



MIDWEST JOURNAL OF

TRENCHLESS TECHNOLOGY 2024

OFFICIAL PUBLICATION OF THE MIDWEST SOCIETY FOR TRENCHLESS TECHNOLOGY

MSTT: A NON-PROFIT ORGANIZATION



**MSTT 2024 Conference Ivy Tech
Value Engineering With Trenchless
Small Town Big Impact**

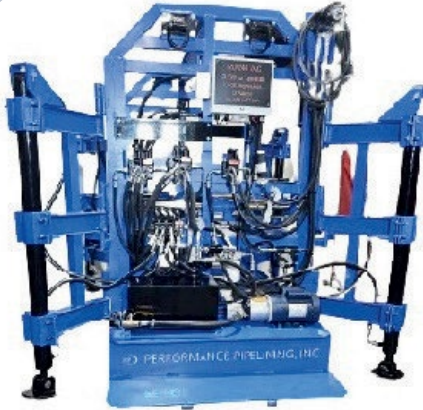


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Building on over two decades of trenchless technology outreach and education efforts across the Midwest, the MSTT Chapter hosted a very successful and well attended Midwest Trenchless Technology Conference November 21, 2024 in the main Ballroom at the Ivy Tech Community College main campus in Indianapolis. The Conference highlighted the value and benefits across of utilizing trenchless technology applications in projects across the Midwest.



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MESSAGE FROM THE PRESIDENT

Chris Schuler, MSTT President

Thanks to everyone for your support over the years. We are now celebrating the twelfth annual publication of *Midwest Journal of Trenchless Technology*. We could not do it without the continued support of the many companies and individuals that comprise the MSTT community.

About MSTT: Established in 1998, MSTT is one of the oldest and the largest of the twelve NASTT Regional Chapters. MSTT encompasses the nine states of Illinois, Indiana, Iowa, Kentucky, Michigan, Minnesota, Missouri, Ohio, and Wisconsin.

2024 Seminars: MSTT conducted one in person seminar in 2024. On November 21, 2024 MSTT hosted a highly successful seminar in Indianapolis IN showcasing the wide ranging trenchless technology projects undertaken by the Citizens Energy Group in Indianapolis. Special thanks to John Trypus and team from Citizens for their support!

MSTT has now hosted over 40 seminars since 2003 in 15 different cities across the Midwest Chapter's nine state area. These seminars have engaged over 2200 underground infrastructure professionals in total over this period, facilitating meaningful direct networking between industry and owner groups. We appreciate our presenters, sponsors, and exhibitors who make these events tremendous successes!

2024 No-Dig Show:

The 2024 No-Dig Show was well attended in Providence, RI. We all are looking forward to the 2025 show in Denver, CO March 30 -April 3.

Future of MSTT

With NASTT support, we were able to conduct our first seminar without

MSTT:

Advancing the science and practice of Trenchless Technology for the public benefit, to promote and conduct education, training, study and research in said science and practice for the public benefit.

"MSTT is your organization, and this is your publication."

an executive director. We will be very reliant of board and member participation moving forward to continue to offer resources to our trenchless community.

Additionally, please reach out to others who are not already involved in NASTT and MSTT and share your wonderful experiences with them.

I want to personally thank Steve Matheny for his efforts during transition and after for all he has done for MSTT, NASTT, and me over the years. I also want to thank all the board members and all members of MSTT for your support and help!

We have made some strides over the past year to better our organization. Much work remains and I am confident we will work together to

make ours an even stronger chapter of NASTT.

MSTT is your organization, and this is your publication, so please support us and let us hear what you think. To provide feedback, suggest a location for future events, place an ad, or submit an article for next year's journal; please contact me, or one of our directors. Your support and involvement is critical to our success and the success of the Industry as newer faces enter and greater challenges present themselves.

Sincerely,

Chris Schuler
President, MSTT
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MESSAGE FROM NASTT CHAIR

Matthew Wallin, PE, NASTT Chair

Hello Midwest Regional Chapter Members! As we roll into the Holidays, I want to share some key updates and upcoming opportunities that are of importance to your chapter and our organization and industry.

I'd like to offer a big thank you to everyone who participated in the 2024 No-Dig Show held in Providence, RI. Your engagement and contributions made it a resounding success! The presentations were insightful, and the networking opportunities were invaluable. We are currently in the thick of 2025 planning and we hope you will mark your calendars for March 30-April 4 in Denver, CO! If you have any feedback or suggestions for future events, please do not hesitate to reach out to us at info@nastt.org.

We are excited at the recent success of the Midwest Chapter Trenchless Technology Conference held November 21, 2024 at the main Ivy Tech Community College campus in Indianapolis. The Conference offered twelve educational presentations spotlighting the latest developments, cutting-edge case studies, pioneering research, and technological innovations in the trenchless field. Engineers, Contractors, Suppliers, Owners, and Municipal Engineers joined

"Together, we are driving the future of trenchless technology forward."

together for an entertaining day of networking and learning, gaining valuable insights into the benefits of trenchless technology. Visit www.mstt.org for details on upcoming events throughout the Midwest.

Recently the fifth edition of the Horizontal Directional Drilling (HDD) Good Practices Guidelines book was released. And by popular demand, the book is now available in a digital format you can access online from any device, as well as a print-on-demand version! The fifth edition includes updated content reflecting the latest advancements and techniques in HDD. Alongside the book,



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we have also updated our HDD training course to align with the new edition. These courses are designed to provide both new and experienced professionals with the knowledge and skills needed to excel in their roles. Please check our website for more details on how to purchase the book and enroll in the courses.

Thank you for your continued support and dedication to your Chapter. Together, we are driving the future of trenchless technology forward. If you have any questions or need further information on any of the topics mentioned, please do not hesitate to contact me.

Matthew Wallin, PE

Matthew Wallin, PE
NASTT Board Chair

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MSTT BOARD EXECUTIVE 2024-2025



Chris Schuler - President

Chris Schuler joined Miller Pipeline in 1984 as a laborer in Indianapolis, Indiana. Over the next few years he served the company in many capacities, assuming the role of equipment operator in 1989 and foreman the following year. In 1998 Chris stepped into the role of superintendent over Kansas City

and Indianapolis until 2005 when he was promoted to project manager. In 2009 he assumed the role of general manager of the Municipal Services Division, in 2021 he was promoted to Vice President of Municipal Services Division where he oversaw Miller Pipeline's water/wastewater trenchless rehabilitation operations. In December 2024 Chris transitioned to Underground Solutions to help build the internal joint seal business through their newly acquired WEKO seal product.

Chris attended Indiana University from 1983-1986 focusing on Economics and Business. He graduated from the University of Missouri with a B.A. in Commercial Economics in 2001. Chris serves as the current Miller Pipeline Representative for the Indiana Chapter of NUCA. He is also a member of the NASTT Program Committee in addition to his role as President of the MSTT Board of Directors.



Ryan Poertner - Vice President

Ryan Poertner is a General Manager of Ace Pipe Cleaning, Inc. and lives in St. Louis, MO. Ryan's main focus is on the growing market involving trenchless rehabilitation. APC is a leader in the industry providing all types of rehabilitation solutions for municipalities in need. Ryan has spent

his 20+ years working in the water and wastewater rehabilitation fields. Ryan is a graduate of University of Missouri at Rolla with a degree in Engineering Management. Ryan is an active member of NASTT, NASSCO, WEF and local engineering organizations.



Robert Martin - Secretary

Robert Martin, P.E. has been with Jacobs Engineering Group since 2007 and has over 25 years of comprehensive underground engineering experience on projects including those for the rail transit, water supply, wastewater, and mining. Robert is the Past President

of the ASCE Wisconsin Section Southeast Branch and was a contributor of the ASCE/ UESI Manual and Reports on Engineering Practice No. 106, Horizontal Auger Boring Projects, Second Edition. Robert's experience includes construction feasibility assessments, design of soft ground and rock tunneling using various methods including; drill-and-blast, road header excavations, full-face tunnel boring machines in rock and soil, microtunneling, horizontal directional drilling (HDD) and other trenchless methods and has worked on projects all over the world. Robert is an active member of NASTT in addition to his role as Secretary of the MSTT Board.



Steve Matheny - Treasurer

Steve Matheny, PE has been a business consultant engineer for Logan Clay Products since 2016 where he brings over 30 years of technical experience and knowledge in the construction industry. He has been part of the Midwest Society of Trenchless Technology's (MSTT) board since 2017

where he is committed to advancing both his own technical knowledge and the use of trenchless techniques. Steve has consulted and been involved with multiple trenchless projects (Pilot Tube Method) and has authored several papers and presentations for the North American Society for Trenchless Technology (NASTT). Steve has also written several articles for the MSTT Journal. He is currently consulting on numerous PTM projects throughout the Midwest and East Coast. He is the current president of the ASCE Southeastern Branch where is been a member for over 30 years. His bachelor's and master's degrees in civil engineering are from Wayne State University and is professionally registered in the State of Michigan.

MSTT BOARD EXECUTIVE 2024-2025



Jeff Boschert - Past President

Jeff Boschert, P.E., BC.PLW, F.ASCE, is the President of the National Clay Pipe Institute (NCPI), a not-for-profit organization dedicated to research, education, and leadership in the vitrified clay pipe sanitary sewers industry for more than 100 years. Jeff represents the industry on multiple ASCE and ASTM committees. Jeff was one of the principal authors of the *ASCE/ Utility Engineering and Surveying Institute (UESI) Manual of Practice (MOP No. 133) on Pilot Tube and Other Guided Boring Methods*. He has served on the ASCE/ UESI Pipelines Division Executive Committee (ExCom) and is the past Chairman of the UESI Pipelines Division Technical Committee -Trenchless Installation of Pipelines (TIPs). He served as conference chairman of the UESI Pipelines 2022 Conference. Under Jeff's leadership, NCPI has completed comprehensive updates of the *Vitrified Clay Pipe Engineering Manual*, the *Vitrified Clay Pipe Installation & Inspection Handbook*, and the *Analyzing CCTV Inspection of Vitrified Clay Pipe Handbook*. In 2020 NCPI introduced the *VCP Operations & Maintenance Handbook*, a first-of-its-kind, comprehensive manual for cleaning and maintaining a sanitary sewer collection system. In July of 2024, Jeff became a Board-Certified Pipeline Engineer-Water (BC.PLW) of the Utility Engineering & Surveying Certification Board (UESCB), a subsidiary of Civil Engineering Certification Inc. and the American Society of Civil Engineers. In November of 2024, Jeff was elected to serve on the 2025 NASTT Board of Directors. Jeff holds a Bachelor of Science in Civil Engineering from Missouri University of Science and Technology (S&T).

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PROMOTING TRENCHLESS TECHNOLOGY IN THE MIDWEST!

MSTT 2024 Trenchless Technology Conference a Major Success!



