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Fall 2019

Volume 9 | Issue No. 3

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FALL 2019 EDITION | VOLUME 9, ISSUE NO. 3



COLUMNS

- 4 Executive Director's Message
- 6 Chair Message
- 8 Education Update
- 42 Morty's Trenchless Academy

DEPARTMENTS

- 36 Eye on the Industry
- 40 Chapter News
- 43 Student Chapter Info
- 44 Regional Chapter Info
- 46 Technical Paper
- 50 Calendar/Ad Index

10 Q&A

By Andrew Farr

For our Fall Issue Q&A, we sit down with Dr. Ray Sterling, former director of the Trenchless Technology Center at Louisiana Tech University and NASTT Hall of Famer, to discuss the state of the underground market and the biggest educational needs for young people trying to break into the niche trenchless industry.

12 In the Trenches

By Sharon M. Bueno, Mike Kezdi & Andrew Farr

In this month's "In the Trenches" feature, we profile Dan Buonadonna of Jacobs, Dave Holcomb of TT Technologies and Shane Cooper of Uni-Jet Industrial Pipe Services. We explore their careers, get their take on the biggest challenges facing the industry and how the acceptance of trenchless methods has broadened.

18 NASTT's 2019 Member List

Compiled by NTT staff

The NASTT Member List is an abridged version of the NASTT Online Membership Directory – a searchable directory with complete contact information. In the listing found within this issue, you'll find the names of current individual members and their employers as well as group corporate and government and educational members. Don't see your name? Contact membership@nastt.org.

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EXECUTIVE DIRECTOR MESSAGE



Sharing Knowledge Amongst Your Peers Is Priceless

Networking Helps Us All Succeed



We look forward to recognizing the heart of NASTT in the Fall issue of this publication every year. That heart is you – our members! Networking with your fellow trenchless champions is a benefit of membership that cannot be measured. Use this member list beginning on page 18 to find other organizations you can collaborate with to help our industry continue its growth.

One great networking opportunity that I look forward to every year is the annual summer Program Committee meeting. The committee, along with the NASTT staff recently met in Denver to plan the technical program for the annual show. The committee is led by the 2020 Program Chair, Joe Lane, of Aegion and Vice Chair, John Matthews, of the Trenchless Technology Center at Louisiana Tech University. With these trenchless professionals at the helm, the committee of more than 100 volunteers reviews each abstract that is submitted and uses their expertise and experience to craft an incredibly valuable technical program. Everyone who attends the NASTT No-Dig Show will leave with tangible ideas and resources they can put to use the minute they get back on the job.

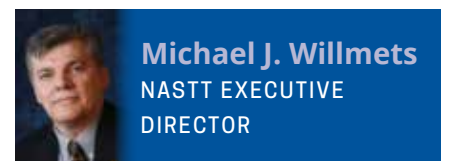
We will continue planning for our 2020 conference in Denver for the next several months, but we also have many regional events, training courses and webinars on the schedule for the rest of 2019 (see p. 50). There is no better way to network with other members in your area than by attending a regional chapter event. These events are top-notch, and our dedicated volunteers put their heart and soul into the planning and execution. You can also visit our online calendar at nastt.org to see

what's coming up in your area.

We are particularly excited about the upcoming first annual No-Dig North conference being held in Calgary at the end of October. The Canadian chapters have come together to plan an event focused on trenchless in Canada with exhibits, technical presentations, project awards and, of course, networking! If you live or do business in Canada, you owe it to yourself and your business to attend. Join us at the Telus Convention Centre, Calgary, Alberta on Oct. 28-30. Details can be found at the conference website at nodignorth.ca.

If you haven't already taken advantage of our newest member networking opportunity, be sure to join the conversation! We have launched an online member-only trenchless community called Talk Trenchless. This is a place where NASTT members can grow and succeed through continuous learning and collaboration and is accessible 24/7. You will be able to network, make new contacts, discuss projects and ideas and even have a little fun! Members can log on at talk-trenchless.nastt.org.

We hope to see you at an upcoming regional event, online in our member community or at the 2020 No-Dig Show in Denver next April. For the latest news and information, visit our website at nastt.org or email us at info@nastt.org. We look forward to hearing from you!



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NASTT Members, Volunteers Reflect Our Mission: Our Industry and Our Society Continue to Grow Because of You

The trenchless industry grows stronger every year. Our members and volunteers are innovative and curious minds that are continually thinking outside the box for ways to improve technology and infrastructure and protect our environment. The fall issue of NASTT's Trenchless Today is dedicated to our members and volunteers. This organization is able to grow and thrive because of you and for that reason, it is important to us to recognize and thank our members for their support.

The biggest opportunity for our members to meet and collaborate is at our annual No-Dig Show and soon too at our annual No-Dig North Show in Canada (coming to Calgary in October). More than 2,000 of our friends, colleagues and fellow trenchless champions gather together to learn, teach each other, and have a great time during a week packed with valuable events. We are currently planning for our 2020 show in Denver, Colorado. We're excited to take the NASTT No-Dig Show back to the Rocky Mountains! The last time we were there was in 2015 and it was the highest attended event we have ever had. We know you will want to join us there again and make the 2020 show even bigger. I'd like to thank our 2020 Program Chair, Joe Lane of Aegion and

Vice Chair, John Matthews of the Trenchless Technology Center at Louisiana Tech University, along with our growing Program Committee for putting together another awesome technical program for next year. I guarantee you will learn a lot of valuable new information with the papers presented in 2020.

NASTT's mission and vision are "to continuously improve infrastructure management through trenchless technology" and "to be the premier resource for knowledge, education and training in trenchless technology." With education as our goal and striving to provide valuable, accessible learning tools to our community, one of the things we are most proud of here at NASTT is our free webinar series. 2019 is the eighth year we've been able to offer complimentary technical webinars to the trenchless industry. Join us for another installment on September 18: NASTT's Pipe Bursting Webinar, featuring Alan Ambler, of AM Trenchless (Moderator), Matthew Timberlake of Ted Berry Company LLC and Michael E. Woodcock of Portland Utilities Construction Company, LLC. This webinar will also be available as an immediate download following the live broadcast. Visit nastt.org/training/events for details and registration. NASTT is dedicated to bringing

you the latest information on our industry, and our webinars are a great way to stay current on technology, as well as to learn about case studies and real-world solutions, right from your desk, and for free!

I'm am very excited for the upcoming No-Dig North conference! The Canadian Chapters are hosting the first annual No-Dig North in Calgary in October. The show will consist of two days of technical paper presentations and industry exhibits in the trenchless technology field. Pre-event Good Practices Courses will also be held. I'd like to thank No-Dig North Chair, Greg Tippett, for his leadership in the planning of the conference. The event will be held at the Telus Convention Centre in Calgary. Visit nodignorth.ca for all the details.

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



Craig Vandaele
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Survey Says...

Municipal Grouting Course Joins NASTT Suite of Good Practices Courses

Working in the marketing space, I can't help but be a total survey junky. Any time I receive an online survey I answer it, Amazon gift card drawing or not. I've always thought it was important to give honest feedback, good or bad, as it ideally helps people do their job better.

Knowing that surveys are an important part of improvement, we here at NASTT launched a survey last year to get a pulse on our programs and offerings. To our delight members and non-members had a lot of positive feedback. One thing that rang true in the survey results is that the trenchless industry wants more education. You told us, and we listened.

As we were evaluating our offerings, I received a call from Don Rigby, now with Madewell Products Corp. He mentioned an interest in partnering with NASTT to offer training events. The timing couldn't be more perfect. Don, along with Marc Antcil of Logiball and Ron Manestar of

Aries Industries, had developed a municipal grouting course. After some initial discussions it seemed like a great addition to our library.

After our Board of Directors' approval, we set out to integrate the municipal grouting technical content. As with all of our trainings and technical presentations, the municipal grouting course needed to be peer reviewed by a technical team. A huge thank you to Jeff Maier, P.E., of Garver who stepped up to be the chair of the committee. He is joined by Kevin Bainbridge, A.Sc.T, Robinson Consultants, Michelle Beason, P.E., National Plant Services and Jennifer Glynn, P.E., Woodard & Curran.

NASTT was pleased to present the Municipal Grouting Good Practices Course at this year's No-Dig Show in addition to our suite of Good Practices Courses. Don, Marc and Ron taught the inaugural class, and the course received glowing reviews.

