NASTT NORTHEAST REGIONAL CHAPTER

NORTHEAST JOURNAL
OF TRENCHLESS TECHNOLOGY PRACTICES

Future Proof Culverts

Pipeline Assessment

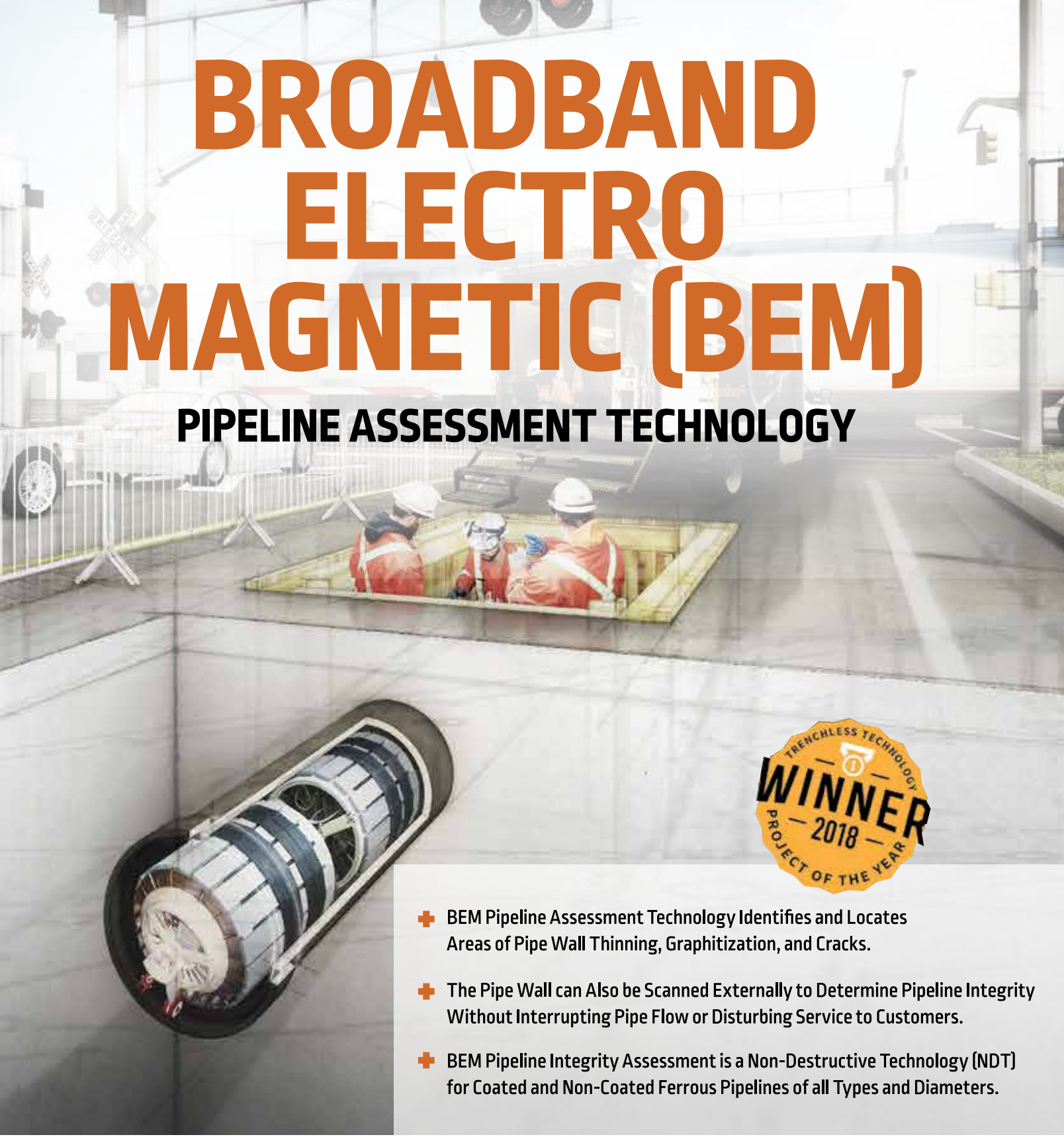
Answering the Call

UMass Lowell Students

2021 SPRING EDITION

BROADBAND ELECTRO MAGNETIC (BEM)

PIPELINE ASSESSMENT TECHNOLOGY



TRENCHLESS TECHNOLOGY WINNER 2018 PROJECT OF THE YEAR

- BEM Pipeline Assessment Technology Identifies and Locates Areas of Pipe Wall Thinning, Graphitization, and Cracks.
- The Pipe Wall can Also be Scanned Externally to Determine Pipeline Integrity Without Interrupting Pipe Flow or Disturbing Service to Customers.
- BEM Pipeline Integrity Assessment is a Non-Destructive Technology (NDT) for Coated and Non-Coated Ferrous Pipelines of all Types and Diameters.

PPM PROGRESSIVE PIPELINE MANAGEMENT

THE INFRASTRUCTURE RENEWAL SPECIALISTS

www.progressivepipe.com | 855-246-6344 | info@progressivepipe.com

CONTECH®
PIPE SOLUTIONS

IS RELINE A VIABLE OPTION FOR YOUR PROJECT?

FIND OUT TODAY.

Use the free DYOReline online design tool to conduct a quick feasbility analysis to determine if a reline solution is possible.

DYOReline™
www.conteches.com/dyoreline

RELINE DONE RIGHT™

With over 70 years of relining experience and 15 reline products, Contech Engineered Solutions provides permanent, fully structural solutions based on time-proven design methods. With experience comes knowledge, 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

CONTECH®
ENGINEERED SOLUTIONS

Experience the Evolution

For all your Directional Drilling and Vacuum needs call JESCO today at (800-241-7070) or visit one of our convenient locations.

Shrewsbury, MA
167 Memorial Dr | Shrewsbury, MA 01545
Phone: (508) 719-0200

Fairfield, NJ
1275 Bloomfield Ave | Fairfield, NJ 07004
Phone: (973) 227-2221 • Fax: (973) 900-8861

Lumberton, NJ
1799 Route 38 | Lumberton, NJ 08048
Phone: (609) 534-7477 • Fax: (609) 784-7846

South Plainfield, NJ
118 Saint Nicholas Avenue | South Plainfield, NJ 07080
Phone: (908) 753-8080 • Fax: (908) 821-1400

Deer Park, NY
110 East Jefryn Blvd. | Deer Park, NY 11729
Phone: (631) 256-6850

Beacon, NY
497 Fishkill Ave | Beacon, NY 12508
Phone: (845) 831-1800 • Fax: (908) 821-1671

Middletown, DE
1001 Industrial Drive | Middletown, DE 19709
Phone: (302) 376-0784 • Fax: (410) 918-5103

Baltimore, MD
8411 Pulaski Highway | Baltimore, MD 21237
Phone: (410) 687-1700 • Fax: (410) 918-5136

Frederick, MD
1525 Tilco Drive | Frederick, MD 21704
Phone: (301) 874-5500 • Fax: (410) 918-5101

District Heights, MD
8200 Cryden Way | District Heights, MD 20747
Phone: (301) 909-7799

Waldorf, MD
48 Industrial Drive | Waldorf, MD 20747
Phone: (301) 870-1438

CONTENTS

Features:

FUTURE PROOF: Improving Railway Infrastructure in Vermont: Culverts Help Thwart Future Hurricanes

By Joe Bradfield

BEM Ferrous Pipe Condition Assessment Technology Greenlights Railroad Crossing

By Casey Giambrone

Answering the Call for Pandemic Protection: NASTT-NE Member Shares his Thoughts

By David Wickersham

Virtual Student Navigates Trenchless Technologies: UMass Lowell NASTT Student Chapter Report

By Violet Smith

ALSO:

13 ANNOUNCEMENT - 2021 NASTT-NE Trenchless Technology Conference
31 UMass Lowell NASTT Student Chapter Success – from the Dean and Chancellor
32 Wareham Uses Trenchless Technology to Protect Coastal Environment
36 Spray-in-Place Pipe Rehabilitation Method Extends Life of Water Mains
39 NASTT No-Dig Show 2021 Conference ON-DEMAND Option Available!
40 Mini-HDD Guidelines For Placement of HDPE Pipe Water Applications

Departments:

Welcome Message from the NASTT-NE Chair 7
Message from the NASTT Chair 8
Membership in NASTT 9
NASTT-NE 2021 Board Executive Committee 10
NASTT-NE 2021 Board of Directors 12
Index to Advertisers 47

PUBLISHER

A TO B PUBLISHING INC.

662 Dudley Avenue
Winnipeg, MB Canada
R3M 1R8

EDITORIAL
Andrew Pattison
204.275.6946
marcomap@shaw.ca

ADVERTISING SALES
Bert Eastman
204.997.6371
bert@atobpublishing.com

Wayne Jury
204.803.1300
waynej@atobpublishing.com

PRODUCTION TEAM

harper media
your social media strategy & web marketing partner

700 - 200 Main Street
Winnipeg, MB
R3C 1A8

DIRECTOR
Aaron Harper
204.318.1121 xt. 101
aharper@harpermedia.ca

LAYOUT & DESIGN
Joel Gunter
204.318.1121 xt. 108
joel@harpermedia.ca

Printed 03/21 in Canada.

GO THE DISTANCE

THE NEW POWERHOUSE IN VACUUM EXCAVATION

Trenchless expertise is in high demand, and your ability to make a big impact with a small footprint is critical. The new frontier is underground, and we're a leader in bringing you everything you need.

EQUIPMENT | TRUCKS | TOOLING | PARTS | SERVICE | FINANCING

Vermeer®
All Roads

844-VERMEER | VERMEERALLROADS.COM

MESSAGE FROM NASTT-NE CHAIR

Babs Marquis, CCM, NASTT-NE Chair

Welcome to OUR Spring 2021 edition of the NASTT Northeast Regional Chapter's *Northeast Journal of Trenchless Technology Practices*. About this same time last year, we resentfully acknowledged the onset of the Global COVID-19 Pandemic, the looming public health threat, as the world resolved into an abrupt holding pattern on economic and social activities. For the NASTT Society itself, the acute impact was the cancellation of the 2020 No-Dig Show in Denver, CO, the NASTT premier 30-year celebration, within only a few weeks of the event. With several vaccines now in play, the tide is turning, and the future is looking bright. We are poised to meet the challenges ahead with vigor, innovation and optimism.

Over the past year, both the National Board of Directors and NASTT-NE Regional Chapter, in concert with volunteer member involvement, have evolved and adapted in various ways to keep our members engaged. As a result, NASTT will kick off 2021 with a hybrid In-Person and On-Demand No-Dig Show in Orlando, FL March 28 – 31, with enhanced COVID-19 Precautions and Procedures for a safe event. The NASTT-NE Regional Chapter is also looking forward to a Grand 2021 regional Trenchless Technology Conference scheduled to be held November 15-16 at the historic West Point Military Academy in New York.

Although we were initially disappointed to have cancelled our 2020 5th annual Trenchless Technology Conference in November at the elegant Portland Sheraton at Sable Oaks in Portland Maine, I am pleased to report that we are continuing our goal to expand awareness of trenchless technology throughout our region with an increased presence in Maine. For that reason, the Board has secured the venue and is continuing with planning arrangements for our 2022 annual event at the same venue!

In lieu of the cancelled 2020 Annual Conference, the Chapter sponsored a free webinar on Thursday November 12th to keep the Regional Chapter members engaged. In addition, the Chapter awarded four scholarships to deserving student members of the UMass Lowell NASTT Student Chapter. We plan to expand the scholarship program and extend it to the new incoming student chapter from Quinnipiac University School of Engineering in Connecticut in 2021.

We are continuing to work with our UMass Lowell student chapter to schedule virtual guest lectures for this academic year and returning to in-person lectures in September for the 2021 – 2022 academic year as well as restoring trenchless project site visits. We continue to solicit input from our regional trenchless practitioners to get involved in continuing with this endeavor as we see it as a forward looking investment in the future of our industry.

Conducting the business of this chapter (especially hosting our annual conferences, publication of this journal as well sponsorship for our student chapter scholarship) would not be possible without the generous support of our sponsors and vendors. We extend our sincere gratitude for your continued support, participation and investment to sustain the chapter. I hope the time you spend reviewing the articles and information in this edition of the Journal will encourage you to get involved in the chapter, perhaps with an article or advertisement for the next Journal, or a presentation at the 2021 Conference. The Northeast Chapter is a strong voice for trenchless in the region, and we need your support to ensure the Chapter's continued success and growth in its mission and membership. We continue to explore ways to maintain the connection with past presidents and founding members of the Northeast Trenchless Association.

"THE FUTURE IS LOOKING BRIGHT!"

Thank you to all of our members for staying involved and sharing ideas that contributed to the NASTT-NE Chapter getting through the pandemic. We appreciate your contributions of editorial content, advertising, reading and sharing this Journal, and joining us at our annual conferences. Thanks also to our current Executive Committee, and Board of Directors for your time and dedication during this difficult period.

Please join us! Stay healthy, stay safe as we work towards a brighter future for the NASTT and regional chapters.

Babs Marquis

Babs Marquis, CCM
Chair, NASTT-NE

MESSAGE FROM NASTT CHAIR

Alan Goodman, NASTT Chair

Hello Northeast Chapter Members. This year I begin my term as Chair of NASTT's Board of Directors, and I am looking forward to seeing the continued progress and expansion of NASTT, the Northeast Chapter and the trenchless industry. 2020 was a year that truly was unprecedented! We've seen challenges with communication and physical meetings due to the global pandemic, however the perseverance of our membership, sponsors, and trenchless community have enabled this society to rise above the circumstances and set our future for success. Due to unparalleled creativity and sheer effort, we will continue to experience growth and recovery as we work toward our common goals in 2021.

We are in the final days of planning the NASTT 2021 No-Dig Show being held in Orlando, FL at the end of March. We are excited to be offering an On-Demand option for attendees that are unable to be onsite in Orlando or for those that would like to watch additional technical sessions they didn't have the time for while onsite. Visit the conference website at www.nodigshow.com and explore the pages in this magazine for more information on all the ways you can virtually participate in the 2021 No-Dig Show.

The Value of Strong Volunteers

"PERSEVERANCE OF OUR MEMBERSHIP, SPONSORS, AND TRENCHLESS COMMUNITY HAVE ENABLED THIS SOCIETY TO RISE ABOVE THE CIRCUMSTANCES!"

NASTT exists because of our dedicated volunteers. With training and education at the forefront of our mission as a Society, we look forward to offering many creative options for trenchless training and education throughout the year including our Virtual Good Practices Courses and our virtual or in-person Regional Chapter meetings, conferences and webinars. Stay tuned as we roll out a wide range of opportunities to meet your professional needs.