Networking and close personal access to industry expertise is a central aspect of the annual MSTT Conference

Building on over two decades of trenchless technology outreach and education efforts across the Midwest, the MSTT Chapter hosted a very successful and well attended Midwest Trenchless Technology Conference November 21, 2024 in the main Ballroom at the Ivy Tech Community College main campus in Indianapolis.

More than 80 trenchless professionals, municipal attendees, industry exhibitors and students gathered together to enjoy a full day of networking and 12 peer-reviewed, presentations on New Installations and Rehabilitation providing environmentally friendly trenchless solutions and cost-saving opportunities for municipalities and utilities. A

highlight of the Midwest Trenchless Technology Conference was the morning keynote address by John Trypus, Director Underground Engineering & Construction, Citizens Energy Group outlining increasing usage of trenchless technology applications in his company's rehabilitation and construction programs. There were also 10 informative trade



Attendees enjoyed a full day of 12 informative peer-reviewed presentations on a wide range of trenchless technology topics in New installations and Rehabilitation

"The MSTT Chapter Board of Directors thanks everyone for their participation in a very successful Midwest Trenchless Technology Conference at Ivy Tech November 21, 2024. We look forward to seeing you again in 2025." Check for updates and details @ www.mstt.org.



A dozen trenchless technology presentations offered environmentally friendly solutions and cost-saving opportunities for municipalities and utilities

exhibits showcasing a wide range of leading edge trenchless and condition assessment technologies.

Very well attended, the Conference helped advance the overall effort to highlight the value and benefits across the

Midwest of utilizing trenchless technology applications in infrastructure renewal and new construction programs. Educating public officials, engineers, utility company personnel, designers, and contractors involved with the construction,

rehabilitation, and management of underground infrastructure assets on the many social and economic benefits of using trenchless technology, the Conference facilitated direct networking between industry and owner groups.



The Midwest Trenchless Technology Conference is an excellent learning opportunity – PDH Certificates are available to all attendees

MIDWEST TRENCHLESS TECHNOLOGY 2024 CONFERENCE: IVY TECH COMMUNITY COLLEGE, INDIANAPOLIS IN -NOVEMBER 21, 2024-

PRESENTATIONS

DigIndy – Rounding Third Base,

Michael Miller, PE, Citizens Energy Group

Successful Use of Pilot Tube Guided Boring for Duck Creek Sewer Interceptor

Kim Hanson, Hazen and Sawyer;
Luke Minger, Minger Construction &
Alex Potter, McClure Engineering

Packaging Large Rehabilitation Projects Can Yield Benefits

Mike Figlio, Michels Trenchless Inc.

Cured in Place – Two Ways: Reducing Inflow and Infiltration to a Major Interceptor Located Under Wetlands

Erin Abramson, City of Superior, WI

Strength Under Pressure: AWWA Class III, Semi-Structural, Close-Fit Liner Provides Emergency Repair to a Critical Siphon Line

Shane McFadden, Engineering & Construction Innovations, Inc.

Sanitary Sewer Installations Using Pilot Tube Method of Guided Boring

Steve Matheny, Logan Clay Products

Horizontal Directional Drilling of a New 18-inch Siphon Sewer under the Licking River

Sean O'Rourke, Hazen and Sawyer

Differing Site Conditions: How to Address Cooperatively Without a Differing Site Conditions Clause

Tom Olson, OC Law, PC

Internal Joint Seals - Where, When, & How

Jeremy Kieninger, Miller Pipeline

Preventative Manhole Rehabilitation Program Restores Aging Infrastructure in Des Moines, Iowa

Keith Walker, Waterline Renewal Technologies

Simplifying Force Main Inspections with New Inline Tool

Jason Hoffman, RJN Group

Building the Future Together while Optimizing Manhole Rehabilitation

Tim Shutters, Citizens Energy Group

Furthering the MSTT mandate to “promote Trenchless Technology through education for the public benefit”, the Conference continued the long-standing track record of the MSTT of raising awareness of the advantages of using trenchless technology methods in infrastructure construction programs. Historically MSTT has conducted a total of 40 seminars since 2003 in 15 different cities across the Midwest Chapter’s nine state area. Led with tireless energy by former MSTT Executive Director Leonard Ingram, these seminars have engaged

over 2100 underground infrastructure professionals throughout the region. Continuing this fine tradition with a fresh new approach, the 2024 Midwest Trenchless Technology Conference was a major success!

Special thanks to all MSTT 2024 Trenchless Technology Conference exhibitors, sponsors, presenters and attendees for your participation and support. A bright future is ahead as MSTT continues its program of trenchless technology outreach across the Midwest in 2025. †



John Trypus, Director Underground Engineering & Construction, Citizens Energy Group delivered the morning keynote address



For information, dates and locations of future MSTT Trenchless Technology Conferences and Seminars planned for the Midwest, visit:

www.mstt.org



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Municipal and public utility scholarship applicants from all over North America are planning to be at the NASTT 2025 No-Dig Show.

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VALUE ENGINEERING WITH TRENCHLESS TECHNOLOGY:

Burton, MI Benefits from Alternative Installation Methods

By: Steve Matheny P.E., Logan Clay Products LLC & Dan DiLegge, DVM Utilities

There is no such thing as an “automatic” design assumption when it comes to sanitary sewers. Open-cut installation is probably as close as we get. If there isn’t a specific motivation for exploring other options, many system designers give little consideration to alternative installation methods. But that is changing. Designers and contractors are now exploring alternative installation methods when value engineering projects. A recent example of this approach comes from a small project in Burton, MI.

The SRF (State Revolving Fund) Segment 2 for the City of Burton, MI (near Detroit) was a simple, short run of 8-inch gravity sanitary sewer between two existing maintenance holes. Some of the challenges that led the contractor (DVM Utilities) to value engineer the project, after it was awarded, included a depth of almost 30 feet with a maximum slope of just 0.13 percent, running under a two-lane asphalt roadway and between two homes with mature trees. The easement between the homes was just 15 feet (from one home).



Tight easement between two homes with mature trees

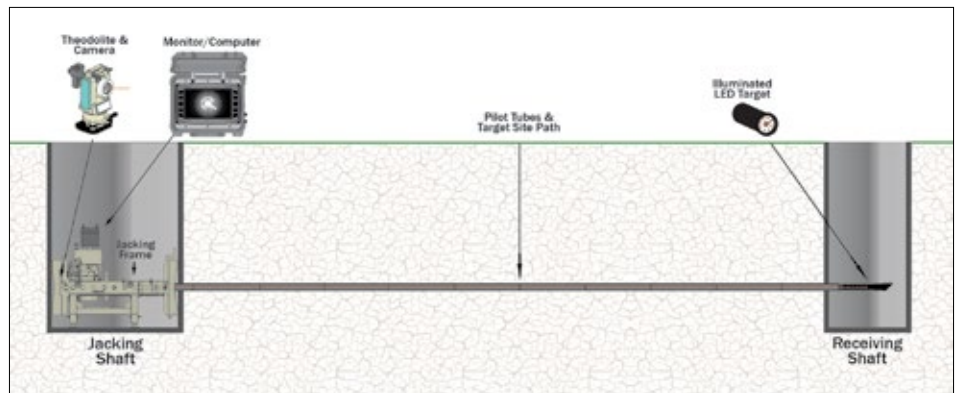
The project was originally planned as an open-cut installation. But in addition to the concerns around surface disruptions, creating the lateral connections at thirty-foot deep was going to be costly and difficult to achieve (with serious exposure to the homes’ foundations).



Challenges included a depth of almost 30 feet

DVM Utilities suggested a two-part solution. Part one was the introduction of an additional maintenance hole where the existing laterals could be located with a drop siphon. Part two was trenchless installation using the Pilot Tube Method (PTM) of Guided Boring. With approval

"No such thing as an "automatic" design assumption when it comes to sanitary sewers."



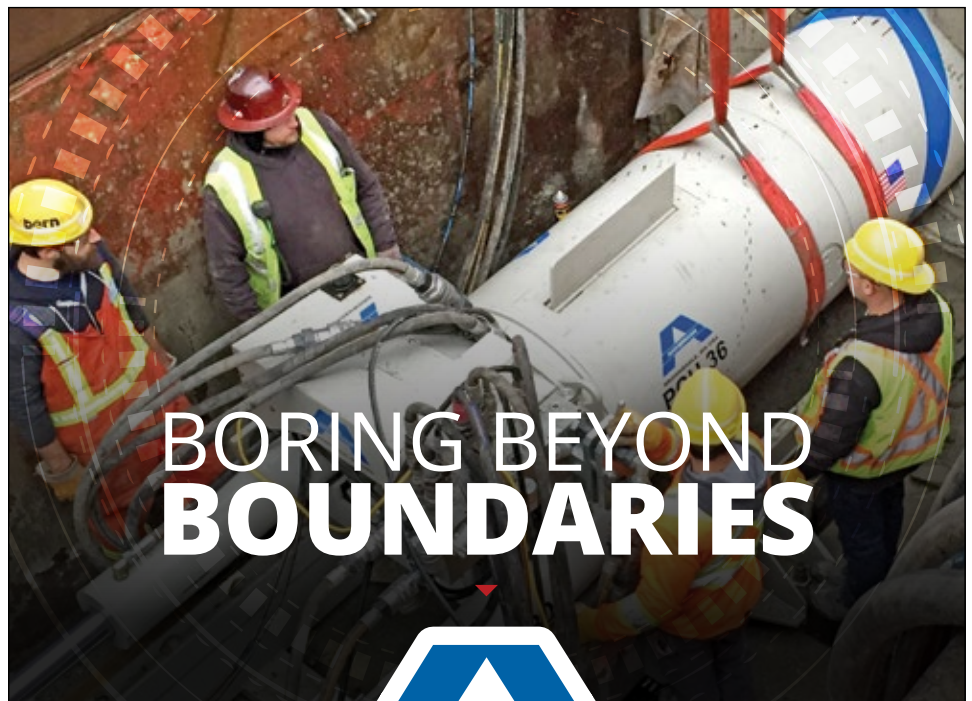
Step 1 of the Pilot Tube Method – Installation of the pilot tube using a theodolite for steering
(ILLUSTRATION PROVIDED BY AKKERMAN)

from the city and engineering firm for the city, DVM used this new plan for installation of the sewer on the original line and grade established in the design documents.

The Akkerman 4800 Series Guided Boring Machine (GBM) system used for this project includes a digital theodolite with an integrated camera mounted independent of the jacking frame, a battery-powered LED illuminated target housed in the slant-faced steering head and a computer monitor screen. This guidance system gave the operator a "real-time" view of the location and steering head orientation of the pilot tubes. This "real-time" view, together with the ability to continuously make adjustments during the entire pilot tube drive, results in pinpoint accuracy. The accuracy of this system was critical to the plan because it allowed the contractor to reliably maintain the desired slope of just 0.13 percent.

In a three-step installation process, driving the pilot tube to the next shaft is step one. Because the pilot tube is just four inches in diameter, no spoils are removed in this step. The soils are displaced using the slant face of the pilot tube.

