr>
<tr>
<td>Berndt Stackohr</td>
<td>Golden Heart Utilities Inc.</td>
</tr>
<tr>
<td>Gerald Stangl</td>
<td>DBA Technology Advisors</td>
</tr>
<tr>
<td>Gregory Stanley</td>
<td>Wade Trim</td>
</tr>
<tr>
<td>Judd Statine</td>
<td>Quam Construction Company Inc.</td>
</tr>
<tr>
<td>Matt Stephl</td>
<td>Stephl Engineering LLC</td>
</tr>
<tr>
<td>Raymond Sterling</td>
<td>Louisiana Tech University</td>
</tr>
<tr>
<td>Velimir Stetin</td>
<td>City of Maple Ridge</td>
</tr>
<tr>
<td>Dennis Sullivan</td>
<td>National Water Main Cleaning Co.</td>
</tr>
<tr>
<td>Lawrence Sullivan</td>
<td>Norwich Public Utilities</td>
</tr>
<tr>
<td>Robert Swensen</td>
<td>Horrocks Engineers Inc.</td>
</tr>
<tr>
<td>Lucas Tabolt</td>
<td>Barton &amp; Loguidice, D.P.C.</td>
</tr>
<tr>
<td>Bob Taylor</td>
<td>Mar-Tech Underground Services Ltd.</td>
</tr>
<tr>
<td>Robert Taylor</td>
<td>Spring &amp; Associates</td>
</tr>
<tr>
<td>John Teer</td>
<td>Prime Horizontal Ltd.</td>
</tr>
<tr>
<td>Charlie Thomas</td>
<td>Norman Utilities Authority</td>
</tr>
<tr>
<td>Richard Thomassen</td>
<td>Arcadis</td>
</tr>
<tr>
<td>Dan Topazzini</td>
<td>Weinmann Ltd.</td>
</tr>
<tr>
<td>Michael Traique</td>
<td>Hoyle, Tanner &amp; Associates Inc.</td>
</tr>
<tr>
<td>Frank Trinchini</td>
<td>City of Toronto - Toronto Water</td>
</tr>
<tr>
<td>Charles Tripp</td>
<td>Kleinfelder</td>
</tr>
<tr>
<td>Walter Trisi</td>
<td>CRS Tunnelling Inc.</td>
</tr>
<tr>
<td>Gene Tupper</td>
<td>GRI</td>
</tr>
<tr>
<td>Grahame Turnbull</td>
<td>JRCRUIZ Corp.</td>
</tr>
<tr>
<td>Robert Turner</td>
<td>Turner Underground Installations Inc.</td>
</tr>
<tr>
<td>Paul Ulrich</td>
<td>Hexion Inc.</td>
</tr>
<tr>
<td>Jesse Vandecreek</td>
<td>Hubbell, Roth &amp; Clark Inc.</td>
</tr>
<tr>
<td>Henry Vanderyl</td>
<td>H V Consulting Ltd.</td>
</tr>
<tr>
<td>Joshua Vandiver</td>
<td>City of Redding</td>
</tr>
<tr>
<td>Alex Varro</td>
<td>Thuro Inc.</td>
</tr>
<tr>
<td>George Vernon</td>
<td>Mill Creek Management Technologies Inc.</td>
</tr>
<tr>
<td>Eric Vieth</td>
<td>Strand Associates Inc.</td>
</tr>
<tr>
<td>Bertus Vos</td>
<td>BlueFox Engineering</td>
</tr>
<tr>
<td>Ophir Wainer</td>
<td>Ts Utility Engineers</td>
</tr>
<tr>
<td>Dean Walker</td>
<td>City of Dryden</td>
</tr>
<tr>
<td>Dennis Walsh</td>
<td>PSE&amp;G</td>
</tr>
<tr>
<td>Ryan Wamble</td>
<td>Campos EPC</td>
</tr>
<tr>
<td>Edward Ward</td>
<td>Hill Services Plumbing HVAC</td>
</tr>
<tr>
<td>Stuart Warren</td>
<td>Mott MacDonald</td>
</tr>
<tr>
<td>Ron Weigel</td>
<td>GeoStructures Inc.</td>
</tr>
<tr>
<td>Jon Wicke</td>
<td>Metro Wastewater Reclamation District</td>
</tr>
<tr>
<td>Darrell Wilder</td>
<td></td>
</tr>
<tr>
<td>Todd Williams</td>
<td>Gannett Fleming Inc.</td>
</tr>
<tr>
<td>Michael Willmets</td>
<td>North American Society for Trenchless Technology</td>
</tr>
<tr>
<td>Clinton Wilson</td>
<td>Black &amp; Veatch</td>
</tr>
<tr>
<td>David Winston</td>
<td>Williams</td>
</tr>
<tr>
<td>Brian Wirth</td>
<td>City of Regina</td>
</tr>
<tr>
<td>Kyle Wong</td>
<td>Sammamish Plateau Water &amp; Sewer District</td>
</tr>
<tr>
<td>Peter Wood</td>
<td>Rooter MD Plumbing</td>
</tr>
<tr>
<td>Michael Woodcock</td>
<td>Portland Utilities Construction Company LLC</td>
</tr>
<tr>
<td>Sergey Wortman-vayn</td>
<td>PSE&amp;G</td>
</tr>
<tr>
<td>Chad Wright</td>
<td>LECET Southwest</td>
</tr>
<tr>
<td>David Yue</td>
<td>Sameng Inc.</td>
</tr>
<tr>
<td>Michael Yuen</td>
<td>Andrews Infrastructure</td>
</tr>
<tr>
<td>Tarek Zayed</td>
<td>Concordia University</td>
</tr>
<tr>
<td>Mark Zemaitis</td>
<td>Peters Township</td>
</tr>
</tbody>
</table>

---

**Azogrount** by Azon, is a diverse family of polyurethane-based waterstop products used for concrete crack repair, stopping water infiltration and soil stabilization.
Corporate Members

Allstream Waste
Nick Gannon
22341 Komoka Rd.
Komoka, ON No.1R0 Canada
519-656-2974
allstreamwaste.com

Alternative Lining Technologies
Jim Rouse, Dace Van Dyken
PO Box 125
Byron Center, MI 49315 USA
616-587-7100
altliner.com

American Augers
Lee Drugan, David Hammond,
Kenny Clever
135 State Rt. 42
West Salem, OH 44287 USA
419-890-1819
americanaugers.com

American Pipe & Plastics
Cecelia Cranmer
PO Box 577
Binghamton, NY 13902 USA
617-332-1675
atkore.com

Ameron Water Transmission Group
Michael Saltikov
201 N. Berry St.
Brea, CA 92821 USA
951-232-6174
nov.com/ameron

Am-Liner East
Mel Willett, Sean Merryman,
Ivy Giuliani, Michael Wadding,
Robert Samuels, Richard Cornelius
601 Jack Enders Blvd.
Berryville, AR 72611 USA
540-955-9671
amlinerest.com

AOC LLC
Emilio Oramas, Joe Simpson,
Frederick Norman, Fletcher Lindberg,
Leslie Beck, Bill Moore
951 Highway 57 E.
Collierville, TN 38017 USA
901-854-2855
aoc-resins.com

AP/M Permaform
William Shook, Keith Walker, Joe Cherry, Brian Culich
6250 NW. Beaver Dr.
PO Box 555
Johnston, IA 50131 USA
515-276-9610
permaform.net

Applied Felts Inc. / Maxliner
David Fletcher
450 College Dr.
Martinsville, VA 24112 USA
540-656-1904
appliedfelts.com

AR Daniel Construction Inc.
Art Daniel
506 Tidewell St.
Cedar Hill, TX 75110 USA
972-291-3304
danielcs.com

Arceneaux Wilson & Cole
Keestan Cole, Joe Wilson, Calvin Prosen,
Marc Ochoa, Keith Zotzky
2901 Turtle Creek Dr.
Suite 320
Port Arthur, TX 77642 USA
409-774-7888
arceneauxwilson.com

Avanti International
Don Rigby, Britt Babcock, Frank Aguilar
1100 Hercules Ave.
Suite 520
Houston, TX 77059 USA
281-480-5500
avantiinternational.com

Avertex Utility Solutions Inc.
Jason Kottelenberg, Steve Kottelenberg, James Vis,
Andy Blokker
20535 County Rd. 109
Amaranth, ON L9W 0T8 Canada
289-237-9670
avertex.ca

Atlas Trenchless LLC
Jim Lagios
1551 Broadway St. W.
Rockville, MN 55369 USA
320-249-8410
atlas-trenchless.com

Azon USA Inc.
Michael Vennix, Erin Johnson,
Larry Meda
643 W. Cressmont Pkwy.
Kalamazoo, MI 49008 USA
269-385-9942
azonusa.com

Barbco Inc.
David Barbera, Jenifer Barbera
315 PKin Dr.
East Canton, OH 44730 USA
330-488-9400
barbco.com

Baroid Industrial Drilling Products (IDP)
Buck Hammond
2664 Headvaer Dr.
Ft. Collins, CO 80521 USA
832-472-3465
baroididp.com/idp

BASF
Ed Paradis
3760 Manor Rd.
Cornelia, GA 30531 USA
770-353-9259
basf.com

Associated Engineering
Jason Lueke, Gabriel Jean, Siu Fung Ma,
Carlie Pittman, Keith Kingsbury, Cian McDermott,
Mark Belanger, Craig Pass
500 8888 Jasper Ave.
Edmonton, AB T5J 5C6 Canada
780-969-6344
ae.ca
Brierley Associates Corp.
Heather Stewart, Rebecca Brock, Nancy Nuttbrock, Nick Strater, Thomas Pullen, Nathan Stubley
990 S. Broadway
Suite 222
Denver, CO 80209 USA
303-703-1405
brierleyassociates.com

Brown and Caldwell
Don Gordon, Susanne Lockhart, Ari Elden, Mark Poppe, Elton DeSouza, Gary Skipper, Christopher Garrett
290 Walt Whitman Ave.
Newport News, VA 23606 USA
757-897-6349
brwncald.com

Brownline Canada Inc.
Chris Frisch
40 E. Lake Green
Airdrie, AB T4A 2J2 Canada
403-512-3181