The course gained traction and was

picked up by the Rocky Mountain Chapter of NASTT as part of its Trenchless Elevated conference. It will be taught by Jeff Maier and Britt Babcock of Avanti on Oct. 24 at the Mountain America Exposition Center in Sandy, Utah. If you are interested there is still time to register by visiting rmnastt.org. It will also be offered at the NASTT 2020 No-Dig Show in Denver in April.

Being a part of developing this course for our industry was a very rewarding experience. I encourage all of you to take advantage of our in-person training courses we offer throughout North America. Trenchless professionals are all about innovation, and it's great to have a front row seat to view the process.



Michelle Hill
NASTT PROGRAM
DIRECTOR



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Q&A with

Dr. Ray Sterling

NASTT's Trenchless Today chats with Dr. Ray Sterling, industry veteran, former director of the Trenchless Technology Center (TTC) at Louisiana Tech University and NASTT Hall of Famer. We get Dr. Sterling's take on his time at TTC and the state of trenchless education today.



What first piqued your interest in the construction/engineering field, particularly underground construction?

I remember being interested in civil engineering and construction after seeing a program as a teenager about a large civil engineering project. The idea of spending a lot of time outside on projects and building major infrastructure works was a strong appeal. For underground construction more specifically, it was much later – as I went to the University of Minnesota to do my Ph.D. in rock mechanics. The uncertainties of underground construction and the ability of underground space used to minimize the impact of infrastructure and buildings on the environment were interesting to me.

Can you tell us about your first introduction to trenchless technology methods?

I became aware of trenchless technology as an emerging technical discipline around 1990 while I was the Director of the Underground Space Center at the University of Minnesota. I think that I corresponded with and perhaps met Tom Iseley while he was working on his Ph.D. and then a few times more after he joined Louisiana Tech University and founded the Trenchless Technology Center (TTC). In 1994, the Underground Space Center, Cornell University, the TTC and Grambling State University made an Engineering Research Center proposal on Underground Infrastructure Technology to the National Science Foundation. It was not successful but provided the connection which led to me accepting an endowed professorship at Louisiana Tech University and taking up the Directorship of the TTC.

You are pretty well known in trenchless circles for your time as director of the Trenchless Technology Center. When you joined the TTC as director, what challenges were you faced with? What were your goals heading into the position?

There were plenty of challenges to face when I took over as the TTC Director but also many opportunities. The challenges were that the founding Director, Tom Iseley, had left a year before for a Department Head position at Indiana University–Purdue University Indianapolis (IUPUI). This had created a lot of uncertainty in the Center and its Industry Advisory Board about the future of center. The TTC had also recently completed a research project in conjunction with the Waterways Experiment Station on the longevity of CIPP and other rehabilitation liners with respect to their creep properties. The results of the testing proved quite divisive in the rehabilitation industry and it was important to show that the TTC was carrying out independent research that could move the whole industry to a better understanding of trenchless methods. My goals were to make the TTC a complement to NASTT with the TTC less engaged in advocacy than in developing better understanding and design approaches for methods, and to help innovate in terms of technical advances.

What are your thoughts on the state of the trenchless industry today? What areas do you see evolving or not evolving?

It seems to me that most areas of trenchless technology continue to evolve in terms of technical innovation and extended areas of application. These are either fueled by innovation in terms of the trenchless methods themselves or by introducing advances in contributing technical fields such as computing, GPS, etc. Another area of continuing advancement is the development of hybrid methods within the trenchless field and the use of trenchless techniques within other project work such as large underground excavations and mining applications.

How did you first get involved with NASTT? Briefly summarize some of your goals or initiatives for the association.

As the new Director of the TTC, I quickly became involved in NASTT activities, conferences and educational initiatives joining the NASTT Board in 1996, serving as Treasurer in 1997 and International Representative to the ISTT in 1998-1999. 1999 to 2001 were busy years with dual responsibilities in NASTT and ISTT before becoming Chairman of ISTT from 2002-2005. During my time on the NASTT Board, the society went from a rapidly growing and financially secure society to one that suffered a series of poorly attended conferences combined with overstaffing as it transitioned from being managed by an association management firm to having its own management team. Fortunately, at the first NASTT show in Nashville, the downward spiral was turned around (thanks to the efforts of Mark Wallbom, the Program Chairman, and many others). Helping in that turnaround was certainly my main effort during that time.

What do you think can be done to better engage students and young professionals in the industry?

Education and training for the future members of the trenchless technology field is critical for its future continued development as it is in almost any field. Engaging students and young professionals is needed at various stages of their education. First to make them aware at a young age that a career within such a technical field is a possibility and then to guide them into the most appropriate educational and/or training choices to equip them for such a career. I believe that internship opportunities are very important in cementing links to the field – whether that is in public works engineering, consulting engineering, industry research or construction operations.

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

I have always enjoyed the fact that the trenchless technology field is one with great potential for innovation in its methods and a need for a better understanding of the engineering parameters of each method needed for better design and control. I also like that the results of trenchless technology methods lead to a better environment and less disruption to our lives.



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In the TRENCHES



Daniel Buonadonna

JACOBS

By Andrew Farr

For Dan Buonadonna, the journey to the trenchless industry began when he got a firsthand look at global infrastructure challenges. While attending the University of Notre Dame, Buonadonna participated in a volunteer civil engineering effort in Haiti where a team of students worked to build and repair drinking water wells in rural communities.

“The experience taught me firsthand that the need for safe drinking water and reliable sanitary service transcends all borders and peoples,” he says.

Buonadonna’s keen interest in this led him to begin his career focusing on development projects in Africa and India. Soon afterwards, he joined CH2M (now Jacobs) as he saw an opportunity to be part of a larger and more coordinated effort to improve water infrastructure both in the United States and abroad.

As a junior engineer, Buonadonna began in the field, doing inspections on buried pipelines that included everything from topside pipe locating to man-entry pipe crawling.

Of the man-entry pipe crawling, Buonadonna jokes, “Being of modest build, it was once said that I was ‘made for the work’ and found myself being ‘volunteered’ for many of the confined space entry tasks. It taught me a healthy respect for the practical aspects of pipeline condition assessment, and also a great appreciation for the technical innovations that could improve the accuracy and safety of our work.”

After being dragged through the mud a few times, Buonadonna shifted his focus to trenchless assessments, identifying pipe repair and renewal needs. He credits his mentors at CH2M for giving him opportunities to get more involved in trenchless rehabilitation design projects, as well as assessment and rehab project management, and overall asset management for pipe networks.

Speaking on the state of the trenchless market today, Buonadonna says the industry overall is robust and increasing demand has resulted in a healthy, competitive marketplace. One of the challenges, he notes,

In the TRENCHES

will be continuing to innovate and increasing the value proposition of a trenchless approach.

“Trenchless assessment and rehab services are frequently found to be cost-effective, but not necessarily low-cost,” he explains. “The price point of these services can unfortunately limit the communities we operate in. This can be due to many factors.

“I think we should meet this challenge by continuing to invest in new tools to break technical frontiers, but also to manage risk with improved education and understanding between owners, engineers, contractors and manufacturers, and not just higher fees.”

Buonadonna also notes the unique and often changing circumstance of the consultant’s role in today’s trenchless market, which he says is largely driven by the constant innovations in technologies and, therefore, efficiency.

“These improvements have commoditized an ever-increasing number of services that improve aging infrastructure, from automated condition data collection and analysis, to codified liner design standards,” he says. “As a result,

rather than defending an old position or idea of ‘the role of the engineer’ the consulting industry must be constantly adapting and looking out at the horizon to identify where the next challenge is that deserves our focus and attention.”

Buonadonna is now a regular presenter at the NASTT No-Dig Show and is also a member of the Society’s Pacific Northwest Chapter. He’s also served on the No-Dig Show Program Committee and has participated in NASTT training and webinars. He’s also active with the Trenchless Technology Center at Louisiana Tech as a member of its Industrial Advisory Board and is involved with the Water Research Foundation as part of Peer Advisory Committees.

“The trenchless technology field is exceptionally dynamic,” Buonadonna says. “I enjoy the exercise of constantly applying critical thinking to new challenges, I appreciate the opportunity to serve a widespread need and I feel privileged to work with similarly dedicated professionals every day.”

Andrew Farr is the managing editor of NASTT’s Trenchless Today.

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Shane Cooper

UNI-JET INDUSTRIAL PIPE SERVICES INC.

By Mike Kezdi

For as long as he can remember, Shane Cooper, C.E.T., has been around the construction industry in one form or another. His initial experience with the industry was through his father, who was a civil engineer and for the last five years at Uni-Jet Industrial Pipe Services Inc., a Winnipeg, Manitoba, Canada-based sewer cleaning and inspection services company.

