



MIDWEST JOURNAL OF

TRENCHLESS TECHNOLOGY 2018

OFFICIAL PUBLICATION OF THE MIDWEST SOCIETY FOR TRENCHLESS TECHNOLOGY

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Features:

16 Trenchless Team Effort Yields Success

Downtown Minneapolis was the location of a unique CIPP rehab of an 18-inch oval main-lateral connection, which had collapsed causing a large sinkhole in front of the historic Francis Drake Hotel. Trenchless CIPP rehabilitation provided the optimal structural solution while minimizing disruption to traffic and businesses nearby.

20 Non-conforming Liner in the City of Saginaw MI

During the rehab of one of six Primary Settling Tanks at the City of Saginaw Wastewater Treatment Plant, CIPP lining repair of the square influent conduit was required due to infiltration and damage to the precast top panels. This unique job required careful meticulous planning of the lining work to ensure project success.

26 Pilot Tube Project Saves Time, Money and Trees!

Using the Pilot Tube Method to install 5,300 feet of 21-inch relief sewer line in the City of St. Clair Shores MI resulted in major savings of time and money over the traditional open-cut method. An added bonus was saving all the mature trees along the project alignment. Installation of Vitrified Clay Pipe served the long term interests of the community.

30 Trenchless Technology Education & Networking

MSTT Trenchless Technology, SSES, and Buried Asset Management Seminars continue to promote and grow the business of Trenchless Technology across the Midwest. Designed to inform public officials, engineers and contractors with networking focused on trenchless projects across the area, the seminars are co-hosted with the local APWA or ASCE Chapters.

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MESSAGE FROM THE PRESIDENT

ADVANCING THE SCIENCE AND PRACTICE OF TRENCHLESS TECHNOLOGY

Jeff Boschert, P.E., MSTT President

We are happy to be celebrating the sixth annual publication of the Midwest Journal of Trenchless Technology, because it is evidence of your continued involvement and support.

Our History and Region: MSTT, established in 1998, is the oldest of the eleven NASTT Regional Chapters. MSTT encompasses the 9-states of Illinois, Indiana, Iowa, Kentucky, Michigan, Minnesota, Missouri, Ohio and Wisconsin.

2018 Seminars: We conducted the first of our two 2018 seminars on September 6, 2018 in downtown Des Moines, Iowa. We continued this year with the single day seminar format established in 2017. The Des Moines seminar consisted of 14 presentations/speakers with topics ranging from condition assessment to new installation methods. We had three professionals from the City of Des Moines in attendance and a presentation by Steve Naber, P.E., the Des Moines City Engineer. Naber provided an overview of their trenchless programs consisting of both new construction and rehabilitation methods. The final 2018 seminar is scheduled for November 28th, 2018 in Minneapolis/St. Paul, MN.

2019 No-Dig Show: The No-Dig Show represents an annual opportunity for education, professional development and industry engagement. I encourage you to attend the 2019 show, scheduled for March 17-21, 2019 at the Donald E. Stephens Convention Center located just outside of Chicago, IL. For more information on the annual No-Dig Show, education & training programs and membership see pages 9 and 43.

Municipal Scholarships Available. The No-Dig Show Municipal & Public Utility Scholarship Award Program was established in 2013 to provide education and training for approximately one hundred employees

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.

of North American municipalities, government agencies and utility owners who have limited or no training funds. Selected applicants are eligible to receive full access to all exhibits and technical paper sessions as well as overnight accommodations. The 2019 No-Dig Show scholarship applications are now being accepted (Application Deadline is November 1, 2018), to apply see <https://www.nastt.org/no-dig-show/municipal-scholarships/>

NASTT Member Benefits: We encourage you to join the NASTT/MSTT and get involved with one of the committees. NASTT members receive complimentary access to over 2,000 technical papers presented and published at past No-Dig Shows, glossary of terms, plus access to the Trenchless Resource

Center available on the ISTT website. <http://www.istt.com/>

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 event, place an ad or submit an article in next year's journal; please contact Leonard, me, or one of our directors.

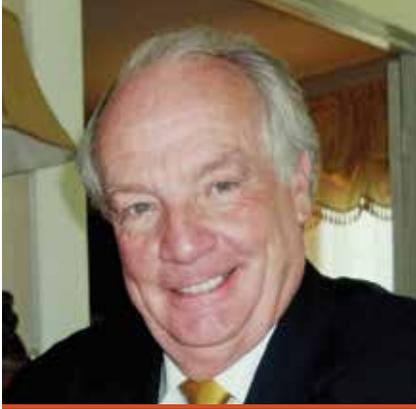
Sincerely,

Jeff Boschert, P.E.
President, MSTT
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MSTT SITE





GREETINGS FROM THE MSTT EXECUTIVE DIRECTOR

Leonard E. Ingram, Sr., PWAM, Executive Director, MSTT

This is the 6th annual publication of the *Midwest Journal of Trenchless Technology* and it highlights some of the many trenchless projects performed in and around the Midwest. It shows the successes and continued growth in demand for trenchless projects. It presents some of the new ideas and innovations coming from MSTT members. I want to thank Jeff Boschert, MSTT BOD Chairman and the Board of Directors of MSTT, and their companies, for their continued support of the MSTT Journal, the “Trenchless Technology, SSES and Buried Asset Management” seminar series, and the MSTT Chapter as a whole for many years. You Guys are Great!

MSTT had a very successful “Trenchless Technology, SSES and Buried Asset Management” seminar on September 5th, 2018 at the Embassy Suites by Hilton Des Moines Downtown, Des Moines IA. The seminar was very well attended and there was a lot of networking and learning. The guest presenter was Mr. Steve Naber, P.E., City Engineer, City of Des Moines with the presentation “Trenchless Technology In Des Moines”. I appreciate Mr. Naber’s support and also the American Publics Works Association (APWA) support by being the Co-sponsor for the seminar. For



Steve Naber, P.E., City Engineer, Des Moines IA

more information on the seminar please see pages 30-31

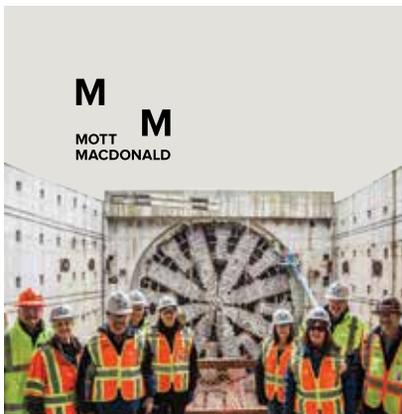
MSTT is planning its final “Trenchless Technology, SSES and Buried Asset Management” seminar for the year to be in downtown Minneapolis/St. Paul MN on Wednesday, November 28, 2018. Plans are to have the guest presenter from the area and to have ASCE and/or APWA as co-sponsors of the seminar.