BT Construction
Chris Knott, Robert “Buck” Bergstrom, Harper Daniell, Marilee Bergstrom, David McCallum, John Beckos, Erica Sittloeh, Kevin Juliano, Catherine Kornbrust, Josh Livernose
9885 Emporia St.
Henderson, CO 80640 USA
303-469-0199
btrenchless.com

C&L Water Solutions Inc.
Jeff Maier, Tracy Stenger, Danny Braning, Christopher Jones, Larry Larson, Chrystalla Larson, Chris Larson
12249 Mead Way
Littleton, CO 80125 USA
303-791-2521
clwsi.com

CDM Smith Inc.
Marc Lehmann, Karen Lowe, Katelyn Biedron, M. Brent Johnson, Jonathan Kunay, Daniel Gilroy, Armin Vakili, Ahmad Habibian, Mohammad Reza Jafari, Clay Tappan, William Cotter
445 Hutchinson Ave.
Suite 820
Columbus, OH 43235 USA
614-628-2151
cdm.com

CBI Inc.
Don McCullers, James Ansprech, Kelly Wehner, Chris Proulx, Lawrence Arcand
380 Park Place Blvd.
Suite 300
Clearwater, Fl 33759 USA
727-678-2151
cbnnd.com

Carollo Engineers Inc.
2880 Gateway Oaks Dr.
Suite 300
Sacramento, CA 95833 USA
602-283-9500
carlo.com

Cartacoustics LLC
Grey Tarkenton
2557 Conifer Rd.
#105-402
Conifer, CO 80433 USA
303-525-1032
cartacoustics.com

Carylon Corp.
Chad Adams, Dennis Keene
2500 W. Arthington St.
Chicago, IL 60612 USA
312-666-7700
caryloncorp.com

CCI Inc.
David Dupuis, Ashkan Faghhi, Ken Birkett, Samuel Wilson, Brent Goers, Ed Donisch, Craig Lenderbeck, Justin Taylor
Bay 9 214 Grande Blvd W.
Cochrane, AB T4C 2G4 Canada
780-655-2161
ccicosolutions.ca

Clad H. Nix Construction
Stephanie Nix, Jon Nix, Ryan Burton
189 5th St.
Suite 205
South Ogden, UT 84403 USA
801-479-9000
chnix.com

Clean Water Works Inc.
Shane Magee
1800 Bantree St.
Ottawa, ON K1B 5L6 Canada
613-433-1261
cwwcanada.com

COP Trenchless
Lawrence Triolo, Jason Bennie, Zack Marietti, Mike Olson
840 N. 700 W.
North Salt Lake, UT 84054 USA
801-298-9956
copconstruction.com

Cretex Specialty Products
Lee Haessig, Kevin Lindner
116 W33390 Stoneridge Dr.
Suite A
Waukesha, WI 53188 USA
262-542-8153
cretexseals.com

CUES
Terri Mooney, Ed Diggis, Pete Monday, Richie Sheridan, Mac McGarry, Mark French, Pierre Mikhail
5600 Rio Vista Ave.
Orlando, FL 32805 USA
800-327-7791
cuesinc.com

CIP Corp.
Steve Gearhart, Robert Peccia, Giacomo Conto
515 5th St.
P.O. Box 598
Hudson, IA 50645-0598 USA
888-485-2477
usa-cipp.com

CJ Geo Geotechnical Engineers
Chris Cline
3402 Acorn St.
Suite 200
Williamsburg, VA 23188 USA
804-551-1424
cjgeo.com

CETCO
Debra Bac, Michael Kleespies, Richard Henkett, Justin Seago, George Dugan, Mario Brunet
2870 Forbs Ave.
Hoffman Estates, IL 60192 USA
800-527-9948
cetco.com

Contech Engineered Solutions LLC
Gaelyn Cunningham, John Kanzlemer, Hugh Mickel, Bob Kerr, Justin Walton, Rian McCaslin
9025 Centre Pte.
West Chester, OH 45069 USA
800-378-1122
conteches.com

COP Trenchless
Lawrence Triolo, Jason Bennie, Zack Marietti, Mike Olson
840 N. 700 W.
North Salt Lake, UT 84054 USA
801-298-9956
copconstruction.com

The Crossing Company
Ryan Maclean, Jesse Funnell, Manley Osbak, Ryan Bowhay, Ben Armstrong, Bill Piers
807 8th St.
Nisku, AB T9E 7S8 Canada
780-955-5051
thecrossingcompany.com

COP Trenchless
Lawrence Triolo, Jason Bennie, Zack Marietti, Mike Olson
840 N. 700 W.
North Salt Lake, UT 84054 USA
801-298-9956
copconstruction.com

The Crossing Company
Ryan Maclean, Jesse Funnell, Manley Osbak, Ryan Bowhay, Ben Armstrong, Bill Piers
807 8th St.
Nisku, AB T9E 7S8 Canada
780-955-5051
thecrossingcompany.com
2019 NASTT SPEAKEASY

EDUCATIONAL FUND AUCTION

NASTT'S 18TH ANNUAL EDUCATIONAL FUND SPEAKEASY AUCTION & RECEPTION

Join us in a Chicago Speakeasy! The Annual Educational Fund Auction helps raise money for very worthy causes. Since 2002, NASTT has raised nearly $1.1 Million and used those funds in support of our many educational initiatives. Due to your generosity, NASTT is able to provide targeted trenchless training courses to the industry, publish trenchless resources manuals and sponsor university students' attendance at NASTT's No-Dig Shows, as well as award scholarships.

EXCITING AUCTION ITEMS
Come to the auction and bid on great items like trips, tickets, electronics, industry items and more!

HAWEIAN VACATION RAFFLE
The winner of this raffle will receive a dream Hawaiian vacation, a $5,000 value! Tickets are $25 or five for $100 with a maximum of 1,000 tickets being sold.

COSTUME CONTEST
Show us your style! Speakeasy style that is! Come dressed in 1920s gangster or flapper attire at the auction's Eighth Annual Costume Contest! Prizes will be awarded- don't miss out!

50/50 RAFFLE
A great way to win some cash for yourself and help out our student chapters! The winning ticket will be drawn immediately following the live auction and you must be present to win. The winner splits the cash pot with the students.

FOR MORE INFORMATION VISIT NASTT.ORG/NO-DIG-SHOW/AUCTION
Corporate Members

North American Pipe Corp.
Mark DaSilva, Robert Eade, Jessica Williams, Rowena Penateau, Shawn Dunlop, Kyle Kutzak, Greg Corbin, David Moore, Suzanne Scott, Keith Moggach, Preston Creelman, Armand Hoover 750 E. Street Rd.
Valleysta, PA 19043 USA 610-541-7656 royalbuildingproducts.com

Northeast Remsco Construction Inc.
Richard Palmer, Robert Ross, Peter Sudkamp, Alberto Solana, Giovanni Scotto, Rolando Acosta, George Gutierrez 1473 RI 34
Bldg B
Farmingdale, NY 11735 USA 516-557-6100 northeastremsco.com

Oxford Plastics
David Sardinha, Sheila Sardinha 101 Dexter Rd.
East Providence, RI 02914 USA 401-497-0821 oxfordplasticsusa.com

Pacific Boring Inc.
David Cline, John Iles, Steve Galllyer, James Gardner, Brad Gardner PO Box 727
1985 W Mountain View Ave.
Caruthers, CA 93616 USA 559-864-9444 pacificboring.com

Permalok – A Northwest Pipe Company
Henry Goff, Trevor Gonterman, Eric Stokes, Shane Zeeman, Brent Keil, Rich Mäkie 472 Paul Ave.
St. Louis, MO 63135 USA 314-888-6811 permalok.com

PIC2 Corp.
Dave Russell, Ed Brain, Ad Shatat, Chris Garrett 4096 74 Ave.
Edmonton, AB T6B 2S3 Canada 780-468-6800 russelltech.com

Picolte Solutions Inc.
Katja Lindy-Wilkinson, Tony Decavitch, Jake Saltzman 20810 SE 18th Pl.
Sammamish, WA 98075 USA 425-505-0646 picotesolutions.com

Pipe Lining Supply
John Heisler 2970 E. La Palma Ave. Suite J
Anaheim, CA 92806 USA 888-354-6464 pipelinesupply.com

PipeFlo Contracting Corp.
Julia Noble 111 Frd St.
Hamilton, ON L8P 4M5 Canada 905-572-7176 pipetfl.ca

PipeLogix Inc.
Jeremy Wagner 36945 Cook St.
Palm Desert, CA 92211 USA 760-779-1700 pipelogix.com

PipeMedic by QuakeWrap Inc.
Mo Ehsami, Tyler Adams, Josh Ahumada 6840 S. Tucson Blvd.
Tucson, AZ 85716 USA 520-791-7000 pipemedic.com

Plastics Institute
Camille Rubeiz, Dede Hart 289 Maple Ln.
Fairfax, VA 22031 USA 469-499-1050 plasticpipe.org

PreTec Directional Drilling, a division of Precision Pipeline LLC
Bill Colson, Carter Larson 5314 56th St.
Eau Claire, WI 54703 USA 715-874-4510 pretecdd.com

Prime Resins Inc.
Michael Vargo, Billy George, Dave Barton, Adam Goldstone, Kevin Anthony, David Dingler 2291 Plank Rd.
Conyers, GA 30012 USA 770-388-0626 primeresins.com

Progressive Pipeline Management
David Wickersham, Christopher Hein, Mario Carbone, Jean Rivard 10 Marissa Ct.
Atlantic Highlands, NJ 07716 USA 732-291-6093 progressivipe.com

Protective Liners Systems Inc.
Jerry Trevino, Ron Lyons, Joseph Trevino, Nick Lyons PO Box 921
Lithonia, GA 30058 USA 770-482-5201 protective linersystems.com

Pure Technologies Ltd.
Sammamish, WA 98075 USA 425-505-0646 picotesolutions.com

Reline America Inc.
Mike Hoffmaster, Jeff Van Huet, Michael Burkhart, Tim Cook 116 Battleground Ave.
Saltville, VA 24370 USA 276-496-4000 relineamerica.com