"I was around the construction industry my whole life, but my actual schooling background is in structural drafting," says Cooper, the operations manager for Uni-Jet. "I fell into the construction field when there was a [position] that needed to be filled at the [consulting] company that I was working for in terms of construction supervision. I was looking to branch out so I volunteered to do it, and I have been involved with construction engineering ever since."

Cooper's first foray into the trenchless industry was reviewing sewer condition assessment video for his former employer. From there, he started reviewing video for lining projects and from there, he was bitten by the trenchless bug. "Once I discovered that there were these technologies out there, I just wanted to learn more and more about them, how they worked and what their applications were for," Cooper recalls.

Armed with that thirst for trenchless knowledge, Cooper attended his first NASTT No-Dig Show in Toronto in 2009. Since 2009, he has attended five NASTT No-Dig Shows and he became actively involved with the NASTT Northwest Chapter, and is one of the directors for the chapter, which serves Alberta, Saskatchewan and Manitoba.

While his consulting days are behind him, Cooper is still dealing with trenchless work on a day-to-day basis as much of Uni-Jet's work is tied to asset management programs, cured-in-place pipe (CIPP) and other pipeline rehabilitation work.

"I see a lot of great players, great contractors and suppliers in the trenchless field, and I see it increasing as the technology evolves," Cooper says. "The big cities have been exposed to trenchless for quite some time, but I now find smaller municipalities becoming more aware of the technology and its benefits and its cost effectiveness over standard construction."

The challenge, he notes, comes down to funding infrastructure improvements – in North America and across the globe – and then convincing these system owners that trenchless methods offer a cost-effective option to renew the existing infrastructure when compared to open-cut construction methods.

"We're doing a great job of promoting the industry, but I would like to see more people come out to the NASTT No-Dig Shows," Cooper says. "I'd love to see municipalities and private industry support their employees more by sending them to these shows and exposing them to this industry. I think they are a tremendous source of knowledge and a great way to get introduced to the technologies and the industry."

To that end, Cooper hopes that municipalities across Canada take advantage of the inaugural No-Dig North conference taking place Oct. 28-30 in Calgary, Alberta, Canada because it is a Canadian-focused event.

I enjoy educating people and speaking to them so they know there are viable alternatives to conventional dig and replace construction," Cooper says. "I love promoting the industry and what we can do for them in terms of cleaning, inspection and asset management. Beyond, Uni-Jet, I love presenting different options to customers and clients and making them aware of the technologies available."

Mike Kezdi is the managing editor of *Trenchless Technology Canada* and a contributing editor to *NASTT's Trenchless Today*.



In the TRENCHES



Dave Holcomb

TT TECHNOLOGIES

By Sharon M. Bueno

TTechnologies' Dave Holcomb knew from an early age that he wanted a job that kept him outside. As to what that career would be, was still unknown to him as he graduated from high school.

Holcomb grew up on a farm where the family was always outside, so finding a career that kept him from sitting behind a desk was paramount. His first job out of high school had him working as an equipment operator, which he enjoyed. However, before he could make a decision on whether to pursue this further, he was drafted into the U.S. Army. After his two-year stint in the service, he enrolled in a trade school, graduating with an associate degree in fluid power technology.

Working outside was still a priority for him.

"I am one of those people who today we encourage to learn a trade, rather than a college degree. Most of [the trade school's] graduates went on to work in manufacturing of various kinds but most were inside jobs," Holcomb remembers. "I wanted an outside job so my applications all went to equipment manufacturers."

He obtained a position at a John Deere Construction Equipment dealer in Minnesota; he quickly moved from a service manager position and into sales. It was while he was at John Deere that he got his first look at cable plows and piercing tools at work. "I thought it was pretty amazing at the time," he says.



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At that time, TT Technologies president and CEO Chris Brahler was one of Holcomb's customers. Together, the two jointly sold a cable plow/crawler to a phone company in Montana. The end result of that trip had Holcomb going to work for Vibra King, which later transitioned into TT Technologies, as it's known today.

2019 marked Holcomb's 36th year with TT Technologies and the trenchless industry – and he wouldn't have it any other way.

He loves how active the trenchless industry is all over the country. TT Technologies offers a broad line of trenchless products covering gas, electric, sewer and water sectors, including pipe bursting, fiber and cable installs, pipe ramming and horizontal directional drilling. "At any one time, all of them or most of them are busy," Holcomb says. "We are fortunate to be in the utility industry. No matter what the economy is doing, we all need water, power, communication and our sewers to work. Business is good."

While there is no shortage of work as our underground utilities continue to age, especially on the rehab side of trenchless, Holcomb sees municipalities struggling at times to secure funding to pay for the work and the public balks at paying more through utilities bills. "People can't see underground utilities and many times don't know or realize they are in the ground so they don't always see the need for additional funding to replace or install new utilities as they are needed," he says.

As Holcomb's interest in trenchless technology has grown, so has his interest in supporting NASTT. He attended his first


NASTT No-Dig Show in 1992 and has been – like many TT Technologies employees – an active member of NASTT ever since. "I have attended all of the No-Dig Shows and have been a speaker at many of them on topics ranging from pipe ramming, pipe extraction and pipe bursting," he says. Holcomb has also been a supporter of NASTT's regional chapters, guest speaking at several chapter events.

Holcomb wants to be a part of anything to promote the trenchless industry – especially education and training, which he says are critical to trenchless continuing to move forward. As a trade school grad himself, he knows how important it is to reach this demographic of the workforce. "If we don't reverse the trend of the last couple of decades of insisting that everyone go to college, pretty soon you won't have anyone to fix your roof or your plumbing, cars, roads or someone to repair or build your home, install new gas lines, pipelines, water and sewer lines. You won't have welders or sheet metal workers, etc."

All in all, Holcomb is excited for the future of trenchless technology, as well as the future of NASTT. "Being such a vibrant industry, it puts you in touch with a lot of great people who are as excited as I am about being better at what we all do every day. The NASTT organization is the very best place to be if you're in the rehab and trenchless industry."


Plus, he still gets to work outside.

Sharon M. Bueno is the managing editor of *Trenchless Technology* magazine and a contributing editor to *NASTT's Trenchless Today*.



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Greg Tippett, Chair, NASTT-NW
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Remco Kleinlugtenbelt, No-Dig North 2019 Program Chair
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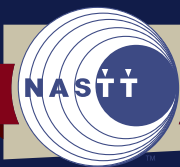
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Obituary: Barbco founder Jim Barbera



Barbco founder James “Jim” S. Barbera, of East Canton, Ohio, passed away on July 8. He was 79.

Barbera was born on March 7, 1940 to the late Cono and Frances Barbera. He was a graduate of Timken Vocational High School and went on to serve his country in the U.S. Army. Jim was employed by the Canton City Police Department, which he retired from in 1974. After, he was employed by American Auger and then started his own family business, a manufacturing company, Barbco. He officially retired 10 years ago and moved south to Englewood, Fla.

According to the Barbco website, Jim and his wife, Fran, were married on Nov. 9, 1963 in Canton, Ohio. Jim was on the Canton City Police Department and Fran worked at a rubber glove manufacturing company. Jim’s experience in home remodeling was a way to bring additional income into the family. During those early years they would purchase homes in the city, fix them up and rent them out. Over the first 5-10 years, they amassed seven homes and were doing well for themselves. Their hard work was paying off.

In 1968, their first son Jim was born, followed a year and a half later by their daughter Chris and then almost a year to the day later by Tony and Dave.

In 1975, Jim retired from the police department and went into business for himself. He continued his work in construction and got into the pool solar heating business. Then, in 1979, Jim started working at American Augers for his brother, Leo. During his 10 years at American Augers, Jim oversaw the sales department and had direct oversight of several initiatives including the reconditioning of a 19-ft Robbins tunnel boring machine and being an active organizer in the auger boring schools that were held in Arizona. 1989 was a pivotal year. Leo Barbera sold American Augers and Jim was in a bit of a quandary as to what his future would be in the industry. With much thought and multiple factors to consider, Jim, with the support of Fran, started Barbco. The company ran out of a shop in Twinsburg, Ohio, for the first six months.