I also serve as the Executive Director of the Mid Atlantic Society for Trenchless

Technology and the Southeast Society for Trenchless Technology. Each year I organize two “Trenchless Technology, SSES and Buried Asset Management” seminars for each of the three Chapters. I also publish an annual journal for each Chapter. Please look for the MASTT, MSTT & SESTT Proposed 2019 Seminar and Journal Schedule that will come out in early 2019 and plan to support the seminars and journals as much as possible. Supporting the seminars and journals helps expose existing and new trenchless technology innovations to those areas. I can tell you that at most of the 110 seminars that I have conducted since 2001, that I have always learned something new about Trenchless Technology. Please go to www.mastt.org, www.mstt.org or www.sestt.org to learn more about the societies, the seminar series and the journal. The current and past journals are on line there with the numerous interesting articles and advertisements.

Thanks for the support!

Leonard E. Ingram, Sr., PWAM
Executive Director, MSTT



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MESSAGE FROM NASTT CHAIR

Frank Firsching, NASTT Chair

Hello Midwest Members! As the year marches along we're looking forward to the continued growth of the trenchless industry and our Society. Earlier this year we hosted NASTT's 2018 No-Dig Show in Palm Springs, California. The conference was very successful on all accounts. The exhibit hall featured close to 190 exhibitors and we welcomed over 2,000 attendees from all over the world, who came to experience the world class technical sessions and networking events that our Show is known for. NASTT's 17th Annual Educational Fund Auction was, once again, the trenchless social event of the year and we raised nearly \$100,000 for our educational programs! Thank you all for your generous support.

NASTT exists because of the dedication and support of our volunteers and our 11 regional chapters. Plans are now underway for the 2019 conference and it is a very exciting time for the Midwest Chapter because NASTT's 2019 No-Dig Show will be held right in your region in the Chicago area! Please plan to join us at the Donald E. Stephens Convention Center in Rosemont, Illinois. We're thankful to two special volunteers that are helping us get the word out locally. Our 2019 Regional Ambassadors are Larry Kiest of LMK Technologies and Cathy Morley of RJN Group. These long time, dedicated NASTT members and volunteers have their fingers on the pulse of the region and will be great assets in spreading the word and inviting regional

Please plan to join us at the Donald E. Stephens Convention Center in Rosemont, Illinois, March 17 - 21

attendees including municipal and public utility contacts.

Our No-Dig Show Program Committee members volunteered their time and industry knowledge to peer-review the 2019 abstracts. These committee members ensure that the technical presentations are up to the standards we are known for. There are many Midwest Chapter Members on our Program Committee! Thank you to the members who have volunteered for this important task this year: Alan Atalah, Rory Ball, Larry Kiest, Dan Koo, Marc Lehmann, Robert Martin, John Milligan, Cathy Morley, Kevin Nagle, Ryan Otto, Jon Robinson, David Rosenberg, Jason Schiro and Chris Schuler. The Midwest Chapter is also home to many of our Session Leaders. Session Leaders are Program Committee members that have the added responsibility of managing a session of the technical program and working with the authors and presenters to facilitate excellent presentations. I would like to extend a special thank you to the Midwest Chapter Members that will also serve as Session Leaders in 2019: Alan

Atalah, Rory Ball, Marc Lehmann, Robert Martin, Cathy Morley, Jon Robison, Jason Schiro and Chris Schuler.

The North American Society for Trenchless Technology is a society for trenchless professionals. Our goal is to provide innovative and beneficial initiatives to our members. To do that, we need the involvement and feedback from our professional peers. If you are interested in more information, please visit our website at www.nastt.org/volunteer. There you can view our committees and learn more about these great ways to stay active with the trenchless community and to have your voice heard.

Our continued growth relies on the grassroots involvement of our regional chapter advocates. Thank you again for your support and dedication to NASTT and the trenchless technology industry.

Frank Firsching

Frank Firsching
NASTT Chair

MEMBERSHIP IN NASTT



All in the Family: NASTT is pleased to present new opportunities to join the NASTT Family!

Attention Students! Available now: Student Non-Affiliated Membership

NASTT proudly engages 19 official Student Chapters, and now we are branching out to all students throughout North America! The NASTT Student Non-Affiliated Membership (\$50 USD per year) is available to any student actively enrolled full-time in a North American university that doesn't currently have an official Student Chapter on campus.

Overseas Opportunities! Available now: International Individual Membership

The NASTT International Individual Membership (\$250 USD per year) is available to any individual residing outside of North America.

Stay Engaged! Available now: Retiree Membership

The NASTT Retiree Membership (\$40 USD per year) is open to NASTT members after they retire from the industry.

Now that you're officially in the family,

are you getting the most out of your NASTT membership? Taking advantage of all NASTT has to offer? As your membership manager, I'm happy to guide you to resources so that you can fill your trenchless toolbox with up to date industry information, webinars, events, and so much more!

Did you know NASTT has the world's largest online trenchless library, filled with technical papers focusing on a wide variety of trenchless topics? All papers are all available for download to our members compliments of NASTT. We sell industry books too!

Does your organization exhibit at NASTT's No-Dig Show? Members can enjoy discounts on training and registration at our annual No-Dig Show.

Are you hiring or searching for a new position? Being a society member allows you to view and post career opportunities on the job board on nastt.org. This complimentary membership tool houses industry specific jobs and gives members the opportunity to search for potential jobs or post positions that are needing to be filled.

Are you interested in getting to know the next generation of trenchless champions? NASTT also offers membership to

students! We are proud of our 19 NASTT Student Chapters and these student members are given the opportunity to attend the No-Dig show and learn about the trenchless world while networking with potential employers. Student chapters fulfill critical roles as not only volunteers at NASTT's No-Dig Show, but are the next generation of trenchless professionals.

Does your NASTT membership also make you a member of your Regional Chapter? Yes! Take the opportunity to work your local network and get involved with your Regional Chapter. Regional Chapters offer trainings and meetings, providing you the chance to expand your regional network. NASTT Regional Chapters encourage community outreach, and are a great tool to expand your knowledgebase and meet other individuals within your industry too!

But wait, there's so much more! NASTT offers a weekly eNewsletter, blog, archived webinars on trenchless topics, and committee and volunteer opportunities for you. Now that you know a little more about the NASTT family, join us! Visit nastt.org and get your membership started today!