In the second step, a reaming head matching the Outside Diameter (OD) of the carrier pipe is fastened to the last pilot tube. Thrust (auger) casings advance the pilot tubes and reaming head. The spoils are transported by the auger to the jacking shaft for



BORING BEYOND BOUNDARIES

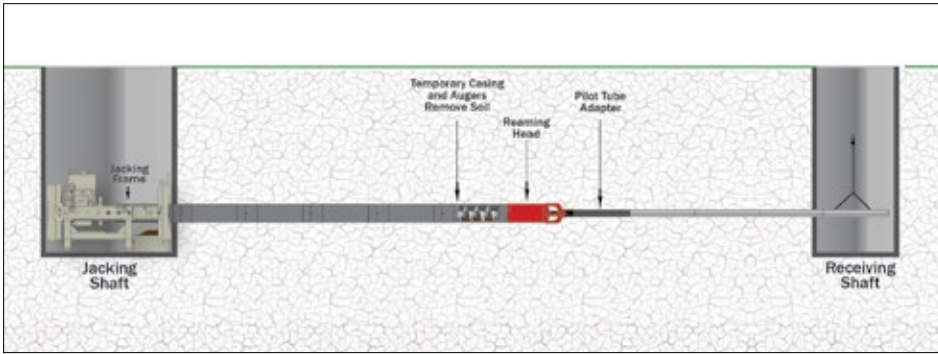


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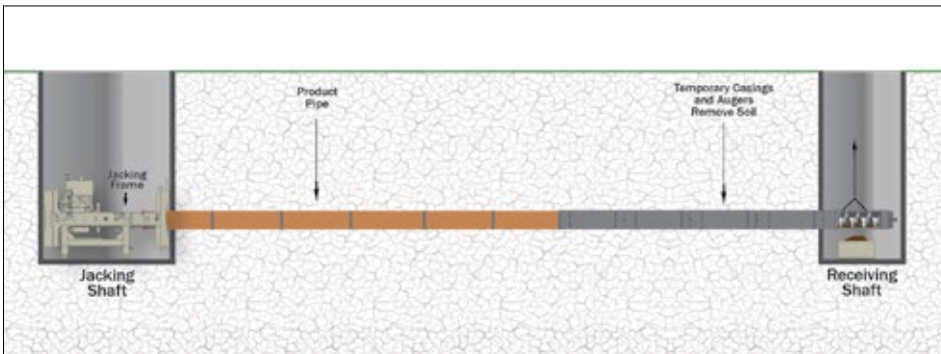
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Step 2 of the Pilot Tube Method – The auger and casing establish the line accommodating the OD of the eventual pipeline (ILLUSTRATION PROVIDED BY AKKERMAN)



Step 3 – The casings are replaced by the product pipe (ILLUSTRATION PROVIDED BY AKKERMAN)

removal. During this process, the pilot tubes and reaming head are advanced to the reception shaft, disassembled and removed.

The spoils removed from the pipeline area are limited to the ground between the four-inch pilot tube path and the OD of the casings along that path.

Step three is installation of the pipe. Taking advantage of the average compressive strength of Vitriified Clay Jacking Pipe (18,000 psi) means that no casing is needed in the final installation. The pipe itself can resist the high jacking forces generated as the pipe is thrust through the ground replacing the temporary casings and augers and eliminating the need for an external casing pipe.

Along with greatly reduced surface disruption, the pilot tube method also greatly reduces the need for imported bedding materials. Even with the expense of an additional maintenance hole, this solution was the economical approach, and it proved to be the best approach

when the project faced a relatively common additional challenge.

Borings indicated the soils would be “Grey Lean Clay” but the soils encountered

proved to be a wet-runny, silty clay offering little support. Pulling a stacked trench box through those soils would have been even more challenging than originally anticipated. An open-cut installation would have been problematic in the tight space between the two homes. The pilot tube method of installation and the pipe are well-suited to this condition.

To create the jacking and receiving shafts, the contractor used a 60,000 lb. Link-Belt 235 with a custom-built extendable stick capable of digging up to 31 feet. The shafts were lined with steel rings with lagging.

DVM Utilities used one-meter pipe lengths for this installation. This allowed the jacking shaft to be limited to 13 feet in diameter. This shaft size was a specified by DVM, typically, shafts can be as small as 8-foot diameter. The reception shaft was constructed of steel pilings that surrounded the existing maintenance hole. Both shafts avoided disruption of the two-lane street.

The selection of PTM for installation meant the pipe material specified also changed from PVC to Vitriified Clay Jacking Pipe. When using VCP for PTM, the structure VCP provides means that no casing is left in the ground, keeping project costs to a minimum. The precision of the method enabled the



Jacking shaft was a compact 13 feet – one-meter pipe lengths were used for installation

contractor to reliably achieve the exacting slopes required.

The Akkerman GBM (Guided Boring Machine) was used to drive the casing following the path established by the pilot tube in a three-step PTM installation. In the final step, the VCP was used to push the casing through the ground and out, into the receiving shaft.

The project was completed in late December 2023. It was under budget and did not require any roadway closures during construction.

While open excavation is still the most common installation method for most utilities, the benefits of trenchless installation are leading many experienced professionals to critically evaluate their options. Trenchless installation is frequently the preferred method for the community, but now designers and contractors are finding it is the economical solution for many projects. †

"Using Vitrified Clay Jacking Pipe means no casing is needed in the final installation."

ABOUT THE AUTHORS:



Steve Matheny PE is a sales engineer for Logan Clay Products. He is a Board Member for ASCE and has authored a number of papers and articles. He is currently consulting on multiple PTM projects. His bachelor's and master's degrees in civil engineering are both from Wayne State University. Steve is also the Treasurer for the MSTT Chapter.



Dan DiLegge is an experienced President with a demonstrated history of working in the construction industry. Skilled in Project Estimation, Construction, Contract Management, Utility Construction, and Subcontracting. Strong business development professional with a Bachelor of Science (BS) focused in Civil Engineering from Lawrence Technological University.



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SMALL TOWN, BIG IMPACT:

BAMI-I Secures \$650K Grant from Indiana Finance Authority, Leading Collaboration with AIRW to Develop an Efficient and Practical Asset Management Model Plan for Switz City, IN

By: Wei Liao, Buried Asset Management Institute - International (BAMI-I)

“I like what you guys are doing, it's boots on the ground and it's getting things done and you're going to benefit the utilities,” Jim McGoff, Director of Indiana Finance Authority (IFA) said to Dr. Tom Iseley and Wei Liao, right before he agreed to provide \$650K to fund BAMI-I's efforts on developing an Asset Management Plan (AMP) for Switz City, Indiana.

The project to develop an Asset Management Plan (AMP) for Switz City, Indiana, began in January 2023. Purdue Underground Infrastructure Team (UIT), Ziptility, BFU, and BAMI-I have volunteered to collaborate on creating the AMP for Switz City since then. This initiative aims to explore ways to support the implementation of Indiana state laws. As the project progressed, numerous companies and individuals joined the effort. They are:

- Alliance of Indiana Rural Water (AIRW)
- Purdue UIT / BAMI-I
- George Kurz Independent I&I Consultant
- Ziptility
- BFU
- Utility Inspection Services
- Smart-View
- InfoSense
- 4M Analytics

With Adam Hershberger transitioning from Ziptility to AIRW, the main parties of the project are now BAMI-I and AIRW. All parties involved in this project continue to support it in various ways.

The project is estimated to cost \$650,000, which the state has agreed to fund. This is the first phase of the entire program. The ultimate program goal is to set the Efficient and Practical Asset Management Model for Utilities across Indiana State and the asset management industry in the United States. With the strong support from IFA, BAMI-I team will lead the efforts to achieve this goal.

The impetus behind the project is to help water utilities comply with Indiana's new regulation, **Indiana Senate Bill 272** (2022), which requires that after July 1, 2023, all water utilities whose project

funding applications for infrastructure improvements are approved by the IFA must have an approved AMP.

Why is this project important to water industries especially in rural areas?

Drinking water and wastewater infrastructure is subject to wear and tear over time, eventually reaching a point of failure. This deterioration leads to increased emergencies, which are often more costly to address than preventative measures.

To maintain reliable service delivery, including consistent water supply and



The first project meeting in the Switz City town hall

efficient wastewater treatment, utilities must prioritize proactive management. A comprehensive risk-based asset management program is essential for achieving this goal.

Indiana Senate Bill 272 (2022) Indiana has established itself as one of the leaders in water-related developments through a series of strategic initiatives and legislative actions. Key milestones include the 2015 evaluation of water utility planning, the 2016 requirement for water audits, and significant reports on financial needs for stormwater infrastructure and wastewater monitoring programs. The state further demonstrated its commitment with the 2019 publication of the Asset Management Program guidelines and the 2021 guidelines for the State Revolving Fund Loan Program. The signing of ISB 272 in March 2022 marks a significant step, positioning Indiana as a leader in water asset management. The Indiana Finance Authority (IFA) has been designated to oversee these efforts.

"To maintain reliable service delivery, including consistent water supply and efficient wastewater treatment, utilities must prioritize proactive management."

Small water utilities are facing challenges

Small water utilities face numerous challenges in developing Asset Management Plans (AMP), including limited funding and human resources, difficulties in data collection and management, lack of professional knowledge and technical skills, complex regulatory compliance requirements, aging infrastructure, insufficient community support and awareness, and limited external support.

Project Team and Collaboration

The project is a collaborative effort between BAMI-I, the Alliance of Indiana Rural Water, and Purdue UIT. The team will leverage the expertise and resources of these organizations to develop and implement the AMP for Switz City. Purdue University will provide technical and administrative support through its Underground Infrastructure Team (UIT), involving graduate students in practical learning experiences.

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Background

BAMI-I was invited to conduct presentation sessions at Alliance's annual conferences on September, 2022. Through this initiative BAMI-I was introduced to Ziptility and Bynum Fanyo Utilities (BFU). It was decided by all 3 parties to volunteer their efforts to develop an AMP in accordance with the IFA Guidelines. The motivation for this initiative was to learn the details of what it takes to develop an AMP utilizing these guidelines. In January 2023, the Town of Switz City

enthusiastically agreed to allow us to develop an AMP for their drinking water and wastewater systems. The agreement with Switz City was with BAMI-I, and Alliance became a cooperative partner.

An Underground Infrastructure Team (UIT) was formed in the College of Engineering at Purdue University in the Construction Engineering and Management (CEM) program. Purdue provides technical and administrative support to BAMI-I through the UIT.

During the Fall of 2023, a graduate-level course was taught on Asset Management of Underground Infrastructure with 22 students. The students were divided into 5 teams, with each assigned to develop an AMP in accordance with the IFA Guidelines. The UIT took the 5 AMPs and merged sections with what had been accumulated and produced what was referred to as the Interim AMP plan for Switz City. It was referred to as "Interim" because the development team had no pipeline condition assessment (PCA) data which means all recommendations had to be very conservative until real PCA data could be acquired.