Our Society is only as strong as our members and volunteers. I have gotten to see first-hand the time and sacrifice that each of you have made. Since our committees align with the strategic plan, I challenge our membership to participate in the NASTT committees. Education and the college curriculum will continue to evolve as we focus on bringing trenchless technology to every corner of North America. I thank you for your dedication and your commitment during what can only be described as one of the most challenging and unusual years of our lifetime!

Alan Goodman

Alan Goodman,
NASTT Chair

"WE FOCUS ON BRINGING TRENCHLESS TECHNOLOGY TO EVERY CORNER OF NORTH AMERICA!"

TALK TRENCHLESS

Carolyn Hook, NASTT Membership Outreach & Database Manager

Whether you're on the job site, at the water cooler or at a conference, you'll want to connect with trenchless professionals. The North American Society for Trenchless Technology can help you make those connections every day with Talk Trenchless.

Talk Trenchless is an exclusive, secure, members-only networking tool designed to connect you with verified NASTT members – your peers and trenchless technology experts throughout North America. Participants can download and share ideas, articles, reports and more in the NASTT Members community.

Establish your professional identity.

Create your profile with your photo and areas of expertise, along with your education and position history. Talk Trenchless is a showcase of NASTT's most valuable assets – its members!

Discuss industry-related hot topics with your peers.

Don't wait for the next meeting. Talk about what's happening today and exchange ideas in a professional NASTT setting.

Increase your network.

Build your own contact list or search for colleagues by name, location, company or region in the NASTT online member directory. Meet others in your area online then connect in person at a regional chapter.

Find answers you need.

Looking for a standard practice or for someone to share their experience with a tool or technique? Post your need and access the ideas and stories of more than 2000 NASTT members.

Pay it forward.

Lend your expertise and give back to the profession when you share your knowledge, innovations, resources and experiences with others.

Access the right tools.

Members can post research, projects, solutions, calculators and videos that will be available at your fingertips in the community library.

IT'S TIME TO TALK TRENCHLESS

TALK-TRENCHLESS.NASTT.ORG

How to Get Started

Log in with your nastt.org credentials at talk-trenchless.nastt.org. If you've never accessed the site, you'll be asked to agree to the Community Rules which remind everyone to:

- Stay on topic.
- Don't post commercial messages.
- Be honest, be yourself.
- Submit only your own, original content.
- Keep it clean, keep it friendly.

Next, click your Profile on the top right and add your information. To access the NASTT Members Community, click Communities, My Communities. You'll see the most recent conversations and posts. Join in or start a new one. Send your questions to **membership@nastt.org.**

NASTT-NE BOARD 2021

BABS MARQUIS – CHAIR

Babs Marquis is presently the Trenchless Practice lead for the East Coast and Construction Manager with the Burlington, Mass., office of McMillen Jacobs Associates. He previously worked for Jacobs Engineering Group for 10 years and Stone & Webster for 11 years. During his extensive career in the trenchless industry, Babs has been involved in major tunneling and trenchless projects in the Northeast for clients such as the Massachusetts Water Resources Authority, Boston Water & Sewer Commission, the Metropolitan District Commission (Hartford, CT), Narragansett Bay Commission (Providence, RI), NYC Dept. of Design & Construction, NYC Dept. of Environmental Protection and is now embarking on a recently awarded New York State Department of Environmental Conservation/Nassau County Design-build Conveyance Project in Long Island, NY.

For the past 23 years, he has focused on underground construction management for tunnels and conveyance including water and wastewater pipeline design and construction projects, with emphasis on trenchless construction methods. He has worked on various pipeline projects utilizing microtunneling, pipe jacking, horizontal auger bore, pipe bursting and other pipeline renewal methods. From 2009-2011 Babs was resident engineer on the pivotal Microtunneling, & Pipe Bursting components of the East Boston Branch Sewer Relief Project. His commitment to the trenchless practice includes co-author for revision and update of the ASCE Manual of Practice (MOP 106) for Horizontal Auger Boring Projects and is the chair leading the effort for review and update of ASCE MOP 112 for Pipe Bursting Projects. Babs was instrumental in the development of the Auger Boring School at the Louisiana Technical University where he continues support the training program agenda.

Babs views the NASTT-NE Regional Chapter as an important vehicle to promoting greater awareness and understanding of trenchless applications at the local level. He sees the level of interest and confidence in trenchless technology growing among owner groups based on the successful completion of many high profile projects across the Northeast. Drawn to the varied unique and innovative aspects of trenchless technology, Babs believes access to ongoing education is key to even greater owner acceptance and NASTT-NE Chapter is a key component towards achieving this acceptance by making information available at the grassroots level as well as attracting student chapters from the region and a robust local participation in the Chapter activities throughout the region.

ERIC SCHULER – VICE CHAIR

Eric Schuler is the Director of Engineering for a public water authority serving 16 municipalities in Central New York. As a Department Head he oversees all of Engineering, Distribution, and Maintenance Operations for MVWA. Mr. Schuler has over 10 years of experience as in both the private and public sectors. He earned his Bachelor of Science in Civil Engineering degree from Clarkson University in Potsdam, NY and has primarily been involved in wastewater, drinking water, civil-site, and stormwater sectors. Eric is a licensed Professional Engineer in New York whose design, project management, and construction-related experiences have helped successfully execute many "trenchless"-focused projects.

Early in his engineering career he gained exposure to various trenchless technologies through utility evaluations and development of utility project design alternatives. He immediately started to envision great opportunities for communities plagued by utility deficiencies and construction constraints to utilize CIPP, HDD, among other trenchless technologies; and for them to be able to benefit from both social and economic perspectives. Eric has also stressed the importance for municipalities to incorporate asset management into utility system evaluations and system rehabilitation designs in order to aid development of capital projects and to determine the most suitable trenchless applications for implementation.

In addition to NASTT-NE, Eric is also a Board Member for the Central New York Branch of the American Public Works Association (APWA), a Director of the Central New York Water Works Conference (CNYWCC), and is active with the New York State American Water Works Association (NYAWWA). Eric continues to push for growth of trenchless technologies in upstate-New York and has trained utility owners on the use of hydraulic modeling methods for proper development of utility rehabilitation project design. He is an advocate for educating (designers & installers) of trenchless applications through proper training and increased accessibility of industry standards/guidelines to ensure successful project design and execution. The successful use and increased awareness of modern-day trenchless technologies that incorporate innovative equipment and materials are what Eric believes will continue to shape and drive the direction of the utility industry for the coming decades.

EXECUTIVE COMMITTEE

CHARLES TRIPP – TREASURER

Charles Tripp, P.E. is a Technical Manager, Pipeline Condition Assessment and Rehabilitation Design, Water, for the New England Area with AECOM. He has 15 years of experience working as a design engineer and project manager on a variety of trenchless projects including condition assessment, rehabilitation, risk modeling, and general asset management. His varied design experience also includes collection systems design and peer review, wastewater treatment, water resources, and site-civil design to improve municipal infrastructure.

Charles was first introduced to trenchless technologies through his involvement in multiple sanitary sewer rehabilitation projects starting early in his career. He also briefly served as a Field Engineer for a world-leading CIPP construction company. This experience has provided a wealth of exposure, and instilled a desire to pursue and advocate for the use of trenchless technologies in projects as a way of mitigating the impacts of excavation in urbanized areas, but also as a means of cost-effective design.

Charles studied Civil Engineering at the University of Massachusetts Amherst earning his B.S. and went on to receive his M.S. in Environmental Engineering from the Worcester Polytechnic Institute. He is a licensed professional engineer in Massachusetts, New Hampshire, Rhode Island, and New York, and is also PACP/MACP certified by NASSCO.

As Treasurer for the Northeast Chapter of NASTT, Charles continues to capitalize on his devotion to trenchless technologies and in advocating for its use in the local construction market. He will look apply his experience to the effective management and administration of fiscal matters of the organization.

JONATHAN KUNAY – SECRETARY

Jonathan Kunay, P.E., PMP is a Principal Engineer and the global Conveyance Market Discipline Leader for CDM Smith in Boston, MA. He has 18 years of experience working as a design engineer and project manager on a variety of trenchless projects including infrastructure assessment with traditional and state-of-the-art investigative techniques, rehabilitation using CIPP, HDD and pipe bursting, facilities planning and master planning, leak detection of water distribution systems, enterprise asset management and risk/criticality studies.

While trenchless technologies have been his primary focus over the past 15 years, he also has worked on civil site design for commercial developments and municipalities, navigated Consent Order driven long-term programs, designed new pumping stations and developed alternatives for sewer separation projects. While Jonathan is based in New England, his diverse project experience has brought him many places to experience unique perspectives in the trenchless marketplace. He has worked on trenchless projects all over the United States including California, Texas, Illinois, Tennessee, Louisiana, South Carolina, Florida and Georgia. He has also implemented trenchless projects and programs internationally in the Middle East, China, South America, the Pacific Islands and Europe.

Jonathan was the project manager and design engineer responsible for helping to bring service lateral lining into the New England market in 2008 as part of a comprehensive sewer system rehabilitation program. This comprehensive model has now been adopted across the country as a proven methodology by which infiltration and inflow can be removed in large quantities from the sewer collection system. This comprehensive approach has been presented at conferences to showcase the validity of utilizing a holistic trenchless methodology when large percentages of I/I by volume must be eliminated.

Jonathan has a Bachelor of Civil Engineering and a Minor in Environmental Engineering from the University of Cincinnati, is certified in NASSCO's Pipeline Assessment and Certification Program (PACP), Manhole Assessment and Certification Program (MACP), and Lateral Assessment and Certification Program (LACP), and is the Co-Chair of the Pipeline Rehabilitation Committee in the National Association of Sewer Service Companies (NASSCO).

EXECUTIVE COMMITTEE - CONT'D

IAN MEAD – PAST CHAIR

Ian Mead, P.E., BCEE is a Senior Project Manager with Tighe & Bond in Worcester MA, and has over 20 years of experience working as design engineer, project manager and construction coordinator. His varied experience includes work on drinking water, wastewater, pipeline, site and civil, energy and other municipal infrastructure projects. His more recent focus is on development and delivery of projects for municipal clients across New England.

Born and raised in the construction industry, Ian has spent his entire lifetime on and around heavy equipment on various construction sites. While working for a private engineering company doing survey and site design work, Ian studied civil engineering at the University of Massachusetts Amherst. His first job after graduation was doing site inspection work on pipeline projects throughout MA and RI. He was quickly introduced to trenchless technology as many municipal clients were then expanding sanitary sewer collection systems, and some of this work involved trenchless applications such as HDD, bursting, and CIPP. More recently his experience has also included comprehensive pressure pipe condition assessment and rehabilitation, and the incorporation of this information into enterprise asset management programs.

Ian thinks that increasing owner acceptance, and convincing local decision makers that trenchless methods should be part of any utility's asset management plan, are important keys to future growth of the industry. Education and information provided to municipalities and utilities will help spread the word that trenchless is a viable and proven option. Ian feels there is a great opportunity to generate more interest in trenchless technology with mid to smaller sized utilities across the Northeast. Another major goal he has is building general awareness of the NASTT-NE Chapter, and coordinating its resources and activities, such as website, publications and conferences, with the parent NASTT organization and other regional chapters across North America.

2021 NASTT-NE BOARD OF DIRECTORS

Chair – Babs Marquis
McMillen Jacobs Associates
marquis@mcmjac.com

Vice Chair - Eric Schuler
Mohawk Valley Water Authority
eschuler@mvwa.us

Treasurer – Charles Tripp
AECOM
charles.tripp@aecom.com

Secretary - Jonathan Kunay
CDM Smith
kunayje@cdmsmith.com

Past Chair – Ian Mead
Tighe & Bond
imead@tighebond.com

Pat Ambrosio
Hallen Construction
pambrosio@hallenconstruction.com

Guy Campinha
Town of Wareham MA
gcampinha@wareham.ma.us

Connor Collier
Vortex Companies
ccollier@vortexcompanies.com

Bill Jeffery
TT Technologies Inc.
bjeffery@tttechnologies.com

Paul Savard
Massachusetts Water Resources Authority (MWRA)
Paul.Savard@mwra.com

Chad Whiting
City of Somerville Water & Sewer Department
cwhiting@somervillema.gov

The Future is Bright for Trenchless Technology!

JOIN US at the Beautiful West Point Military Academy, New York

for the 2021

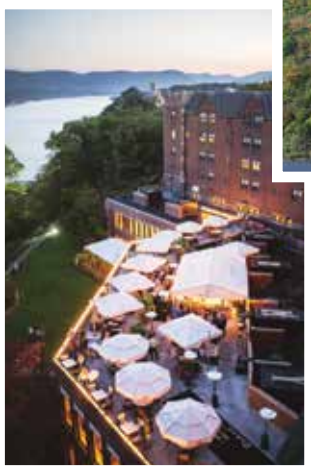
Northeast Regional Chapter Trenchless Conference

November 15 - 16, 2021

Enjoy an amazing stay at the luxurious and historic

The Thayer Hotel
674 Thayer Road, West Point, NY

Technical Demonstrations and Presentations on Trenchless Technology Applications for Water, Sewer, Stormwater, Gas and Power Transmission. Planning, Condition Assessment, Risk-based Engineering & Construction for Trenchless Projects and more!



Save the Date!

Visit www.nastt-ne.org for updates on the conference & program

FUTURE PROOF:

Culverts Thwart Future Hurricanes

By: Joe Bradfield

Culvert set-up during construction

A railway in Vermont has undergone an upgrade using a two-pass system with a combination pipe-ramming and guided boring technique to install culverts to help it endure future weather events.

Although officially listed as only the ninth costliest hurricane to make landfall in the US to date, in 2011 Hurricane Irene caused at least 49 deaths and widespread destruction along a path from first landfall in the Caribbean spanning along the US eastern coast and well into Canada. By August 29, 2011 Irene had made its way as far north and inland as Vermont.

The White River Railway Bridge, located in Vermont, was victim to the storm, with one granite pier sinking more than 6 feet and threatening the total collapse of the bridge. Track washouts west of White River Junction completely shut down Amtrak's high-speed Vermonter rail service from August 29 to October 1, 2011.

While rail service has long since been restored, seven years after the hurricane the Vermont Agency of Transportation (V-Trans) continues to bolster railway infrastructure against future severe weather events of Irene's caliber or greater.

IMPROVING THE SYSTEM

In 2018, two V-Trans rail-system improvement projects, funded by the Federal Emergency Management Agency (FEMA), focused on ground stabilization and drainage upgrades near Ferrisburgh and New Haven.