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MSTT BOARD OF DIRECTORS



Jeff Boschert - *President*

Jeff Boschert, P.E. is the President of the National Clay Pipe Institute (NCPI), a technical resource for sewer system decision-makers and designers of gravity sanitary sewer lines. He holds a BSCE from Missouri University of Science and Technology. Jeff joined NCPI from Missouri DOT in 2004

to serve as the leader of NCPI's trenchless initiatives and has become a leading expert in the pilot tube method of guided boring. In 2012 he took on the added responsibility of conducting research and educational outreach and is now actively working with municipalities as they rediscover the benefits of vitrified clay pipe. In addition to his work with MSTT, he represents the industry on multiple ASCE and ASTM committees. Jeff was one of the principal authors of the new ASCE/ UESI Manual of Practice (MOP No. 133) on Pilot Tube and Other Guided Boring Methods released in August 2017. As President of NCPI, Jeff recently completed comprehensive updates of the *Vitrified Clay Pipe Engineering Manual and the Vitrified Clay Pipe Installation/ Inspection Handbook*.



Chris Shuler - *Vice 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 his current role as general manager of the Municipal Services Division where he oversees Miller Pipeline's water/wastewater trenchless rehabilitation operations.

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 Vice President of the MSTT Board of Directors.



John Milligan - *Secretary*

John Milligan began his career with Vermeer in 1992 as a sales liaison with Latin America and eventually the Asia Pacific region, spending his first 15 years in various international and domestic sales-management positions. After leading the quality team within the trenchless and utility product

segments at Vermeer, John took over as Business Manager for the Water & Sewer Segment, responsible for coordinating and executing the sales, engineering and manufacturing efforts related to the AXIS® guided boring system. He has been with the AXIS program since before its market launch in 2009. John was born and reared in São Paulo, Brazil, and earned a double major in Business Management and Business Marketing from Cedarville University in Ohio.



Ryan Poertner - *Treasurer*

Ryan Poertner is a General Manager of Ace Pipe Cleaning, Inc. and lives in St. Louis, MO. Ryan manages the St. Louis office, as well as the Cured-In-Place-Pipe (CIPP) division within APC. Ryan is directly responsible for the safety and quality of work for these divisions. His main focus is on the growing market

involving lateral rehabilitation. APC is a leader in the industry providing all types of investigation and rehabilitation solutions for municipalities in need. Ryan has spent his entire professional career working in the water and wastewater rehabilitation fields. Prior to the 8 years currently with APC Ryan spent 8 years working for Insituform Technologies, Inc. in roles as Engineer, Trainer, Estimator, and Project Manager. Ryan is an active member of NASTT, NASSCO, WEF and local engineering organizations.

MIDWEST SOCIETY FOR TRENCHLESS TECHNOLOGY BOARD OF DIRECTORS 2018 - 2019

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Professional Water Asset Manager (PWAM)



2018 - 2019 UPCOMING TRENCHLESS EVENTS

October 16, 2018
SESTT Trenchless Technology, SSES & Buried Asset Management Seminar
Tampa, Florida
(Date may change)
Information:
Leonard Ingram, sestt@engconco.com

November 1, 2018
Rocky Mountain Chapter 8th Annual Regional Conference
Denver PPA Event Center
Denver, Colorado
Information: www.rmnaastt.org

November 2, 2018
NASTT HDD Good Practices Course
Denver Broncos Stadium
Denver, Colorado
Information:
www.nastt.org/training/events

November 5 - 8, 2018
BAMI-I CTAM WORKSHOP
Hosted by UCTA-North Texas
Lewisville, Texas
Information: <https://bami-i.com/events>

November 8 - 9, 2018
2018 TAC/NASTT-NW Tunnelling and Trenchless Conference
Fantasyland Hotel, West Edmonton Mall
Edmonton, Alberta
Information: www.tt2018.ca

November 13, 2018
2018 NASTT Northeast Trenchless Conference
Mystic Marriott Hotel & SPA
Groton, Connecticut
Information:
www.nastt-ne.org/seminar-2018.html

November 28, 2018
MSTT Trenchless Technology, SSES & Buried Asset Management Seminar
Minneapolis/St. Paul, Minnesota
(Date may change)
Information: Leonard Ingram,
mstt@engconco.com

December 12, 2018
MASTT Trenchless Technology, SSES & Buried Asset Management Seminar
Virginia Beach, Virginia
(Date may change)
Information: Leonard Ingram,
mastt@engconco.com

February 5, 2019
NASTT CIPL Good Practices Course (in partnership with NEGDC)
8:00 AM - 5:00 PM
PSE&G Training and Development Center
Edison, New Jersey
Information:
www.nastt.org/training/events

March 17, 2019
NASTT Introduction to Trenchless Technology - Rehabilitation
8:00 AM - 12:00 PM
Donald E. Stephens Convention Center
Rosemont, Illinois
Information:
www.nastt.org/training/events

March 17, 2019
NASTT Introduction to Trenchless Technology - New Installations
8:00 AM - 12:00 PM
Donald E. Stephens Convention Center
Rosemont, Illinois
Information:
www.nastt.org/training/events

March 17 - 21, 2019
NASTT 2019 No-Dig Show
Donald E. Stephens Convention Center
Rosemont, Illinois
Information: www.nodigshow.com

March 20 - 21, 2019
NASTT Pipe Bursting Good Practices Course
March 20 2:30 PM - 5:30 PM
March 21 8:00 AM - 12:00 PM
Donald E. Stephens Convention Center
Rosemont, Illinois
Information:
www.nastt.org/training/events

March 20 - 21, 2019
NASTT New Installation Methods Good Practices Course
March 20 2:30 PM - 5:30 PM
March 21 8:00 AM - 1:00 PM
Donald E. Stephens Convention Center
Rosemont, Illinois
Information:
www.nastt.org/training/events

March 20 - 21, 2019
NASTT CIPP Good Practices Course
March 20 2:30 PM - 5:30 PM
March 21 8:00 AM - 1:00 PM
Donald E. Stephens Convention Center
Rosemont, Illinois
Information:
www.nastt.org/training/events

March 20 - 21, 2019
NASTT Laterals Good Practices Course
March 20 2:30 PM - 5:30 PM
March 21 8:00 AM - 12:00 PM
Donald E. Stephens Convention Center
Rosemont, Illinois
Information:
www.nastt.org/training/events