In the interim plan, we got data from the below sources:

- *Ziptility*, the software used by Switz City, provides asset data and preliminary condition assessments, laying the groundwork for an informed and strategic approach to asset management in Switz City. This work was primarily done by Adam Hershberger, who is now an EPA Water Specialist with the Alliance of Indiana Rural Water. He also helped collect general and operational information.
- *George Kurz*, conducted an in-depth Infiltration and Inflow (I/I) analysis based on the operational data. His work involved using this data to assess the extent and impact of I/I on Switz City's wastewater system.
- *BFU*, contracted with Switz City for operations, provided utility system diagrams, operation management practices, and strategies for reducing energy consumption.

During the spring semester of 2024, a graduate-level course on Pipeline Condition Assessment and Integrity Management is being taught where the students are taking the Interim AMP for Switz City an integrating the following 3 data sources:

- *ACCOUSTIC*: An Alliance representative teamed with an InfoSense representative to conduct a PCA program on about 90% of the sewer collection system utilizing advanced acoustic technology known as SL-RAT (Sewer Line-Rapid Assessment Technology). This technology produces a wide range of mapping and condition



The project team visited Switz City Treatment plant



The project team conducted the manhole inspection in Switz City

acoustic signal to pass and would be color coded as GREEN. YELLOW would indicate lines with partial blockage.

- CLOSED-CIRCUIT TELEVISION (CCTV): Utility Inspection Services (UIS) from Knoxville, TN dispatched a 2-person team with their advanced CCTV mobile unit to work with Alliance representative and the Purdue UIT/BAMI-I representatives to internally inspect lines indicating blockage from 0-6. In addition, the manholes were inspected, and a service was inspected with a special lateral launch CCTV technology.
- 4M ANALYTICS: This is the first application of this technology in Indiana. It uses satellite imaging technology coupled with AI (Artificial Intelligence) to develop comprehensive location of utility assets.

data, which detects how unobstructed the pipeline is by rating it 0-10 and generating a GIS map with color-coded lines based on how much blockage exists in the lines. For example, a “0”

indicates no acoustic signal could travel through the pipe, indicating 100% blockage. It would be color-coded RED. A “10” would indicate the barrel of the pipe is fully open allowing maximum

Lessons Learned:

- To develop a comprehensive risk-based AMP in accordance with the IFA Guidelines is demanding even for a small utility like Switz City with less



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The utility Inspection Services team conducted CCTV inspection in the Switz City

than a population of 300. However, they have a fully operating WWTP with a NPDES permit, a sewer collection system with 4 pumping stations and a water distribution system with an elevated storage tank. This represents a lot of assets, and most are buried.

- The IFA Guidelines are excellent and need to be applied to the fullest extent possible without trying to take short cuts or short circuit certain hard obtain steps. This includes to the best job possible on developing the 3 scenarios which project rates and tasks needed for 20 years.
- It is essential to work closely with the major stakeholders to educate them how this AMP is to be a living document to establish the future

business practices. This needs to start with emphasizing the core values and benefits of the AMP.

- It is essential to have a comprehensive strategy for developing AMPs which meet the IFA Guidelines as cost effectively as possible.

Proposal of a Three-Phase Plan and Commitment of IFA Support

Based on the work that has been done, the BAMI-I team proposed a comprehensive Sewer System Evaluation Survey (SSES) and an in-depth investigation of the water system. Their recommendation aimed to collect extensive data to develop a top-tier Asset Management Plan that could be used as a model for smaller utilities. Additionally,

they envisioned the small town becoming a living lab, where new innovations could be tested and monitored over time once the plan was properly implemented.

They developed the three-phase plan and presented it to the IFA to secure funding for the subsequent stages. Following the presentation to the IFA, Jim, as mentioned at the beginning of this article, appreciated BAMI-I's practical approach and its direct benefits to utilities.

PHASE 1: Development Of Comprehensive Amp For Switz City And Model Creation

In this phase, the program team will Further develop a comprehensive Asset Management Plan (AMP) for Switz City. \$250K of the \$650K funding will be allocated for this part. Specific actions will include enhancing the asset management plan's inventory, implementing cost-effective PCA, and creating detailed financial forecasts based on actual data.

Address the urgent needs of Switz City \$400K of the \$650K funding will be allocated for urgent asset upgrades needed in Switz City based on the work that has been done. Below are some proposed actions:

- Address fixing the I&I sources,
- Perform necessary repairs and upgrades at the WWTP and pump stations,
- Replace all water meters.
- Other

PHASE 2: Experimental Promotion And Continuous Improvement (1-2 Years)

This phase will continue to assist in the implementation and management of the Switz City AMP. It will involve developing training materials and selecting 10-15 utilities of various sizes to develop asset management programs and provide training, outreach, and technical assistance. The information collected from this group of utilities should be used for the Manual of Practices (MOP).

PHASE 3: Extensive Implementation Of Model, Establishment Of State-Wide Asset Management Database And Living Lab (Long Term)

Ultimate Program Objective:

1. To get the water assets in Switz City in acceptable operating conditions to serve as a “Living Lab” for assisting small utilities. This Living Lab will serve as a host for validating innovative solutions.
2. A manual of practice (MOP) will be developed to establish tools, templates,



4th project meeting in the Switz City town hall

- and procedures for developing and implementing AMPs in Indiana.
3. Training, education, workforce development, professional development, etc. these will utilize established programs and resources to the maximum extent possible. It will take the existing BAMI-I CTAM program and update it to specifically

teach the principles and practices of AM related to how to develop an AMP which we learned from this program.

The first phase will last until July 2025. BAMI-I has already initiated the project in the past month and has brought in more partners to ensure the project's goals are successfully achieved.



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Project team meeting in Alliance of Indiana Rural Water office

About IFA

The Indiana Finance Authority (IFA) is a state agency dedicated to overseeing and managing financial resources and programs to support public and private infrastructure projects across Indiana. Its primary mission is to provide innovative and cost-effective financing solutions that enhance the quality of life for Indiana residents. The IFA administers a variety of programs, including those related to water quality, economic development, and public-private partnerships, ensuring sustainable growth and development within the state. By leveraging financial expertise and resources, the IFA plays a crucial role in facilitating essential infrastructure improvements and fostering economic vitality in Indiana.

About BAMI-I

The Buried Asset Management Institute – International (BAMI-I) is a non-profit corporation whose main purpose is to educate and assist those who have an interest in applying best-buried asset management practices to extend the life and efficiency of their assets. Although BAMI-I has been mainly focused on water and wastewater systems, the principles of asset management apply to all different types of buried assets including for instance gas distribution pipes, and electric cables.

BAMI-I's mission is to provide a center of excellence for owners of underground infrastructure to join with industry and researchers, using sound science, to evaluate and /or develop buried asset management protocols for application worldwide to benefit ratepayers and other stakeholders by:

- Protecting public health
- Maximizing asset life-cycle value
- Improving the environment
- Sustaining economic development
- Enhancing the quality of life



Flow meter location survey in the Switz City wastewater system

About AIRW

The Alliance of Indiana Rural Water (AIRW) is a non-profit membership association of over 1,000 water and wastewater systems and related professionals. AIRW is Indiana's only representative to the National Rural Water Association. NRWA is the nation's largest utility association with 31,000 members.

ACKNOWLEDGEMENTS:

The organizations have donated their time, efforts and technology to the Switz City AMP development programs:

- Alliance of Indiana Rural Water
- Purdue UIT / BAMI-I
- George Kurz Independent I&I Consultant
- Ziptility
- BFU
- Utility Inspection Services
- Smart-View
- InfoSense
- 4M Analytics

These organizations agreed to participate at no cost because they believe in the goal established with the Town Council of Switz City at our first meeting in January 2023. The goal was to develop a comprehensive risk-based AMP for water and wastewater which will serve as a living document to guide the program decisions on operations and maintenance, rehabilitation/replacement approaches, and funding strategies.

Conclusion

The partnership between BAMI-I & AIRW and the IFA is a significant step forward in addressing the infrastructure challenges faced by small utilities in Indiana. The Switz City AMP project is not just about improving one town's utilities; it's about creating a replicable model that can benefit communities across the state. With the support of the IFA and the dedication of the collaboration team, Switz City is set to become a shining example of how

effective asset management can lead to sustainable and efficient utility services. Please stay tuned for our continued updates.

For more information about the program and others, please contact Wei Liao at Liao186@purdue.edu. †

ABOUT THE AUTHOR:



Wei Liao, Ms. Wei Liao, Lead Research Engineer at Purdue University, focuses on Developing Underground Space. With 14 years of tunnel engineering experience, her expertise spans highway tunnels, underground engineering design, construction, and maintenance. Since 2019, her research has centered on underground infrastructure asset management. A Professional Water Asset Manager (PWAM), she serves as BAMI-I's Executive Director, Board Member, Journal Editor, and Director of the Buried Asset Management Congress, as well as a BAMI-I Project Manager.

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DIFFERING SITE CONDITIONS:

Successful Strategies to Cooperatively Resolve Claims

Tom Olson, Olson Construction Law

Differing Site Conditions (“DSC”) are unfortunately here to stay. Project owners are often either not conducting a subgrade investigation or, if they are, not conducting an *adequate investigation*. And, even an adequate investigation can miss subgrade conditions outside of the borings. The net effect is that since there is nothing a utility contractor can do to stop encountering DSCs, contractors need to successfully identify and implement strategies to cooperatively and fairly resolve DSC claims on the jobsite. Set forth below are some battle-tested strategies. As such, all of these strategies can work for you.



1. When bidding, evaluate ‘right’ to rely upon owner’s subgrade investigation.

When project owners perform a subgrade investigation, they *intend* that bidders will *rely* upon the investigation in pricing the work and selecting the trenchless method. And yet, engineers regularly include contract language which purports to *limit or bar such reliance*. In response, I offer three pointers:

- First, recognize that as a matter of contract, such limiting or disclamatory language is normally set forth in the Special or Supplemental Conditions (and sometimes in the Technical Conditions). Contractors must ensure they evaluate all of these conditions prior to bidding to assess whether such language is included.
- Second, even if the contract includes such language, contractors can still rely upon the project subgrade investigation as evidence of Type II DSC (i.e. conditions different than anticipated for the work in the geographic area), instead of a claim for a Type I DSC (i.e. conditions different than indicated in the contract documents).
- Third, as a matter of law, many

jurisdictions have held that contract language which limits or bars contractors’ reliance on the project subgrade investigation is *unlawful and unenforceable*.

2. When bidding as a subcontractor, state the ‘anticipated’ subgrade conditions.

To help ensure there is no dispute later whether the subgrade conditions you encountered were different than what you anticipated, state what you anticipated in your bid (e.g. full face of hard rock). This is particularly important when the

owner has not performed a subgrade investigation. And, negotiate to *have your bid be incorporated into the subcontract*.