The agency subsequently contracted Engineers Construction (ECI) to perform the scope of work for the projects. Founded in 1965, the multi-division, family-owned contractor specializes in civil and full-service railroad construction, concrete construction, asphalt paving and trenchless pipe installation, and is an industry leader in steel casing installation.

ECI's ability to seamlessly coordinate deployment and integrated task performance of its five divisions-comprising a fleet of more than 500 pieces of equipment and 175 dedicated personnel - assures its customers of highest quality work at greatest value in complex and highly technical projects. ECI teams performed all work on these two contracts, with tasks ranging from

"THE BUSY LINE HAD TO BE KEPT RUNNING. THIS REGION HAS SEVERELY LIMITED REROUTING OPTIONS."

- TOM LOYER, TRENCHLESS PROJECT MANAGER & ESTIMATOR, ECI

The pipe-ramming technique permitted rail service to continue unimpeded throughout the 6-month duration of the project

heavy civil construction to sheet piling, earth anchoring and extensive erosion prevention and sediment control.

The work included the installation of a new 100-foot long culvert in New Haven and two replacement culverts- one 49 feet and the other 50 feet long- to upgrade flow capability near Ferrisburgh VT.

INSTALLATION

Each culvert required a two-pass installation system, installing 72-inch (1,829 mm) casings to receive an Ultra-Flo Smooth Interior Culvert carrier pipe varying by culvert in diameters of 42, 48 and, 52 inches (1,066, 1,220 and 1,321 mm).

ECI Senior Project Manager Tom Loyer, who is also head of the company's trenchless division, says open cut techniques were out of the question for these projects.

"Our rail and excavation crews could certainly do it, but not between the scheduled trains," he says.

"The busy line had to be kept running. This region has severely limited rerouting options."

Loyer preferred the auger boring method for the railway casing installations to meet the project's typically tight tolerances for grade and azimuth. While the New Haven site gave the crew ample space for an auger boring setup, site restrictions in Ferrisburgh were complicated by a shared boundary with environmentally protected wetlands.

Elevation was not a problem here, as the shallower culverts were just under 1 m below the toe of the shoulder ballast, but the allowable worksite dimensions were too tight for an auger-boring machine or construction of a backing wall. The site restrictions did allow for 40-foot working pits, adequate space to operate a medium-sized horizontal directional drilling (HDD) machine and a pipe ramming tool setup.

"Combination pipe ramming and a guided boring method was an easy call on this job.

We weren't crowded then at all", says Loyer.

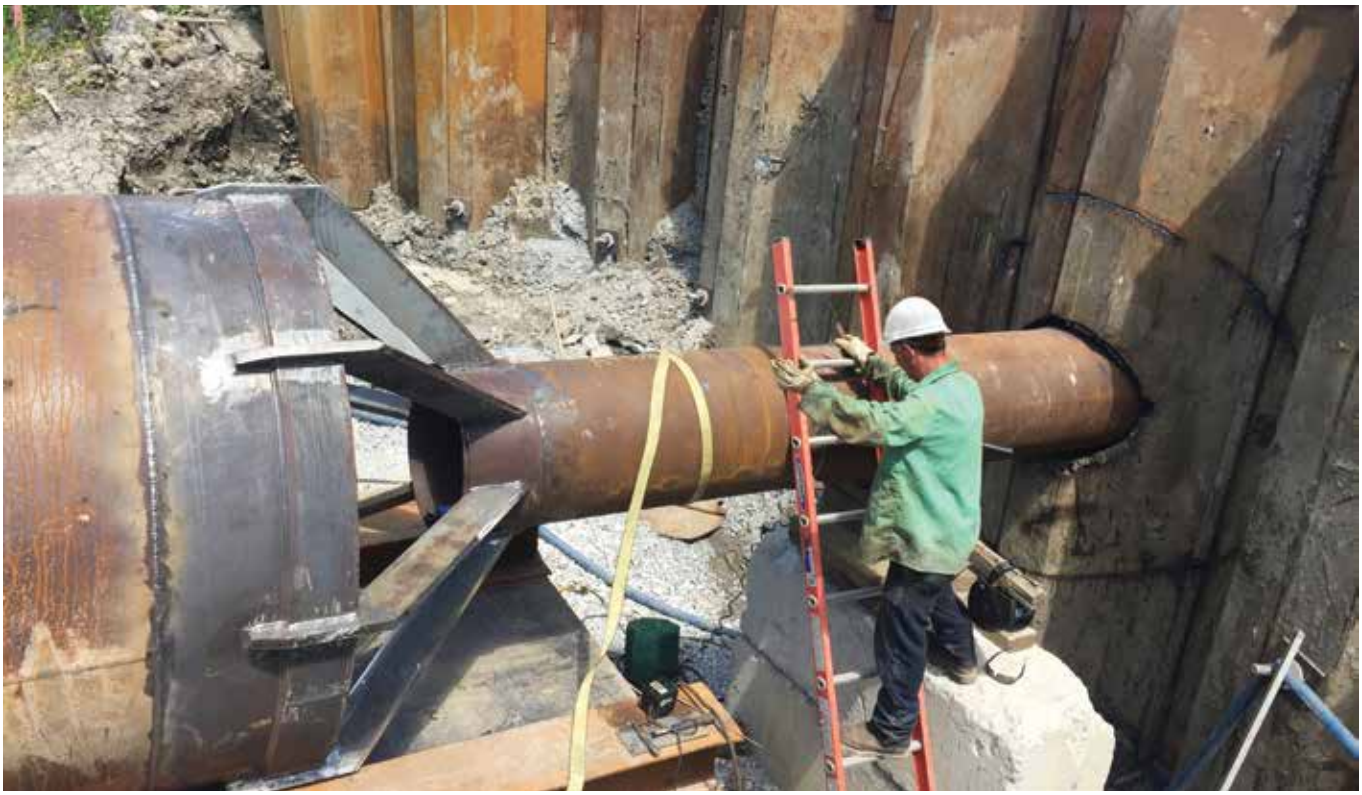
Other ECI divisions worked on sheet piling at the two sites and on grouting up the existing 100-year-old stone box culverts at Ferrisburgh. ECT's trenchless crew began with the Ferrisburgh project. One pipe path was adjusted prior to installation operations to accommodate a ledge discovered during ECI's preconstruction exploratory probing.

TRUSTED TECHNOLOGY

The ECI equipment fleet represents all major manufacturers in the market. In 2012, the company purchased its largest hammer, the HammerHead 24 inch (610 mm) ramming tool used for this job.

Loyer's personal experience with HammerHead equipment and support goes back more than 28 years. He and his brother, who has since passed away, founded Trenchless Technologies of New England, which he says was one of the first companies in the country to offer pipe ramming.

The team used one of ECI's mid-sized Ditch Witch HDD machines to establish the grade and azimuth with 5-inch (127 mm) pipe. Once through the ground's heavy clay conditions, a 24-inch (610 mm) Akkerman guided-boring machine (GBM) weld-on reaming head was adapted for use,



24-inch "Pilot Pipe" was used as a guide for ramming the 72-inch casing

centralizing ramming operations on the pipe.

The pipe then guided ramming operations as they installed the 24-inch diameter, 0.5-inch (13 mm) wall, steel pipe casing into the bore using a small ramming tool. The casing served as the final pilot pipe' to guide ramming of the 72-inch (1,829 mm) grout-ported, 25 mm wall carbon steel casing.

"A 5-inch pipe, of course, won't stand up to ramming operations on a 72 inch casing," says Loyer.

"Since these were relatively short runs in conducive soil, we only needed to step up to 24 inch pipe. In longer runs and tougher soils with similar, sensitive grade requirements, we might go from five to 24 inches, and then step up again to 36- or even 42-inch pipe to drive a 72-inch casing.

"It all depends on the requirements and ground conditions of the job."

ECI used a second Akkerman GBM weld-on reaming head to guide the 72-inch casing on the 24- inch pipe. The reaming head's spoke-like blades allowed spoil to pass through as the casing progressed while ensuring it stayed centered on the bore path.

Two 755 L/s Caterpillar compressors supplied power to the HammerHead ramming tool. Each 20-foot length of casing took a day to drive. Adding a section to the installation required two

From the outside you can't see all that fine work

> **"FROM THE OUTSIDE YOU CAN'T SEE ALL THAT FINE WORK."**
>
> **- TOM LOYER, TRENCHLESS PROJECT MANAGER & ESTIMATOR, ECI**

certified ECI welders and a full shift to make the joint. Then, to clean out the pipe, the team used a 64-inch auger tool and skid steers.

"That basically got the pipe so clean, we just handed out shovels and a hose to manually wash out the little that was left," says Loyer.

The project plans initially called for contact grouting of the 72-inch casing. When V-Trans came to inspect the installation, it found heavy clay densely packed around the pipe with zero voids detected at the ports. Contract grouting requirements were waived.

The crew installed cross-members within the pipe to support the polymer-coated carrier prior to performing the project's requirement for annular grouted fill.

ECI installed precast concrete headwalls and wingwalls, incidentally obscuring the culverts' robust two-pass engineering.

"From the outside you can't see all that fine work," said Loyer.

FIT FOR THE FUTURE

With construction completed, the culverts are now strengthened for decades to come; the next Hurricane Irene to come along will not reveal their inner workings. The carrier within the two-pass system has a rated service life of at least 100 years.

The total project time, including culvert installations, took about six months, start to finish. ECI completed the two contracts within specification, on schedule and within budget, never disrupting scheduled railway traffic.

NOTE: This article originally appeared in the Spring 2019 issue of Trenchless International.

ABOUT THE AUTHOR:

Joe Bradfield *is a freelance writer specializing in case stories, technical writing and photography for the mining, construction, drilling and energy industries. Prior to the global pandemic of 2020, Bradfield was senior editor/writer for an international communications agency, providing site-based photojournalism of high-profile mining, drilling and construction projects around the world. His background in education, science and technology and Master of Arts degree in writing create a unique skillset for telling the stories of the industries' applications, innovations and people.*

BEM PIPELINE ASSESSMENT TECHNOLOGY GREENLIGHTS RAILROAD CROSSING

Use of Condition Assessment Technology for Ferrous Pipe Allows Project to Proceed

By: Casey Giambrone, Progressive Pipeline Management (PPM)

The ability to identify and measure the integrity of ferrous pipe walls provides critical data needed to determine the condition and integrity of an underground facility. PPM has invested in Broadband Electromagnetic Probe (BEM) to accurately assess the condition of pipelines and identify the degree of corrosion or graphitization. The technology proved to be valuable when a utility client needed to assess a section of a 20-inch cast iron main that runs under a railroad right-of-way. The task was to determine if the pipe was a good candidate for cured-in-place-lining.

Since 2002, Progressive Pipeline Management has been renewing natural gas pipelines in challenging situations including highways, bridges, railroad lines and environmentally sensitive areas. Starline® cured-in-place-lining (CIPL) is a proven, cost effective trenchless technology that extends the life of a pipeline by 100 years.

In November 2020, Progressive Pipeline Management was lining a 2,000 foot section of 20-inch cast iron main for a major eastern gas utility along Edgewater Avenue in Ridgefield, New Jersey. A section of the main, roughly 150 feet, runs underneath the railroad right-of-way and belongs to the railway. Railroad companies operate differently, but the railroad would not allow the utility to perform work on their line within the right-of-way unless they verified the condition of the line. It had to meet the conditions to be a good lining candidate.

BEM FERROUS WALL CONDITION ASSESSMENT

For the railway to greenlight the cured-in-place-lining project to proceed, the utility had to perform an assessment. We recommended Broadband Electromagnetic Probe (BEM) on the 150-foot section. BEM is a patented, ferrous main assessment tool that's been in operation in Australia for over 20 years. It was developed by Rock Solid Pty. Ltd. The Australian company has extensive experience with non-destructive assessment of cast iron and other ferrous piping.

The first step was a field visit. We reviewed the maps showing the layout of the pipe geometry to determine the layout of the pipes. Was it a straight run? Were there any 90-degree bends or 45-degree bends? The inspection tool has some limitations on the pipe geometry it can negotiate.

We identified that the pipe was a straight run which made it feasible for us to perform the internal BEM inspection. After the section was isolated, the next steps were cleaning operations and CCTV inspections. Two excavations were required. The BEM crew was scheduled to start the inspection once the excavations were complete.

BEM technology for ferrous pipe integrity assessment can determine wall thinning, graphitization and cracks. The BEM tool allows pipeline assessments to be performed in-line or externally. Both inspection techniques produce the same data. Sensor shapes and sizes for emitting and collecting suitable data are highly flexible for each type:

1. **In-line or remote application**: used for the segment in this project uses an internal delivery vehicle such as a 'pig' to transport the device.
2. **External Flexible Array Scanning Tool (FAST)**: for surface application devices where manned access is possible

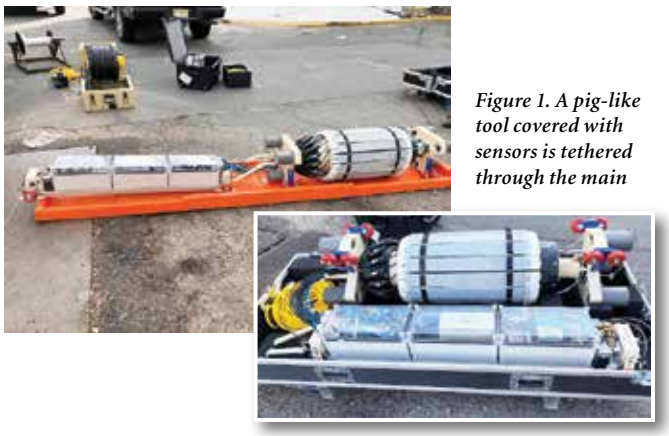


Figure 1. A pig-like tool covered with sensors is tethered through the main

"THE TESTING AND LAUNCH HAS EXCEEDED EXPECTATIONS."

-DAVID WICKERSHAM, CEO, PROGRESSIVE PIPELINE MANAGEMENT.