The Robbins Co.
Brian Sethman 29000 Hall St.
Solon, OH 44139 USA 216-872-9050 therobbinscompany.com

Rain for Rent
John Lake, Charlotte Storms, Paul Reilly, Brian Brandstetter, Chris Schill, Todd Dahlstrom PO Box 2258
Bakersfield, CA 93303 USA 661-599-9124 rainforrent.com

Ramvac Vacuum Excavators
Chris Falk 1590 Dutch Rd.
Dixon, IL 61021 USA 815-600-1171 seewearquipment.com

RapidView LLC
Rex Robison, Matthew Sutton, David Daake, Andy Melton, Guy Leslie, Kris Robison, Richie Notz 1828 West Oslon Rd.
Rochester, MN 55925 USA 574-224-9855 rapidview.com

Rausch Electronics USA LLC
Gregory Hall, Josh Frankenfield, Mike Coons 1686 Opportunity Ave.
Chambersburg, PA 17201 USA 717-372-4878 rauschusa.com

Reline Americ Inc.
Mike Hoffmaster, Jeff Van Huet, Michael Burkhart, Tim Cook 116 Battleground Ave.
Saltville, VA 24370 USA 276-496-4000 relineamerica.com

RS Technical Services Inc. (RST)
Chris Remillard, James Dorough, Bob Grenier 1327 Ledge St.
Petaluma, CA 94954 USA 800-767-1974 rstechnics.com

SAK Construction LLC
Charlie Kuhnmuench, Cory Street, Jerry Shaw, Steve Hirtz, Casey Smith, Joe Feuerborn, Robert Stier, Anthony Aderhold 864 Hoff Rd.
O Fallon, MO 63366 USA 636-385-1100 sakcon.com

Radius HDD Direct LLC
Riff Wright PO Box 3106
Weatherford, TX 76086 USA 800-894-9114 radiushdd.com

Raelinger Primus Line Inc.
Andreas Fleischmann, Troy Fuller 112 S. Tryon St.
Suite 1130
Charlotte, NC 28206 USA 704-773-0065 primusline.com

Progressive Pipeline Management
David Wickersham, Christopher Hein, Mario Carbone, Jean Rivard 10 Marissa Ct.
Atlantic Highlands, NJ 07716 USA 732-291-6093 progressivipe.com

Protective Liners Systems Inc.
Jerry Trevino, Ron Lyons, Joseph Trevino, Nick Lyons PO Box 921
Lithonia, GA 30058 USA 770-482-5201 protective linersystems.com

Pure Technologies Ltd.
Sammamish, WA 98075 USA 425-505-0646 picotesolutions.com

Reline America Inc.
Mike Hoffmaster, Jeff Van Huet, Michael Burkhart, Tim Cook 116 Battleground Ave.
Saltville, VA 24370 USA 276-496-4000 relineamerica.com

RS Technical Services Inc. (RST)
Chris Remillard, James Dorough, Bob Grenier 1327 Ledge St.
Petaluma, CA 94954 USA 800-767-1974 rstechnics.com

SAK Construction LLC
Charlie Kuhnmuench, Cory Street, Jerry Shaw, Steve Hirtz, Casey Smith, Joe Feuerborn, Robert Stier, Anthony Aderhold 864 Hoff Rd.
O Fallon, MO 63366 USA 636-385-1100 sakcon.com
<table>
<thead>
<tr>
<th>Corporate Members</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Corporate Members</strong></td>
</tr>
<tr>
<td><strong>TRIC Tools Inc.</strong>  Michael Lien, John Rafferty, David Huff  1550 S. Loop Rd. Suite 104  Alameda, CA 94502 USA  510-865-8742  trictrenchless.com</td>
</tr>
<tr>
<td><strong>Notify TEK Machine Works Inc.</strong>  Debbie Miller, Dennis Burger  250 N. Main St.  Jacobus, PA 17407 USA  717-428-0570  trytek.com</td>
</tr>
<tr>
<td><strong>TT Technologies Inc.</strong>  Chris Brabie, Rick Melvin, Kevin Nangle, Eddie Ward, Sarah Mahlik, Brian Hunter, Bill Jeffery  2020 E. New York St.  Aurora, IL 60502 USA  630-851-8200  tttechnologies.com</td>
</tr>
<tr>
<td><strong>TuffRod Pipe Co.</strong>  Jim Kavadas  6680 Hodgson Rd.  Lino Lakes, MN 55014 USA  844-586-9354  tuffroad.com</td>
</tr>
<tr>
<td><strong>Vivax Metrotech Corp.</strong>  Rich Jordan  3521 Olcott St.  Santa Clara, CA 95054 USA  408-734-1400  vivax-metrotech.com</td>
</tr>
<tr>
<td><strong>Vortex Co.</strong>  Kit Jones, Andrew Gonnella, Scott Peterson, Brocklyn stone, Matt Peterson  310 S. 6th  Richmond, TX 77469 USA  713-269-2333  vortexinfrastructure.com</td>
</tr>
<tr>
<td><strong>Warren Environmental Inc.</strong>  Danny Warren, Steven Fortin, Greg Swartz, Max Silva  PO Box 1206  Carver, MA 02330 USA  908-947-8539  warrenenviro.com</td>
</tr>
<tr>
<td><strong>Wilson &amp; Company Inc.</strong>  Steve Salazar, Jesse Giuliano, Charles Loughman, Justin Klaudt, Garrett Lust, Brian Spano  1673 Broadway Suite 200  Denver, CO 80202 USA  303-501-1239  wilsonco.com</td>
</tr>
<tr>
<td><strong>Vermeer</strong>  John Milligan, David Wisniewski, Jeff Utter, Kayla Breja, Tod Michael, Tony Briggs  PO Box 200  Pella, IA 50219 USA  641-628-3141  vermeer.com</td>
</tr>
<tr>
<td><strong>Ultimate</strong>  Gregory Penza, Tony Hranicka, Nathan King, Robert Kodek  55 Corbin Ave.  Bay Shore, NY 11735 USA  631-667-9200  ulementics.com</td>
</tr>
<tr>
<td><strong>Underground Magnetic Inc.</strong>  Michael Young  5555 NW, Beaver Dr.  Johnston, MN 55031 USA  515-505-0960  undergroundmagnetics.com</td>
</tr>
<tr>
<td><strong>Underground Tools Inc.</strong>  Al Chancellor, Ann Peterson  6600 Hodgson Rd.  Lino Lakes, MN 55014 USA  763-554-1930  undergroundtools.com</td>
</tr>
<tr>
<td><strong>Uni-Jet Industrial Pipe Services</strong>  Shane Cooper, Scott Klapprat, Ryan Slagerman, Ursula Baziuk, Christine Pull, Darrin Lukie  1900 Brookside Blvd.  Box 2 Group 200 RR2  Winnipeg, MB R3C 2E6 Canada  204-673-4879  unijet.ca</td>
</tr>
<tr>
<td><strong>Vactor Manufacturing Inc.</strong>  Kristy Gussarson, Ben Schmitt, Nick Bruhn, Bryan Blankenship  1500 W. Bartlett Rd.  Elgin, IL 60120 USA  847-622-7044  vactor.com</td>
</tr>
<tr>
<td><strong>Vac-Tron Equipment LLC</strong>  Tim Fischer, Brian Showley, Tim Ross, Cori Walsh  27337 S. Hwy. 33  Okaulumpka, FL 34762 USA  352-728-3222  vactron.com</td>
</tr>
<tr>
<td>Government, Utility and Education Members</td>
</tr>
<tr>
<td>------------------------------------------</td>
</tr>
</tbody>
</table>
| **Alderwood Water & Wastewater District**  
Paul Richart, Brigitte McCarty,  
Chris Schumacher, David MacDonald, Amy Johannes, Chris Danson, Lenny Vander Houwen  
5025 156th St. SE  
Lynnwood, WA 98087 USA  
425-741-7997  
awwd.com  |
| **Carmel Area Wastewater District**  
Drew Lander, Daryl Lauer  
5945 Rio Rd.  
Carmel, CA 93922 USA  
831-624-1248  
cawd.org  |
| **Castro Valley Sanitary District**  
Landon L ochrie  
21040 Marshall St.  
Castro Valley, CA 94546 USA  
925-537-9757  
cvsan.org  |
| **Central Contra Costa Sanitary District**  
Alexandr Mestetsky, Mark Wenzelawski, Amanda Schmidt  
5019 Imhoff Place  
Martinez, CA 94553 USA  
925-228-9500  
centralcsan.org  |
| **Charlotte Water**  
Ethan Brown, Chris Allen, Mike Wirth, Keith Shirley, Micah Burgess  
5730 General Commerce Dr.  
Charlotte, NC 28213 USA  
704-335-0295  
charlottenc.gov  |
| **City of Charleston**  
Terry Smith, David Hull, Lindsay Leal, Lindsey Stephenson, Cathy Nhothsavath  
9590 El Camino Real  
Carlsbad, CA 92008 USA  
760-533-7354  
carlbadca.gov  |
| **City of Columbus**  
Michael McCloud, Jeff Keener, Paul Pannin II, John Rubadue  
11205 Fairwood Ave.  
Columbus, OH 43215 USA  
614-645-1486  
columbus.gov  |
| **City of Dallas**  
Anna Polito, Sabrina Dykes, Charlie Zambito, Eric Belanger  
12001 De Salaberry Blvd.  
Dollard-des-Ormeaux, QC H9J 2A7 Canada  
514-682-0722  
villesdirc.qc.ca  |
| **City of Denver**  
Jim Harding, Jeffrey Perrigo, Crystal Ponton, Lisa Mitchell  
1600 Mist Lake Dr.  
Denver, CO 80270 USA  
303-446-3642  
durbanmc.gov  |
| **City of Eugene**  
Patrick Cox, David Starns, Robert Hallett, Mark Smith, Jennifer Maier  
5019 Arbutus Ave.  
Eugene, OR 97401 USA  
541-682-5291  
eugene-eg.org  |
| **City of Houston**  
Susan Jacob, Harry Krinas, Taufeeq Ameer, Michael Zanthing, Erika Waite, Gary Moore  
77 James St. N  
Suite 320  
Houston, TX 77002 USA  
713-652-2700  
houstonwater.org  |
| **City of Regina**  
Evan Lutarnas, Brian Graham, Allen Pribyl, Dayna Livingston, Glenn Kessler, James King, Kelly Lawson  
2190 Brier Park Place NW  
Medicine Hat, AB T1C 1S6 Canada  
403-502-8035  
medicinehat.ca  |
| **City of New York Department of Design + Construction**  
Mohsen Zaregarehald, Gurdip Saini, Eric Macfarlane, Shahram Jaromi, Thomas Leung  
50-30 Thompson Ave.  
Long Island City, NY 11101 USA  
718-351-2095  
you.gov  |
| **City of Pacifica**  
Brian Martinez, Doug Trade  
700 Pacific Coast Highway  
Pacifica, CA 94044 USA  
650-922-4072  
cityofpacific.org  |
| **City of Port Coquitlam**  
Gary Goff, Roy Savage, Clarissa Brennan, Carven Ma  
1737 Broadway St.  
Port Coquitlam, BC V3C 2M9 Canada  
604-880-3771  
portcoquitlam.ca  |
| **City of Regina**  
Evan Lutarnas, Brian Graham, Allen Pribyl, Dayna Livingston, Glenn Kessler, James King, Kelly Lawson  
2190 Brier Park Place NW  
Medicine Hat, AB T1C 1S6 Canada  
403-502-8035  
medicinehat.ca  |
| **City of Reno**  
Dave Kershaw, Dustin Waters, Jon Simpson  
1 E. First St.  
Reno, NV 89503 USA  
775-328-2901  
reno.gov  |
| **City of Richmond**  
Jamie Villaluz, Eric Sparolin, Elena Pallier, Roger Keating, Milton Chan, Patrick Lai  
691 No. 3 Rd.  
Richmond, BC V6Y 2C1 Canada  
604-276-4014  
richmond.ca  |
Attend NASTT’s 2019 No-Dig Show for the networking events.