The first of Jim and Fran’s children to work for the company was Tony Barbera, who had just graduated from high school. His twin brother, Dave Barbera, started in 1992 and worked primarily in the office. The other children, Chrissy and Jim, worked intermittently during the early years of the company. Barbco continued to expand its product line as Jim saw opportunities in the trenchless industry. He brought into the fray of Barbco’s manufacturing capabilities, products such as directional drills and pilot tube machines. With this growth, Jim continually looked for facilities that would give him the space he needed to build the equipment customers were looking for. In 2003, Jim moved the company to its present location in East Canton, Ohio. At this location, Barbco had the space to build and the land to expand manufacturing when needed.

Both Jim and his brother Leo were well known with the trenchless industry. Both were recently honored by the Trenchless Technology Center at Louisiana Tech University and were presented with Lifetime Achievement Awards by Dr. Tom Iseley for their contributions to the trenchless technology industry. Additionally, a new training and educational facility being built on campus is being named in honor of the brothers.

Remembering Dick Robbins 1933-2019



In June, The Robbins Co. announced the death of Richard James Robbins, president and CEO from 1958 to 1993.

Robbins passed away surrounded by family on Thursday May 30, 2019 in Seattle, Washington, USA. He is survived by his wife Bonnie, son Jim and daughter Jennifer.

Dick Robbins was widely regarded as a titan of the tunneling industry and built The Robbins Company into an industry leader, from the first Double Shield machine to modern-day disc cutters for hard rock, to his notable TBM innovations at the Channel Tunnel connecting the U.K. and France.

In total he filed 11 U.S. patents and 56 foreign patents in the field of underground mechanical excavation, and ultimately won the 2009 Benjamin Franklin Medal in Engineering for his contributions. He accomplished all of this after taking over the company at the age of 25 following the untimely passing of his father James S. Robbins in a plane crash.

“In 1968 when I first had the chance to work for what was then known as James S. Robbins Co., I did not fully appreciate that I was getting a chance to work with the greatest innovator in the tunneling industry,” said Robbins President Lok Home. “Dick was a great mentor as a boss and as a person. He was always pushing the limits of what could be done with TBMs. Dick’s integrity, energy, and passion improved the worldwide tunneling industry, and his creations set many of the industry standards. It has been an honor to further the great name of Robbins in the industry.”

“Dick unselfishly gave back to his industry and to his community,” said consultant and former ITA President Harvey Parker, a long-time friend of the Robbins family. “He was very active in our industry’s professional associations both here in the United States and internationally. I was honored to work closely with Dick during his significant involvement in the International Tunnelling and Underground Space Association (ITA) where he served on the Executive Council for years, was elected first vice president, and was a leader for the ITA Working Group on Mechanized Tunnelling.”

Robbins’ many awards garnered over the years included numerous honorary degrees, memberships and directorships in a wide variety of organizations ranging from Virginia Mason Medical Center to the Board of Trustees at his alma mater Michigan Technological University. In 1999, the *Engineering News-Record* selected him as one of the “125 Top People of the Past 125 Years,” an equipment innovator who “helped shape this nation and the world.” Robbins was also well known in Seattle for his active contributions in community organizations and sports.

Vermeer Mid Atlantic earns Pinnacle Award

Vermeer Mid Atlantic (VMA) celebrated being awarded the 2018 Vermeer Pinnacle designation in recognition of its efforts to provide a superior experience for customers. The Pinnacle Award is given annually by Vermeer to select dealer partners who are top performers in sales, marketing, aftermarket support and equipment safety and functionality training for its employees and customers.

“Vermeer Pinnacle dealers provide an exemplary customer experience,” said Tony Briggs, vice president of sales and distribution at Vermeer Corp. “This award highlights dealers across the globe who consistently lead in a variety of key business performance metrics.”

The achievement, which makes Vermeer Mid Atlantic a multiple-time Pinnacle recipient, comes at a momentous time as the company celebrates 50 years in business.

“It’s a tremendous accomplishment to be considered a Vermeer Pinnacle designee, and I am truly proud of the effort and commitment from our entire team,” said Mark



Boyle, President of VMA. “To celebrate receiving the award in our 50th year in business is incredibly special.”

The original Vermeer Mid Atlantic founder, John Vos, started his career at Vermeer in the cleanup crew at the Ohio headquarters, and he worked his way to become a demo representative. After years of dedication, John was given the opportunity to open his

own dealer location in Maryland in 1969, which has developed into what is now Vermeer Mid Atlantic.

VMA now represents 12 locations spanning Maryland, Virginia, North Carolina South Carolina, West Virginia, Pennsylvania and Ohio. To learn more about Vermeer Mid Atlantic and the services it offers, visit vermeerallroads.com.



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Ring-O-Matic announces new director of engineering, product development

Ring-O-Matic recently announced that Dave Langenfeld has joined the company as the director of engineering and product development. Langenfeld comes to Ring-O-Matic with more than 30 years of experience in the construction equipment industry at Vermeer Corp., and most recently at Weiler.

With a unique and experienced skill set in all aspects of engineering, Langenfeld will provide fresh leadership to the engineering team and add value to the company's operation in Pella, Iowa.

According to Ring-O-Matic, Langenfeld has a record of not only leading new product develop, project timelines and efficiency im-

provements and understanding the changing climate of the underground industry, but also has a proven ability to coach, mentor and drive for daily improvement across an organization.

"Frankly I'm honored that someone with Dave's experience, technical skills and desire would entertain joining our Ring-O-Matic team," said Brian Metcalf, CEO and owner of Ring-O-Matic. "His background, experience and knowledge in product development within our industry is just not easy to come by, so we're excited to have Dave's leadership."

Ring-O-Matic is a provider of trailer and truck mounted vacuum excavation equip-



ment and car wash pit cleaning machines. Founded in 1960 and headquartered in Pella, Iowa, Ring-O-Matic products are sold in the underground utility, municipal and water and gas markets.

Structural Technologies expands pipeline product offering

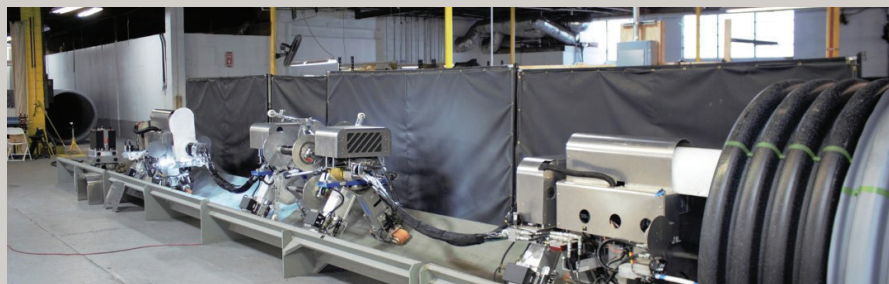
Structural Technologies, a provider of infrastructure repair products and services, recently announced a major product line expansion within its Pipeline Division. With the completion of agreements with Sipp Technologies LLC (SippTech) and Ashimori Industries Co. LTD., Structural Technologies is adding three new systems to its StrongPIPE suite of products.

Known for its fully-structural StrongPIPE V-Wrap Carbon Fiber repair and renewal systems, Structural Technologies provides pipeline repairs to water and wastewater agencies, power generation stations and industrial facilities across the United States and Canada.

The first step in their product line expansion is the acquisition of the exclusive worldwide license for SippTech. SippTech products include two internal robotic lining systems which will be added to the StrongPIPE product line as StrongPIPE MICP (Manufactured-In-Place-Composite-Pipe) and StrongPIPE EXL (Extended-Life Liner).

These repair and renewal systems are comprised of custom-designed combinations of specialized polyurethanes and (in the case of the MICP product) a carbon fiber matrix that creates a fully structural Class IV lining product.

MICP and EXL are installed using SippTech's advanced robotics platform – an industry game-changer which will improve the safety, efficiency and quality of pipelining projects, delivering feasible and cost-ef-



fective alternatives to current large diameter pressure pipe rehab systems.

Kent Weisenberg, former CEO/CTO of SippTech, will remain chief technology officer of Structural Technologies' Pipeline Robotics Division.

"I am pleased to join Structural Technologies and look forward to combining our robotic mechanizations with Structural Technologies' reputation in the industry and ability to safely and successfully implement pipe lining projects," said Weisenberg.

The second step in the product line expansion includes an agreement with Ashimori Industries, Co. LTD., of Osaka, Japan, to become the exclusive provider and installer of the PALTEM Flow-Ring System in the United States and Canada. The StrongPIPE PALTEM Flow-Ring System is a composite system consisting of steel rings, HDPE strips and high-strength specialty grout.