INTERNAL BEM ASSESSMENT TOOL

Once the pipeline was taken out of service, a pig-like tool covered with sensors and probes was inserted into the pipe and pulled along the inside of the gas main. [Figure 1] The tool was approximately the same diameter of the gas main. A power source trailed behind the pig as it traveled through the pipe. Antennae on the pig sent electromagnetic signals into the pipe. A series of sending and receiving readings indicated if there was any level of pipe loss. The pig moved along in increments via a tether and took multiple readings throughout the entire length of the pipe. [Figure 2]

Figure 2. BEM internal tool inserted into 20-inch cast iron main

HOW BEM TECHNOLOGY WORKS

The technology works by inducing eddy currents to flow in close proximity to the transmitter. In a ferrous pipe, these eddy currents migrate, allowing a complete profile of the ferrous pipe to be obtained. Data is recorded at distinct frequency increments; the duration and number of increments depend upon the material conditions as well as the nature of the target. Parameters were set with the aid of a pre-survey calibration of the ferrous material. BEM recorded data can reveal the location of perturbations in the thickness of the ferrous pipe. With appropriate configuration, indications of fracturing can be detected.

The data acquired is sent to a laptop via a data cable and is represented graphically as heat maps with color contours depicting the level of wall thickness. [Figure 3] If the pipe wall thickness is between 90 to 100 percent, meaning a loss of 0 - 10 percent, it will come up as green. If the pipe wall thickness is between 70 to 89 percent, a loss of 11 to 30 percent, it will show as yellow, which is an indication of some metal loss on that particular sensor location. If the pipe wall thickness is less than 70 percent of the original thickness, it shows red. In this case, there would be a high level of graphitization in the pipe at that location, indicating an area of major concern.

In the case of the Edgewater Avenue Project, the data was good quality and our client presented the charts and images from the BEM report to the railroad company. Both parties were comfortable with the wall thickness and corrosion parameters and the lining project was green lighted to proceed with lining under railroad right-of-way. The rest of the project proceeded smoothly.

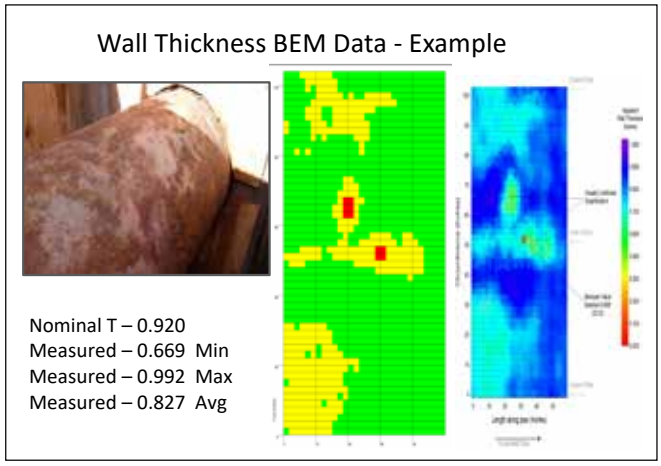


Figure 3. BEM heatmap indicating pipe wall thickness

EXTERNAL FERROUS WALL CONDITION ASSESSMENT TOOL

The second type of BEM is done externally and is effective for spot inspections. The Flexible Array Scanning Tool (FAST) is ideal for external pipe wall condition assessments carried out

Figure 4. External BEM is effective for spot inspections and opportunistic scans during planned maintenance &/or emergency work

Figure 5. Sensor blanket for BEM external Flexible Array Scanning Tool (FAST) wraps around the pipe

Figure 6. BEM is a valuable tool when considering CIPL. Lining can cost one third the cost of direct bury replacement

on all types of ferrous pipelines to explore the integrity of pipe diameters from 2 inches and upwards [Figure 4]. The pipe wall is scanned externally and pipe wall integrity is determined without interrupting the pipe flow or disrupting gas service. Manned access is needed to position the sensors and antennae which surround the pipe. Complete coverage of the pipe can be obtained without diameter or shape restrictions. Individual readings are taken along the surface of a pipe. The coating (bitumen, polyethylene, or even concrete) does not need to be removed. The wall can be scanned with the aid of a temporary marked grid around the outside of the pipe allowing for accurate positioning of each reading taken.

In this case, the pipe needs to be excavated and fully exposed. A fabric "blanket" has snaps and sensors and antennae. It wraps around the pipe and you take a shot of the pipe at that position. Then the blanket is re-situated to the next position until the section has been fully scanned. [Figure 5] It is great at capturing a sample of what the integrity of the pipe looks like at problematic locations, for example if there is pipe wall loss. It is fast and effective informing decisions about specific sections of a pipeline.

WHY IS BEM EFFECTIVE?

The need to utilize technology to identify the integrity of a ferrous pipeline's health is recognized by industry operators and by the governing bodies of the natural gas industry. Within the gas industry there are a number of different types of technology used. BEM is a cost-effective method that can be performed on a routine basis. It can be an ideal companion when considering lining.

"For non-destructive testing of cast iron, there has not been a technology available like this before. Prior to investing in the technology invented by Rock Solid in Australia, we formed a work group with three utility customers. The testing and launch has exceeded expectations," says Dave Wickersham, CEO Progressive Pipeline Management.

Other options are more costly and inefficient. Smart pigging technology can be expensive but effective for a very in-depth assessment. The old-fashioned way is direct assessment, when the company excavates the line and performs a hands-on investigation of problematic areas. With the cost of excavation, impact on the environment, and resources required, this should only be considered as a last resort.

THE POWER OF DATA FOR DECISION MAKING

BEM can help determine whether the effort and costs of direct bury are necessary and justified. Too often, the first decision for pipeline replacement is to utilize direct bury. This requires a full trench excavation and the abandonment of the old pipe. It is costly, especially when using steel for larger diameter pipes. Other costs include back filling, paving (temporary and final restorations), equipment and labor. Some streets are so congested there's no place to put another piece of pipe, and conditions such as bridges, railways and historical protected areas make excavation difficult or impossible.

Trenchless pipeline rehabilitation has been PPM's specialization for 20 years using Starline ® Cured-In-Place-Lining (CIPL), proven to extend the life of pipelines by 100+ years. [Figure 6] Lining can cost about one third the cost of direct bury replacement. Benefits to lining also include the ability to maintain flow volumes through systems. The use of CIPL also allows for capitalization of asset replacement costs.

BEM is a valuable tool when considering CIPL as it captures actual data on pipe conditions providing decision makers real time data [Figure 7]. With the data provided by BEM tools, replacement methods can be evaluated with empirical data and facts to help determine the most cost effective and environmentally efficient solution.

PPM has invested in Broadband Electromagnetic Probe (BEM) pipe inspection technology for gas Distribution Integrity Management Program (DIMP) programs. It gives utilities the tools to make informed decisions on the most appropriate manner to replace gas facilities and accurately rank pipe replacement. Greater depth of knowledge around assets, the condition they're in, and the degree they're in, creates value down the road.

These tools empower decisions for safe and effective networks. Using tools that aid proactive actions for preventing potential gas leaks or dangerous situations is essential.

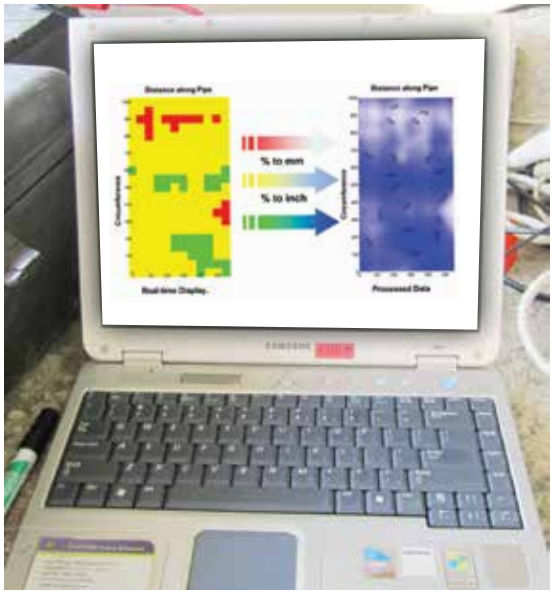


Figure 7. Initial results can be seen live via a laptop. The real-time wall thickness display uses color to denote wall thickness ranges and areas of concern

Ferrous pipeline materials– steel, cast iron and ductile iron- can be investigated and pipes of any size from 4inches (110mm) diameter and upwards. BEM can process continuous data records along extensive lengths of pipeline. Due to the large volumes of data recorded as part of any scan, distances surveyed along smaller diameter pipes are typically 200 - 250 feet per day, while in large diameters lower footages per day are scanned.

PIPELINE INTEGRITY MANAGEMENT INTO THE 21ST CENTURY.

PPM has decades of specialized expertise associated with gas pipeline related issues, including lining and trenchless technology. They hold the exclusive license for North America for the Starline® CIPL liner. This depth of understanding and engineering is applied from inception to completion of the entire project, any time, any place. The PPM team and crews have collaborated with industry experts at leading utilities and institutions. Together, they have developed and tested innovative technology that will extend the life of gas infrastructure for generations to come. Through advanced robotics and Broadband Electromagnetic Inspection (BEM) technology, this truly non-destructive testing method investigates ferrous pipelines of all types and all diameters.

"THE BEM TOOL ALLOWS PIPELINE ASSESSMENTS TO BE PERFORMED IN-LINE OR EXTERNALLY."

ABOUT THE AUTHOR:

***Casey Giambrone**, Vice President at PPM, is an MBA and Industrial Engineer who has the ability to balance sharp technical understanding with a business mindset. Before joining the PPM family in 2020, his career included twenty years with National Grid. He was responsible for National Grid's New York City and Long Island City State Construction practice and helped create the NYC Public Works Tracking System. Casey leads CIPL projects in New Jersey, Baltimore, Chicago, New England, and other US territories.*

ANSWERING THE CALL FOR PANDEMIC PROTECTION

Dave Wickersham, CEO of NASTT-NE member Progressive Pipeline Management & PPM Site Services shares his thoughts on 12 months of the COVID-19 pandemic from virus decontamination into pivoting to provide much needed USA-made PPE and COVID-19 testing for businesses and communities.

David Wickersham, CEO, Progressive Pipeline Management & PPM Site Services

In late February 2020, I was in the New York-Presbyterian Hospital emergency room in New York City. My mother-in-law was in need of an ER visit. I brought her since my wife was in Walt Disney World about to run the Princess Half-Marathon.

The waiting room and lobby were overcrowded, with doctors everywhere and people coughing. CNN was on TV in the waiting room. We saw news stories about a virus in China and a few early cases in the USA. A young intern in NY Pres scrubs tapped me on the shoulder and pointed to the TV saying, "Keep your eye on this. It is going to get bad."

I will never forget that moment. How right he was. In a few days, the world had changed. It was my 50th birthday.

I was involved in emergency hazardous material response before starting Progressive Pipeline Management (PPM.) My first job out of college was at the National Response Corporation (NRC) that provides national oil spill response with a dedicated network of owned and sub-contracted resources. We were quite busy in the mid-1990s post Exxon Valdez and I started to realize some of our largest oil spill clean ups were coming from pipelines. Learning about pipeline safety and integrity led me to URS, a large civil and environmental engineering company, helping companies comply with pipeline regulations.

While working PCB decontamination for natural gas pipelines, I stumbled upon the Starline(r) cured-in-place-lining (CIPL) technology in Philadelphia. I was very intrigued by this technology and an opportunity arose, and I took it. CIPL is a proven, cost effective trenchless technology that extends the life of a pipeline by 100 years. PPM started in 2002, focused on renewing natural gas pipelines in challenging situations including highways, bridges, railroad lines and environmentally sensitive areas- serving our valued clients in public utilities and gas distribution.

Parallel to the pipeline renewal work, we continued offering environmental response and site services for natural disasters and remediation. We were there for hurricane responses, the avian bird flu in the Midwest, oil/chemical spills and cleaning AMTRAK tunnels and stations.

In early March 2020, we started getting calls requesting decontamination services for the coronavirus. We deployed crews to the US Capitol and other prominent buildings in DC, and major retailers such as Whole Foods and Costco. By the end of March we had contracts with our larger clients from Florida to Boston to clean and decontaminate buildings, vehicles, offices and warehouses. Rapidly deploying resources, we researched the best products and services for decontamination, as well as how to properly protect our Haz-Mat Strike Teams.

PPM SITE SERVICES
BIOHAZARD STRIKE TEAM
www.ppmsiteservice.com

DECONTAMINATION SOLUTIONS

We went into a deep dive to learn about the virus and find the best and safest products to combat it. As first responders, protecting our workers against the virus and keeping them safe while on the job was number one. Our research and testing also focused on the best disinfectants and solutions to deploy to clean and disinfect our client sites for protection from the virus. The full range of cleaning options are on **www.ppmsiteservices.com**.

One fantastic disinfectant product is BioGlove. It was created by a Navy Seal in 2009 to combat SARS. It's an

anti-microbial spray, 95 percent water but alcohol-free, and triclosan-free. We weaponize BioGlove in an electrostatic sprayer that puts up to a 28-day barrier on a surface. It's not a sanitizer, nor a glove. All of our vans, all of our trucks, hotel rooms, office areas, bathrooms etc., are treated with BioGlove every three weeks. We've had zero infections originate from Progressive Pipeline Management or PPM Site Services work.

With BioGlove, customers don't need crews cleaning every day. It's a fantastic disinfectant, effective for ambulances and hotel rooms, retail and high trafficked surfaces. We've been using it in major NYC restaurants, schools, churches and with local law enforcement and EMT squads.

There is a personal BioGlove product as well, an anti-microbial spray that applies in a light, dry spray on the skin. Other sanitizers are alcohol-based, and tough on skin and surfaces. BioGlove is not. Every day I spray it on myself and on my mask. It lasts up to 12 hours per application. Spray once in the morning and you're done. It has been tested on over 300,000 people. It also protects against other viruses and bacteria including sars, e.coli, fungi, and streptococci.

THE CALL FOR PPE

With up to 400 employees and contractors cleaning in contaminated zones, or at the frontlines on pipeline projects, we had to develop our own aggressive PPE program. It was an overwhelming surge, but that is what happens in an emergency response. Research points to mask wearing as one of the best ways we're going to get through this.

After check-in, tests are performed by a medical professional

"PROTECTING OUR WORKERS AGAINST THE VIRUS AND KEEPING THEM SAFE WHILE ON THE JOB WAS NUMBER ONE."

"Mobile Business Testing Available - Let us come to you!"

Which mask is the best? Hands down, the Kimberly-Clark NIOSH-certified, USA-made N95 mask is the best mask on the market. It's an unknown secret. We heard in much of the media not to buy an N95 because they are needed for hospitals. This Kimberly-Clark N95 mask was designed for industrial and general purpose use, not for medical use. It is manufactured of the same medical grade and certification. If you wear one N95, that is all you need. It's what our employees use every day, and I am proud to say we have had zero infections for our workers in the field in New York, New Jersey, Philly and other hot spots.

A couple of our people were called out for symptoms. We quarantined them, tested them and they were negative. The couple of positives within the company have been traced back to family and other group gatherings.