3. When bidding as a subcontractor, state ‘right’ to payment for ‘stand-by’ costs if DSC encountered

One of the common costs incurred for a DSC is ‘stand-by:’ waiting for a decision to be made on how to proceed. And, based on my experience, contractors fail to seek payment for stand-by costs. To help ensure a subcontractor is paid for such costs, subcontractors should state the ‘right’ for such payment in their bids,

"Contractors need to successfully identify and implement strategies to cooperatively and fairly resolve DSC claims on the jobsite."

and then seek to have the bid incorporated into the subcontract. Make sure when negotiating your subcontract that there are not clauses which would negate this, such as a “no damage for delay” clause.

Additionally, most public contracts include such a payment right in the General Conditions. Note that this payment right is sometimes hidden in the “Suspension of Work” clause, which is the normal case when DOT Standard Specifications are used. Further, to help get a DSC claim resolved sooner, when there is a contractual right to payment for ‘delay,’ a contractor should so advise as part of its initial DSC claim notice. If your iron must remain idle waiting for a decision, it is important that the engineer understand this at the outset.

4. The contractor should *always* provide written notice of a DSC.

Literally all public construction contracts require written notice if a contractor believes it has encountered a DSC. And, the reality is that much of the communications on site are verbal, not

"Literally all public construction contracts require written notice if a contractor believes it has encountered a DSC."

written. As a consequence, I have been involved on many projects *after the fact* where a contractor only provided verbal notice. While I have been successful getting around this notice failure on many occasions, it is risky business. This is true for two reasons.

First, on public construction projects, the inspector is not authorized to waive

any contract requirements. That means that even if the inspector stated that verbal notice is sufficient, a contractor is not excused from providing written notice. Make certain you are discussing any contract changes with the person authorized to make changes, typically the engineer.

Second, as a matter of law throughout the country, other than on *federal projects*, a contractor is generally deemed to have *waived* its DSC claim absent written notice. That is true regardless if the contractor provided the same notice *verbally* that it would have provided in *written* form.

5. Encourage the engineer to re-design the utility work to avoid the DSC.

Upon written claim notice, per standard DSC clause, a contractor is required to stop work, allow the engineer to investigate and, if the engineer determines there is or may be a DSC,



evaluate how to proceed. It is good to be *paid* for DSC extra costs. It is even better to *avoid* incurring the extra costs. A strategy not typically attempted is to work with the engineer to evaluate whether the affected work can be *re-designed* to avoid being performed in the DSC.

I recently helped a contractor accomplish this. The contractor assisted the owner and engineer to further investigate the subgrade (the contractor performed some excavations while the engineer took additional borings). The investigation revealed the existence of the anticipated subgrade conditions, albeit at different vertical and horizontal locations. The design was subsequently revised to reflect the more preferable location of the utility work. As a consequence, no extra costs were incurred (other than for the additional lineal footage of pipe that was required, for which the contractor was paid).

6. Contractor should perform its own subgrade investigation.

Too often, the project engineer will deny a DSC claim, notwithstanding that the engineer did not perform a subgrade investigation. This happened on a recent project. In response, we helped the contractor perform its own subgrade investigation. We retained a geotechnical engineer to substantiate the existence of a DSC, as well as the impact on the auger bore operations. We also retained the

auger bore manufacturer, who confirmed that the contractor's extra costs were not caused by improper construction. The net result was the contractor was paid an acceptable amount, and did not have to pay any liquidated damages for the corresponding delay. All of this occurred on the jobsite.

As a standard business practice, if there is any question re: the existence of a DSC or its impact in time and/or dollars, the contractor should conduct its own subgrade investigation.

7. Contractors should seek payment on a revised unit basis.

My experience is that when an engineer acknowledges that a contractor has or may have encountered a DSC, the contractor subsequently performs the work on a force account basis. This results in the contractor being *underpaid* (e.g. Blue Book equipment rates are too low). Fortunately, contractors have a means available to potentially overcome this problem: seek payment on a *revised unit price basis*. While the engineer may say "no" to such a request, the engineer certainly cannot say "yes" unless the contractor requests this. And, as you should explain to the engineer, it is in the owner's interest to agree to a revised unit price. By doing so, the owner will know *before the work is performed* what it will cost versus waiting until *after the work is performed* to add up all the labor and equipment hours.

8. If there is a dispute on the existence of a DSC or its financial impact, a contractor should use the engineer's estimate.

When an engineer alleges that the contractor should have anticipated the subgrade conditions encountered and/or the financial impact, I recommend potential use of the *engineer's estimate*. I have helped contractors successfully utilize this strategy when the engineer's estimate for the DSC work is *lower than or similar to the contractor's corresponding bid amount*. This allows a contractor to powerfully state that since it did not have dollars in its bid for the DSC, then the engineer must not have either. Since neither the engineer nor the contractor had dollars in their bids for the DSC, it is fair to conclude that neither anticipated the subgrade conditions actually encountered. The same comparison can also then help establish the amount of compensable extra costs.

9. If you can use the Measured Mile Approach for calculation of your extra costs, do it.

To prove the financial impact of a DSC, contractors normally compare their planned costs (i.e. what they *bid*) with their actual costs. While this strategy is acceptable, there is a better strategy. If you have successfully performed work *outside* of the DSC (e.g. an earlier crossing), then a contractor can and should use production rates (and hence corresponding costs) from the *outside* area. This strategy is better for two reasons.

First, use of *actual* production rates from an area *outside* of the DSC should eliminate any question of what your production rate could have and would have been *but for the DSC*. By contrast, if you are relying upon your *bid*, the engineer can question if this is a valid baseline since it is *theoretical*, not *actual*. For the same reason, if you can't cooperatively resolve the issue on site, courts prefer use of the Measured Mile Approach when it is possible.

Second, use of actual rates should result in the contractor being paid for more extra costs. My experience is that



the contractor's bid rate is normally lower insofar as it typically accounts for the impacts of utility, weather and delays as well as re-work. By contrast, comparison of actual production rates achieved outside of the DSC with those obtained within the DSC should typically be higher (i.e. there will be a greater loss of production, and hence greater extra costs recoverable).

10. A contractor can successfully maintain a DSC claim when it encounters the anticipated 'type' of subgrade condition which 'reacts' in unanticipated manner.

It is considered a standard rule of law that a contractor cannot successfully maintain a DSC unless it encounters a subgrade condition which is different in 'type' than that shown in the owner subgrade investigation or otherwise anticipated for the work being performed in the geographic area. I am proud to share that I have successfully developed and applied another strategy. We helped a contractor get paid a significant amount of money and not pay a significant amount of liquidated damages when it encountered the anticipated 'type' of soils which 'reacted' in an unanticipated manner. We based this strategy on legal cases which we have collected over a period of decades. Notably, we helped the contractor achieve this result on the jobsite.

11. A contractor can prove the existence of a DSC on the basis of an adverse impact to the contractor's operations.

Sometimes, a contractor cannot prove actual *physical evidence* of a DSC. This may occur because a contractor cannot collect physical samples of the actual conditions encountered. This would also be the case if, as in the project discussed above, where the contractor encountered the anticipated 'type' of subgrade conditions which 'reacted' in an unanticipated manner. To substantiate the existence of a DSC on this project, we collected evidence of how the contractor's operations were adversely affected: equipment was damaged, larger equipment was required, production rates were abysmal, and the work could not be completed as designed. Like the strategy above, we successfully based this unique strategy on legal cases which we have collected for decades. Having successfully utilized this strategy for the first time, we know it can work elsewhere.

12. If the contract does not contain a DSC clause, a contractor can still potentially seek payment under the Extra Work clause.

Normally on public construction projects, the contract contains a DSC

clause. That clause places the financial risk of DSC on the owner, not the contractor. On private projects, it is not that unusual for a DSC clause to be absent. By contrast, on limited occasions, I have been involved on public projects which did not include such a clause. That was the case on a recent public utility project. Given the absence of the DSC clause, we approached this as *extra work*. We listed the *new items* of extra work (i.e. not included in the contract) as well as the *increased quantities of contract work* (which is also properly characterized as *extra work*). This provided a contractual basis for payment. This is the referenced project on which the owner re-designed the project to avoid the DSC. I believe one important reason we were able to help facilitate this result was because the owner believed that the extra costs which would have been incurred were compensable under the "Extra Work" clause.

In summary, remember the following:

- Owners regularly fail to adequately investigate the subgrade on trenchless projects.
- As a consequence, contractors will continue to encounter differing site conditions ("DSC").
- Contractors need effective strategies to be paid when they encounter DSC.
- There are a number of strategies which contractors can use to avoid incurring DSC-related extra costs as well as get fairly paid when a contractor does incur such costs.
- Based on the author's personal experience, these strategies have worked to cooperatively and fairly resolve DSC issues on the jobsite.
- As a consequence, each of these strategies can and should produce similar results. †



ABOUT THE AUTHOR:



Tom Olson has helped utility contractors around the country for decades resolve issues on the jobsite, not in the courtroom. He recently helped edit and author a national trenchless manual.

DELIVERING ALTERNATE SOLUTIONS

The Use of Down-Hole Horizontal Hammer Boring in North America

By: Richard Revolinsky, Geonex Inc, (GEO)

Expecting the unexpected is status quo for the trenchless industry. Designers and Contractors alike carefully evaluate project parameters to develop a plan utilizing the know methods to achieve success. Furthered by collaboration between equipment manufacturers and industry professionals, the approach and solutions to anticipated project hurdles is ever evolving. The unknowns, especially in trenchless construction, can be disastrous to a project plan and budget, but have led to some of the most creative solutions that were once considered to be novel, have become tried and true industry standards. In this article we'll focus briefly on a few examples of North American projects that turned to Horizontal Down-Hole Hammer Boring for success.

Horizontal Down-Hole Hammer Boring is a trenchless method for new installations which utilizes a pneumatic hammer and tooling located within the lead casing. Each stroke of the hammer accelerates heavy steel tooling forward which both pulverizes the subgrade as well as advance the casing installation by "pulling" the casing into place from the front, not pushing from the rear. Compressed air is then released, conveying the pulverized material through openings in the face of the tooling, back into the steel casing where it is carried back to the launch pit by rotating auger. This method can be successfully deployed in ground consisting of solid bedrock, intermittent cobbles as well as mixed conditions without having to change tooling for differing

conditions. The diversity of conditions in which the method is successful has led to several recent projects turning to Horizontal Down-Hole Hammer Boring when traditional methods have been unsuccessful, restricted, and where anticipated risk encouraged seeking an alternative solution.

Alternative to Auger Boring

In June 2023, Dunigan Brothers of Summit Twp, Michigan set out to install 140 feet of 24-inch steel casing for a 12-inch Waterline below a pair of high-speed Amtrak rail lines. Familiar with the area and observing the topography, Dunigan

anticipated cobbles and wet conditions in the 14-foot deep bore. "When you look at the site, it looks like the railway is laid in an old creek bed. We knew it would be wet and sloppy but had a feeling we'd hit rock so we made sure we had a back-up plan" said Patrick Dunigan II, VP of Operations at Dunigan Brothers Inc.