March 20 - 21, 2019
NASTT HDD Good Practices Course
March 20 2:30 PM - 5:30 PM
March 21 8:00 AM - 2:30 PM
Donald E. Stephens Convention Center
Rosemont, Illinois
Information:
www.nastt.org/training/events

March 20, 2019
NASTT Gas Good Practices Course
2:30 PM - 5:30 PM
Donald E. Stephens Convention Center
Rosemont, Illinois
Information:
www.nastt.org/training/events

April 5 - 9, 2020
NASTT 2020 No-Dig Show
Colorado Convention Center
Denver, Colorado
Information: www.nodigshow.com



2018 SEMINAR & JOURNAL SCHEDULE

MASTT - MID ATLANTIC SOCIETY FOR TRENCHLESS TECHNOLOGY
 MSTT - MIDWEST SOCIETY FOR TRENCHLESS TECHNOLOGY
 SESTT - SOUTHEAST SOCIETY FOR TRENCHLESS TECHNOLOGY

SOCIETY	PROPOSED DATE	PROPOSED LOCATION	STATUS
SESTT SEMINAR	MAY 9, 2018	ATLANTA GA	COMPLETED
MASTT JOURNAL	MAY 24, 2018	PUBLISH DATE	PUBLISHED
MASTT SEMINAR	JULY 19, 2018	PITTSBURGH PA	COMPLETED
MSTT SEMINAR	AUGUST 15, 2018	DES MOINES IA	COMPLETED
MSTT JOURNAL	SEPTEMBER 14, 2018	PUBLISH DATE	PUBLISHED
SESTT SEMINAR	OCTOBER 16, 2018	TAMPA FL	PROPOSED
MSTT SEMINAR	NOVEMBER 28, 2018	MINNEAPOLIS/ST. PAUL MN	PENDING
SESTT JOURNAL	NOVEMBER 16, 2018	PUBLISH DATE	PROPOSED
MASTT SEMINAR	DECEMBER 12, 2018	VIRGINIA BEACH VA	PROPOSED

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MSTT MEMBER CHRIS BRAHLER INDUCTED INTO 2018 NASTT HALL OF FAME CLASS



Chris Brahler with Mike Willmets



Chris Brahler accepts NASTT 2018 Hall of Fame Induction (l-r): Mike Willmets, NASTT Executive Director, Chris Brahler, President/CEO TT Technologies, Frank Firsching, NASTT Chair, Derek Potvin, Past NASTT Chair

At the NASTT 2018 No-Dig Show in Palm Springs, March 25 - 29, MSTT Chapter member Chris Brahler was formally inducted into the 2018 NASTT Hall of Fame after an extensive career of leadership in the underground and trenchless construction industries for over 40 years.

Chris received a bachelor's degree in marketing and business administration in 1974 and began his career in the cable installation equipment market that same

year. Early on, Chris worked with several different pieces of cable installation equipment and soon developed an interest in trenchless technology.

In 1975, he helped secure an arrangement with Tracto-Technik in Germany to bring several trenchless product lines to North America. In 1991, Chris started TT Technologies, Inc., Aurora, IL, a manufacturer of trenchless tools and equipment.

As President and CEO of TT Technologies, Chris has worked tirelessly with water, wastewater and gas utilities, plumbers, telecommunication companies, engineers and contractors to promote the value of trenchless technology and help build the market in North America. Over the years, he has dedicated the time and resources needed to develop, improve and refine trenchless equipment, methods and solutions.

He has been a featured presenter at conventions and conferences around the country, as well as in Canada, Mexico, China and South America, helping develop emerging markets for trenchless technology.

In 2007, he was chosen Trenchless Technology Magazine's "Trenchless Person of the Year." He has served on the No-Dig Show Trenchless Committee, the marketing and management committees for ICUEE, DCA's Board of Directors and the NUCA Trenchless committee. In 2009, Chris began a term as NASTT Board Chairman and in 2014 he received the Lifetime NASTT Chair Service Award. His contributions and service to NASTT have helped strengthen the organization and advance its mission. He is an educator, mentor, leader and innovator. Congratulations Chris on your induction into the NASTT Hall of Fame in recognition of your lifetime contributions to the advancement trenchless technology.

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MSTT MEMBER MATTHEW SMITH, MICHELS CORPORATION, HONORED WITH 2018 NASTT TRENT J. RALSTON AWARD



Matthew Smith accepts 2018 NASTT Trent J. Ralston Award inspired by the future potential of trenchless technology



(l-r): Michael Willmets, NASTT Executive Director, Ralston Award winner Matthew Smith, Frank Firsching, NASTT Chair

At the NASTT 2018 No-Dig Show in Palm Springs, March 25 - 29, MSTT Chapter member Matthew Smith, Direct Pipe Manager, Michels Corporation, was one of two recipients honored with the 2018 Trent Ralston Award for Young Trenchless Achievement, along with Charlie Tripp.

Since 2010, this prestigious annual award has recognized a young individual demonstrating excellence in the early stages of his or her career who is making a notable contribution to the trenchless technology industry. Volunteer service to NASTT, a NASTT Regional Chapter, or NASTT Student Chapter, is a key criterion for this award.

Matthew Smith has spent his career in trenchless construction and, at 29, is one of the most experienced Direct Pipe practitioners in North America. After graduating from Gonzaga University in 2011, Smith joined Michels as a project engineer, working on several significant tunneling projects in Galveston, Texas and Miami. He became a project manager midway through a series of seven microtunnel drives in Akron, Ohio in 2013.

Because of his success with tunneling and microtunneling projects and understanding of HDD principles, Matthew was selected to manage Michels' fledgling Direct Pipe program. Since then, he has shepherded crossings under international borders, interstate highways, rivers and a 4,039-foot installation of 48-inch pipe under the Dow Barge Canal in Clute, Texas.

Matthew's is inspired with a continuing willingness to push the limits of HDD and other trenchless technologies. Congratulations Matthew on this important career milestone!



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TRENCHLESS TEAM EFFORT YIELDS SUCCESS IN DOWNTOWN MINNEAPOLIS

Unique Rehabilitation of an 18-Inch Oval Main Lateral Connection



Phases One & Two were completed at night

By: Cody Delmendo, Eric Sullivan, LMK Technologies LLC

Located in the heart of Minneapolis, MN, at the busy off ramp from Interstate 35 and the terminus of Highway 65, a few blocks away from US Bank Stadium and the downtown financial district, is the historic Francis Drake Hotel. Built in 1926, the Drake Hotel was initially constructed as a luxury hotel; it now serves as a temporary residence for homeless families and individuals.