We source and buy the products that we think are the best in class, because they deserve to be protected. We worked a deal with the distributor and Kimberly-Clark for USA made N95 certified masks. I knew masks were going to be around for a long time, so we upped our quantities.

FIRSTCALL PPE
TESTHERE .COM

"DAVE, WILL YOU SELL US THESE?"

Customers on industrial sites and gas utilities started asking advice on PPE products we were using, and whether we could sell the product to them. We pivoted again and started F**irst Call PPE www.firstcallppe.com** to offer quality personal protective equipment with competitive pricing. First Call focuses on USA-made products that we use and own.

In addition to N95 Masks and BioGlove, the next piece to the pandemic puzzle

"Drive-Thru model gives patients a convenient, fast, and safe testing experience"

to protect our workers and their families was COVID-19 testing. We learned the difference between PCR, Antigen and Antibody testing. We started Rapid Antibody testing backed up by a molecular PCR test by partnering with several of the best National Labs.

Critical issues about testing are distinguishing the type of tests, how to use the tests and understanding the accuracy. There are different tests and test kits from all over the world. The only test kits we use have been authorized by the FDA under the Emergency Use Authorization (EUA). That path led us to seeing another gap in the market for testing, both for businesses and public test sites.

TESTHERE.COM

In our quest for test kits and best practices, I was introduced to Dennis Guadenzi, who owned and operated a successful event planning and marketing business. As his industry is one of the most severely hit during this pandemic, he looked to pivot and help provide PPE solutions in a principled way. We launched **TestHere.com** on Dec 1, 2020 and set up a web based model for safe, convenient and efficient drive-through test sites. We were looking at the safety of employees during testing, and had seen companies where they've had several hundred people standing in line. The six-foot spread goes away, and people are standing for a long time. Testing was becoming a spreading event.

Safe convenient and effective drive-thru testing sites are set up in parking lot

Dennis and I felt we each uniquely had a skill set that complimented the other and that we could provide a better testing option than what we had seen. With RVs and our drive-thru model, we've tested over 15,000 people since December with our sites in New Jersey and Virginia. We are adding more sites in these states as well as Dallas, Houston and New Orleans in March.

Our testing process is fully compliant and transparent following reporting requirements for positive and negative outcomes through State requirements. Any testing for COVID-19, has to be reported to the CDC and state according to specific guidelines. We formed relationships with national and local labs and best-in-class testers. First Call has obtained all required CLIA laboratory licensing and works directly with each state we operate in.

Businesses and our customers have turned to us for help navigating the complexities of testing and for counsel about the frequency, strategy and management. We can set up testing sites for companies or organizations in

"I AM PROUD TO SAY WE HAVE HAD ZERO INFECTIONS FOR OUR WORKERS IN THE FIELD IN NEW YORK, NEW JERSEY, PHILLY AND OTHER HOT SPOTS."

Virginia, Pennsylvania, New York, New Jersey, Maryland, Louisiana, and Texas. The drive-through model is set up in a parking lot and we schedule out in fifteen minute increments. Employees do not leave their car and are not standing in line potentially spreading the virus. We are doing testing programs for various small, medium and large sized businesses.

We offer multiple tests. With the rapid antigen testing, a patient knows if they are positive or negative within 10 minutes. It's great for community testing. PCR tests are often called the "gold-standard" of tests, and rightly so. Molecular diagnostic tests, like PCRs, test the sample to check for virus in the genetic material and must be run at a laboratory. The PCR is the typical requirement for international travel, college campuses, and medical procedures. Our PCR test has quick turnaround time for results, with same or next day options. This is different from the four day PCR test offered at larger retail chain test sites. Antibody testing is also available, with results in 15 minutes.

GIVING BACK

For those who cannot afford it, we have made a number of donations, well over half a million dollars in give-backs in donated masks, wipes, BioGlove and testing. Our crews have also been out doing cleaning and decontamination for churches, schools, EMT, police stations and fire houses at no cost.

In our Atlantic Highlands, NJ test center, EMTs and first responders get tested for free. We've issued free tests, and there are multiple stories of our team out testing on holidays and in homeless shelters. We've done cleaning programs in New York City with Guardian Angels and the founder Curtis Sliwa. And we are currently working with the Baltimore Guardian Angels and their Commander, Marcus "Stryder" Dent in putting together a pro-bono COVID-19 testing weekend with free PPE, testing and an educational outreach to some of the areas that don't have access. The local community, city and elected officials work closely with us. Marcus, one of our Haz Mat Strike Team Managers, has been on the front lines of our response efforts.

Medical staff practice safety protocol to ensure each test is processed accurately

Storefront test center, Atlantic Highlands NJ. EMTs and First Responders are tested for free

"OUR CUSTOMERS HAVE TURNED TO US FOR HELP NAVIGATING THE COMPLEXITIES OF TESTING."

Beating the virus is 100 percent about good and safe work practices."

"WHEN'S IT GOING TO END?"

I don't think coronavirus is going to end, in the proverbial sense, but will remain with us as the virus mutates into new strains and variants. Beating the virus is absolutely possible, in my opinion, but will be 100 percent about managing it with good and safe working practices. Based on our real world success on stopping the spread and zero infection rates, our corporate COVID-19 safety protocols will remain in effect regardless of the political pandemic football game being played. We will carry-on with USA Made PPE, COVID-19 Testing and aggressive Sanitization practices like BIOGLOVE, as we have for the past year.

In closing, I'd also like to single out all of our employees who have embraced and remain compliant with our internal procedures. The men and women at our collective companies, First Responders all, have performed so well during such a difficult year. **I could not be more proud of each and every one of you! #ppmstrong #whosyourFIRSTCALL**

ABOUT THE AUTHOR:

***David Wickersham**, Owner and President, formed PPM Site Services in August 2002, at the same time as Progressive Pipeline Management. First Call PPE was founded this May 2020 to respond to needs arising from the Covid-19 Pandemic. Dave is a Graduate of U.S. Merchant Marine Academy at Kings Point and Veteran of Gulf War One Operation Desert Storm.*

FIRSTCALL PPE

TESTHERE.COM

PROTECTING YOUR BUSINESS!

Providing the best in PPE, On-Site Testing, and Site Clean Up

Let our team bring safety and peace of mind to your team! Always available **USA Made** products include Industrial-Grade NIOSH N95 masks, Surface Disinfectant, Hand Sanitizers, Wipes and more. Quality site cleanup and decontamination services are ready to deploy. Our on-site COVID-19 testing teams are equipped to serve your business needs quickly and conveniently.

WE CAN COME TO YOU!

FOR MORE INFORMATION or TO PLACE AN ORDER VISIT US ONLINE AT: www.FIRSTCALLPPE.com

VIRTUAL STUDENT NAVIGATES TRENCHLESS TECHNOLOGIES

UMass Lowell NASTT Student Chapter Report

By: Violet Smith (Student) and Dr. Raj Kumar Gondle (Faculty Advisor)

NASTT-NE Scholarships awarded virtually to four students from UMass Lowell

I joined the UMass Lowell student chapter in the spring of 2020. Unfortunately, two months after I joined, COVID-19 spread throughout the country, and everything went virtual. Normally, during this time, we would be prepping for the Spring No-Dig Show, registering students, and getting organized. That year's NO-DIG 2020 Show was set to take place in Denver, Colorado, and the whole chapter was thrilled to have the opportunity to go. We were all set to fly out after we returned to campus from our Spring break. However, we never returned from our Spring break.

In the beginning of the Semester, I attended my first meeting, held on campus in the brand-new Environmental Engineering wing, Perry Hall. Seeing everyone's faces was routine at the time, I had no idea how much I would miss it. The meeting went very well as we discussed upcoming events for us to attend, including field site visits to observe trenchless techniques being used locally. That was going to be my first live introduction to the industry. Then, as we entered March and people started to become more wary of this strange new virus going around, events started getting delayed. "That's okay, it will be just a couple extra weeks," I remember everyone thinking, so positively. Then, the UMass Lowell Campus officially shut down for the rest of the semester. Shortly after, we received the news that the NO-DIG Show in Denver would no longer be taking place. At this point, I had been involved in the chapter for a few months and had only seen my fellow chapter member's faces a handful of times and had yet to see what Trenchless Technologies really means. The semester slowed down, with a few virtual events happening through the university, and Zoom lectures pushing us through to the end. The student chapter did not slow down. We looked forward to the next semester with open minds and began planning for new ways to grow our chapter, even if we stayed virtual.

This year has been great, all things considered. I still have not seen most of the other members, but we have been meeting even more frequently than we had when we were on campus. Our elections took place in the Fall semester as they normally would, with everyone obtaining the positions they ran for. I was elected Secretary. We all took our oaths to the chapter's constitution via Zoom. Around this time, four of our student members, including myself, applied for the **NASTT Northeast Student Chapter Scholarships**. All four of us were awarded the scholarships at a virtual meeting with several industry heads. This helped raise the spirits of our student group even more. Virtual events seemed more organized this semester, as well as virtual class structure. With the improvements to online campus activity, we were able to reach more of the student body to teach them about our chapter and how they can get involved. The Civil and Environmental Engineering Open house took place in early December. Our President, our Treasurer, and I, accompanied by our faculty advisor, Dr. Gondle, were able to be on campus to give prospective students a virtual tour of our department, as well as share extensively about our chapter. We carried this same energy to our classes and to other virtual department meetings. This spring, we were very happy to see several new faces at our meetings.

Now our focus is on engagement for the future. This past year has been difficult,

"OUR CHAPTER IS VERY PROUD OF THE AMOUNT OF EXPERIENTIAL LEARNING WE CAN OFFER OUR MEMBERS."

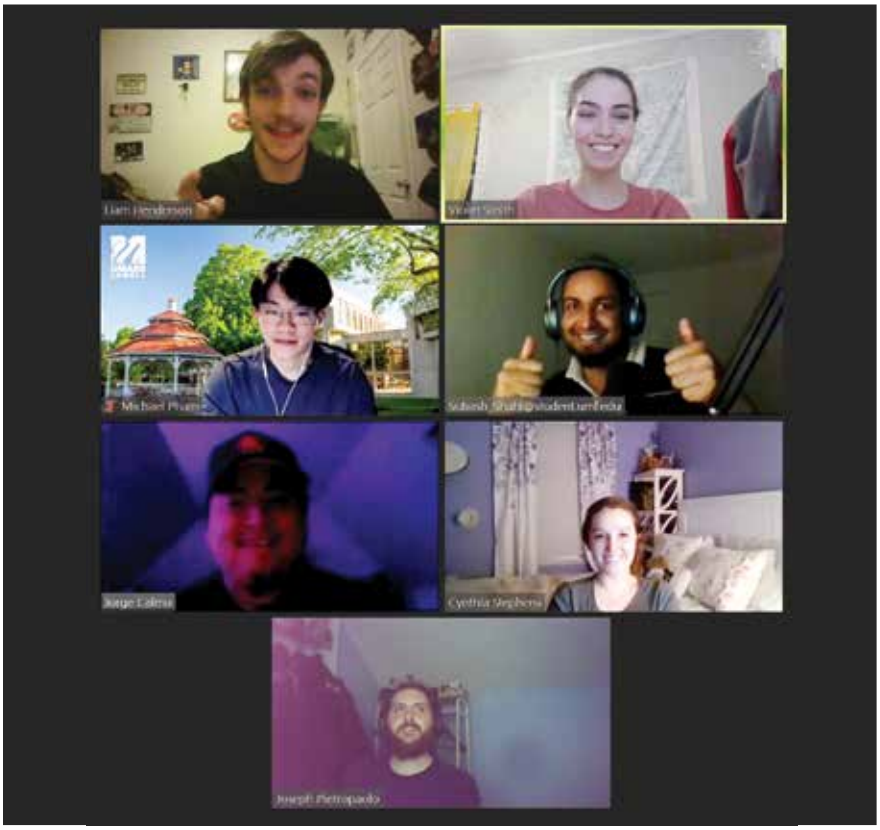
NASTT Student Chapter Engagement Expo

especially for me. I have not been able to attend any industry events since joining the chapter. Our chapter is very proud of the amount of experiential learning we can offer our members. With site visits, guest speakers, and attending conferences, students can graduate with a well-versed knowledge of the industry already. However, as the chapter's first fully virtual student, I am sad to say that I missed out on many of these experiences. My knowledge of the industry consists of previous publications and digital models paired with some pictures from field visits. I have heard all about Horizontal Directional Drilling, pipe bursting and more, but I have struggled to picture them or their applications. This distance from the industry is the biggest difference between me and the other members. This is changing, though, as we are designing scale models of the industry's technologies for our chapter to use at various engagement events. Planning these models has helped me understand the industry much more and has even helped me visualize what a work site might look like, or how one might operate. It is exciting to see the pieces come together; even more exciting to be able to share that with new members.

Coming up for our chapter is the Orlando NO-DIG 2021 Show. This will be my first time attending a live event with the NASTT. I am thrilled to be able to have this opportunity to meet with industry professionals, as well as learn all there is to know about the trenchless industry. This type of experiential learning is what I was missing most being a virtual member. As a chapter, this is a big moment for us this year. This will be the first time all our elected members will be able to meet in person since going virtual. We are looking forward to networking with industry professionals and learning about the different applications in the trenchless industry and how we might use them in future projects. Going to this event will be a great way for all of us to come together with fresh minds and brainstorm new ideas to help grow our chapter back on campus as well as within the NASTT.

Going forward, I will be the longest remaining member of our student

WE ARE DESIGNING SCALE MODELS OF THE INDUSTRY'S TECHNOLOGIES



UMass Lowell Student Chapter meeting. Pictured (Left to Right, top to bottom): Liam Henderson- Student Chapter President, Violet Smith- Student Chapter Secretary, Michael Pham, Subash Shahi, Jorge Calmo- Student Chapter Vice President, Cynthia Stephens, Joseph Pietropaolo- Student Chapter Treasurer

Students on campus working in a social distancing set up. UML NASTT Student members Cynthia and Subash (far right) working together in Geotechnical Lab

chapter, as several of our members will be graduating this Spring. It will be my job to lead the new group of members at UMass Lowell in the trenchless industry. I hope to make long-lasting connections with industry professionals as well as other student chapters at the upcoming NO-DIG show, as well as other live events, to help me with this transition in the Fall. The last year has been full of new experiences and styles of learning, but our chapter is ready to get back out in the field and attending more conferences. I have learned a lot from my virtual experiences, but there is more to be learned by getting involved with the industry.