Strengthen relationships with existing customers, form new ones, and make invaluable connections in the ever-growing trenchless industry.

Networking events include: Kick-Off Breakfast, 18th Annual Educational Fund Auction and Reception, the Gala Awards Dinner and Reception and the Closing Luncheon.

Coffee Breaks and the Exhibit Hall showcasing more than 190 exhibitors are great networking opportunities too!

nodigshow.com

The No-Dig Show is owned by the North American Society for Trenchless Technology (NASTT), a not-for-profit educational and technical society established in 1990 to promote trenchless technology for the public benefit. For more information about NASTT, visit our website at nastt.org.
Government, Utility and Education Members

City of San Jose
Amanda Lei, Mellownie Salvador, John Aquino
200 E. Santa Clara St.
San Jose, CA 95113 USA
408-555-8478
sanjoseca.gov

City of Santa Barbara
Lisa Arroyo, Dale Escobar, Louis Gutierrez
PO Box 9990
Santa Barbara, CA 93102 USA
805-564-5412
santabarbaraca.gov

City of St. Albert
Kate Polkovsky, Blair Roy, Larry Galy, Justin VanDorp, Meredith Willacy, Allen MacAllister, Brian Broust, Kevin Cole, Michele Habrylo
5 St. Anne St.
St. Albert, AB T8N 3Z9 Canada
780-564-5412

City of Stockton Municipal Utilities Department
Jeffrey Telmo, Ken Merklo, Juan Chavez
3001-32 Ave.
City of Stockton Engineering & Public Works
2300 Navy Dr.
Stockton, CA 95206 USA
209-957-5647
stocktongov.com

City of Surrey
Parwinder Atwal, Tim Arlt, Cameron Clark
6651 148 St.
Surrey, BC V3S 3C8 Canada
604-590-7235
surrey.ca

City of Vaughan Engineering & Public Works
John Paterson, Jennifer Rose, Jack Graziosi, Vince Musacchio, Paolo Masaro
2800 Rutherford Rd.
Vaughan, ON L4K 2W9 Canada
905-582-8562
vaughan.ca

City of Vernon
Mark Dowhanian, John Box, Geoff Mulligan, Sean Irwin
3001-32 Ave.
Vernon, BC V1T 1S6 Canada
250-550-3647
vernon.ca

City of Victoria
Derk Wevers, Nina Sutic-bata, Randy Chang, Carla Coghlan
1 Centennial Square
Victoria, BC V8W 1E6 Canada
250-361-0552
victoria.ca

City of Vista / Buena Sanitation District
Elmer Alex, Alfred Podraza, Tony White
200 Civic Center Dr.
Vista, CA 92084-6725 USA
760-726-1540
cityofvista.com

Colorado Springs Utilities
Holly Link, Dan Derksen, Susan Funchio, Justin Festuca
1521 Hancock Expy.
Mailcode 1821
Colorado Springs, CO 80947 USA
719-668-4733

csu.org

Con Edison
Richard Trieste, Jake Pettinato
4 Irving Pl.
Room 2215-S
New York, NY 10003 USA
212-460-4870
coned.com

District of Saanich
Jeff Butcher, Peter Kelly, Sean Elliott, Nathan Robertson
770 Vernon Ave.
Victoria, BC V8X 2W7 Canada
250-477-1775

EP Cor
Coronation Yard
Albert Kwan, Mahendra Weeratunga, Thang Ho, Sara Kang, Michael Wong, Aniano Fornelos, Michael Kan, Arbind Mainali, Eduardo Jaramillo, Bernie Canlas, Shiva Shankar, Eric Magtoto, Emilia Rojas, Diana Lu, Nadia Kushka, Max Mao, Allen Xu
14135 - 115 Ave.
Edmonton, AB T5M 3B8 Canada
780-615-4178
epcor.com

EP Cor Drainage Services
Bindu Rajbhakdari, Darwin Smith, Minnan Liu, Jodhish Tailor, Arjun Aryan
14135 - 115 Ave.
Edmonton, AB T5M 3B8 Canada
780-496-5550
epcor.com

EP Cor Utilities Inc
Tina Vanitaki, Gary Eggen, Joseph Aregha, Shawn Rajendra
12116 - 107 St.
Edmonton, AB T5G 2N7 Canada
780-412-3446
epcor.com

Gwinnett County Water Resources
Phillip Page, Willis Manis, Christopher Miller, Robert Deaton
684 Winder Hwy.
Lawrenceville, GA 30045 USA
770-756-6700
gwinnetcounty.com

Halifax Water
Sheldon Parsons, Danny Patey, Thoren Pelley, Shawn Rowe, Dino Amara, Chris Weeks, Jamie Hannam, Susheel Arora, Cedric Williams
PO Box 8388 RPO C3C
Halifax, NS B3K 5M1 Canada
902-490-1781
halifaxwater.ca

Incline Village GID
Mike Lefrancois, Joe Pomroy, Brad Johnson, Jim Youngblood
11220 Sweetwater Rd.
Incline Village, NV 89451 USA
775-832-1274

Joint Meeting of Essex & Union Counties
James Paluch
500 S. First St.
Elizabeth, NJ 07202 USA
908-553-1515
jmescc.com

Long Beach Water Department
Edward Mendoza, Jinny Huang, Robert Vercelius, Wendy Chen, Joe Quiros, Tyler Powell
1800 E. Wardlow Rd.
Long Beach, CA 90807 USA
562-570-2322
lbwater.org

Louisiana Tech
Mohammadamin Azimi, David Iseley, John Matthews, Shaurav Alam
1207 Agriculture Dr.
Ruston, LA 71270 USA
318-243-8106
latech.edu

Metropolitan Water Reclamation District of Greater Chicago (MWRODGC)
Kevin Fitzpatrick, Carmen Scalice, Joanna Jacobs, Frederick Wu
111 E. Erie St.
Chicago, IL 60611 USA
312-751-3165
mwrd.org

Ministère des Transports, de la Mobilité durable et de l’Électrification des transports (MTMDET)
Eric David, Bolduc Maxime, Jean-François Demers, Marilyn Swiderski
180, chemin Sainte-Foy, 3e étage
Quebec, QC G1S 2L2 Canada
418-643-8577
transports.gouv.qc.ca

Mohawk Valley Water Authority
James Bednarzycz, Christopher Carmody, Richard Goodney, Joseph Gazzal
1 Kennedy Plaza
Utica, NY 13502 USA
315-452-0329
mvwa.us

Murrieta Water and Sewer Dept.
Valerie Smith, Jim Stacey, Matthew Powers
220 NW. Broad St.
Murrieta, CA 92570 USA
619-848-5200
murrieta.water.ca

Niagara Region
Joseph Tonellato, Kyle Maote, Glenn Fulton, Greg Epp, Michelle Moore
3501 Schmon Pkwy.
Thorold, ON L2V 4T7 Canada
905-685-4225
niagararegion.ca

Northeast Ohio Regional Sewer District
Robert Auber, Anthony Vitale, James Jones, Richard (Scott) Keith, Matthew Waite
9300 Euclid Ave.
Cleveland, OH 44115 USA
216-881-6600
norsd.org

Orange County Sanitation District
Brad Moore, Raul Cuellar, Yvonne Dake, Martin Dix
10844 Ellis Ave.
Fountain Valley, CA 92708 USA
714-860-265
ocsd.com

Region of Halton
Martin Larkin, Jason McCausley, Mark Bajor, Brena Kingsmill, Rick Ranalli, John Duong, Kiyoski Oka, Jacke Pawlus
1151 Bronte Rd.
Oakville, ON L6M 3L1 Canada
905-825-6000
halton.ca

GASTI TRENCHLESS TODAY: FALL 2018
34
NASTT.ORG
Government, Utility and Education Members

Ross Valley Sanitary District
Katherine Hayden, Stephen Miksis, Manuel Vigil, James Smith Ross
2960 Kerner Blvd.
San Rafael, CA 94901 USA
415-259-2949
rvsd.org

Salt Lake City Department of Public Utilities
Jason Brown, Michael Velarde, Alex Christensen, Jenni Oman, Steve Terry
546 Water Wheel
Stansbury Park, UT 84074 USA
801-259-0735
slcgov.com