Despite its age, neither the hotel nor its underground infrastructure had ever been updated. In early summer of 2017, a sink hole was discovered below 5th Avenue South, caused by a failure in the hotel's side sewer and its connection to the mainline.

This sink hole presented a major problem for the traveling public as thousands of cars rely on this corridor daily. To make matters worse, a nearby bypass tunnel, which allows traffic to avoid the downtown area, had also been partially closed for unrelated repairs and maintenance. This forced even more

commuters onto 5th Avenue South, the site of the sewer failure. Moreover, the cost for a traditional open cut rehabilitation method was estimated to be approximately \$45,000 for this single repair, and take several days to complete, disrupting nearby businesses. Decision makers from the City of Minneapolis determined that an extended closure of 5th Avenue South 5th for an open cut excavation to replace the side sewer and mainline connection would not be possible.

In situations like this, sewer agencies tend to take a keen interest in options available through the use of trenchless technologies, which is the use of methods and equipment to renew or replace existing underground infrastructure with minimal disruption to surface traffic, business or property. In this case, the City of Minneapolis was no exception, and Sean Oberg, the City's Sewer Maintenance Supervisor, who worked as a facilitator with the Drake Hotel, reached out to Pete Dannenberg, Regional Sales Manager at LMK Technologies.

Based in Ottawa, Illinois, LMK Technologies has been offering trenchless cured-in-place-pipe (CIPP) lining solutions since 1993 and was known to Oberg as an innovative problem-solver. Oberg explained that the mainline pipe was a unique oval shape, and 18 inches in diameter, making it larger than average, previously repaired with a CIPP liner. The sewer line from the Drake to the main was a more typical 6-inch diameter pipe with a "tee" style connection to the mainline. Confronted with this unique challenge, LMK's technical team went to work, crafting a solution to repair the problem using a custom designed T-Liner. They decided that LMK's T-Liner® would be the best solution to meet this need.

The T-Liner system is a one-piece main-to-lateral CIPP connection liner. The liner is formed as a structural cylinder and renews 18 inches of the mainline at the main-to-lateral interface and extends up the lateral pipe simultaneously. The T-Liner can line a service lateral up to 150 feet from the main pipe in



The sinkhole presented a major problem for the traveling public

In situations like this, sewer agencies tend to take a keen interest in options available through the use of trenchless technologies...

one installation. The system utilizes hydrophilic rubber gaskets, compliant with ASTM F3240, which swell after becoming moist, and form a seal between the host pipe and the new liner which therefore provides a watertight connection, eliminating groundwater infiltration and wastewater exfiltration. Because of these unique features, the T-Liner is compliant with ASTM F2561, which is the industry standard countless sewer agencies turn to when looking to simultaneously rehabilitate a sewer service lateral and its connection to the main using a single liner.

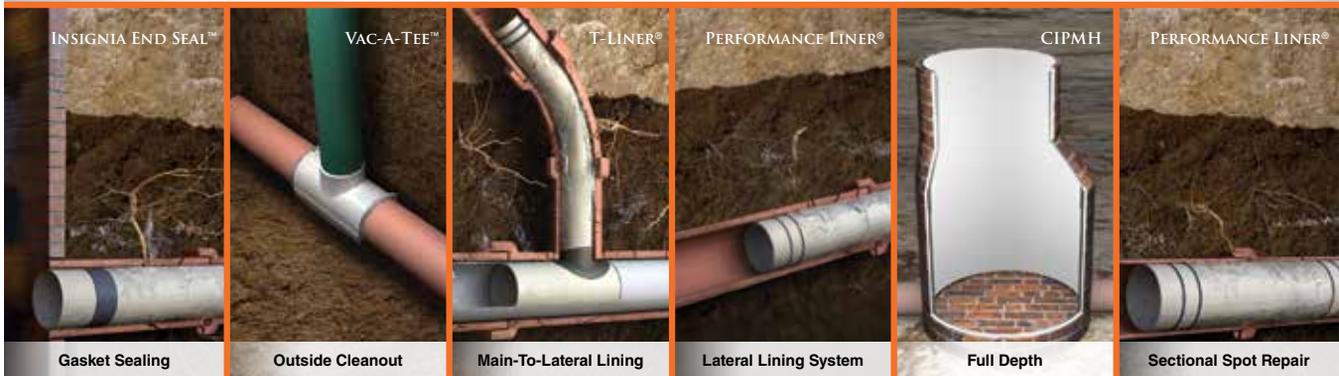
Trenchless installation of LMK Technologies' T-Liner system would

structurally renew the leaking pipes quickly and without shutting down streets and businesses, and it was much more cost effective than digging. Most importantly, the Drake Hotel was able to stay open during the entire process. Dannenberg contacted Quam Construction, a Minneapolis contractor and LMK licensed contractor, for this project based on a past record of success working together on multiple projects since June 2015, when Quam first entered the field of trenchless lateral rehabilitation.

"Our relationship with LMK has been fantastic," Judd Stattine, Vice President of Trenchless Pipe Solutions at Quam, says.



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(l-r): Pete Dannenberg, LMK Technologies, Jason Hoffman, Quam Construction, Judd Stattine, Quam Construction

“Working with LMK has allowed us to diversify our labor, expand our tool box, and have more trenchless solutions in general.” Quam verified the pipe and its shape and size by accessing the manhole in the street, providing critical details

LMK needed to design the T-Liner. LMK technical staff custom-designed and tested its trenchless solution, while the Quam team worked out the on-site details on how to complete the installation while keeping traffic moving and the Drake

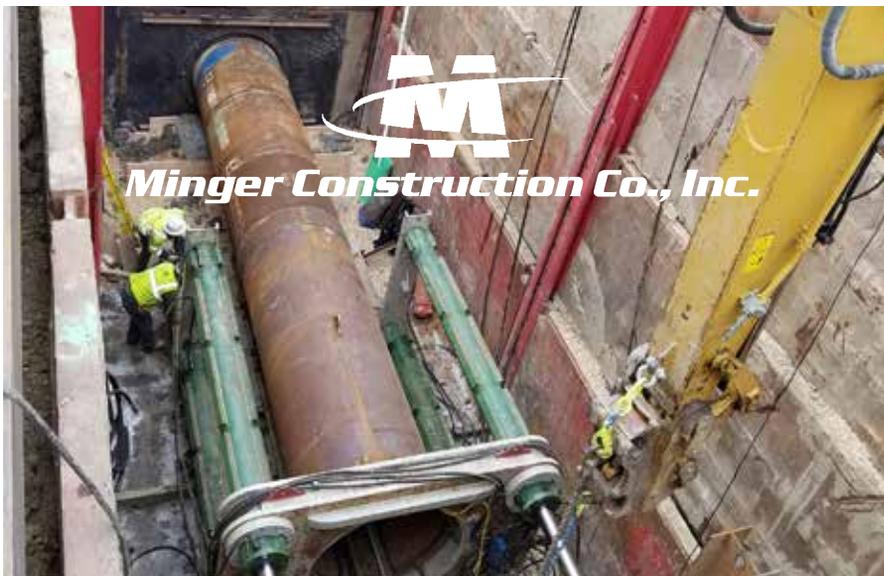
Hotel in operation. To lessen its impact, the project was split into two different phases, timed to be undertaken one week apart.