"Violet Smith is relatively a new member of the NASTT Student Chapter who has some experience with Robotics adding multidisciplinary approach to solving real-world engineering problems. Despite a challenging year for most of us, it's nice to see motivated students like Violet coming out of the zoom black boxes and actively engaging in student activities. We will continue to encourage more students and be accommodating as we are planning together to return safely on campus soon." Dr. Gondle.

Thank you!!! We appreciate your hard work and dedication to Trenchless Technology in the Northeast!

ABOUT THE AUTHORS:

Violet Smith *is a junior in Environmental Engineering program at the University of Massachusetts Lowell. She is currently the secretary of the NASTT Student Chapter.*

Dr. Raj K. Gondle *is an Assistant Teaching Professor in the Department of Civil and Environmental Engineering at the University of Massachusetts Lowell (UMass Lowell). He serves as a faculty advisor for the NASTT Student Chapter. He was recognized with the 2020 UMass Lowell Departmental Teaching Excellence Award and the 2017 ASCE ExCEEd teaching fellow. Dr. Gondle is genuinely committed to student learning, devoted to student clubs/chapters, and inspirational to UMass Lowell's student body with his optimistic and bold vision for student success.*

Student Success – From the Dean

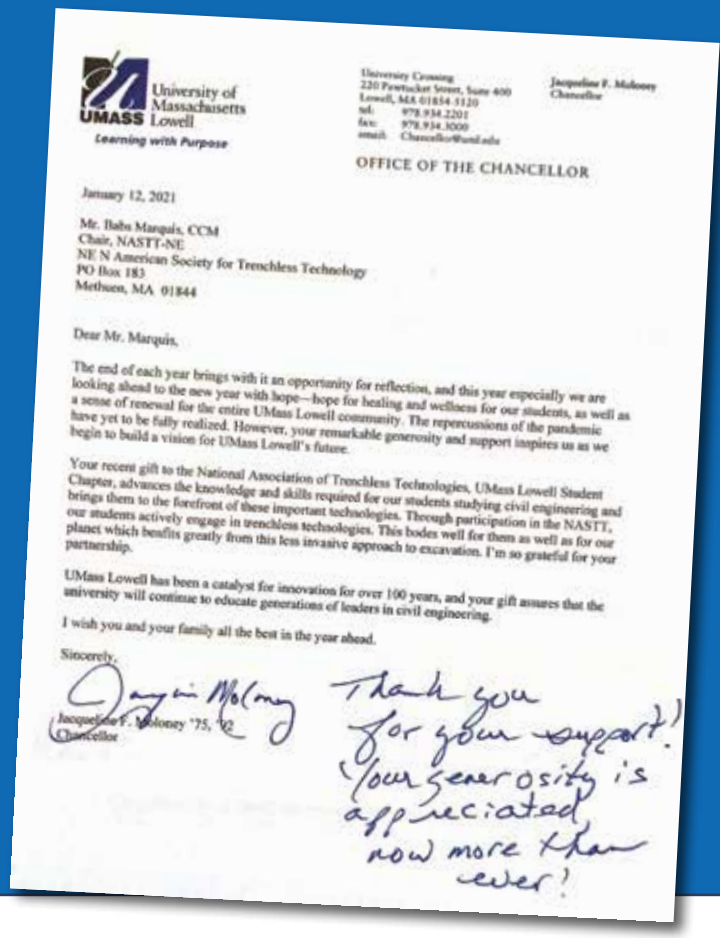
UMass Lowell NASTT Chapter Wins $6,000 in Scholarships

The North American Society for Trenchless Technologies (NASTT) Student Chapter at UMass Lowell is excited to share stories about its accomplishments and recent developments. The UMass Lowell NASTT Student Chapter was established in 2016 and gives students the opportunity to learn about the world of trenchless technology.

Students can meet industry leaders, interact with trenchless professionals, and gain experiential learning. Assistant Teaching Professor Raj Kumar Gondle of the Department of Civil & Environmental Engineering (CEE) established the NASTT Student Chapter with help of Professor Pradeep Kurup, CEE Department Chair, and Dennis Doherty, a National Practice Leader in Trenchless Technologies and UMass Lowell graduate. Gondle serves as the faculty advisor for the chapter.

The NASTT Student Chapter continues to receive support from the NASTT national office and industry leaders from the Northeast. The Northeast Regional Chapter offered scholarships to four students for the Spring term of the 2020/2021 academic year: Connor Sullivan, Joseph Pietropaolo, Liam Henderson and Violet Smith. The Scholarships are competitive, and the awards can be used by students towards tuition, academic fees, books, electronic media, or computer hardware required to successfully complete their schoolwork.

-Dr. James A. Sherwood,
Ph.D., Dean,
James B. Francis
College of Engineering



University of Massachusetts Lowell
Learning with Purpose

University Crossing
220 Pawtucket Street, Suite 400
Lowell, MA 01854-5120
tel: 978.934.2201
fax: 978.934.3000
email: Chancellor@uml.edu

Jacqueline F. Moloney
Chancellor

OFFICE OF THE CHANCELLOR

January 12, 2021

Mr. Babs Marquis, CCM
Chair, NASTT-NE
NE N American Society for Trenchless Technology
PO Box 183
Methuen, MA 01844

Dear Mr. Marquis,

The end of each year brings with it an opportunity for reflection, and this year especially we are looking ahead to the new year with hope—hope for healing and wellness for our students, as well as a sense of renewal for the entire UMass Lowell community. The repercussions of the pandemic have yet to be fully realized. However, your remarkable generosity and support inspires us as we begin to build a vision for UMass Lowell's future.

Your recent gift to the National Association of Trenchless Technologies, UMass Lowell Student Chapter, advances the knowledge and skills required for our students studying civil engineering and brings them to the forefront of these important technologies. Through participation in the NASTT, our students actively engage in trenchless technologies. This bodes well for them as well as for our planet which benefits greatly from this less invasive approach to excavation. I'm so grateful for your partnership.

UMass Lowell has been a catalyst for innovation for over 100 years, and your gift assures that the university will continue to educate generations of leaders in civil engineering.

I wish you and your family all the best in the year ahead.

Sincerely,

Jacqueline F. Moloney '75, '92
Chancellor

Thank you for your support! Your generosity is appreciated now more than ever!

TRENCHLESS TECHNOLOGY PROTECTS TIDAL MARSHLANDS

Sea Street Epoxy CIPP Project in Town of Wareham MA Proves Beneficial

Trenchless technology has proven to be beneficial for the beautiful seaside community of Wareham MA, used in repair projects that protect the sensitive coastal habitat while also improving the resiliency of the sanitary sewer system for future generations. With 54 miles of sandy beach coastline, maintaining the wastewater collection system in a state of good repair is crucial because any exfiltration damages the delicate ecology of the estuarine marshland, impacting the shellfish beds, cranberry bogs, and the commercial/recreational fishery.

The Town of Wareham retained the BETA Group to design and oversee construction on a recent project to line 1900LF of 8- to 10-inch ductile-iron pipe along the Sea Street beachfront. The project is a prime example of the benefits that can accrue to smaller coastal communities from the use of trenchless technology in infrastructure rehabilitation projects. It also demonstrates how the twin challenges of tidal influence and a high water table can be successfully overcome. Through this, and previous projects, the Town has developed a good working knowledge of the efficacy and cost savings that arise from using an epoxy CIPP liner to provide structural rehabilitation of gravity sewer pipe.

Trenchless Technology is essential in reducing the impact of underground construction work on local residents and minimizing disruption to their daily lives. Wareham is a densely populated beachfront community with narrow streets, and the population doubles to 44,000 residents in the summer. Any underground construction work performed requires a very compact site footprint.

Much of Wareham's sewer network is 15-16 feet deep with a tidally influenced 6- to 8-foot groundwater level and soil with a high hydraulic conductivity. This makes dewatering necessary, and open excavation sewer replacement work more difficult and cost prohibitive.

Tidal influence and high water table levels presented big challenges during construction. Installations were limited to a 6-hour low-tide window, lining approximately 300LF segments of pipe per day, in a tightly choreographed process.

Rollers and mud mats were used to protect sensitive beachfront environment during installation of the CIPP liner below Sea Street, threading between the narrowly-spaced beachfront homes. Vehicles and equipment were located in the roadway approximately 100 – 300 feet away from each manhole.

Due to the tidal influence bringing the liner into contact with colder seawater, steam curing times were increased to compensate. Curing time for most segments took nearly two hours.

To finish the monolithic system and make it resistant to I&I, all 12 manholes were spray coated with 350mm epoxy spray using the same low toxicity aquatic safe epoxy that was used for the liner. Curing of the epoxy was assisted using a heater mounted at the top of the manhole. The complete CIPP system guaranteed the protection of the local ecology, with the pipe completely submerged in the ocean. The Town has acquired valuable experience in using expoxy CIPP to re-establish a pipe's structural integrity when situated below a tidally fluctuating water table.

The Sea Street CIPP rehabilitation effectively created an ecologically benign monolithic lining host-bonded structural system that will protect the Wareham sanitary sewer system and town's oceanfront for many years to come. Manufactured by Warren Environmental, the low-toxicity zero-VOC epoxy CIPP products used are rated as aquatic-safe and presented no residual odor on or near the site.

Vitally important that the marshlands and waterways of the Town are protected. The wildlife, estuarine habitat, and the commercial and recreational fishing opportunities, are all worth preserving for the continued enjoyment of Wareham residents and guests for generations to come. This project highlights the importance of local municipalities being aware of the impact rehabilitation methods have on the surrounding environment and the necessity to find solutions which will eliminate those impacts.

Guy Campinha Sr. *is Director of Water Pollution Control for the Town of Wareham, and a longtime proponent of the benefits of Trenchless Technology methods. A currently serving member of the NASTT-NE Board of Directors Guy is a tireless advocate for preserving Wareham's beautiful natural environment, and for using trenchless methods to achieve this goal. Thank you Guy for your care, positive proactive thinking, and hard work on behalf of your local community!*

APRIL 10-14 | MINNEAPOLIS, MN

NO-DIG SHOW 2022

Call for Abstracts

Submission Deadline: June 30, 2021



The North American Society for Trenchless Technology (NASTT) is now accepting abstracts for its 2022 No-Dig Show in Minneapolis, MN at the Minneapolis Convention Center on April 10-14, 2022. Prospective authors are invited to submit a 250-word abstract outlining the scope of their paper and the principal points of benefit to the trenchless industry. The abstracts must be submitted electronically at NASTT's website by June 30, 2021: nastt.org/no-dig-show.

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

Potable Water and Pressure Systems

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

Wastewater, Storm water and Non-pressure Systems

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

Energy Pipeline Systems

- Pipeline Inspection, Locating, and Condition Assessment
- Aging System Rehabilitation
- New Trenchless Installation
- Standards and Regulations

Trenchless Research and Development

- University and Industry Initiatives
- Education and Training

Industry Issues

- Subsurface Utility Engineering
- Submittal Requirements and Quality Assurance/Quality Control
- Project Budgeting and Prioritization
- Funding for "Green" Technologies
- Selection Criteria for Contractors
- Social Costs and Impacts
- Carbon Footprint Reduction
- Sustainable Construction Practices
- Industry Trends, Issues and Concerns
- Differing Site Condition Claims

New Installations – Tunneling, Boring and Pipe Ramming

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

Horizontal Directional Drilling (HDD)

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

Microtunneling

- New Concepts and Applications for Microtunneling Equipment, Materials and Methods
- Case Studies

Questions?

Please contact:

Michelle Hill
NASTT Program Director
E: mhill@nastt.org
P: 888-993-9935

For more information visit

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.

SPRAY-IN-PLACE PIPE REHABILITATION METHOD EXTENDS LIFE OF WATER MAINS

By: Audrey Leamy, SUEZ

Camera inspection before lining

As a community's water infrastructure ages, its many buried pipes approach the end of their useful life, and the incidence of leaks and water main breaks escalates. This results in an increase in water loss and costly repairs, thus causing disruption to consumers and the local economy.

In fact, problems with aging infrastructure cost municipalities hundreds of millions of dollars each year in maintenance, repair, replacement costs, and shutdowns. The deterioration of pipes causes water quality issues, like pipe corrosion and tuberculation in steel, cast iron, and ductile iron pipes, and the buildup of biological material.

Maintaining infrastructure assets such as water mains in a fit-for-purpose condition is a critical aspect of utility management. Today, pipeline asset management programs, which help communities optimize these assets as well as their annual pipe renewal budget, have become increasingly important. Moreover, advanced solutions such as the Spray-in-Place Pipeline (SIPP) rehabilitation process offered by SUEZ, provides a new tool to extend the life of existing underground pipes while creating an alternative to the traditional solution dig-and-replace pipe or direct replacement. With SIPP, no major road or sidewalk tear-ups are necessary.

AN INNOVATIVE PROCESS

SIPP is an efficient and long-lasting pipe rehabilitation solution that scrubs underground pipes clean and then uses a state-of-the-art, computer-controlled robotic spray rig to apply an internal epoxy pipe lining on-site, to an already existing host pipe. The epoxy coating applied by SUEZ is NSF 61-approved for use in potable water systems. Once it has cured, the epoxy lining seals the pipe, preventing leaks and water contamination, and extending the pipes' service life.

This solution also minimizes future maintenance costs and increases the flow capacity for greater system efficiency, most important for firefighting.

Importantly, SIPP eliminates the need for major road or sidewalk tear-ups, requiring only a series of small access excavations along the pipeline to be rehabilitated. This process can be used

Pipe cleaned by drag scraping

SIPP Spray Head

to rehabilitate pipes made of different materials including cast iron, steel, and ductile iron, working in diameters ranging from 4 inches to 36 inches.

The SUEZ SIPP rehabilitation process consists of several steps:

- The first step is to agree with the utility on the access point locations to be used for the SIPP process. A small access pit is excavated one foot below the host pipe. A three-foot section of the host pipe is removed to allow access to safely launch the lining equipment inside the existing host pipe. A CCTV inspection is performed to analyze the condition of pipe to be restored.
- Next, the pipe interior is prepared for restoration by drag scraping and/or hydro-jetting to create a clean, smooth dry surface.
- A second CCTV inspection follows to determine if there are any leaks, groundwater infiltration, or repairs that are needed outside of the SIPP scope of work. If so, any such repairs are done without requiring additional excavation. This process ensures

Pipe relined

that the pipe is properly prepared for the next step – the epoxy coating.