The Flow-Ring System is well-suited for wastewater applications and can be custom-designed to meet a variety of pipe shapes

and loading conditions. This repair system is utilized throughout Japan and has a nearly 20-year track record of successful installations and performance. Structural Technologies is pleased to bring this pipeline repair product to the United States and Canada and will focus its use on wastewater pipelines including gravity systems and culverts.

"We are committed to growth through innovation, and we look forward to the opportunity to combine our ability to work with pipeline owners with the SippTech and Ashimori products," said Peter Emons, founder and CEO of Structural Technologies. "These new systems, and the robotics platform, will enhance our capability to address ongoing pipeline infrastructure challenges with reduced construction time, minimal disruption, and higher value."

Structural Technologies said it will continue to expand its ability to deliver long term structural upgrades to large and small diameter pipeline systems.



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NASTT

Chapter News



British Columbia

The British Columbia Chapter (NASTT BC) is looking forward to co-hosting the first-ever No-Dig North, a new conference geared specifically toward the trenchless market in Canada. No-Dig North will be held Oct. 28-30, 2019 in Calgary, Alberta. Visit nodignorth.ca for more information.



Great Lakes, St. Lawrence & Atlantic

The GLSLA Chapter will co-host No-Dig North in Calgary next month along with the British Columbia and Northwest Chapters of NASTT. For more information on GLSLA, other events and to view the chapter training schedule, please visit glsla.ca.



Mid Atlantic

MASTT conducted a very successful Trenchless Technology, SSES and Buried Asset Management seminar in Arlington, Va., on Aug. 24, 2019 at the Key Bridge Marriott Hotel. The guest presenter was Matthew J. Doyle, P.E., CCM, branch chief, Wastewater Design and Construction Division, with the County of Fairfax. Doyle presented on trenchless technology in Fairfax County. APWA Mid-Atlantic Chapter was the seminar co-sponsor.

MASTT published its annual *Mid Atlantic Journal of Trenchless Technology* in June of 2019. The journal and past issues can be seen at mastt.org.

Please go to mastt.org to learn more about MASTT and the MASTT seminar program. Or, contact Leonard Ingram, MASTT executive director, at leonard@engconco.com or (334)-327-7007. Thanks for your support!



Midwest

The Midwest Chapter (MSTT) conducted a



Miller Pipeline hosted a Trenchless Technology Seminar with the Midwest Chapter at its facility in Indianapolis, June 26-27.

successful two-day Trenchless Technology Seminar June 26-27 at the Miller Pipeline Training Facility in Indianapolis. This seminar consisted of 20 presentations and speakers with topics ranging from condition assessment to new installation methods. We featured a presentation, "Trenchless Technology in Indianapolis," presented by John Trypus, director, Underground Construction & Engineering, Citizens Energy Group. A special thanks to MSTT Vice Chair Chris Schuler and the staff at Miller Pipeline for hosting this excellent outreach and networking event and promoting trenchless technology in the Midwest!

MSTT will publish its annual *Midwest Journal of Trenchless Technology 2019* in early October. The journal has numerous excellent articles featuring trenchless projects in the Midwest. Each publication is distributed to more than 4,000 water and sewer decision makers within the MSTT 9 state region. The journal and past issues can be seen at mstt.org.

On Dec. 4, MSTT will conduct a Trenchless Technology, SSES and Buried Asset Management Seminar in Council Bluffs, Iowa. Please place this date on your calendar and plan to participate. To learn more about the seminar program or the MSTT Chapter, visit mstt.org or contact Leonard Ingram, MSTT executive director, at leonard@engconco.com or (334)-327-7007.

ence in Syracuse, N.Y., scheduled for Nov. 11-12, 2019. A welcome reception will be held at Dinosaur Bar-B-Que on the evening of Monday, Nov. 11, with a full day of technical presentations and outdoor technology demonstrations on Nov. 12. The spring edition of the *Northeast Journal of Trenchless Technology Practices* was released at the NASTT No-Dig Show in March, and we're looking forward to the fall 2019 edition as well.

The Northeast Chapter also sponsored the development and publication of the inaugural *Trenchless for Gas Infrastructure Journal*, to further spread the word on the capabilities of trenchless technologies. The chapter will hold elections this summer for several Board of Director positions, with results to be announced at our annual conference. We continue to work with our student chapter at UMass Lowell to identify volunteers to provide technical presentations and sponsor field trips to engage the next generation of trenchless experts, and leadership at the University is actively pursuing the establishment of a Center of Excellence focused on advances in trenchless technologies. Please see our website, nastt-ne.org, for more information and please join us!



Northwest

The Northwest Chapter is proud to be jointly presenting the No-Dig North conference in partnership with the Canadian Chapters of NASTT. The conference will take place in Calgary, Alberta, Oct. 28-30, 2019, at the TELUS Conference



Northeast

The Northeast Chapter is actively planning its annual confer-

Centre. Pre-event Good Practices Courses will be available on Monday, Oct. 28. The show will consist of two days with three tracks of technical paper presentations and industry exhibits in the trenchless technology field on Oct. 29-30.

For more information on registration, the program or exhibitors, please visit the No-Dig North website at nodignorth.ca. The Northwest Chapter is currently planning a 2019-2020 Technical Lunch Program in both Edmonton and Calgary and would like to extend an invitation to its chapter members to submit topics for this program. At the time of this issue's publication, the chapter had also planned to host an evening Social Mixer in Edmonton on the evening of Sept. 26. If you have topics or projects that you would like to see highlighted at our future events, please reach out and let us know. For info, email Greg Tippett at gtippett@nastt-nw.com.



Pacific Northwest

One of the goals of the Pacific Northwest Chapter last update was to have our new website up and running by this update. Thanks to Brendan O'Sullivan, the immediate past chair for carrying that project through to the end! You can check out our new website at pnwnastt.org.

We had a great response to our call for abstracts for our yearly publication, *PNW Trenchless Review*. Expect many great articles coming up in that publication at the end of this year. We continue our talks with a large regional university to start a student chapter. One of the faculty has volunteered to be an academic advisor and we hope to see a strong response from the students as they return from summer break later this fall.



Rocky Mountain

The Rocky Mountain Chapter is experiencing growth and continues to push for new avenues to get the word out about trenchless technologies. The chapter recently hosted a Young Professionals meet and greet happy hour for new consultants,



South Central Chapter Chair Alan Goodman (middle) awards scholarships to University of Texas-Arlington graduate students Zahra Kohankah Kouchesfehiani (left) and Amin Darabnoush Tehrani (right) during the chapter's event at UTA in May.

contractors, municipal folks and suppliers at Tap and Burger in the Denver Tech Center. The chapter is continuing to find champions in the Nebraska and Kansas markets, scheduling another field trip to a large tunnel project for the City of Aurora. We're also on track for our annual clay shoot on Oct. 4 and, of course, we are gearing up to what is going to be a very successful show on Oct 23-24 for our annual conference. The Rocky Mountain Chapter will also be unveiling a new website this year, which will provide our members with up-to-date information and provide for easy registration for events.



South Central

The South Central Chapter is pleased to announce that its fifth annual chapter conference will be held next year in the Houston, Texas metro area for the first time ever. The conference will be held at the Sugar Land Marriott Town Square on Oct. 6, 2020. We are very much looking forward to the interesting and exciting exhibitors and presentations on the newest industry developments, compelling case studies and technologies that will be showcased. Further details will be available in future updates, however if you are interested in exhibiting, presenting or attending please reach out to Jim Williams at jwilliams@brierleyassociates.com or Justin Taylor justin.taylor@cciandassociates.com.

In the lead up to next year's conference, the chapter will also be releasing

the third annual *Texas and Oklahoma Trenchless Journal* earlier in 2020.



Southeast

The Southeast Chapter (SESTT) is planning a Trenchless Technology, SSES and Buried Asset Management seminar in Charlotte, N.C., on Tuesday, Oct. 8, 2019. Please place this date on your calendar and plan to participate. Please visit sestt.org to learn more about SESTT and the SESTT seminar program or contact Leonard Ingram, SESTT executive director, at leonard@engconco.com or (334) 327-7007.

SESTT plans to publish the 2019 *South-east Journal of Trenchless Technology* in mid-November. The publication will be distributed to more than 4,000 water and sewer decision makers in the SESTT area and will highlight numerous trenchless projects in the area. Thanks for your support!