The project first required a sewer lateral cleanout outside the hotel. LMK’s ASTM F3097 compliant trenchless VAC-A-TEE® system was the chosen solution because it would enable installation of a cleanout access point with minimal equipment footprint and minimal disruption to the surface. Phase One would be to site and install the VAC-A-TEE. Phase Two would be to repair the lateral service connection utilizing the cleanout with a T-Liner, which would extend 8 feet up the service lateral pipe to be installed from the sewer main.

Working closely with the City, Quam closed the street parking lane, creating one single lane of traffic, on the June evening chosen for the execution of the Phase One cleanout installation. After the cleanout was installed, they backfilled the area with sand and a layer of black dirt to restore the cleanout site to its original condition. The process, which took only three hours to complete, began at 9 pm. With minimal disruption, Phase One was successfully concluded.

Phase Two began exactly one week later. Again at 9 pm, Quam closed three lanes of the road and used the parking lane so traffic could flow between 10th and 9th streets as well as 5th Avenue South. The crew used a specialized single-access self-propelled robot to clean the pipe and connection, removing all obstructions. It then fully saturated the T-liner with resin, loaded it into the liner’s launching device, and pulled it 215 feet into the mainline pipe to the repair location. Using the VAC-A-TEE cleanout installation, the crew watched the positioning of the liner during the inversion process in real time with a CCTV camera.

Once the liner was positioned, air pressure was used to inflate the mainline portion against the sidewall of the 18-inch diameter oval mainline pipe and the lateral liner was then inverted up the service pipe, also using air pressure. Once the liner was fully inverted, Quam used steam curing methods which took seventy-five minutes. Once cured, Quam removed the bladder and launcher



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Before



After

A unique CIPP rehabilitation of 18-inch oval main lateral connection

Dannenberg notes that “being able to do this with trenchless technology — as the city advised — turned out to be a fantastic decision for all parties.” Larry Kiest, President and Founder of LMK, agrees. “We are pleased with the results and ecstatic that the Drake Hotel was able to use trenchless CIPP rehabilitation methods. There is no challenge too big or too small for what we do. At LMK, we welcome challenges that require us to build unique solutions.”

assembly from the mainline pipe. After a CCTV inspection, the crew cleaned up and removed its traffic control equipment, restoring full access to the roadway by midnight. The City used compacted stone to fill the sink hole, finishing the repair with asphalt. Phase Two also took only three hours, and the entire project cost \$17,000, saving the Drake Hotel \$28,000, or just over one third the cost as compared to open cut excavation.

“Overall, it’s accurate to say that the city

is happy with the results,” says Katrina Kessler, Director of Surface Water and Sewers for the City of Minneapolis. “The minimally invasive solutions were ideal because the issue was in a very congested part of downtown Minneapolis where we strive to lessen traffic concerns and impacts to residents and the traveling public.” If the crew had used open cut methods, it would have closed all the impacted roads during the two to three days required to complete the job.

ABOUT LMK TECHNOLOGIES:



LMK Technologies has been a leader in trenchless Cured-In-Place

Pipe (CIPP) lining since 1993. LMK is recognized by many municipalities and engineering firms as the innovative leader for the trenchless renewal of sewer laterals, mainlines and manholes. LMK has over 100 patents and pending patent applications throughout the world.

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NON-CONFORMING LINER IN THE CITY OF SAGINAW MI

CIPP Lining of a 30-inch x 30-inch Influent Conduit from Distribution Box to Clarifier

By: Greg Marker, P.E., OHM Advisors

The majority of the City of Saginaw's sanitary sewer system was constructed in early to mid-1900s as a combined system. The collection system is quite robust, consisting of 373 miles of combined sewer, 9 pump stations, 31 sewer regulators, 7 retention treatment basins (RTB), and the Waste Water Treatment Plant (WWTP). The WWTP serves a population of approximately 51,000 inside the City, along with some areas outside the City. The WWTP has completed several upgrades over the last 15 years and the capacity of the plant exceeds the demand due to decreased volume of industrial and private users over the same time period. Currently the WWTP discharges treated effluent to the Saginaw River.

The Saginaw WWTP is designed to handle an average daily flow of 32 MGD. During wet weather events, the plant influent flow can reach 72 MGD. The 40-acre plant site includes 16 buildings. The plant processes include fine screens, a multiple tray grit removal system, primary settling, aeration basins, secondary settling, disinfection using chlorine gas, and de-chlorination with sulfur dioxide.



OHM Advisors and SME worked with staff at the Saginaw WWTP to study the possibility of rehabilitating one of the six Primary Settling Tanks (PST #1). PST #1 was damaged when the empty tank heaved because of ice, preventing primary influent from properly filling the tank. This tank had been out of service since 2014 due to cracking of the walls, base slab, and damage

to the clarifier mechanism. After looking at the life cycle and anticipated remaining useful life, two options were considered, rehabilitating the tank or total tank replacement. The City elected to move forward with rehabilitating the tank. In addition to repairing the existing tank walls and slab, along with replacing the mechanism, the square influent conduit between the distribution box and PST #1 needed repair due to infiltration, and damage to the conduit precast top panels.

During rehabilitation of PST #1 conduit, the City also wanted to address infiltration and exfiltration in the influent conduit to PST #4. Prior to issuing bid documents for rehabilitation of PST#1, the plant observed exfiltration of primary influent through the pressure relief valves in the base slab of PST #4 when placing the tank into service. It was suspected that PST#4 influent conduit construction joints were leaking. Therefore, lining on the PST#4 influent conduit was added to the construction documents.

Both influent conduits were identified for CIPP lining during the rehabilitation project. Both conduits were 80 feet long and had one vertical 22.5 degree, one horizontal 22.5 degree, a 45 degree bend, and a 90 degree bend between the influent entrance in the bottom center of the tank and the square entrance to the Distribution box, with slide gates for controls. PST #1's concrete conduit had a missing section of vaulted ceiling and numerous infiltration points. PST# 4 had infiltration and a transition from 30x30 inches to 60x46 inches. As well, the clarifier equipment was still in place.