During excavation of the jacking pit, Patrick's feelings were confirmed when they began pulling rounded cobbles up to 24 inches in diameter from the pit. Under the direction of the project owner, Dunigan proceeded with traditional auger boring but made it only about 13 feet before hitting the cobbles. "I reached out to GEONEX Inc. for rental pricing as a



Technician uses the remote control to operate the GEONEX HZR610 drill machine set up for 10-foot casing lengths

contingency plan before we even started digging. After reviewing the project details, they were certain they could be successful barring any steel obstructions. When we hit the cobbles, I confirmed pricing, presented a change to the owner, and with minimal delay, GEONEX Inc. was on-site with their technician and tooling to get this project back underway.” explained Patrick. “We could only accommodate 10-foot casing lengths so it took a little while to make all those welds and we finished the bore in 4 days. I was impressed how well the equipment performed in the sloppy soft spots as well as through the cobbles.”



Aerial view of equipment set up to bore under the railway

Alternative to Micro-tunneling

For a project in Jersey City, NJ, Northeast Remsco Construction (Remsco), a JAG Company, was contracted to perform (8) parallel 36-inch diameter micro-tunnels below the NJ Transit Light Rail which would house electric conduits. While preparing the site, it was discovered the ground below the bore path consisted of vastly differing conditions that were not

suitable for the MTBM. In addition to being below the water table, soft soils and occasional cobbles were revealed as well as an abandoned concrete duct bank and cast-iron water main. As the contract prohibited the used of other common methods, Remsco began evaluating the feasibility of the Horizontal Down-Hole Hammer Boring method.

Remsco Project Manager George Gutierrez P.E. talks about the turn of events. “When we reviewed the additional information, we immediately conveyed our concerns to our client Yonkers Contracting Company. While waiting to discuss solutions with the Port Authority, we went through process of elimination for the other methods we perform; Auger

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The face of the boring system used to pulverize the rock



Receiving pit – showing 6 of the 8 completed installations using the DTH method

"Horizontal Down-Hole Hammer Boring is a trenchless method for new installations."

Boring, HDD, Microtunneling, and pipe ramming. We've been interested in the GEONEX systems for Horizontal Down-Hole Hammer boring and began evaluating it further. A joint meeting between Remsco, GEONEX and the project owner led to a preliminary approval. Once the owner approved, GEONEX expedited production and delivery of their HZR1200 drill machine which is capable of up to 48-inch casing installations. We accepted delivery in May 2024."

Currently all 8 installations are complete. "We always want what is best for the project, and we were fortunate all involved let us employ an alternate method. Now that we have the GEONEX system, we've been looking at how it can improve success for other upcoming projects," said Gutierrez.

Alternative to Pipe Ramming

In March of 2024 Horizontal Down-Hole Hammer Boring was utilized to successfully install 320 feet of 42-inch casing in the mountains of Southwestern VA. Three significant hurdles made this critical

installation challenging. First, the 42-inch bore would proceed 105 feet, crossing an active NSF railway. Second, the remaining 215 feet would be below a shallow creek that is habitat to a U.S. Fish & Wildlife classified Threatened species of fish. And lastly, this installation would have to be performed through ground consisting of cobbles the size of a V8 engine block.

The stakes were high. Not only had the had previous attempts with roller cone auger boring heads been unsuccessful, but additional attempts utilizing small diameter pipe ramming had been unsuccessful. Additionally inadvertent returns of air from pipe ramming could create turbidity in the stream, having a significant impact and potential harm to the threatened species.

Project owner Equitrans Midstream was open to suggestions. HDD and Slurry Microtunneling were considered, however both the cobbles and potential for IRs eliminated these options. Mike Kidd of Atlantic Underground presented the idea of using Horizontal Down-Hole Hammer Boring. The method does not require bentonite, is proven successful for cobble conditions, and because the air flows back through the casing, the potential for creating turbidity in the creek was significantly reduced.

After exhaustive planning, preparation, and cross-checking data, Atlantic Underground was asked to mobilize to the site by March 18. "Once the pit was excavated and trench boxes in place, the GEONEX Machine was set in the launch

pit, air compressors connected, and the first casing set to install. It took 5 days to complete the bore, with a couple of long nights to complete the 4 to 5 hours of welding per joint. 40-foot lengths of casing were installed at an average rate of 17 feet per hour, yielding 80 feet per day. Once the crossing was complete, the product pipe was slick-bored into place, said Kidd.

An Equitrans representative indicated there were over 350 bores on the project through the same type of ground. "Knowing what we know now about the Horizontal Down-Hole Hammer Boring method and GEONEX, we could have utilized this method on several challenging bores and saved months on the project." †

ABOUT THE AUTHOR:



Richard Revolinsky is the North American Operations Manager for Geonex Inc.

"Expecting the unexpected is status quo for the trenchless industry."



BEFORE: A worker stands next to boulders retrieved during excavation of the launch pit



AFTER: A pile of cuttings generated during installation by the horizontal down-hole hammer boring process



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NAVIGATING FUTURE WORKFORCE DEVELOPMENT

By: Jason Holden, Akkerman

Trenchless contractors throughout the Midwest remain busy amid a declining skilled workforce. At the advent of the trenchless industry, developing a skilled team to install tunnels with exact line and grade precision meant hiring individuals on the faith they would graduate from the school of hard-knocks with honors, while remaining loyal for much of their career. These men and women are the trenchless pioneers, and many have, or are currently dreaming about retirement. This is causing many contractors anxiety when considering how to close the knowledge gap as they look to the future. Here are some tactics that business owners can consider as they navigate the future.



Teams that work well with each other will openly share knowledge

Hire Slow, Fire Fast

Hiring slow, firing fast has a harsh connotation; however, it can be the most effective way to close the knowledge gap between trenchless pioneers and future rockstars. It's better to be selective until you find a candidate that is a natural fit for the team. Teams that work well with one another will openly share knowledge. Everyone accumulates wisdom through experience and interaction. If your team openly shares tips & tricks they've picked up along the way, your new up-and-comers will be exposed to your leader's know-how, instead of the crew picking up the pieces for someone that's playing out of position.

Contractors that are fortunate to know their employee's retirement strategy and are equipped with the resources to do so, should be willing to start their recruitment search early. By

allowing yourself the time to carefully select a new employee that checks all the boxes, you can choose someone that will contribute to the growth of the organization, even if you find that candidate sooner than anticipated.

Navigating the Knowledge Gap

A wise man once said, "A bit of knowledge is lost with each generation." As my daughter approaches her 16th birthday, my wife and I felt it was necessary to teach her how to drive a stick shift before anything else. The likelihood of my daughter ever owning a vehicle with a manual transmission is small since every manufacturer, including many over-the-road trucks, have switched to electronic shift. As parents, we felt an obligation to equip our daughter with the skills to grind gears just in case she was ever faced with the challenge. Many

in my daughter's generation may never encounter a clutch, nor even understand why there was a third pedal on the floor near the brake. The knowledge of operating a manual transmission could become a lost art, just like Dogs & Wedges used to square up casing ends, were once commonplace in the bed of a crew members' trucks. This type of knowledge loss happens organically as new technology obsoletes previous designs. Skills that were once required daily can become just tricks that people need to remember for when an issue arises.

It is advantageous for contractors to establish a process that enables skilled veterans to share their tips and tricks with the new generation of workers to ensure there is a transfer of knowledge. At a leading construction equipment manufacturer in the Midwest, retirees are periodically invited back as consultants to share their perspectives and insight. These types of interactions often expose fundamental know-how gained through experiences that could otherwise be lost; forcing your team to take the time to relearn them based on their shortcomings.

Equipment Training Centers

Equipment manufacturers, trenchless organizations and educational institutions are heavily investing in the future of the workforce. For decades, the industry has offered numerous conferences around the world where one could interact with colleagues and learn about the latest trends. Due to the nature of conferences and the associated high cost, it isn't feasible to provide hands-on training of equipment at these venues. While they can be great to learn about trends, developing crew members requires a different approach.



The D. H. Akkerman Training and Development Grounds are available to all customers

In the fall of 2023, Akkerman opened the D.H. Akkerman Training & Development Grounds available to all customers in need of additional assistance. Customers can register to receive two days of factory-certified GBM training on the latest equipment, while having the opportunity to investigate any of the other trenchless methods Akkerman has to offer, such as slurry microtunneling, sliplining, rock boring, and pipejacking.

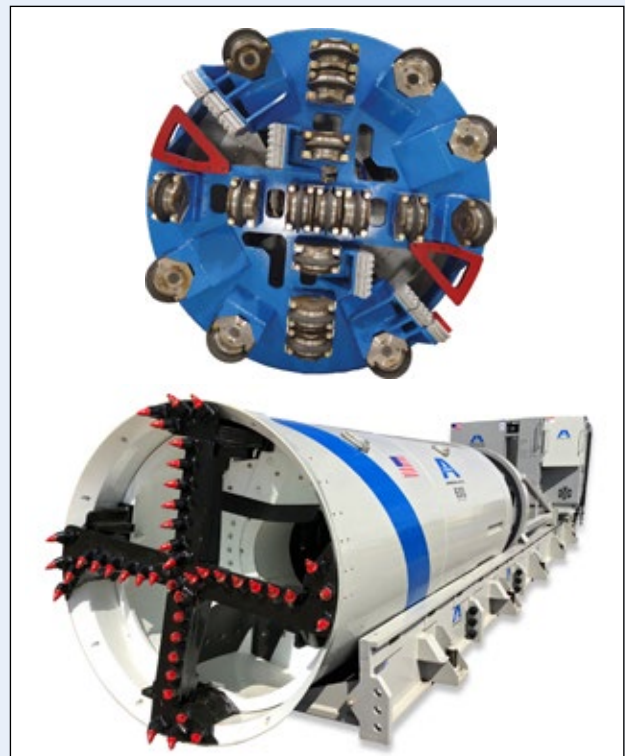
"Akkerman currently is preparing for the release of an autonomous haul unit in 2025."

Equipment Updates

The trenchless industry was created from technological advancements by innovators like D.H. Akkerman, who built his first tunnel boring machine in Brownsdale MN in 1963 to install line and grade sensitive tunnels under roadways in a safer, more cost-effective manner for his construction company. Today, multiple products are available to assist contractors install more accurate tunnels in a wide range of conditions.

Akkerman D-Series TBM Systems

Akkerman TBMs have been a critical piece of equipment for most trenchless contractors around the world. They were built tough, and the system was extremely versatile, with many used machines commanding a higher resale value than when purchased new.