Western

The Western Chapter (WESTT) is in the final planning stages for its fall 2019 Western Regional No-Dig Conference and Exhibition in Oahu in conjunction with Hawaii Water Environment Association (HWEA). The conference is on Wednesday, Nov. 20 and a NASTT Good Practices Course will be offered on Thursday, Nov. 21. The conference will include presentations on trenchless construction and rehabilitation projects, as well as collection systems and infrastructure assessment. The agenda and registration information are available on the chapter website at westt.org.

WESTT is also giving back to our membership again this year. WESTT has purchased the new 3rd Edition of NASTT's Pipe Bursting Good Practices books and will be distributing them to all current members of the chapter. In addition, WESTT is also donating books to the technical libraries of our two student chapters, Arizona State University and Cal Poly Pomona. WESTT members should expect delivery of the book early this fall.

A Chronology of Trenchless Innovation at the Northeast Ohio Regional Sewer District

By Robert J. Auber



The historic June 1969 Cuyahoga River fire sparked national interest in developing the federal legal framework for improved water quality. Congress passed the Federal Water Pollution Control Amendments in 1972 (which eventually led to the Clean Water Act of 1977) to improve and maintain the nation's water bodies through the elimination of pollutant sources. About the same time, Cuyahoga County Court of Common Pleas Judge George J. McMonagle mandated a court order that created the Cleveland (now Northeast Ohio) Regional Sewer District, hereinafter referred to as NEORSRD, to plan, finance, construct, operate and maintain pollution control measures in the region.

As with many cities in the nation, when a storm event occurs, the inundation of the sewer system causes an overflow that discharges combined sewage – a mixture of sanitary sewage and stormwater – to the local water systems. To greatly diminish the impact of these events, the NEORSRD entered into a \$3 billion, 25-year consent decree with the US Department of Justice, US EPA and Ohio EPA called Project Clean Lake. Project Clean Lake will reduce Combined Sewer Overflows (CSOs) to Lake Erie and tributaries and has three major components. The first is green infrastructure, which seeks to keep stormwater from various hard surfaces which, in turn, conveys stormwater to the combined sewer system. The second is through improvements and added capacity at area wastewater treatment plants (WWTPs). The third component is a system of conveyance and storage tunnels strategically aligned with existing

overflow outfalls.

Under Project Clean Lake, a total of seven large storage and conveyance tunnels are being constructed to collect known CSO flows within NEORSRD's combined sewer service area of the NEORSRD's three large treatment plants: Easterly WWTP, West-erly WWTP and Southerly WWTP. To date, four of the seven storage tunnels are either completed, near completion or partially completed since the program started back in 2011.

The NEORSRD has been involved with several innovations within the trenchless community over the last few years. Some of NEORSRD's cutting-edge developments is as follows:

The Euclid Creek Tunnel (ECT) was constructed from 2012 to 2017 (17,750 LF, 24-ft. internal diameter) and was the first known single-pass, segmentally-lined tunnel, fully grouted in rock that was ever attempted. Over 50 individual grout mix designs were tested until a final mix was obtained that achieved the desired flow rate, set time and strength. The process of the grout mix design involved the assistance of BASF Corporation throughout the testing procedure. At the time of the project, the only other known global project with more individual grout mix designs for a single application was at the construction of the new Freedom Tower in New York City.

ECT was also the first utilization of synthetic plastic fiber reinforcement for a cast-in-place tunnel installation. This development was outlined formally in technical paper and presentation at the 2015 Rapid Excavation and Tunneling Conference (RETC) in New Orleans, Louisiana: Synthetic Fiber Reinforcement for the Cast In Place Final Tunnel Liner at the Euclid Creek Tunnel Project (Carlson, Wotring, Auber & Vitale). Since the introduction of the synthetic fiber cast-in-place reinforcement on ECT, the application has been implemented on other projects across the country.

The Dugway West Intercommunity Relief Sewer (DWIRS) was constructed from 2013 to 2017 (7,000 lf of 72-in. microtunnel, 3,300 lf of 48- and 36-in, microtunnel and

numerous diversion and regulating structures). The NEORSRD became one of the pioneering agencies to accept a contractor driven proposal to implement a microtunnel curve (662 LF of 72-inch RCP at a 915 ft. radius) at the end of the project to mitigate the need for an access structure and to reduce impact to the local residents. This change resulted in the first curved micro-tunnel in the Midwest United States (and fourth microtunnel curve in the U.S.). This innovation was outlined in formal technical paper and presentation at the 2016 NASTT No-Dig Show in Dallas, Texas: Dugway West Interceptor Relief Sewer Curved Microtunnel Between PM-13 to PM-16 (Auber, Smith, Lepley & Kolster).

In addition, the NEORSRD's Kingsbury Run Culvert Repair Project was constructed from 2017 to 2019 (3,461 LF of 60-inch RCP microtunnel) and had the first horizontal S-curve and double vertical curve in the United States (spanning 2,722 LF). This milestone was outlined in formal technical paper and presentation at the 2019 NASTT No-Dig Show in Chicago, Illinois: Kingsbury Run Culvert Repair: First Horizontal S-Curve and Double Vertical Curve in the United States (Irwin, Wiberg, Janosko & Daugherty)

The NEORSRD is definitely an agency on the side of the ledger that not only promotes progressive thinking, but is willing to take the necessary risk and responsibility to utilize trenchless innovation that benefits our industry.



Robert J. Auber, CCM, is the large tunnel construction manager for the Northeast Ohio Regional Sewer District. He has more than

34 years of experience in the heavy civil and underground construction industry and has managed projects ranging from medium size sewage interceptor tunnels to deep large volume combined sewage overflow storage tunnels.



NASTT STUDENT CHAPTERS

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 19 Student Chapters, visit nastt.org/student-chapters.



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NASTT has a network of 11 regional chapters throughout the United States and Canada. With a single NASTT membership, you're automatically enrolled in the national organization, the international organization (ISTT) and also in your regional chapter. Regional chapters offer valuable educational and networking opportunities in your local area. Share your ideas, network with colleagues and find solutions to your everyday challenges.



British Columbia
Website: nastt-bc.org

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

Chapter Contact
Charlotte Wong
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Elected Officers
Chair - Ophir Wainer
Treasurer - Preston Creelman



Great Lakes, St. Lawrence & Atlantic
Website: glsla.ca

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

Chapter Contact
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Elected Officers
Chair - Kevin Bainbridge
Vice Chair - Anna Polito
Secretary - Gerald Bauer
Treasurer - Derek Potvin



Mid Atlantic
Website: mastt.org

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.

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Elected Officers
Chair - Richard Thomasson
Vice Chair - Michael Delzingaro
Secretary - Dennis Walsh



Midwest
Website: mstt.org

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

Chapter Contact
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Elected Officers
President - Jeff Boschert
Vice President - Chris Schuler
Secretary - John Milligan
Treasurer - Ryan Poertner



Northeast
Website: nastt-ne.org

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

Chapter Contact
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Elected Officers
Chair - Ian Mead
Vice Chair - Babs Marquis
Secretary - Marshall Gaston
Treasurer - Eric Schuler



Northwest
Website: nastt-nw.com

The Northwest Chapter was established in 1995 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.

Chapter Contact
Greg Tippett
greg.tippett@stantec.com

Elected Officers
Chair - Greg Tippett
Vice Chair - Ben Campbell
Secretary - Jeff Galloway
Treasurer - Keith Moggach



Pacific Northwest
Website: pnwnastt.org

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

Chapter Contact
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Elected Officers
Chair - Carl Pitzer
Vice Chair - Andrew Thorne
Secretary - Glen Wheeler
Treasurer - Heidi Howard



Rocky Mountain
Website: rmnastt.org

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

Chapter Contact
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Elected Officers
Chair - Chris Larson
Vice Chair - Benny Siljeborg
Secretary - Swirvine Nyireberg
Treasurer - Stephanie Nix



South Central

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

Chapter Contact

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Elected Officers

Chair - Alan Goodman
Vice Chair - Jonghoon "John" Kim
Secretary - Luis Cuellar
Treasurer - Josh Kercho



Western

Website: westt.org

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

Chapter Contact

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 WESTTchapter.org@gmail.com

Elected Officers

Chair - Brian Avon
Vice Chair - Lisa Arroyo
Secretary - Jennifer Glynn
Treasurer - Norman Joyal



Southeast

Website: sestt.org

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

Chapter Contact

Leonard Ingram
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 leonard@engconco.com

Elected Officers

Chair - Jerry Trevino
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REHABILITATION OF VARIOUS TRUNK SEWERS

in City of Toronto and Upcoming Opportunities

PRAPAN DAVE

City of Toronto,
Toronto, Ontario, Canada

LAUREL MURPHY

Jacobs
Toronto, Ontario, Canada

In 2017 & 2018, City of Toronto completed rehabilitation of various trunk sewers, which include (a few other projects not listed are in construction):