Seattle Public Utilities
Aziz Alfi, Susie Larson, Caroline Barlow, Reed Blanchard
700 5th Ave.
No. 4900
Seattle, WA 98101 USA
206-386-1834
seattle.gov

South Adams Water & Sanitation District (SACWSD)
Abel Moreno, R. Evans, Joseph Sandoval
10200 E. 102nd Ave.
Henderson, CO 80640 USA
720-206-0900
sacwsd.org

Spartanburg Water
Ronald Champion, Brian Smith, Wesley Arrowood
301 South Ave.
Spartanburg, SC 29306 USA
864-508-7204
spartanburgwater.org

Tahoe-Truckee Sanitation Agency
Aaron Carlsson
12084 Lariat Ln.
Truckee, CA 96161 USA
442-236-1720
tttsa.net

Town of Cary
Robert Hirt, Lynn Brils, Dave Halgren, Jonathan Lane
PO Box 8005
Cary, NC 27512 USA
919-481-5099
townofcary.org

Town of Flower Mound
Clayton Rigg, Tiffany Bruce, Brian Waltenburg
2121 Cross Timbers Rd.
Flower Mound, TX 75028 USA
972-974-6411
flower-mound.com

Town of Grand Falls-Windsor Engineering Dept
Nelson Chatman, Roger Waugh, Derrick Hounsell, Chad Clendenning
5 High St.
Grand Falls-Windsor, NL A2A 2J8 Canada
709-489-0426
grandfallswindor.com

Upper Trinity Regional Water District
Kurt Staller, Adam McKnight, Ronna Hartt, Elizabeth Boddicker
PO Box 305
Lewisville, TX 75067 USA
972-219-1228
utrwd.com

West Valley Sanitation District
Jorge Picado, Kevin Hatchett, Edward Gryama, Jason Cumbo, Alan Kam
100 E. Sunnyoaks Ave.
Campbell, CA 95008 USA
408-378-2407
westvalleysan.org
PPI issues advisory for substandard pipe

THE PLASTICS PIPE INSTITUTE INC. (PPI) has issued a warning about substandard high-density polyethylene (HDPE) pipe that does not comply with the relevant product industry standards.

PPI made the Sept. 4 announcement after HDPE had been found in the oil and gas gathering operations of the Permian and Delaware basins in Texas and New Mexico, according to the association. These pipelines are not marked in accordance with the relevant product standard requirements, and therefore, may not comply with those product standards. Pipe that is not properly marked or certified provides no assurance of product quality and may not perform as intended for the application. The notice extends to other areas where HDPE pipe is widely used, such as in potable water, force main sewers, industrial and mining applications.

"We're issuing this advisory because we are seeing HDPE pipes that have significant quality issues," stated Tony Radoszewski, CAE, president of PPI. "In some cases, neither the manufacturer nor the origin of the pipe could be identified. A properly marked HDPE pipe includes relevant standards on the pipe's printline to identify piping materials that meet specific standards, and to help confirm that the pipe is suitable for its intended purpose."

PPI is the major North American plastic pipe trade association with many of its member companies producing resins, pipe, fittings and components.

AOC Resins parent company acquired by CVC Capital Partners

AOC RESINS’ PARENT COMPANY, The Alpha Corp. of Collierville, Tennessee, recently signed a definitive agreement with CVC Capital Partners Fund VI to be acquired.

The transaction includes AOC LLC the primary asset and wholly owned subsidiary of The Alpha Corp. Upon completion of the transaction, AOC, under the ownership of CVC, plans to work closely with Swiss-based Aliancys, a manufacturer of quality resins and a CVC portfolio company, to create a global leader in the industry. Aliancys’ products are sold to various composites end users in the automotive, building and construction, marine and relining/CIPP sectors.

"AOC is excited about the partnership with CVC Capital Partners as the company moves forward on a new path to future growth that will allow AOC to better serve new and existing customers, strengthen our supply chain, and create additional growth opportunities for our suppliers around the world," said Fred Norman, CEO of AOC. “Aliancys has excellent customer relationships and represents a great strategic and complementary fit with AOC as a market leader in global resin chemistries.”

HammerHead Trenchless unveils new purpose-built CIPP trailer

HAMMERHEAD TRENCHLESS, a Charles Machine Works company, recently introduced a new, purpose-built trailer for cured-in-place-pipe (CIPP) applications that gives installers a uniquely versatile and efficient workstation suited to almost any job they encounter.

The LT-20PRO features a modular design with all storage, electrical power and air supply needed for a wide range of lateral lining tasks. The configuration is customizable, allowing the customer to tailor it to their specific needs and avoid duplication of existing equipment. The 20-ft-long trailer’s modular design not only maintains an efficient workspace during installations but keeps all components secure and at-the-ready while traveling from job to job.

On more restrictive job sites, all equipment in the LT-20PRO can be unmounted for easy relocation. "Our trailer’s modular design accommodates the widest range of environments, difficult site conditions and logistics," said Matt Gabrielse, HammerHead product manager. "Versatility was key in creating these trailers for our customers, but in cases where it is necessary to work from a roof or inside a large building, our rig allows key components to be easily removed from the trailer to work remotely."

Each trailer can be outfitted with the desired inversion drum size, curing equipment, reinstatement and drain cleaning tools to meet each customer’s individual needs. HammerHead LT-20PRO CIPP trailers are also available ready-made for immediate sale and delivery. To learn more, visit hammerheadtrenchless.com.
CONSTRUCTION WAS BORN OF HUMBLE BEGINNINGS IN 1980. Equipped with a small excavator and a few great employees, Bob Bergstrom and John Turner set out to establish a utility construction company that would be a new standard in the Denver market. Now, 38 years later, BT Construction has become a leader in underground utility and infrastructure construction across the Western United States.

BT Construction is a common name amidst the community of contractors. BTrenchless, a division of BT, performs trenchless construction and enjoys a resume comprised of some difficult and high-profile projects across several states. The capabilities of BTrenchless ranges from small diameter auger bores to 10-ft diameter microtunnels. Its arsenal of equipment includes tunnel boring machines, pneumatic hammers, guided boring machines, custom hand tunnel shields, and an array of other equipment. Supported by the open cut capabilities of parent company BT Construction, BTrenchless is able to provide complete utility services for owners and municipalities.

Recently, BTrenchless has completed several interesting projects. In the City of Denver, a 210-ft, 10-ft diameter storm sewer was installed under the Union Pacific Rail Yard. In the mountains, a curved TBM restored the Michigan Ditch after a landslide that cut off a major source of water. In Fort Collins, a 14-ft pedestrian and equestrian tunnel was installed under the BNSF Railroad embankment.

BTrenchless has a long history of success using trenchless technology in overcoming challenges and solving the problems inherent with underground construction. Combining a history of experience with new technologies, BTrenchless is always looking at ways to complete projects in a better, safer and more economical manner. With every passing year, utility corridors are getting more crowded, social and environmental costs are increasing, and the need for creative trenchless solutions are ever increasing. BTrenchless is looking forward to what tomorrow holds.
British Columbia

The British Columbia Chapter (NASTT BC) is continuing its efforts to introduce trenchless technologies into educational institutes. In 2017 and 2018, the chapter has had very promising meetings with the University of Victoria and the British Columbia Institute of Technology. Stay tuned for more information on how the chapter is looking to work with these organizations in the future.

NASTT BC has also developed an online Carbon Calculator to identify the reduction in greenhouse gases that can be realized using trenchless technology. The Carbon Calculator is the basis for a more sophisticated calculator being developed in conjunction with NYSEARCH, the R&D arm of several gas companies across North America. For more information, please visit utilitycarboncalculator.com.

Great Lakes, St. Lawrence & Atlantic

The Great Lakes, St. Lawrence & Atlantic (GLSLA) Chapter has held multiple CIPP Good Practices courses in the past two years and has partnered with such organizations as the national NASTT and ACWWA. The courses have been well attended and the GLSLA Chapter would like to thank ACWWA for its partnership in presenting the course and it looks forward to continuing to promote the trenchless industry in Atlantic Canada with ACWWA. For more information on GLSLA, events and chapter training sessions, please visit glsla.ca.

Mid Atlantic

The Mid Atlantic Chapter (MASTT) hosted a very successful Trenchless Technology, SSES and Buried Asset Management seminar in Pittsburgh on July 19 at the at Hyatt Place – Pittsburgh – North Shore. The guest presenter was Shawn McWilliams, civil engineer for regional conveyance with the Allegheny County Sanitary Authority (ALCOSAN) in Pittsburgh, who presented on ALCOSAN’s trenchless program in Pittsburgh. ASCE Pittsburgh Section was the seminar co-sponsor with special reduced fees. The seminar was a great success with a lot of learning and networking.

MASTT is planning a Trenchless Technology, SSES and Buried Asset Management seminar in Virginia Beach, Virginia on Oct. 3, 2018. Please plan to support and attend this seminar to enjoy the networking and learning. Please go to mastt.org to learn more about this seminar and/or to register online.

Northeast

The Northeast Regional Chapter of NASTT is continuing planning efforts for its 2018 annual conference, scheduled for Tuesday Nov. 13 in Mystic, Connecticut. A welcome reception will be held at Mystic Pizza on the evening of Monday Nov. 12. Prepara-
tions of the fall edition of the Northeast Journal of Trenchless Technology Practices is also underway. The Northeast Chapter is working with its student chapter at UMass Lowell to identify potential presentations and field trips to engage the next generation of trenchless experts during the fall semester. Please visit our nastt-ne.org for more information and to sign up for the fall conference!

**Northwest**

The Northwest Chapter is proud to be jointly presenting the TT2018 – TAC/NASTT-NW Tunnelling and Trenchless Conference in partnership with TAC featuring the theme Innovation in Underground Infrastructure. The conference will take place in Edmonton, Alberta, Nov. 7-9, at the Fantasyland Hotel at West Edmonton Mall.

Wednesday, Nov. 7 will feature a Microtunneling Short Course. Thursday, Nov. 8, and Friday, Nov. 9, will include all keynote and theme lectures, concurrent technical sessions and panel discussions. The TAC AGM will take place at the end of the technical sessions on Nov. 8, followed by the 2018 TAC Awards Banquet that evening. The NASTT-NW Project of the Year will be presented on Nov. 9. For more information on sponsorship opportunities, tradeshow booth sales and delegate registration, please visit tt2018.ca. For more info, please email gtippett@nastt-nw.com.