Akkerman D-Series TBMs have become an extremely popular asset



Projects such as the one shown above is an example of how contractors, such as Snyder Construction of Evansville, IN, utilize their Akkerman 240A GBM system. Snyder Construction was able to use one GBM system to accurately install pilot tubes and keep two auger boring machines productive, while minimizing disturbance to the public

Akkerman D-Series TBMs offers even more versatility in soft ground and includes enhanced power necessary to combat rock. Produced in sizes starting at 48-inch OD and larger, these TBMs have become an extremely popular asset for both new equipment and fleet upgrades.

Akkerman currently is preparing for the release of an autonomous haul unit in 2025 which will reduce jobsite manpower requirements, and enhance tunnel safety. A prototype design has been proven and engineering work is underway on production scale units. Autonomous muck cycling is just the first step in future remote-control TBM operations.

Guided Boring System - GBM

Akkerman has been providing the trenchless industry with top quality guided boring equipment for over two decades. While there are several methods available, Guided Auger Boring is the most prevalent and widely used across North America. With hundreds of systems in service,

contractors can accurately install pilot tubes on line and grade and then directly follow-up with steel casing. Auger Bore contractors have historically been limited to water levels or lasers and would have to trip augers to make alignment corrections with control wedges. Guided Auger Boring has many advantages over the traditional jack-and-bore method, but none more important than overall efficiency and worker safety. †

ABOUT AKKERMAN:



Akkerman, a renowned producer of high-grade tunneling and boring equipment has recently been taking ground-breaking steps in enhancing operator training for construction companies specializing in trenchless underground construction. This move again demonstrates that innovation and customer-centric strategies are the pillars of Akkerman's continued success and growth. For more information visit www.akkerman.com





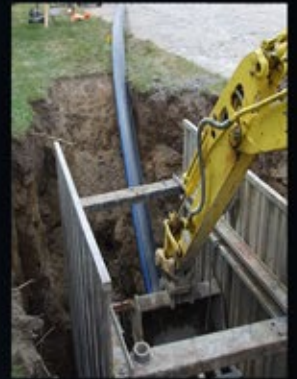
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BIG EASY UPGRADES WATER SYSTEM

One Phase Completed, Saving Five Million Gallons Daily; Others Fast Tracked Due to Timesaving HDPE Pipe Installation Method

HDPE is the way of the future

By: Steve Cooper, SCA Communications

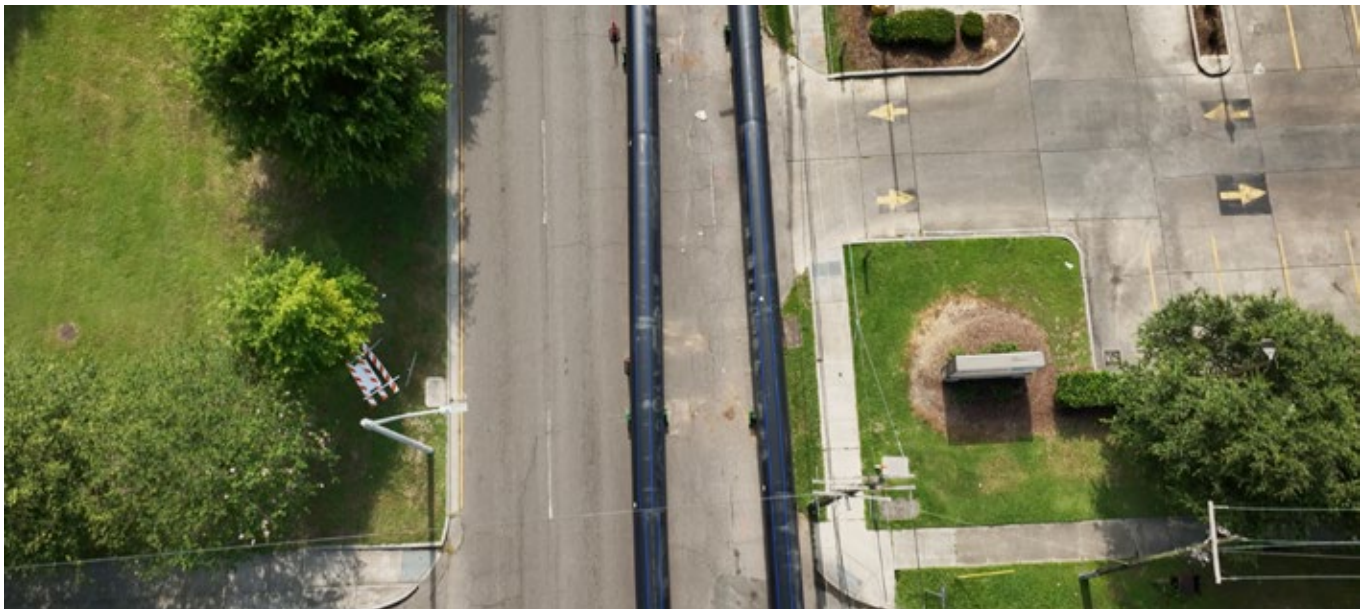
Being more than 300 years old, the Crescent City has had water transmission lines ranging from hollowed-out cypress logs to more traditional materials such as cast iron, asbestos concrete, and now leak-free high-density polyethylene (HDPE) PE4710 pipe that allows for greater pressures, while providing a greater hydraulic capacity,

resiliency, cost effectiveness, water conservation, and installation efficiencies.

New Orleans' aging infrastructure has led to numerous boil orders, unstable water pressure, plus damage to roads and pavement from water main breaks. To rectify those issues, the Sewerage & Water Board of New Orleans (SWBNO) launched an 11-project effort in 2023 to replace its

cast iron potable water transmission mains with a modern piping system, stating that it was "using the HDPE pipe because it is more durable than traditional pipes." The utility serves more than 138,400 customers with nearly 152 million gallons of water daily using 1,600 miles of water main.

The South Claiborne Transmission Main Project, one of the 11 now on the



Longest pull was about 1,400 feet

books, aimed to stabilize water pressure in many areas of the city and improve water quality with HDPE pipe that has a design life of 100 years. Completed in the fall of 2023, it has been reported that the new pipeline is saving New Orleans five million gallons of water a day.

Using CompressionFit™ trenchless installation technology and the HDPE pipe, it has been estimated by the contracting installer that there was an overall 25 percent savings in materials, labor and time compared to other methods.

“The South Claiborne Transmission Main project illustrates the value of PE4710 HDPE pipe for cost-effective piping rehabilitation through CompressionFit,” explained Camille George Rubeiz, P.E., F. ASCE, co-chair, HDPE Municipal Advisory Board (MAB), and senior director of engineering for the Plastics Pipe Institute’s (PPI) Municipal & Industrial Division. PPI is the major North American trade association representing the plastic pipe industry.

The Transmission Main Program is FEMA-funded and managed by SWBNO

“HDPE pipe virtually eliminates leakage plus prevents any infiltration of sediment or rainwater.”

- Camille George Rubeiz, P.E., F. ASCE, Co-chair, HDPE Municipal Advisory Board

in cooperation with the City of New Orleans as part of the Joint Infrastructure Recovery Roads (JIRR) Program. Total cost for the South Claiborne Avenue Transmission Main was budgeted at \$25.5 million.

The Murphy Pipeline Contractor’s (Jacksonville, FL) CompressionFit method uses the old pipeline as a path for pulling through the new pipe. Governed by ASTM F3508, CompressionFit uses HDPE pipe with an outside diameter larger in size than the inside of the existing pipe. After the HDPE pipe sections are heat fused to the desired length, the monolithic pipeline is pulled through a reduction die before

entering the old host pipe. This reduces the HDPE pipe temporarily below the inside diameter of the host pipe allowing it to be inserted.

Once the pipe has finished being pulled through the length of the section, the tension reduction allows it to expand, pushing flush against the interior of the existing pipe. This technique, especially for the South Claiborne Transmission Main Project, helped reduce overall project costs, minimize traffic disruption, and simplify the installation. It was also a key component for securing project funding. Murphy is a member company

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- Auger bores



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Lake Ouachita Water Supply Trenchless Crossings

Michels’ Contributions:

- Trenchless crossings for Lake Ouachita Water Supply Project
- 2,569-foot Direct Pipe installation of 54-inch pipe
- 510-foot microtunnel installation of 56-inch pipe
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Trenchless TECHNOLOGY 2024 NEW INSTALLATION HONORABLE MENTION

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The CompressionFit method helped reduce overall project costs and minimize traffic disruption

of PPI’s Municipal Advisory Board (MAB).

According to HDPE pipe industry expert and consultant Harvey Svetlik, P.E. “One of the principal things that this technology does is that it preserves the flow rate of the existing host pipeline and seals over holes and leaks, so you have a dual-wall composite pipeline. And the thicker HDPE pipe provides structural integrity.” The wall thickness of the DR 17 HDPE pipe is 2.9 inches and is pressure rated to handle 125 psi. The city’s water transmission lines run 70 to 80 psi.

HDPE pipe, according to PPI’s Rubeiz, offers corrosion protection, flexibility, durability, ground movements, and best seismic resistance than any other piping materials. “Moreover, it virtually eliminates leakage plus prevents any infiltration of sediment or rainwater into the system. The pipe also has a low biofilm formation potential, highlighting

its capability to preserve water and water quality while conveying it,” he stated “Even the 48-inch diameter HDPE pipe with a wall thickness of nearly three inches is ideal as its properties align with the compressed fit installation method outlined in ASTM F3508.”

Two sizes of PE4710 DIP SDR 17 pipes were used: 4,400 feet of 48-inch and 1,150 feet of 30-inch diameter. The pipe was manufactured by AGRU America at its Charleston, S.C. plant. AGRU pipe is available in sizes up to 11.5 feet (OD) and seamless lengths up to 2,000 feet long. It is a member company of PPI.

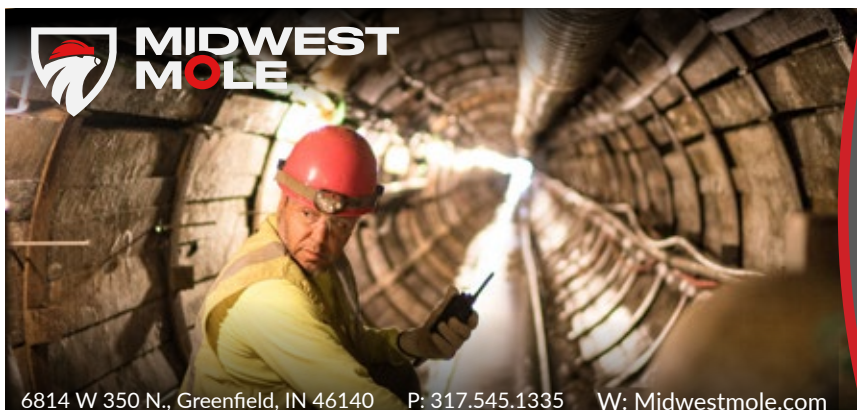
The South Clairborne job was voted Project of the Year by the Municipal & Industrial Division of PPI for the year 2023. Each year the PPI membership reviews and votes on the Project of the Year for each of the five PPI divisions. The award was presented to AGRU during the

"The new pipeline is saving New Orleans five million gallons of water a day."

association’s annual membership meeting held in May 2024.