- The epoxy coating is applied to the interior of the host pipe using a computer-controlled robotic spray application rig to ensure a uniform coating at the correct ratios and the desired thickness. Once cured, this coating creates an internal seal that prevents leaks and helps protect against future corrosion and biological buildup. Because the epoxy coating bonds with the pipes, it also seals cracks and protects against the development of infiltration in the future. The two-component, 100% solid epoxy system used to coat water distribution systems exceeds ANSI/NSF 61 standards. The epoxy coating is a Zero VOC material with certified zero fish kill.
- A final CCTV inspection is performed to confirm the quality of the lining. The pipe can then be reinstated. The utility proceeds with the chlorination/disinfection before system restoration.

SIPP AND THE CITY OF WYANDOTTE, MICHIGAN

A look at the program utilized by the city of Wyandotte in southeastern Michigan provides insights into how SIPP works.

The city of Wyandotte is located approximately 11 miles south of Detroit. Situated on the Detroit River, its water source, it is part of the collection of communities known as Downriver. In 1867, the village of Wyandotte – a flourishing industrial community – was incorporated as a city. Twenty-two years later, the residents created the Wyandotte Municipal Water Utility to provide fire protection and a convenient, safe source of drinking water.

The Wyandotte Municipal Water Plant serves over 12,000 customers and can produce up to 15 million gallons of water per day. The distribution system consists of 110 miles of water mains ranging from 4 inches to 30 inches in diameter. Eighty hundred fifty fire hydrants throughout the community provide fire protection. The water system has a 500,000-gallon elevated storage tank and 4.5 million gallons of ground-level storage for peak demand periods such as fighting fires or other emergencies. The Wyandotte Municipal Water Utility has annual revenues of over $3.5 million and sells over 1.5 billion gallons of water annually.

According to Bill Weirich, Superintendent of the Wyandotte Water Department, the utility's traditional method of maintaining the water mains was open cutting and direct replacement, which entails trenching the entire length of pipe to be repaired or replaced and laying down new pipe in the trench. The downsides of this method are the high cost, the lengthy time involved in the process, and the disruption and inconvenience that customers encounter.

The presence of underground utilities presented another difficulty with the open cut and direct replacement method. "Having all the other utilities underground makes it almost impossible to relocate your mains without running into gas and electric, and we also have underground cable," Weirich says.

However, Weirich had heard about the SIPP process offered by SUEZ, with which Wyandotte already contracted to provide water tower maintenance through its Asset Management Program. "We started looking into SIPP and decided to give it a try on small areas and see what happened," he recalls.

At Weirich's suggestion, Wyandotte elected to use this system for pipe maintenance in the older part of the township. With aging cast iron pipes that dated back to the 1930s through the 1950s, this area had experienced numerous water main breaks and faced the potential for more. Wyandotte intended to remediate the aging infrastructure through SIPP with the goal of extending the life of the pipes by another 50-75 years.

Weirich describes how the process worked on the section of pipes marked for the SIPP. "We took some main on which we had about 10 to 15 repair clamps. We did three parts of the system – a four-inch pipe and two six-inch pipes. With the SIPP program, we were able to open up three holes to remediate the pipes rather than open cut the whole area and replace the main," he says.

After locating the pipe next to a valve on each end, SUEZ inserted a receiving pit for the robotic device that applied the epoxy coating. After one section was done, the valve was replaced, and spraying of the lining continued down the line to the next valve, and so on.

Weirich notes that "In essence, we were lining the pipe and

putting in two new operational, more up-to-date valves to replace the older ones that dated back to the 1950s. This gives us a more reliable way to shut the system down. And by sealing the inside of the pipes, I think we've greatly reduced the likelihood of main breaks in that area."

RESULTS

According to Weirich, the SIPP program has yielded numerous benefits.

"In all, Wyandotte rehabbed approximately 3,500 feet of main in only about one month. If we would have open cut that, we would have likely worked on it all summer," he says. He also notes that "We were getting only about 1500-2000 feet for the same amount of money with the open-cut method."

"When we talk about cost savings with SIPP, we compare it to traditional dig-and-replace pipe, or direct replacement, where you dig up the entire length of the pipe that needs attention and replace it all. That causes a lot of disruption, whether you're digging up a roadway, someone's yard, driveway, and so forth. We estimate that, on average, SIPP can yield a cost saving of about 30 percent when compared to direct replacement," he says.

Weirich also notes a benefit that transcended cost: the ability to minimize inconvenience to consumers by using SIPP rather than open cut and direct replacement. "I look at SIPP as being unobtrusive to the customer because you are not creating a major construction zone. We try as much as we can to prevent inconvenience our customers."

Because it is a trenchless technology application, SIPP requires only two access points: the first point, where the equipment is inserted, and the second at the other end of the segment – the discharge – where equipment is, in essence, attached and pulled through. And because only very small access points are required, disruption is minimal. There is no need to dig up the whole length of the road. SIPP is great for applications underneath railroads, interstates, highways, buildings, and so forth. That provides a huge benefit to communities and their customers.

"I believe we were the first water department in Michigan to use SIPP. That's why we started small, so we could make sure that the process was going to work. We took a worst-case scenario to see how this would work. Going forward, we're going to expand on where we started and begin expanding out to the whole system from those three points," adds Weirich.

ABOUT THE AUTHOR:

Audrey Leamy *is Project Manager for Concrete, Plant, and Pipeline Services for the Advanced Solutions division of SUEZ North America.*

GUIDELINES FOR USE OF MINI-HORIZONTAL DIRECTIONAL DRILLING FOR PLACEMENT OF HDPE PIPE FOR WATER APPLICATIONS

By: Dr. Lawrence M. Slavin, Outside Plant Consulting Services, Inc.

ABSTRACT

A set of guidelines for the use of mini-horizontal directional drilling (mini-HDD) has been developed by the Municipal Advisory Board (MAB) of the Plastics Pipe Institute (http://plasticpipe.org/pdf/mab-7-mini-hdd-guide.pdf). Previously available as Technical Report TR-46, published in 2009, the recently issued and revised *MAB Guidelines for Use of Mini-Horizontal Directional Drilling for Placement of HDPE (PE4710) Pipe in Municipal Applications*, emphasizes the implementation for water projects, and provides detailed information for both IPS and DIPS size pipes, constructed of the latest PE4710 material.. The new document is intended to provide information analogous to that provided in ASTM F1962, *Standard Guide for Use of Maxi-Horizontal Directional Drilling for Placement of Polyethylene Pipe or Conduit Under Obstacles, Including River Crossings*, but at a level appropriate for the less complex mini-HDD technology and typical project characteristics.

BACKGROUND

ASTM F1962 provides overall guidelines, addressing preliminary site investigation, safety and environmental considerations, regulations and damage prevention, bore path layout and design, implementation, and inspection and site cleanup for maxi-HDD operations. One of the significant contributions of ASTM F1962 is the provision of a rational, analytical method for selecting the polyethylene pipe strength based upon the estimated installation and post-installation (operational) loads on the polyethylene (PE) pipe.

While considered convenient and practical to apply by experienced engineers for a maxi-HDD operation, the equations and procedures provided in ASTM F1962 represent relatively complicated formulae, and an extensive tedious methodology, when considering smaller, lower cost operations associated with typical mini-HDD applications. Mini-HDD operations are often performed during an upgrade of a large community, comprising many individual installations, with any single installation not requiring or receiving extensive analysis. Nonetheless, some mini-HDD installations may be considered to be relatively critical, or approach limits with respect to the capability of the available drill rig and/or the strength of the product pipe being installed. Furthermore, any construction procedure must address basic safety rules, avoid damage to existing facilities, adhere to applicable government regulations, and consider environmental issues. The *MAB Guidelines for Use of Mini-Horizontal Directional Drilling for Placement of HDPE (PE4710) Pipe for Municipal Applications*, was therefore developed to serve as an inclusive document, providing practices for placement of PE4710 HDPE pipe using mini-HDD. Similar to the previous TR-46, it is anticipated that MAB-7 will become widely used for mini-HDD pipeline installations, serving a similar role as ASTM F1962 for maxi-HDD applications. The present guidelines may also be used for some midi-HDD installations, depending on the application and the judgment of the contractor or engineer.

DESCRIPTION OF MAB-7

Document MAB-7 comprises ten main sections, plus six Appendices and References:

- Scope
- Referenced Standards and Specifications
- Terminology
- Preliminary Site Investigation
- Safety and Environmental Considerations
- Regulations and Damage Prevention
- Pipe Design and Selection Considerations
- Bore Path Planning and Drill Rig Setup
- Implementation
- Completion
- Appendices (A – F)
- References

The scope includes the design, selection considerations, and installation procedures for the placement of polyethylene water or sewer pipe using mini-HDD equipment. (It is beyond the scope of the MAB-7 guidelines to provide detailed operational procedures for the various mini-HDD and auxiliary equipment. It is assumed that the contractor has gained the appropriate proficiency.) The

primary focus is on pipe constructed of high density polyethylene (HDPE) with a material designation code of either PE4710. Such pipe may be supplied in continuous lengths on a reel or discrete segments assembled together, typically by fusion, in the required length.

Of particular interest is the practical methodology for estimating the relevant forces and effects, based on the route geometry, facilitating proper selection of the pipe wall thickness, and the guidelines for proper drill rig positioning, consistent with meeting required placement depths and drill rod capabilities.

PIPE DESIGN AND SELECTION CONSIDERATIONS

In comparison to ASTM F1962, which is generally intended for use by experienced engineers for major maxi-HDD installations, MAB-7 contains a convenient calculation method appropriate for persons with various backgrounds, including the operators of mini-HDD equipment and/or the utility engineers. The procedure presented provides a means of selecting the pipe strength to avoid collapse due to hydrostatic pressure at the desired placement depth, as well as to withstand the required pulling loads during installation. The pipe strength is directly related to the wall thickness, as specified by its dimension ratio, DR, defined as the pipe outer diameter by the (minimum) wall thickness. The methodology is based upon a simplification of ASTM F1962.

Minimum Wall Thickness Based upon Depth

The guidelines indicate that essentially all the commonly used wall thicknesses (e.g., DR 7 to DR 17) for the HDPE pipe, with the possible exception of DR 17, would be sufficiently strong for depths to approximately 15 ft, the typical limit for mini-HDD installations. DR 17 should generally be limited to less than 10 ft, although 15 ft may be acceptable in some cases. For depths significantly greater than 15 ft, the adequacy of the product for the application should be verified using the information provided in the Appendix. The allowable depths assume an empty pipe during the installation and pre-operational phase, in the absence of internal fluids or pressure, which would offset the effects of the external pressure due to drilling fluid/slurry. Although some HDD installations, such as more complex maxi-HDD installations, or possibly some midi-HDD applications, may deliberately allow the pipe to be filled with water or drilling fluid in order to reduce pull loads due to buoyancy effects, as well as the net effective hydrostatic pressure, during installation, such practices are not typically employed in mini-HDD operations.

Minimum Wall Thickness Based upon Pulling Load

Table 1 and Table 2 provide the safe pull tension for HDPE (PE4710) pipe for a variety of sizes, for the IPS and DIPS systems, respectively. The pulling load (lbs) is based upon a safe tensile stress of 1,400 psi, considering a minimum tensile yield strength of 3,500 psi x 0.4 factor at 80°F, as applied to the pipe cross-section. This characteristic accounts for the effective cumulative tensile load duration on the pipe, assumed to be 1 hour, and a significant reduction relative to the nominal tensile test strength of HDPE to limit non-recoverable viscoelastic deformation. The

NORTH AMERICAN SOCIETY *FOR* TRENCHLESS TECHNOLOGY

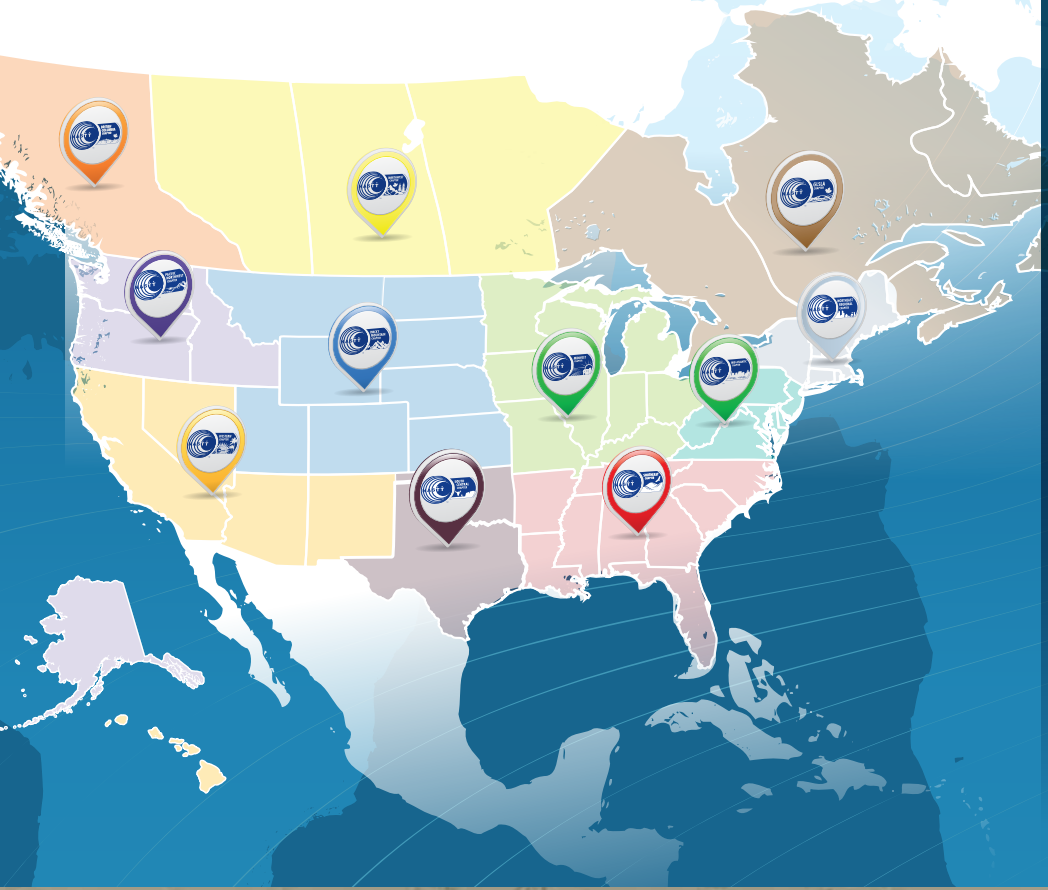
NASTT REGIONAL CHAPTERS

REGIONAL ISSUES, INTERNATIONAL SUPPORT

Contact your regional chapter today.

The grassroots of NASTT is a network of eleven regional chapters throughout the United States and Canada. Regional chapters network at the local level, share infrastructure challenges and develop new ideas. Regional chapters hold various events throughout the year, and like NASTT, are dedicated to the advancement of trenchless technologies for the benefit of the public and the environment.