**Rocky Mountain**

The Rocky Mountain Chapter (RMNASTT) is looking forward to a productive local conference come Nov. 1. We have a few exciting field trips in Utah that are lined up for September as well as our annual clay shoot at Kiowa Creek Sporting Club on Oct. 5. Since our last update, we have been reaching out to other state members associated with our chapter. In particular, we are currently forming local teams in Nebraska and Kansas with the idea of each state within our chapter having board representation, as well as a local team to drive events and annual conferences. RMNASTT is in the process of updating and revamping its website and will be working to optimize the site through the search engines. The chapter is also looking for part-time administrative aid, as well as employing a public relations/marketing firm as we are starting to outgrow the capacity and time available to our volunteers and board members.

**South Central**

The South Central Chapter recently released its first annual Texas and Oklahoma Trenchless Report, a new publication highlighting some of the groundbreaking trenchless work being done within the region. The chapter will also be hosting its third annual Trenchless Technology Conference, Sept. 25-27, taking place for the first time at Oklahoma State University (OSU) in Stillwater, Oklahoma. The conference will include two full days of trenchless presentations, exhibits and networking, as well as the opportunity to partake in OSHA training activities offered by OSU. We hope to see you there! For more info, visit trenchless.ceatpd.okstate.edu.

**Southeast**

The Southeast Chapter (SESTT) conducted a Trenchless Technology, SSSES and Buried Asset Management seminar in Atlanta on May 9, 2018 at the Hilton Atlanta Northeast Hotel. The featured presenter was Maurice L. Horsey, IV, chief EPA municipal and industrial enforcement, with the U.S. EPA Region 4. Horsey presented on “Lessons Learned and Future Efforts” regarding trenchless construction including discussion about EPA’s past, present and future. ASCE’s Georgia Section served as the seminar co-sponsor. Seven PDHs were offered and the seminar was a great success.

SESTT has another Trenchless Technology, SSSES and Buried Asset Management seminar proposed for Tampa, Florida, on Dec. 12, 2018. Please plan to support and attend the seminar to enjoy the networking and learning. Please visit sestt.org to learn more about the seminar and to register.

SESTT is also publishing its annual Southeast Journal of Trenchless Technology in mid-November. Past journal issues are available at sestt.org. The publication will be distributed to more than 4,000 water and sewer decision makers in SESTT’s area.

**Western**

The Western Chapter of NASTT (WESTT) is in the final stages of planning its annual Western Regional No-Dig Conference and Exhibition. This year’s conference will be held Sept. 17-18 in Scottsdale, Arizona. The first day of the conference will include presentations of technical papers drawn from NASTT’s national No-Dig Show, and includes a variety of new installation and rehabilitation topics. The second day of the conference will offer the two Trenchless 101 courses: New Installations and Rehabilitation. The keynote speaker will be Jim Thompson, city manager for the City of Scottsdale. The Western Chapter is looking forward to another successful event! To learn more, visit westt.org.
Trenchless Technology Leads to Award for City Project

ENGINEERS IN THE CITY OF BLOOMINGTON, ILLINOIS PUBLIC WORKS DEPARTMENT received an award for the Hojo and Wittenberg Sewer Improvements Project, which used trenchless technology to make the construction of a gravity sewer more cost-effective than replacing a failing pump station. The American Public Works Association, Illinois Chapter awarded it Project of the Year for Environmental Projects in 2018.

The Howard Johnson (HoJo) Pump Station, which Bloomington put into service in 1977, began nearing the end of its useful life in 2013. When studying the options, engineers realized they had an opportunity to make the city's infrastructure more sustainable, because they could use trenchless technology to install gravity flow sewer pipes to eliminate the HoJo Pump Station. The same process could be used to eliminate the Wittenberg Pump Station, upstream from the HoJo Pump Station. The task would have been extraordinarily expensive if not for trenchless technology, because the sewer pipes needed to go underneath two interstates.

Engineers planned to use the technology in two different ways to make the construction of the gravity sewer cost-competitive with replacing two pump stations. Their first strategy repurposed 1,600 ft of previously-abandoned 12-in. force main. The repurposed 12-inch force main helped make the mile-long connection between the HoJo Pump Station and yet a third abandoned pump station. Engineers also planned to use an epoxy resin liner to line the original ductile iron force main. The engineers’ second strategy leveraged the advantages of horizontal directional drilling to minimize the impacts to Interstate 55 and Interstate 74, which carry 47,000 vehicles per day. In two pulls, contractors installed 1,035 ft of 14-in. high-density polyethylene pipe (HDPE) that served as the casing. Then, they installed an epoxy resin liner as the carrier pipe in order to satisfy Illinois Department of Transportation requirements for crossing sewers under highways. Each of these strategies provided significant cost savings and limited the impacts to the adjacent property owners.

The Hojo and Wittenberg Sewer Improvements Project is a great example of how The City of Bloomington Public Works Department maintains its commitment to providing excellence in stewardship and service. The department is figuring out the best ways to leverage trenchless technology by giving importance to educating staff. Using their talent and creativity, employees have found and will continue to find unique and cost-effective uses for trenchless technology in order to tackle projects with ordinary or extraordinary challenges. The Public Works Department provides training for trenchless technology in-house. This approach begins with ensuring that staff knows that digging doesn’t solve all problems and raising awareness for what can be accomplished with the technology. The training ranges from informal chats in the hallway to formal training from the best in the industry.

Seventeen employees attended the three-day Pipeline Assessment Certification Program, offered by the National Association of Sewer Service Companies (NASSCO), in June 2018. By training employees on the North American Standard for defect identification and assessment, the department will be able to increase the amount of sewer work that can be provided in-house. Two employees participated in the Inspector Training and Certification Program, also offered by NASSCO. The certification allows the city to line sewers using cast-in-place pipe (CIPP). Sewer lining adds longevity to aging sewers by creating a new pipe within the old pipe, saving replacement costs and avoiding service interruptions. Crews lined 1,100 ft of 36-in. pipe in the city’s downtown area without impacting downtown businesses and residences.

In conjunction with the CIPP program, Public Works set the bar for Central Illinois by performing lateral launches using closed-circuit television for every service prior to lining. This allows the city to disconnect abandoned sewer services that would have otherwise formed a sinkhole. During one project, crews identified 56 abandoned sewer services in 3 blocks within the city’s downtown area that they were able to disconnect. That project eliminated 56 potential sinkholes due to the creative use of trenchless technology by city staff.

The City of Bloomington, Illinois Public Works Department maintains 254 miles of sanitary sewers, 85 miles of combined sewers, 9 miles of sanitary force mains, and 244 miles of storm sewers in a community of 76,610 people. These pieces of infrastructure are fully funded by user fees that have an annual 3 percent increase to keep up with ever-increasing costs of infrastructure construction. This year, Bloomington’s operating, maintenance and capital budgets included $3.7 million for the stormwater management fund and $7.2 million for sanitary sewer fund. There is no question that trenchless technology is a necessary tool for making the best use of these available funds.

This article was contributed by LUKE THOELE, CIVIL ENGINEER, AND MICHAEL HILL, MISC. TECHNICAL ASSISTANT, FOR THE CITY OF BLOOMINGTON PUBLIC WORKS DEPARTMENT IN ILLINOIS.
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
- **Chapter Contact:** Charlotte Wong
  - Website: nastt-bc.org
- **Elected Officers:**
  - Chair - Karl Mueller
  - Treasurer - Preston Creelman

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

### Great Lakes, St. Lawrence & Atlantic
- **Chapter Contact:** Kevin Rainbridge
  - Website: glsca.ca
- **Elected Officers:**
  - Chair - Kevin Rainbridge
  - Vice Chair - Anna Polito
  - Secretary - Gerald Bauer
  - Treasurer - Derek Potvin

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.

### Mid Atlantic
- **Chapter Contact:** Leonard Ingram
  - Website: mastt.org
- **Elected Officers:**
  - Chair - Richard Thomasson
  - Vice Chair - Michael Delzinger
  - Secretary - Dennis Walsh

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.

### Midwest
- **Chapter Contact:**
  - Jeffrey Boscher
  - Website: mastt.org
- **Elected Officers:**
  - President - Jeffrey Boscher
  - Vice President - Chris Schuler
  - Secretary - John Milligan
  - Treasurer - Ryan Poertner

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.

### Northeast
- **Chapter Contact:** Ian Mead
  - Website: naatt-ne.org
- **Elected Officers:**
  - Chair - Ian Mead
  - Vice Chair - Ralph Marquis
  - Secretary - Eric Schuler
  - Treasurer - Marshall Gaston

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

### Northwest
- **Chapter Contact:**
  - Greg Tippett
  - Website: nastt-nw.com
- **Elected Officers:**
  - Chair - Greg Tippett
  - Vice Chair - Ben Campbell
  - Secretary - J. Chris Ford
  - Treasurer - Keith Moggach

The Northwest Chapter was established in 1999 by members in the provinces of Alberta and British Columbia, Canada, and in Washington state. In 2005, the members in BC established the NASTT-BC Chapter. In 2009, members in Washington state established the Pacific Northwest Chapter and the Northwest Chapter adjusted the geographic area to include members in the provinces of Manitoba and Saskatchewan.

### Rocky Mountain
- **Chapter Contact:**
  - Robert Creelman
  - Website: mstt.org
- **Elected Officers:**
  - Treasurer - Marshall Gaston
  - Secretary - Eric Schuler
  - Vice Chair - Josh Kercho
  - Chair - John Milligan

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

### South Central
- **Chapter Contact:**
  - Justin Taylor
  - Website: cciandassociates.com
- **Elected Officers:**
  - Chair - Justin Taylor
  - Vice Chair - CCPA North-Central
  - Secretary - Ryan Poertner
  - Treasurer - Brent Johnson

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.

### Southeast
- **Chapter Contact:**
  - Leonard Ingram
  - Website: cciandassociates.com
- **Elected Officers:**
  - Chair - Jerry Trevino
  - Vice Chair - Ed Paradis
  - Secretary - Ryan Poertner
  - Treasurer - Brent Johnson

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.