1. Chapman Sanitary Trunk Sewer - 750 to 850 mm, 1.3 km length of sewer in ravine, crossing creek, and located in private properties using CIPP
2. Humber Sanitary Trunk Sewer - 1,600 to 1,800mm, 2.4 km length of sewer crossing river located adjacent to Humber River and crossing the River 3 times using sliplining technique with Hobas pipe.
3. Highland Sanitary Trunk Sewer - 2,200 mm, 290 m length of sewer located in road allowance using sliplining with Channeline pipe

The Chapman, Humber and Highland Sanitary Trunk Sewers case studies present concrete pipe sizes between 750 mm and 2,184 mm diameter, with challenges that include environmentally sensitive settings, construction sites in former garbage dumps, working in floodplains, golf course, fast moving sewer flows, congested utility corridors, and navigating rehabilitation of long radius bends. Through this paper and presentation, readers will be able to anticipate challenges, issues and be able to estimate the cost and schedule for rehabilitation projects. This paper also discusses, Toronto's 10 to 12-year, approximately CAD \$750 million capital sewer rehabilitation program.

INTRODUCTION

Toronto Water commissioned a comprehensive sewer inspection and condition assessment program of its sewer infrastructure, which was undertaken between 2009 and 2012. Resulting from this assessment, a number of recommendations were made to ensure the long-term operational ability of the sewers. The recommendations included rehabilitation of major sections of sanitary trunk sewer.

The Engineering and Construction Services Division of the City of Toronto works closely with Toronto Water Division to manage capital construction projects. Trenchless rehabilitation of large diameter sanitary trunk sewers was new to the City of Toronto, but since the rehabilitation recommendations noted previously, the Engineering and Construction Services Division has undertaken a number of successful projects. This paper will review three case studies from a few projects completed in Toronto, and will discuss their challenges, design considerations, construction observations, and lessons learned.

The sewer rehabilitation techniques implemented for these projects were CIPP and Sliplining. The paper discusses rationale for selecting the rehabilitation methods, and the design considerations, construction challenges, and lessons learned from each of these projects.

CASE STUDY 1

Chapman Sanitary Trunk Sewer Rehabilitation from MH-020 to MH-01 Primary Design Challenge: Environmentally Sensitive Area Background

The Chapman Sanitary Trunk Sewer is a circular reinforced concrete sewer between 750 mm and 825 mm in diameter (30 to 33 in.), with average depth from surface of 3 meters (10 ft) and an average slope 0.3 to 0.4 percent. Sewer flows are fast moving and flow at approximately 40 to 50 percent of the pipe depth.

The length of sewer identified to be rehabilitated was 1,246 meters (4,088 ft) long and included 20 sewer sections. These sewer sections were classified in poor condition and assigned a WRc structural condition grade of 4 due to heavy corrosion, loss of concrete, exposed and damaged reinforcing steel, damaged joints and exposed gaskets. The section of Chapman sewer to be rehabilitated is located in the western part of the city of Toronto, within the Humber River Valley ravine.



FIGURE 1 – Chapman Sanitary Trunk Sewer Alignment.

This sewer location presented several challenges, primarily based on the fact that it was located in a heavily vegetated and environmentally sensitive ravine. While majority of the ravine property itself belonged to the city parks, the areas surrounding watercourses in Toronto are regulated by the Conservation Authority, and coordination and permitting is required for construction or even access to the site. In addition, the Chapman sewer follows the alignment of the Humber Creek and crosses under the creek at three locations.

Access and construction in the Creek bed required clearance from the Conservation Authority and the Federal Department of Fisheries and Oceans.

REHABILITATION DESIGN CONSIDERATIONS

Jacobs was contracted to undertake the



FIGURE 2: Humber Creek and Ravine.

preliminary and detailed design for the rehabilitation of the Chapman sewer, with the intention to extend the remaining useful life of the sewer by 50 years. Based on the information gathered during preliminary design, the rehabilitation technique recommended for this sewer was CIPP. The goal during design was to minimize ground disturbance, minimize excavation and minimize impact to the surrounding natural environment.

Even with minimal excavation, extensive permitting and access agreements were still required. The sewer passes through eight private properties for which the city has easement, but additional easements and negotiations were required with each property owner to access city's easement. Tree removals were required to construct temporary paths for construction vehicles. While securing some of these access agreements was relatively painless, others took more time and were still not finalized at the time of issuing the construction tender. The tender package therefore included alternate plans and means in case the access agreements did not go through.

Besides access challenges, other challenges of working in this environmentally sensitive area included trying to minimize tree removals, protecting the existing natural vegetation, regulatory timing windows associated with working within a floodplain, complying with migratory bird nesting by-law, and working in high water table. In order to address some of these challenges, the construction contract included the following risk mitigating strategies:

- While it was not anticipated that excavation or dewatering would be required, a regulatory permit to take ground water was secured prior to construction, so as not to delay construction should it be needed. (Entire process from study to application to approval can be 4 to 6 months).
- A proposed temporary sewer bypass route was designed working with permitting agencies and included in the contract drawings, which included two overland creek crossing structures. All permits were pre-approved from the regulatory agencies, and documents shared with the contractors. The contractor was recommended to use the proposed bypass alignment. If the contractor wanted to use other alignment, delays and costs associated with securing new permits would be at the risk of the successful contractor.
- During the design phase, the arborist and design team identified all the trees that required removal in order to access the sewer and along the route of the proposed bypass alignment. Two separate tree removal permits were secured, one for the trees to be removed for access, and one for the bypass alignment. This meant that should the contractor choose a different bypass alignment, that amendment to the access tree removal permit would not be required. The proposed bypass was designed to convey flows for a two-year storm.

To read more about the Chapman Sanitary Trunk Sewer Rehabilitation project, download the full version of paper TM2-T5-04 at nastt.org/technicalpapers.



FIGURE 3: Bypass Piping and Creek Crossings.

CASE STUDY 2

Humber Sanitary Trunk Sewer Rehabilitation from MH029 to MH015 Primary Design Challenge: Difficult Geotechnical Conditions

The Humber sanitary trunk sewer is a circular reinforced concrete sewer between 1,500 mm and 1,650 mm in diameter, with a depth ranging from 4 and 16 m, and an average slope 0.32 to 0.36 percent. Dry weather flows within the Humber STS can be characterized as fast moving and flowing at approximately 20 to 30 percent of the pipe depth. The length of sewer identified to be rehabilitated was 2,506 meters long and included 14 sewer sections. CCTV inspection indicated that the sewer exhibited substantial corrosion including softened concrete, exposed aggregate, exposed and heavily corroded reinforcing steel, concrete loss in excess of 25 mm, damaged joints and corroded ladders and platforms within maintenance holes. The sewer section in question had an average WRC structural condition grade of 3, with one section identified as a 2 and one section identified as a 4.

The length of the Humber STS identified for rehabilitation is located within parks and ravine environment, along the Humber River valley, and within the river floodplain. Within this reach the Humber STS crosses the Humber River at three locations, and several of the access chambers are close to the Humber River's edge.



FIGURE 4: Humber Sanitary Trunk Sewer Alignment

REHABILITATION DESIGN CONSIDERATIONS

Jacobs was contracted to undertake the preliminary and detailed design. During the preliminary design, a geotechnical site investigation was undertaken including advancing 6 boreholes approx. 500 m apart along the alignment of the sewer, to depths between



FIGURE 5: Shaft and Sliplining.

6.1 and 9.2 meters. Groundwater monitoring wells were installed in all six boreholes.

While it was anticipated during preliminary design that the method of rehabilitation would be sliplining, the final proposed location of the access shafts had not yet been determined, so the geotechnical analysis was generic along the length of the pipe, instead of being focused to specific areas. Ultimately, only 2 of the 6 boreholes ended up being near or at the proposed shaft locations.

Borehole analysis showed substantial fill and debris in the ground, including “compact to very loose material, rubbish fill, wood fragments, glass pieces, garbage debris, ashes, red brick fragments and plastic pieces” (Geotechnical Data Report, CH2M HILL April 2015), and that this debris extended down to 3 m below grade.

It was ultimately determined that a portion of the proposed construction area had been used as a waste dump at some point in the past. The proximity of the sewer to the river also resulted in saturated soil conditions, and the groundwater table at a very shallow depth. It was acknowledged early in the design process that significant dewatering and/or watertight shaft construction would be required.