RAM Construction was the prime Contractor for the entire project with Elite Pipeline Services subcontracted for CIPP lining. Elite worked with CIPP Services for supply of the liner, wet out, and specialty equipment. After televised inspection of the conduits by Elite, the contracting team presented various options as alternatives to lining PST #4 because of the access issues presented by the clarifier equipment. Spray in place lining (SIPP), point repair sleeves, and grouting were evaluated based on product viability, extended life-span, and cost. The City's goal was to minimize the possibility of exfiltration of primary influent to extend useful life of the primary settling tank. Upon evaluation of the options, the owner recognized that the PST#4 clarifier equipment would require replacement in the next 10-15 years; and, therefore, chose to delay rehabilitation until clarifier removal

The patience of the contracting team during the equalization, heating, and cool down periods of curing allowed the liner to conform, ensuring the tightest possible fit



PST#4 influent conduit existing condition at 45 degree bend



PST #4 influent tunnel televising existing conditions and the one point of infiltration/exfiltration

and more thorough evaluation. Until then, leaking joints were addressed via the least intensive option of chemical grouting.

Due to the unique nature of this project, planning of the lining activities was critical to the success. The planning included:

- Several site visits by Elite to gain a thorough understanding unique challenges of the project.
 - Determine procedures for accessing the conduit.
 - Identify safety concerns of working in confined spaces at an operating wastewater treatment plant
 - Identify impacts on the WWTP operations.
 - Coordinate shutdown of WWTP operations and isolation of areas impacted by construction activities.
- Detailed submittals, back and forth on submittals, back and forth on materials, and detailed procedures prior to construction.
- Pre-install meeting with the Owner, Engineer and Contractor to discuss the plans and challenges.
- Field verification of conduit sizes and conditions prior to release of materials for fabrication.
- Follow up conference calls to ensure all parties understand the plan.

One of the more challenging aspects of the project was pulling the liner through the PST #1 influent conduit. While inversion techniques were considered, Elite and CIPP Services determined inversion posed additional risk with the bends and conduit configuration. When the liner arrived in the morning, the pull-in took nearly 15 hours to winch, pry, and shift the liner into place. To ease drag, the liner was pulled over lubricated plywood using



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a 5-ton Hammerhead winch. Liner resin stabilization throughout this timeframe was maintained with ice – over 400 pounds.



Liner being pulled into PST#1 Conduit



Winch set up at the distribution box to pull the liner into place

In addition to three sets of rollers inside the conduit, the winch cable negotiated a 90-degree bend at the bottom of the distribution box and pulley at the top to maneuver the 7,000-pound liner. The pulley was secured to a Sky Trak that was rested on a slide gate I-beam frame that transferred the 5-ton pulling force.

Throughout the installation, the winch was repositioned at various hold-points – inching slowly into the conduit. Repositioning the cable was an exhausting effort with mere inches of movement. After back and forth activity that lasted several hours, the liner was successfully positioned. Curing started immediately thereafter and lasted through early morning. The liner was inflated with air and held under pressure for over an hour before introducing steam for cure. Thermo-sensors placed at the upstream and downstream ends of the liner confirmed the resin's exothermic reaction and began curing. Post lining videos confirmed that anticipated annular spaces in the corners were drastically reduced and that the liner conformed beyond

expectation. The patience of the contracting team during the equalization, heating, and cool down periods of curing allowed the liner to conform, ensuring the tightest possible fit.

Originally it was anticipated there would be 3-inch radial voids in the corners that would need pressure grouting to fill. The actual radiuses were 1-inch in the corners, therefore to eliminate potential water migration through the annular cavities, the ends and essential pathways were filled with one of Avanti's flexible grouts. Voids of this nature are common due to the square-corner host configuration and inability of liners to form sharp corners.

PST #1 was successfully lined with a 33-inch 15mm liner. PST #4 was acrylamide pressure grouted while the dewatering system was in place. As noted above, PST #4 influent conduit is on the lining list for rehabilitation when the clarifier equipment is removed and replaced in the future.



PST#1 conduit precast ceiling panels missing and vaulted



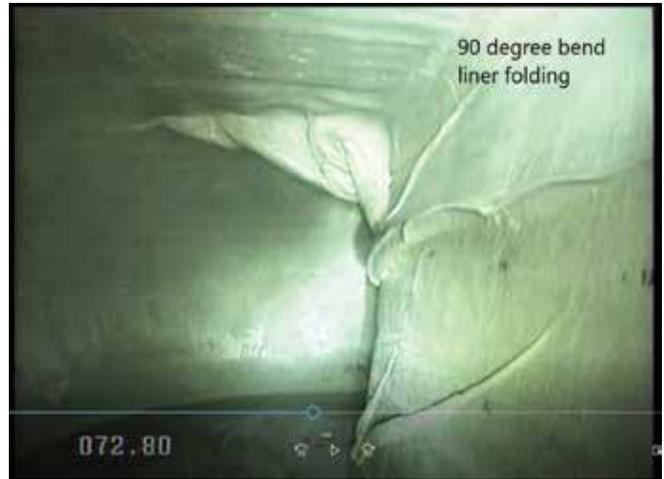
PST#1 conduit after lining

The decision process and the lessons learned came out as valuable information in non-conforming liner situations.

- The pull-in process became the single greatest difficulty for this project. The Contracting team successfully completed it, however it did have significant challenges during the work. This can be contributed to pulling around direction changes with winching impingements. How the winch was set up had the greatest impact



PST#1 post lining at a 45 degree bend



PST#1 post lining at the 90 degree bend

on the pull in. The winch configurations needed to be rearranged many times to take advantage of pulling capacity and minimize conduit damage.

- The bends did cause wrinkles and folds in the finished liner at corners. While these were anticipated, the wrinkles are prominent as they come into view with post-video inspections.

In the end, a long submittal process ensured the right fixes and the right materials were selected for each problem. The construction ran into some hurdles that had to be overcome onsite

and led to a 24-hour construction day, however the final product met the intent of the owner for each of the respective conduits. 🏠

ABOUT THE AUTHOR:



Greg Marker, P.E., has 19 years in the industry and is currently the Practice Leader for the Construction group at OHM Advisors.

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Alex & Amber Harris, AH Underground, with Mag 6

Alex Harris is an owner operator at AH Underground in Colorado Springs CO. Alex was one of the first operators to use the Underground Magnetics Mag 3 system in the US. His input into the development of the Mag 3 US operating system was a huge help.