### Western
- **Chapter Contact:**
  - Cindy Preuss
  - Website: westt.org
- **Elected Officers:**
  - Chair - Brian Arden
  - Vice Chair - Lisa Arroyo
  - Secretary - Kathryn Wallin
  - Treasurer - Norman Joyal

The Western (WESTT) Chapter was established in 2003 by members from the states of Arizona, California, New Mexico, Nevada and Hawaii.
Members of NASTT's Student Chapters 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 an NASTT Student Chapter – scholarships, networking opportunities, education and career opportunities to name a few. To learn more about NASTT’s 20 Student Chapters, visit nastt.org/student-chapters.

University of Alberta
Edmonton, Alberta
Advisor: Dr. Alireza Bayat
E-mail: abayat@ualberta.ca

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@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: TBD

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

Kent State University
Kent, Ohio
Advisor: Dr. Lameck Onsarigo
Email: lonsarig@kent.edu

Laval University
Quebec City, Quebec
Advisor: Dr. Genevieve 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

University of Massachusetts at Lowell
Lowell, Massachusetts
Advisor: Raj K. Gondle, Ph.D.
E-mail: RajKumar_Gondle@uml.edu

Montana Tech
Butte, Montana
Advisor: Larry Hunter
E-mail: lhunter@mttech.edu

Oklahoma State University
Stillwater, Oklahoma
Advisor: Jonghoon “John” Kim, Ph.D.
E-mail: jongkim@okstate.edu

Purdue University
West Lafayette, Indiana
Advisor: Dr. Dulcy Abraham
E-mail: dulcy@purdue.edu

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

CUIRE/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
Learning about UV CIPP versus Steam and Water Cure CIPP in Portland, Oregon

Mark W. Hutchinson, P.E.
STAHLEI TRENCHLESS CONSULTANTS
PORTLAND OREGON

Erik Durshpek
CITY OF PORTLAND

This paper will explain the steps the City of Portland (city) went through to gain experience with Ultraviolet Cured-in-Place-Pipe (UV CIPP) on three projects. Also, what was learned regarding how UV CIPP compared with steam and water cured CIPP in cost, quality, schedule, constructability, strength and public reaction.

Introduction

The City of Portland has over 2,500 miles of sewer pipes with most of them built prior to 1930 and in need of repair. The City started to rehabilitate pipes with Cured-in-Place Pipe (CIPP) since the 1980s to repair aging sewer and stormwater pipes, first with water cure and later steam cure when contractors began using this technology in the 1990s. CIPP has been a useful tool to rehabilitate the pipes from 6 in. to 60 in. in diameter. Over the years, we have learned many lessons on the difference between steam and water cure CIPP, from the experienced and less experienced installers and workman.

The City of Portland’s pipe rehabilitation program has varied over the years from emergency-based replacement to programmatic basin focused pipe replacement. In 2011, we decided to put more emphasis on assessing our existing old sewer system. Having just finished with our $1.4 billion combined sewer overflow system improvements in 2010, money was then made available to begin an aggressive program with rehabilitate the worst of the worst pipes in Portland utilizing CIPP, pipe bursting and open cut construction methods. This program was called the Large-Scale Sewer Rehabilitation Program (LSSRP). The LSSRP is a $250 million program to fix the structurally deficient pipes, mostly in the residential neighborhoods of Portland. We were installing 21 miles of pipe a year. CIPP was responsible for 15,000 to 30,000 lf, or a quarter of the new replacement pipe annually. This volume of work allowed the city to experiment and try some newer products and technology, such as UV CIPP. We hoped by adding another tool to our tool box we could achieve our pipe rehabilitation annual goals.

How We Did It

Initially we researched UV CIPP at the NASTT No-Dig shows and read articles in Trenchless Technology. Feeling the need to know more, we put together an in-house half-day session about UV cured CIPP. We invited three manufacturers to Portland from the East Coast and Europe to provide training and answer questions about UV CIPP, for our engineers, inspectors and consultants. This event demystified the product. We also came to realize that we did not have any local UV CIPP contractors in the Pacific Northwest. To attract UV CIPP contractors to the area, we decided to dedicate a large project from our LSSRP program to get experienced contractors to bid and dedicate a UV CIPP project in Portland. Unfortunately, other priorities got in the way. Three years passed and we still hadn’t designed and bid a UV CIPP project. Then came the following opportunities to develop, implement, and learn about UV CIPP.

• The first was an emergency project to repair a 42-in. concrete pipe with a severely corroded crown, downstream from a force main discharge adjacent to the Portland Airport (NE 112th & Holman).

• The second was a three-week window of opportunity to rehabilitate century old pipes under our light rail tracks in Portland Central business area (SW Yamhill & Morrison).

• The third was a change order to a project calling for a CIPP rehabilitation to be used in an 8-in. pipe under SE Powell, a major arterial (SE Powell Rehabilitation).

Working through these projects helped the city define and refine specifications for UV CIPP in its large scale program that first started with listing UV CIPP as an alternate bid item to thermal CIPP when we bid out CIPP work in the LSSRP program. Unfortunately, due to price and lack of local contractor the UV CIPP alternate was not selected by our contractors who won the contracts. Realizing the need to do more, our engineers began extensive outreach to UV CIPP contractors around the country to be engaged in the city’s sewer rehabilitation program and developments, which also helped the city’s efforts in development of a large-scale project to be bid exclusively as UV CIPP.

Projects

NE 112th & Holman

This was an emergency project to replace a failed 42-in. reinforced concrete pipe downstream from a sewer pressure line discharge after a sink hole developed, shown in Figure 1. The reinforced pipe had deteriorated due to hydrogen sulfide (H2S) corrosion. This project was an emergency requiring a quick response due to the proximity to the Portland International Airport and because the sink hole closed the street used by semi-trucks serving the airport and also impacted accesses to three hotels. The city hired a contractor, on time and materials basis, to excavate the sink hole and install a sewage diversion system. Our maintenance engineers then developed a design to first replace the failed pipe with fiberglass reinforced pipe, then to line the remainder of the downstream pipe run that was affected by the H2S with CIPP. The 42-in. HOBASE pipe was procured and CIPP subcontractors were contacted for quotes, while the sewage diversion pumping system remained in place and was maintained by the open cut contractor. When the quotes came in, the installer for water cured CIPP was less expensive but took six...
Figure 1: Sink hole over failed 42-in. sewer requiring a quick repair

weeks longer to get manufactured as compared to the UV CIPP. The UV CIPP turned out cheaper, overall, when considering projected diversion costs and public disruption. A small local UV CIPP firm was hired by the open cut contractor. While the city was checking references and submittals of the UV CIPP subcontractor, the prime contractor installed the 42-in. HO-BAS pipe in the sink hole area. On the day of the lining the open cut contractor performed most of the support work to help facilitate the progress of the UV CIPP. The UV CIPP subcontractor showed up at 6 a.m. ready to clean and CCTV the pipe. Cleaning and the pre-CCTV inspection was done by 8 a.m. The CIPP installation began by 8 a.m. The light train for curing the liner was pulled thru at approximately 1 in. per minute, ends of the mainline were cut out by 10 p.m., and laterals reinstated by 12 a.m. (midnight). To maximize efficiency, the open cut contractor assisted the subcontractor with the installation of the liner using winches, equipment and workman they had close by, resulting in 402 ft of 42-in., 20 mm thick UV CIPP.

SW Yamhill & SW Morrison Project

The SW Yamhill & Morrison Sewer Repair Project came into being when Portland’s Bureau of Environmental Services (BES) found out that the TRIMET Max light rail trains, located in Portland’s Central Business District were going to be closed for upgrades. These planned upgrades were scheduled to occur over a three-week period, working 24 hours/day, in May of 2017. This created an opportunity for BES to rehabilitate some of the oldest sewer in the city, located underneath train tracks during the closure. This project had a short timeline: the design, and procurement had to be completed in three months. The city looked at several options for contracting and determined that the best option was to design and administer the contract under the Urgent pipe contract more formally called the Price Agreement for Urgent Rehabilitation of Sanitary and Storm Sewers (PAURSS). Under the PAURSS contract the city completes a draft design and submits it to the contractor for pricing based on prearranged unit prices and estimated costs. The contractor returns an estimate and a final price is negotiated based on the scope. For this project, the scope of work required replacement of mainline sewers on two parallel streets SW Yamhill and SW Morrison Street, from Naito to SW 13th Ave.

The length proposed to be replaced was 6,000 lf of 100 to 140-year-old deteriorated sewer pipes. The pipes were in dire need of repair showing signs of cracks, breaks, holes, offset pipes, root and grease obstructions. In the initial considerations, the work included open cut and CIPP type of work, but due to time constraints CIPP was the only option. Thru scope refinement, the project scope and estimate went from $1.0 million to $3.5 million. As the cost rose, concerns rose over handing a $3.5 million contract to a single prime contractor and a single major subcontractor. When considering the City’s goal of 20 percent minority subcontractor participation, this contract was not meeting the city’s aspirational goals for contracting. To address this concern, we encouraged the prime contractor, JW Fowler, to subcontract as much work as possible to minority- and women-owned firms.

Additionally, the prime contractor was concerned with the 3-week time constraint window, and having one subcontractor not be able to complete the project on time. If they had an equipment breakdown, or a weather issue arose, they were concerned about the ability to maintain or divert flow. As a result, the CIPP subcontract work was to be split between two subcontractors. The work on SW Morrison St. was to be completed by Michels and work on SW Yamhill was to be completed by Final Liner, a small female-owned firm that does UV CIPP. This resulted in all mainline pipes on SW Yamhill Street to be lined using UV CIPP.
and pipes on SW Morrison Street to be lined with conventional Polyester Thermal Cure CIPP.

Some of the project challenges included lining mainline pipe segments that are adjacent to historic buildings varying from five to 20 stories, with major utilities, and vaulted basements protruding well into the right-of-way (in some cases to the face of curb). These challenges posed major implications with sewage diversion, in some cases impossible with the time constraints the project was up against.