The recommended rehabilitation technique for the Humber sewer was sliplining

due to existing high flows. Sliplining can be completed with no-bypass or reduced bypass when compared with other rehabilitation technologies. A full bypass required for CIPP would have been prohibitively complex and expensive and would have possibly required temporary river crossings.

Modeling and hydraulic analysis identified that if the successful contractor could undertake the sliplining in 20 percent pipe full depth flow conditions a partial pumped bypass could be required. If the contractor could undertake the sliplining in 50 percent pipe full depth flow, then no bypass would be required.

A partial bypass design was included in the tender package, but was not a mandatory requirement, with means and methods left to the contractor to determine and implement. Given that the existing maintenance holes were not large enough to be used for installation of the slip line pipe, access shafts were designed in suitable locations along the existing sewer to provide construction access for inserting the GRP pipe sections.

The high ground water table and susceptibility for flooding required waterproof shaft construction with walls that extended up above the potential flood line. The geotechnical report recommended steel ribs and lagging/liner plate system for circular

CASE STUDY 3

Highland Sanitary Trunk Sewer – MH06 to MH05 Primary Design Challenge: High Flows and Long Radius Bend

shafts or drilled-in soldier piles and lagging/liner plate for rectangular or irregular-polygon-shaped shafts.

The fact that most of the construction site was located within a flood zone was also a constraint on construction, and the design included provisions to keep all storage of materials, pumps, generators, refueling stations and such activities on raised platforms, on higher grounds, or offsite and away from the river.

CONSTRUCTION OBSERVATIONS AND LESSONS LEARNED

The construction contract for the rehabilitation of the Humber sewer was issued to Southland Renda for \$22.9 million CAD, of which approximately \$5 million CAD was for provisional items and contingency. The successful contractor chose to bid and execute the project in full live flows without the use of any bypass.

Eight temporary shafts were constructed for sliplining in the upstream and downstream directions, with installation lengths between 200 m and 500 m. Construction of shafts was challenging, as anticipated, and sorting and disposal of the garbage ridden excavation spoils took the contractor significantly more time than they had anticipated.

To read more about the Humber Sanitary Trunk Sewer Rehabilitation project, download the full version of paper TM2-T5-04 at nastt.org/technicalpapers.

The Highland Sanitary Trunk Sewer section from MH220-06 to MH220-05 is a 2,134 mm (84 in.) diameter cast in place concrete tunnel within a tunnel liner. As-build drawings indicate that the sewer section is approximately 276 m (905.5 ft) long, up to 18m (59 ft) deep with average slope 0.23 percent. Between these two maintenance holes the sewer turns through two 30.48m (100 ft) radius bends, approximately 27.5m and 21m long respectively. A short section of the pipe at the downstream end close to MH 05 is tapered and widens in diameter to 2,438 mm (96 in.) diameter.

To read more about the Highland Sanitary Trunk Sewer project, download the full version of paper TM2-T5-04 at nastt.org/technicalpapers.

PERMITTING AND APPROVALS

Ensuring that all permitting, and approvals are in place prior to tendering the project is a very effective way of reducing risk during construction specifically for work in ravines, major roads and impacting private properties.

For these projects, a number of permits and approvals were required, including: Temporary access and construction agreements (agreements and easements from local residents and private land owners); tree removals and pruning (parks, ravines, ministry to natural resources and forestry); environmental screening (species at risk, migratory birds, heritage trees); Certificate

of Approval for changes to sanitary sewers (Ministry of the Environment); archeological screening (for previously undisturbed areas); permit to take water (to pump water out of the ground); permit to discharge water (into storm or sanitary sewer systems); and natural environment protection and restoration (local conservation authorities).

PUBLIC RELATIONS AND COMMUNICATION

Construction is almost always experienced as a nuisance to local residents who live with the impact of noise, dust, odor and traffic congestion in their neighborhoods. For all projects, preconstruction notices were issued at least four months before anticipated start of construction. As the work progressed, the public was continually updated by distributing construction updates. Notices were circulated to the City Councilors prior to public distribution, and the City maintained a webpage with project status and updates throughout construction.

While it is generally agreed that trenchless rehabilitation is less invasive and less visible from the surface than open cut, these projects were still significant, and the level of public consultation and communication did not decrease.

These projects were not without their complaints, but we feel that the early and sustained engagement with councilors and residents prevented many complaints that we would otherwise have had to deal with.

CONCLUSIONS

The City of Toronto is growing its list of successful large diameter trenchless rehabilitation case studies as these initial 6 to 7 large diameter sewer rehabilitation projects close-out throughout the city. There is much more work to come and as these projects wrap up, we can expect to see more consulting and contracting assignments coming out from

the City of Toronto and from other surrounding municipalities for similar work. The Toronto area needs more contractors with experience in trenchless rehabilitation due to significant planned rehabilitation work in Toronto and surrounding municipalities. We hope that both local contractors will gain the needed experience, but also that new technology options might become available to us

as North American and global contractors begin to see the opportunities in Toronto and begin to bid on work here.

This paper was edited for style and space for publication in *NASTT's Trenchless Today*. To view Paper TM2-T5-04 in its entirety, please visit nastt.org/technicalpapers.

Calendar

October

9
NASTT's Introduction to Trenchless Technology – Rehabilitation Good Practices Course
 Hosted by Atlantic Canada Water & Wastewater Association (ACWWA)
 Halifax, Nova Scotia

17
NASTT's Introduction to Trenchless Technology – Rehabilitation Good Practices Course
NASTT's Introduction to Trenchless Technology – New Installations Good Practices Course
 Hosted by the Northern California Pipe Users Group (NorCal PUG)
 Oakland, California

23
Trenchless Elevated
 Hosted by NASTT's Rocky Mountain Chapter
 Sandy, Utah

23
Trenchless Elevated 2019
 Hosted by NASTT's Rocky Mountain Chapter
 Sandy, Utah

24
NASTT's Introduction to Trenchless Technology – Rehabilitation Good Practices Course
 Hosted by NASTT's Rocky Mountain Chapter
 Sandy, Utah

24
NASTT's Municipal Grouting Good Practices Course
 Hosted by NASTT's Rocky Mountain Chapter
 Sandy, Utah

28
NASTT's Introduction to Trenchless Technology – Rehabilitation Good Practices Course
 Hosted by NASTT's Northwest, British Columbia and GLSLA Chapters
 Calgary, Alberta

28
NASTT's HDD Good Practices Course
 Hosted by NASTT's Northwest, British Columbia and GLSLA Chapters
 Calgary, Alberta

28
NASTT's Gas Distribution Good Practices Course
 Hosted by NASTT's Northwest, British Columbia and GLSLA Chapters
 Calgary, Alberta

28
NASTT's New Installation Good Practices Course
 Hosted by NASTT's Northwest, British Columbia and GLSLA Chapters
 Calgary, Alberta

29
No-Dig North
 Hosted by NASTT's Northwest, British Columbia and GLSLA Chapters
 Calgary, Alberta

November

11-12
2019 NASTT Northeast Trenchless Conference
 Hosted by NASTT's Northeast Chapter
 Syracuse, New York

20-21
15th Annual Western Regional No-Dig Show
 Hosted by NASTT's Western Chapter
 Honolulu, Hawaii

December

4
Trenchless Technology Seminar
 Hosted by NASTT's Midwest Chapter
 Council Bluffs, Iowa

For more information visit nastt.org/calendar.

Future NASTT No-Dig Shows



The NASTT 2020 No-Dig Show
April 5-9
 Colorado Convention Center
 Denver, Colorado



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



The NASTT 2022 No-Dig Show
April 9-13
 Minneapolis Convention Center
 Minneapolis, Minnesota



The NASTT 2023 No-Dig Show
April 30-May 4
 Oregon Convention Center
 Portland, Oregon

Ad Index

Akkerman Inc.	13
Applied Felts	Back Cover
Contech Engineered Solutions	7
CUES	11
Direct Horizontal Drilling	2
Hammerhead Trenchless	9
Holly Pipe/NST Corp.	37
I.S.T. Innovative Sewer Technologies.....	45
Infrastructure Resources.....	29
LaValley Industries	33
Michels Corp.	15
NASTT's Center for Excellence.....	34
NASTT's Municipal Scholarship Program.....	39
No-Dig North.....	16
The NASTT 2020 No-Dig Show	15
The NASTT Educational Fund Auction	51
TT Technologies	5

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