CMG Pipelines, Inc. (Kenner, LA) installed the pipe. “There’s not a lot of certainty about what’s in the ground in New Orleans. With directional drilling or digging trenches, who knows what you’ll hit,” explained CMG President Carmelo Gutierrez, P.E. “A lot of New Orleans is built on reclaimed land, using whatever they found that was cheap to throw in the hole is what they filled it up with. And when you start digging through that, it’s going to be a pain. The typical trench for 48-inch pipe required here in New Orleans would be eight feet wide and five feet deep to the top of the pipe. So, you’re eight feet wide, 14 feet deep for a thousand feet. Digging that is not fun. It’s horrible, horrible ground to dig in and tough. Plus, protecting our crew is most important. That’s also why we suggest HDPE, because of the soil here, and the settling that we have and the water table, and all the little issues that we have in New Orleans. HDPE solves those issues.”

During the 14-month long project, it took the CMG crew of 16 – two teams of eight – four months to actually install the pipe from



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South Claiborne and State Street to South Claiborne and Upperline Street. One team was at the entrance pit took care of fusion and moving pipe. The other one took care of prepping the holes and did the pull.

“We did 4,400 feet of 48-inch, nearly 1,200 feet of 30-inch, and some 8-inch open cut. Because we’re close to Tulane University, we had to watch their football schedules, and had to pay attention to traffic,” Gutierrez explained. “Our longest pull was about 1,400 feet through the old cast iron pipe. We had a couple of large control valves. We dropped one 48-inch valve and three 30-inch valves in the system to help control the flow.

“There were also sidewall fusions where we were able to use HDPE all across to do our tie-ins, plus, standard fittings, adapters and MJ adapters. That’s because of HDPE’s flexibility at normal ductile line pipe size, and we didn’t miss a beat. We had all the fittings we needed. Basically, one day the pipe was above ground and the next day it was gone.

“Compression allowed the city to fix their lines quicker,” he continued. “We didn’t have to worry now about the path of the pipe, because we followed the same path. It made an otherwise tough job fun. And the utility agreed that this was the most cost-effective and time-effective method to quickly replace their mains without creating so much mess in the city.

“We believe HDPE is the way of the future. It solves a lot of check marks for the concerns of utility companies, utility



Protecting the crews is most important

owners. That’s how Murphy Pipelines and CMG brought this technology to New Orleans, and SWBNO has added a new tool to its pipe replacement toolbox. Now, they’re rehabilitating large diameter lines, and a few years ago that was never a thought.”

“One of the things about the ASTM F3508,” Svetlik explained, “is that it can be utilized not only for municipalities for gravity flow, but even more ideally for pressure pipes for water pipeline replacement, or force main replacement.”

Additional information can be found at www.plasticpipe.org/mabpubs or www.plasticpipe.org/municipalindustrial 📄

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ABOUT PPI:



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CAN-DO CONTRACTOR WINS AT 2024 HDD RODEO

By: Tyler Price, Underground Magnetics

Ward Trenching, in La Grange, Wyoming, began purchasing directional drilling rigs shortly after the first HDD Rodeo in Grapevine, Texas 1998. Over the years, the fourth-generation utility contractor expanded its HDD operation, adding two Astec 3238s and an American Augers DD-6. The family business, which installs everything from electric, gas, telephone, water, and sewer lines to duct runs for varying projects, is best known for being a Can-do Contractor, taking on the more technical jobs no one else wants to tackle.

Robert Ward handles the trenching and plowing. His son Joe manages the boring and excavating. Continuing the family legacy, Joe's son, Hank, became part of field operations while his brother, Brody, tended the livestock and hay business on the family farm from the time he could reach the pedals of the tractor. In can-do fashion, Joe, for many years, wanted to compete in the HDD Rodeo.

This past summer Ward Trenching was swamped. Day-to-day work for High West Energy, a rural electric cooperative, continued, as did directional drilling on the Warren Air Force Base, but the can-do contractor was also awarded several fiber duct run jobs at data centers around Cheyenne. Throughout the summer, crews installed massive bundles of conduit, plowing where possible and using the American Augers DD-6 for several road and gas



Very busy summer installing multiple bundles of 4-inch conduits

"Spectators wondered what was the bucket for?"

pipeline right-of-way crossings. In several cases, the job called for burying multiple bundles of twelve or thirteen 4-inch conduits.

But everything changed. Hank decided to follow his interest in aircraft mechanics and enrolled in the Aviation Maintenance Technician school in Sidney, Nebraska. Joe had signed up for the 2024 HDD Rodeo competition, so brother Brody put on his hard hat, and the father-son duo completed a few bores. Joe operated the Astec drill rig,



Joe and Brody with rig and UMAG locator – their can-do attitude prevailed in Missouri



New hand Brody finds the Mag 9 locator easy to understand



Dead center for the win!

"Smallest contractor to compete in the 2024 HDD Rodeo."

and Brody learned to locate with the Underground Magnetics Mag 9 locator. "The Mag 9 is easy to understand", says Brody. "On the screen, with the Echo 70 transmitter, you can see exactly where your drill head is going, how deep you are, and left to right of line." Hank headed off to Nebraska to aircraft mechanics school, and Joe and Brody packed up for the HDD Rodeo in Missouri.

Ward Trenching may have been the smallest contractor to compete in the 2024 HDD Rodeo. Its total payroll is four. To add to this David-and-Goliath scenario, Brody had only located on two-directional bores. But their can-do attitude prevailed.

At the rodeo, ten of the best HDD teams in the country were registered to compete. On the second day of the two-day competition, Joe and Brody ended up in lane 13 after hitting a pile of rubble on their first attempt. Each lane was marked off with a 230-foot-long white line to resemble an actual bore, with a donut hole-like target at the end of the course. Judges stood by with clipboards, observing each team, tracking the time of each bore, and subtracting points for unsafe drilling practices and deviations from the prescribed depth and bore line at checkpoints along the bore path.

When Brody sets a bucket at the far end of the bore, spectators wondered, "What's the bucket for?". Throughout the bore, Brody set his Mag 9 on Drill-To mode and walked out to the next checkpoint. "He made absolutely sure the front-and-back signal from the box was aligned exactly on the line",

explains Joe. "The system gives perfect numbers 30 feet out, so Brody set the locator at the next checkpoint." Joe could also see the readings on the remote display at the rig.

What was the bucket for? Brody set the locator on the bucket, so on the last leg, the locator was aligned at the actual height of the target when the drill head came out of the ground. The drill head hit the donut hole dead center.

Ward Trenching was awarded over \$75,000 in cash and prizes at the final ceremony. For Brody, the 230-foot bore brought his total boring experience to around 1,000 feet, a testament to how quickly a new hand can learn to locate if you have the right tools. Everyone's still talking about the bucket. †

ABOUT UNDERGROUND MAGNETICS:



Underground Magnetics offers unmatched locating solutions that are simple, powerful, and affordable. With worldwide headquarters in the heart of America's Heartland – Johnston, Iowa – this privately held company has been on the leading edge of product advancement from the very beginning, designing, producing, and servicing the most powerful and versatile walk-over HDD locating systems in the world today.

PRECISION UTILITIES UTILIZES HYDRO-EXCAVATION FOR EMERGENCY UTILITY WORK

By: TRUVAC

When it comes to emergency work for utilities, urgency is essential. “For that emergency work, it’s ‘we need you here now or needed you here yesterday,’” said Dan Lipe, co-owner of Precision Utilities in Mayer, Minnesota.

It was those types of pressing needs that went into Precision Utilities’ decision to get a vacuum excavator – in particular the TRUVAC HXX.

Precision Utilities is a fairly new company that began in 2020 right before the pandemic hit. Lipe and his friend Cory Efraimson decided to combine their respective lengthy experience to strike out on their own. Efraimson is a master plumber with certifications for gas work as well while Lipe came from the water, sewer and excavation side.

Since its start, the business has been steadily growing. What began as residential work has now transformed into

city contracts, municipality work and commercial buildings.

Part of that growth was emergency utility work. While Precision Utilities used to rely on subcontractors, that process was too slow. With their own TRUVAC HXX hydro excavation truck, the team was able to respond quickly, which their customers appreciated.

“Now, it’s a matter of turning the key and going,” said Lipe. “Our customers are very pleased that we’re not waiting on subcontractors.”

The immediacy isn’t the only benefit of the new truck. The safety provided with hydro-excitation was a key factor in their decision to purchase a TRUVAC.

“Digging around gas lines or power lines could without a doubt kill someone, cause serious injury or cause a career-ending injury. We have to be especially careful to not hit power, gas or fiber-optic lines. It’s crucial to dig safely. Our





"Calling 811 to ensure the location of buried utilities is essential safety practice."



TRUVAC is essentially a truck that sprays water, vacuums and uses the water's pressure to dig. As far as safety, it's a necessity," said Lipe. "We care about our employees, and we care about the environment. Safety is number one in the excavating world. You have to get with the times because everyone wants to get home at the end of the day."

Calling 811 to ensure the location of buried utilities before digging is another essential safety practice. The operators at 811 help identify gas lines, electric and other utilities before work begins.

Beyond safety priorities, Precision Utilities also factored in various weather conditions in Minnesota including ground that is covered in frost. That makes hydro-excavation an even better option when the hard ground is factored in.

"The features on the TRUVAC are great," said Lipe. "We looked at various trucks, and what it comes down to

is service. That's number one because everything that has moving parts is going to break. You end up going with who has the best service because the second a machine breaks down, you're losing money. We would absolutely choose TRUVAC again." †

ABOUT TRUVAC:



TRUVAC

With a commitment to innovative, safe-digging technology, TRUVAC

enhances performance and productivity with its vacuum excavator trucks and trailers. Its expansive dealer network provides dependability and service. Made in Streator, Illinois, TRUVAC vacuum excavators are designed specifically for businesses and organizations that locate and verify underground utility lines and pipes.



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Seattle Public Utilities Pump Station 043 Emergency Force Main Repair,
Hiram M. Chittenden Locks (the Ballard Locks) in Seattle, WA.

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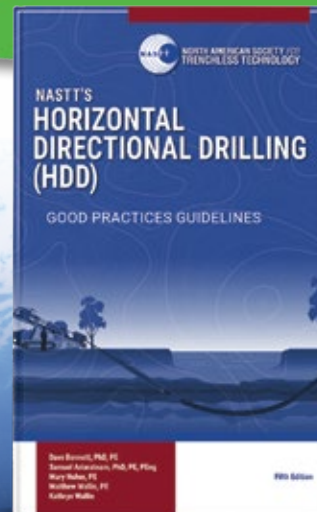
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