JW Fowler worked around the clock, 24 hours/day and seven days/week, from March to May installing cleanouts and preparing flow diversions. In addition, JW Fowler and the city were meeting with building owners to design and plan sewage diversions where deemed feasible.

When the three weeks in May arrived approximately 14 mainline segments, out of the 24 mainline segments planned, were available to be lined. Michel's came in and lined one line after the next and left, after completing six of 12 segments. Final Liner, with JW Fowler's assistance, lined eight of 12 segments over the three weeks that were available. At the end of the three weeks in May, there were 1,445 lf of UV CIPP installed, ranging from 9 in. in diameter to 20 in. in diameter, and a total 1,700 lf of thermal cure CIPP was installed ranging from 10 in. in diameter to 16 in. in diameter; 1,355 lf of thermal cure CIPP and 1,120 lf of UV Cured CIPP were uninstalled. Because either lateral could not be located or laterals could not be accessed for installing a sewer diversion in the time available work could not proceed; independent of whether the liners were UV Cure CIPP or Thermal Cure CIPP.

To make things worse Finaliner experienced theft of the light train equipment, and lost some of their more experienced staff/workforce. These posed additional challenges to completing the project within the time constraints.

In the following months, the unused and wetted-out thermal cure CIPP liners expired and were discarded. The city is continuing to work with the prime contractor, and building owners, to complete the flow diversion plans required to finish the installation of the remaining UV CIPP liners. At the time of this paper, the city has 10 liners to complete, four of which are UV CIPP and six are thermal cure. The work is tentatively scheduled to be completed in early 2018.

**Tabor Powell Phase II Sewer Rehabilitation**

The Tabor Powell project is a Large-Scale Sewer Rehabilitation Project. The project is located in Southeast and Northeast Portland. The boundaries of these combined projects are 1-84 on the north, NE/SE 43rd Ave. on the west, NE/SE 67th Ave. on the east and SE Holgate Blvd. and SE Long St. on the south. This project is to rehabilitate sewer using CIPP to approximately 28,000 ft of deteriorating combination sewer located throughout Tabor and Powell neighborhoods. The sewer pipe in this project was constructed between 1910 and 1955. The sewer pipe sizes range from 8 in. to 36 in. in diameter with depths that range from 7 to 21 ft.

This project was targeted for UV CIPP only. The design documents were developed through the project delivery team in concert and with consulting engineers Brown and Caldwell. Outreach was made to nine UV contractors, resulting in five bidders. The contract was awarded to Precision Trenchless out of New York and the project was in the construction phase at time of this paper’s completion.

**COMPARING UV CIPP AND THERMAL CURE CIPP**

**Liner Cost**

When looking at average costs of what the City of Portland has seen, on the most common pipe diameters, the cost of UV CIPP is trending to be higher; see Figure 3.

**Liner Strength Properties**

The typical strength of the UV CIPP trends much higher than that of the thermal cure CIPP. The data shown is an average strength of liners installed of the UV CIPP for a single installer, and the thermal cure of two different local installers.

Similarly, when looking at the typical flexural modulus of the UV CIPP it trends were much higher than thermal cure CIPP. The data shown uses an average flexural modulus of liners installed of the UV CIPP, for a single installer, and the thermal cure of two different local installers.

**Liner Constructability**

When looking at projects we are often challenged with selecting construction methods that best fit the desired outcome while balancing between risk, cost, schedule, and impacts. When looking at the differences between CIPP Thermal Cure and UV cure we categorize them from the perspective of ‘pros and cons’, otherwise known as advantages and disadvantages. Here are some of the comparisons that were observed.
**Figure 4: UV and Thermal Cure CIPP Strength Comparison.**

**Thermal Cure**

Pros:
- The standard polyester product is flexible, and can mold to the existing pipe and can go through pipe segments with small degrees of turns, radius, or direction changes in the mainline pipe alignment.
- Once the product is installed the laterals are relatively easy to locate as most of the time there is a dimple in the liner surface providing indication of the lateral location.
- A transitional liner is not uncommon.
- There are many experienced installers, with multiple crews, who know what they are doing.
- The City of Portland knows the challenges using thermal cure CIPP and has developed protocols for successful projects from over 30 years of experience, we don’t have that level of comfort and institutional knowledge for UV CIPP.
- Thermal cure CIPP is available in a variety of resin types: polyester, vinylester, epoxy, and reinforced fabrics fiberglass, fibreglass and polyester.

Cons:
- The condition of the host pipe needs to be within a range of degradation, due to the lower strength liner or burst pressures. Advance work may be required to correct some of the mainline deficiencies, like pipe loss or gaps, and voids.
- Construction footprint is larger than that of UV cure.
- When installing the liner, there is limited viewing ability to see what the liner looks like, after putting into position, until its cured and a post CCTV inspection has been done.
- The workability, or work time, of the thermal cure CIPP is much less than that of the UV CIPP. If a challenge arises, on the day of the inversion, there is less flexibility to adjust to the condition at hand. Liners could prematurely harden.
- When the liner is wetted out, it has a short shelf life.
- Cure time can be longer, then that of UV cure.
- Custom liner sizes can take a while to manufacture.
- There are concerns about Styrene odor with traditional styrene systems.
- Hot water and steam present safety risks for workers.
- The liners can prematurely harden in hot weather, or when refrigeration is challenged.
- Liners do not always cure completely, due to heat sinks, water circulation or equipment malfunction and you often don’t know until you cut the ends.
- Because of the increased thickness of Thermal liners to UV this can be a heavier product to transport.

**UV Cure**

Pros:
- The product is more rigid, allowing the ability to span locations of mainline with larger amount of pipe loss, presence of gaps and/or voids exist. May require less advance work to be done on the mainline host pipe.
- Construction footprint is small, making it more convenient and less impactful to the public.
- When installing the liner there is pre-curing viewing ability allowing you to see how the liner looks, in position, prior to starting the cure.
- The workability, or work time, of the UV CIPP is much longer than of the thermal cure CIPP. If a challenge arises, on the day of the inversion, the liner cure could be delayed. If the liner is not used, and is properly stored, it typically has a 6-month shelf life.
- Cure time is much faster than of the thermal cure, however the total liner install time is heavily dependent on the experience of the crew on-site doing the work.
- On custom size, UV liners can typically be manufactured quicker than the thermal cure CIPP.
- Cure time for the section is immediate once the light train passes as opposed to thermal cure where the entire length must be brought up to temperature for cure to occur.

Cons:
- Cost of the UV CIPP is roughly 60 percent more than thermal CIPP for small diameters.
- The product has little flexibility to expand and requires a feasibility analysis on mainline segments with turns, radius, or direction changes in them.
- The light train cannot go thru most bends.
- Locating and noting the locations of all laterals is extremely important. Once the product is installed there is no dimple in the liner surface, the locations need to be reinstated based on measured distances and notes recorded. In cases of less experienced installers, this often creates overcutting on the lateral reinstatements.
- A transitional liner is less common, and often requires an access point to be dug and a manhole added at the transition point.
- Fewer smaller contractors exist that install the UV CIPP lining on a less regular basis. The smaller contractors require assistance from more experienced open cut contractors and can be less efficient. They have little or no experience with City of Portland requirements.
- Sizes and thicknesses of liners are limited.

This paper was edited for style and space for publication in NASTT’s Trenchless Today. To read more about the comparative conclusions on UV CIPP versus steam and water cured CIPP presented in Paper TM1-T6-05, please visit nastt.org/technicalpapers.
calendar

FUTURE NASTT EVENTS

October
14
NASTT’s Complementary Webinar Series Presents: Introduction to Rehabilitation Your Computer!

November
1
Trenchless Elevated 2018 Hosted by NASTT’s Rocky Mountain Chapter Denver, Colorado

2
NASTT’s HDD Good Practices Course Hosted by NASTT’s Rocky Mountain Chapter Denver, Colorado

8-9
2018 Northwest Trenchless Conference Hosted by NASTT’s Northwest Chapter Edmonton, Alberta

13
Northeast Trenchless Conference Hosted by NASTT’s Northeast Chapter Mystic, Connecticut

14
NASTT’s Complementary Webinar Series Presents: Introduction to New Installations Your Computer!

For more information, visit nastt.org/training/events.

locations

FUTURE NASTT’S NO-DIG SHOWS

NASTT’s 2019 No-Dig Show
March 17-21
Donald E. Stephens Convention Center | Chicago, Illinois

NASTT’s 2020 No-Dig Show
April 5-9
Colorado Convention Center | Denver, Colorado

NASTT’s 2021 No-Dig Show
March 27-31
Orange County Convention Center | Orlando, Florida

NASTT’s 2022 No-Dig Show
April 9-13
Minneapolis Convention Center | Minneapolis, Minnesota

ad index

Aegion ........................................................................................................... 7
Applied Felts .................................................................................................. Back Cover
Azon ............................................................................................................... 21
Btrenchless ................................................................................................... 37
Contech Engineered Solutions LLC .......................................................... 9
Direct Horizontal Drilling Inc. ................................................................. 2
I.S.T. Innovative Sewer Technologies ..................................................... 23
Michels Corporation .................................................................................. 15

Miller Pipeline .......................................................................................... 13
NASTT’s 2019 No-Dig Show ...................................................................... 33
NASTT’s Center for Excellence ................................................................ 35
NASTT’s Education Fund & Auction ....................................................... 25
NASTT’s Municipal Scholarship Program .............................................. 16
PICA Corporation ..................................................................................... 5
TT Technologies .......................................................................................... 11
Vivax-Metrotech ........................................................................................ 17

NASTT.ORG

NAS T T’S TRENCHLESS TODAY: FALL 2018 47
THE WORLD’S LEADING CIPP LINERS,
REINFORCED
WITH PERSONAL CARE.

Applied Felts uses innovative technology for the precision manufacturing of our custom, quality felt and reinforced cure-in-place liners for gravity sewer, pressure pipe and potable water applications. Our liners are world-class, but it’s the people behind the product that make Applied Felts a global leader. With over 200 million feet of successful installations around the world, our personalized care and close attention to the smallest of details—from using only the highest quality raw materials, manufactured with our state-of-the-art equipment, to our rigorous 28-stage QA/QC testing program—help our customers grow right along with us. Visit appliedfelts.com