With your NASTT membership you are automatically enrolled not only in the national and international organization, but also in your regional chapter. So join today and get to know the "local heroes" that are making their communities better places through the innovative engineering solutions of trenchless technologies.



REGIONAL CHAPTERS

British Columbia
nastt-bc.org
British Columbia

Great Lakes, St. Lawrence & Atlantic
glsla.ca
Ontario, Quebec, New Brunswick, Prince Edward Island, Nova Scotia, Newfoundland and Labrador

Mid-Atlantic
mastt.org
Delaware, Maryland, New Jersey, Pennsylvania, Virginia, West Virginia and District of Columbia

Midwest
mstt.org
Illinois, Indiana, Iowa, Kentucky, Michigan, Minnesota, Missouri, Ohio and Wisconsin

Northeast
nastt-ne.org
Connecticut, Maine, Massachusetts, New Hampshire, New York, Rhode Island and Vermont

Northwest
nastt-nw.com
Alberta, Manitoba and Saskatchewan

Pacific Northwest
pnwnastt.org
Alaska, Idaho, Oregon and Washington

Rocky Mountain
rmnastt.org
Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah and Wyoming

South Central
Oklahoma and Texas

Southeast
sestt.org
Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee and Puerto Rico

Western
westt.org
Arizona, California, New Mexico, Nevada and Hawaii

nastt.org
North American Society for Trenchless Technology
14500 Lorain Avenue #110063 • Cleveland, Ohio 44111
Phone: 888-993-9935

Here's Why PE 4710 Pipe is the Best Solution for Water Systems

With 100-year design life, zero allowable leakage and the largest internal diameter, HDPE piping is superior for open cut and trenchless installations. It's even recognized by worldwide standards including AWWA C901 and C906, and in the new AWWA M55 Manual.

Just ten of the many reasons HDPE Pipe is the best pipe solution

Properly designed and installed PE 4710 pipe provides:

1. 100-year design life
2. Zero - leakage allowance
3. Larger internal diameter and flow capacity
4. C coefficient of 150 - up to 50% higher C than others
5. Corrosion and tuberculation resistance
6. Lowest initial cost and lowest life cycle cost/CSIRO
7. Popular for open cut & trenchless applications
8. Superior resistance to water hammer, fatigue, earthquakes, ground movements and freeze-thaw cycles
9. Safety factor of ≥ 2
10. DIPS and IPS sizes up to 65 inches

PLASTICS·PIPE·INSTITUTE® 70 YEARS
THE VOICE OF AN INDUSTRY

HDPE MUNICIPAL ADVISORY BOARD

For more details, visit PPI and MAB websites **https://plasticpipe.org/municipal_pipe**

PE4710 Pipe: The Best Solution for Water Systems

quantitative values shown are based on the minimal required wall thickness, as opposed to that of the actual manufactured product, and therefore underestimate the average safe pull tension by approximately six percent.

Table 1 Safe Pull Tension (lbs), HDPE (PE4710) Pipe, 1 hour IPS

Nominal Size	Pipe Diameter to Thickness Ratio (DR)				
	7	9	11	13.5	17
2-in.	3,038	2,450	---	---	---
3-in.	6,597	5,321	---	---	---
4-in.	10,906	8,796	7,361	6,109	4,931
6-in.	23,638	19,066	15,954	13,240	10,687
8-in.	40,064	32,315	27,040	22,441	18,114
10-in.	62,237	50,200	42,006	34,861	28,140
12-in.	87,549	70,616	59,090	49,039	39,584

Table 2 Safe Pull Tension (lbs), HDPE (PE4710) Pipe, 1 hour DIPS

Nominal Size	Pipe Diameter to Thickness Ratio (DR)				
	7	9	11	13.5	17
3-in.	8,445	6,812	---	---	---
4-in.	12,408	10,008	8,375	6,950	5,610
6-in.	25,641	20,681	17,306	14,362	11,593
8-in.	44,109	35,578	29,771	24,707	19,943
10-in.	66,356	53,522	44,786	37,168	30,002
12-in.	93,838	75,689	63,335	52,562	42,428

The following equation was developed as a convenient means of estimating the peak force applied to the pipe as it is pulled throughout the bore hole:

Tension (lbs) = [Bore Length (ft) x Buoyant Weight (lbs/ft) x (1/3)] x $(1.6)^n$

The buoyant weight may be calculated as:

Buoyant Weight (lbs/ft) = ½ [Pipe Outer Diameter (in.)]2 – Pipe Weight (lbs/ft)

or may be conveniently selected from Figure 1.

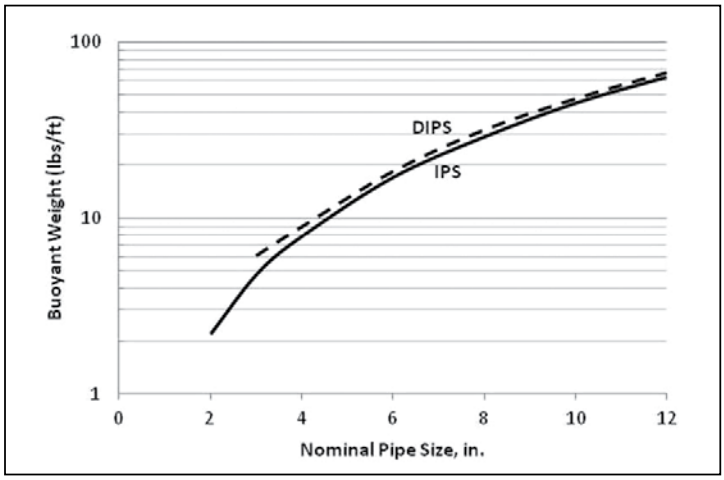


Figure 1. Buoyant Weight of HDPE Pipe (Source: Outside Plant Consulting Services, Inc.)

The parameter n is equal to the number (or fraction) of 90° route bends due to cumulative route curvature, where $\mathbf{n = n_1 + n_2}$. The quantity n1 is the effective number of deliberate/planned 90-degree route bends, and n_2 is the cumulative curvature (90-degree route bends) due to the unplanned undulations. The following value of n_2 is suggested:

n2 = [Bore Length (ft) / 500 ft] x [2-in / Rod Diameter (in.)]

The criteria for selecting an appropriate pipe strength then corresponds to selecting a DR value (Table 1 or 2) with a safe pull tension at least as large as the estimated tension, as determined above. This procedure is analogous to the procedure incorporated in ASTM F1962 for maxi-HDD installations. The present mini-HDD calculations, however, will generally result in considerably shorter possible placement distances than that corresponding to application of the methodology and equations provided in ASTM F1962, which may also include the use of anti-buoyancy techniques to reduce buoyant weight to significantly reduce required pull loads. The shorter placement distances for mini-HDD are also due to the increased drag ("capstan effect") generated by the additional route curvature of mini-HDD operations, due to path corrections, which are typically of greater magnitude and significance than that encountered in well-controlled maxi-HDD installations.

In general, therefore, the preceding formulas and methodology are recommended for estimating pull loads for mini-HDD installations. Other methods for determining pulling loads, including ASTM F1962 or associated software tools, are typically based on well-controlled maxi-HDD installations and not representative of actual mini-HDD applications with respect to anticipated pull loads.

BORE PATH PLANNING AND DRILL RIG SETUP

MAB-7 addresses the planning of the bore path, consistent with meeting the requirements of the project owner, including placement depth, as well as corresponding drill rig setup information, which is dependent upon the equipment parameters (e.g., allowable drill rod curvature), and which is typically performed by the contractor for mini-HDD installations. For more complex HDD operations, such as maxi-HDD installations, these functions would typically be performed separately, by experienced individuals or organizations.

The drill rig setup and related distances are controlled by the allowable radius of curvature (bend radius) of the steel drill rods, as specified by the manufacturer of the rods, and is a function of their diameter. For pipe constructed from HDPE or other very flexible material, the bend radius limitation of the drill rods is sufficiently large to be compatible with that of the product pipe.

Figure 2 illustrates a typical mini-HDD bore vertical profile trajectory, including occasional pits along the route. These pits may be required for pipe splicing, completing lateral connections, or to expose existing utilities. The pits may also be useful for collecting drilling fluid from the boring or reaming operations. Figure 2 designates certain points along the bore path and their relative distances from the drill rod entry and exit points. These distances are a function of the entry angle and drill rod characteristics, and determine the setup location and space requirements in which to perform and complete the pipe installation. Figure 3 shows a typical plot for the required setback distance, and also the rod to ground surface, indicates the minimum depth achievable at the beginning of the bore path to achieve a level trajectory.

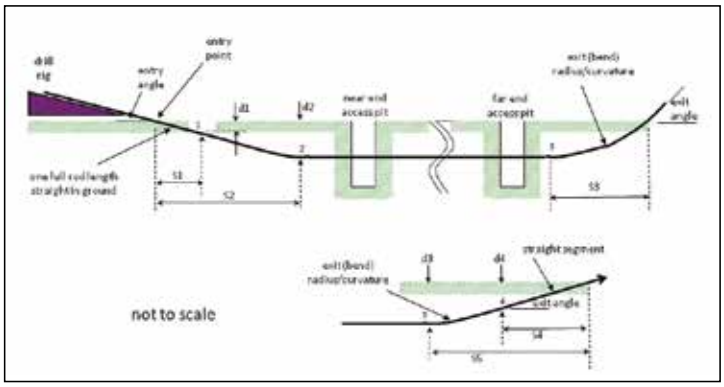


Figure 2. Drill Rig Setup and Related Distances

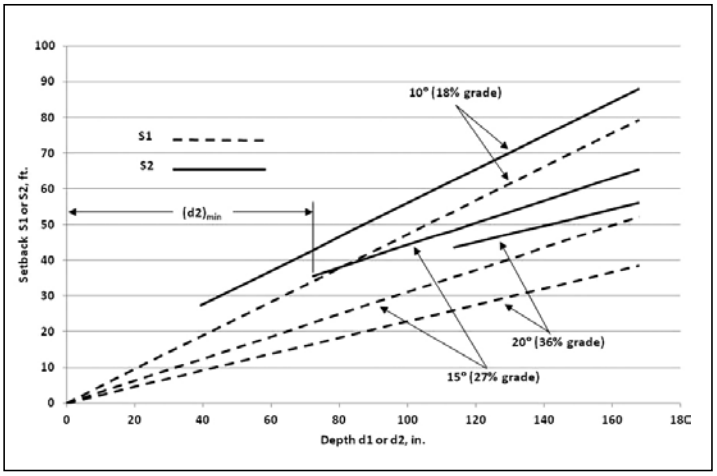


Figure 3. Drill Rig Minimum Setback Distance
Drill Rods: 10 feet Long, 100-foot Radius of Curvature

Information regarding other significant dimensions, including required horizontal distance to rise to surface are also provided in a convenient format.

SUMMARY

The MAB Guidelines for Use of Mini-Horizontal Directional Drilling for Placement of HDPE (PE4710) Pipe in Municipal Applications, issued by the Municipal Advisory Board of the Plastics Pipe Institute as MAB-7, represents a comprehensive set of information supporting the placement of the HDPE (PE4710) pipe by mini-HDD equipment, for water and sewer projects. In general, the simplified formulas and methodology provided for estimating pull loads for mini-HDD installations are considered more appropriate for such cases than other methods for determining pulling loads, including ASTM F1962 or associated software tools, which are typically based on well-controlled maxi-HDD installations. The latter procedures are not representative of actual mini-HDD applications with respect to anticipated pull loads.

Although the MAB-7 guidelines are primarily described with respect to mini-HDD operations, the information may also be applicable to midi-HDD installations. Thus, guidelines for the use of midi-HDD machines and associated practices may be obtained from the present MAB-7 document, as described herein, and/or ASTM F1962, depending upon the particular application and the judgment of the contractor or engineer.

ABOUT THE AUTHOR:

Dr. Lawrence (Larry) M. Slavin *is presently Principal of Outside Plant Consulting Services, Inc., which was established in the year 2002, following long careers in the telecommunications industry at AT&T/Lucent Bell Telephone Laboratories (Distinguished Member of Technical Staff), and Telcordia Technologies (now Ericsson, formerly Bellcore).*

NORTH AMERICAN SOCIETY *FOR* TRENCHLESS TECHNOLOGY

educate • train • research • publish

YOU'RE AN IMPORTANT PART OF THE NASTT FAMILY!

RENEW YOUR MEMBERSHIP TODAY

When you renew your membership, you help NASTT continue to provide the great programs and initiatives that help grow and expand the trenchless market and the trenchless community. As part of the NASTT family you have access to the best trenchless educational materials, white papers and more.

Not a member? Join the NASTT family today!

NASTT Members Enjoy Great Benefits

- World's largest online trenchless technical library
- Extensive networking
- Trenchless training programs and publications
- Non-commercial technical books and manuals

Family matters and so do you!

Renew or sign up today and help make the NASTT family stronger!

NASTT MEMBER

nastt.org

North American Society for Trenchless Technology
14500 Lorain Avenue #110063 · Cleveland, Ohio 44111
Phone: 888-993-9935

INDEX TO ADVERTISERS

ADVERTISER	WEBSITE	PAGE
ECI - Engineers Construction, Inc.	www.ecivt.com	Outside Back Cover
BETA Group, Inc.	www.beta-inc.com	33
Contech Engineered Solutions LLC	www.conteches.com	3
First Call PPE	www.firstcallppe.com	27
Hallen Construction	www.hallen.com	41
Henniker Directional Drilling LLC	www.hddbore.com	29
JESCO Inc.	www.jescoditchwitch.us	4
Miller Pipeline	www.weko-seal.com	37
Plastics Pipe Institute, Inc.	www.plasticpipe.org	15, 43
Progressive Pipeline Management (BEM)	www.progressivepipe.com	Inside Front Cover
Tectonic Engineering Consultants, Geologists & Land Surveyors, D.P.C.	www.tectonicengineering.com	21
Tighe & Bond	www.tighebond.com	44
TT Technologies Inc.	www.tttechnologies.com	17
Turner Underground Installations Inc.	www.turnerunderground.com	26
Vermeer Allroads	www.allroadscompany.com	6

ECI

ENGINEERS CONSTRUCTION INC.

Our corporate mission is to serve our clients with quality work at a fair price. Safety, quality, and integrity are a priority on our projects.

ECI

Celebrating 55 Plus Years in Business!
Established 1965

Phone: 802-863-6389 | 98 Engineers Drive | Williston, VT 05495

www.ecivt.com

"Always Recruiting Quality People"