Since then, Underground Magnetics has sold thousands of Mag systems worldwide. Alex is now running the new Mag 6 system and is about ready to put another drill in the field. "I will definitely be including a new Mag 6 when my new rig is ready" says Alex. "Working with Mike Young and Underground Magnetics has been very good for my business. If it wasn't for Mike and his team's support, I don't think I would be adding a new drill so soon".

Alex loves the versatility of the Mag 6 system. "Being able to switch frequencies and power down hole has been a real advantage when it comes to the everyday active interference's that effect HDD locating systems". He also likes the simplicity of the bore-to feature. "I can

set my Mag 6 30 feet or more out front and drill to it with absolute confidence in where the head is and how deep it is. Not long ago, I needed to work a weekend to get a job done on time. One of my guys called in sick and I wondered if I was going to meet my deadline. My wife was free that day so I asked if she was game to give me a hand with the locating. She first said she didn't think she would be any help but I convinced her that the system was so easy to run she wouldn't have any trouble, I was right, it took her only a few minutes to get the hang of running the locator. Together, with the Bore-To feature, we finished the job on time and perfectly on course".

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This is an exciting year for Underground Magnetics. We are building a new engineering and assemble facility in Iowa. Some very exciting new products will be unveiled soon and as always, software updates are free! 🎉

ABOUT THE AUTHOR:



Mike Young, President, Underground Magnetics Inc. has a thirty year history in the HDD industry, owning and working for many of the well-known drill rig manufacturers and

HDD guidance system producers. Mike is still helping innovate new products for the HDD industry today.

PILOT TUBE PROJECT SAVES TIME, MONEY AND TREES!



Tree-lined streets and multiple utilities presented challenges in St. Clair Shores, MI

Overcoming Challenges in St. Clair Shores MI

By: Steve Matheny, Logan Clay Products LLC

Within the City of St. Clair Shores, MI (population: 59,800) a small sewer district of 645 homes and businesses is served by a combined sewer system (with roof and footing drains connected to sewers). Recurring basement backups, some dating back more than 30 years, prompted several studies and evaluations of the area served by these combined sewers.

These studies consistently found that excess storm water from wet weather events overloaded the sewers, resulting in basement backups. Backups were occurring with storm events of as little as 1.4 inches of rainfall in 24 hours. The recommendations were consistent:

1. Disconnect roof drains from the sewer system.
2. Disconnect footing drains from the sewer system, and
3. Construct a relief sewer

Multiple large storm events occurred in 2014 and again in 2016, with one rainfall exceeding 5 inches in 24 hours. Hundreds of basements flooded resulting in a sense of urgency around finding and implementing a solution.

While continuing to explore the recommendations that will reduce demand and additional alternatives for reducing wet weather flows into the combined sewer system, in August 2016, the City Council authorized Anderson, Eckstein and Westrick, Inc. (AEW) to prepare the construction documents for a relief sewer.

Project Design

The Ten Mile Road corridor was slated for a complete reconstruction before the end of 2017. To allow time for resurfacing, government financing incentives for that portion of the project required that sewer construction be completed by September 1, 2017.

The project area was occupied with two water mains, several gas mains, the combined sewer, additional storm sewers and numerous large trees. The geotechnical report indicated a very soft clay for the full length of the installation. The design immediately focused on pipe sizing as well as the means and methods of construction. Because this project was

strictly a relief sewer, there would be no need to disconnect or reconnect existing service lines. The trees in the area were seen as a community asset and part of the design directive was to save the trees.

The initial design contemplated the use of a traditional, open-cut method to construct 5,300 feet of a 21-inch relief sewer. Based on planned alignments and a sewer depth of up to 18 feet, nearly all of the mature trees would require removal, two lanes of pavement would need to be replaced, and a full road closure would be needed to accommodate construction efforts.

A variety of installation methods were considered, including an option to bore past individual trees in efforts to save as many mature trees as possible. This effort was bid as one of the project alternatives so the City could responsibly evaluate the cost impacts of saving existing trees.

Microtunneling was considered and bid as another alternative to the open cut method of constructing the project. With a significantly reduced impact to the construction area, this alternative

allowed for saving most mature trees while limiting removal of paved surfaces to the launch and receiving shafts.

The bid documents were being prepared in November of 2016, when AEW attended the “Microtunneling: Not just for Gophers” event hosted by the Southern Michigan branch of ASCE. The event included a site visit to an active Pilot Tube Method (PTM) project at the Little Mac project in Clinton Township, MI. The project featured Akkerman’s GBM 339A system with a 22.5-inch powered-cutter head to install 18-inch jacking pipe. The small project footprint required for this installation method seemed uniquely suited to address the project challenges presented in St. Clair Shores.

Finding out more about the trenchless method was the first step.

Due Diligence

At the onset of the project, AEW met with City staff to review project design elements. This included alignments, pipe sizing, pavement and tree removals, traffic controls and consideration of existing utilities, and MDOT coordination for upcoming projects. Several visits were made to the project area to evaluate the construction zone impacts and traffic controls.

With project cost and tree preservation being driving factors, bids for alternative installation methods were requested. The City was then able to evaluate the costs and benefits associated with each of the various means and methods under consideration for the project: Open-cut construction, combination open-cut with steel cased borings under the tree roots, or the Pilot Tube Method (PTM).

Presentations were made to the City Council summarizing the costs, impacts and benefits associated with each of the alternatives. These presentations were designed to allow the Council to make an informed decision about the short- and long-term value of each installation method. PTM was approved as an equivalent method of construction to Microtunneling.

The general expectation is that an open cut project will be less expensive than a trenchless installation. For this project, the opposite was true. Using PTM was the responsible financial choice.

Bid Selection

Saving the existing tree corridor, minimizing disruption to traffic and utilities, and reducing repaving costs while constructing the relief sewer were all benefits that drove the final selection.

The general expectation is that an open cut project will be less expensive than a trenchless installation. For this project, the opposite was true. The minimum bid for an open cut installation (\$3.2 million) came in at approximately 33% over the bid for PTM installation (\$2.4 million).

MK Construction was awarded the contract in March of 2017. With the urban setting, MK Construction cited the following reasons as the drivers for their decision to bid using PTM as the most

cost-effective option for this project:

- Open-Cut methods would require the excavation of the roadway (10 Mile Road) for approximately 5300 feet of the project.
- Existing utilities within the right-of-way
 - gas, electric, water, storm and existing sanitary would be undisturbed using PTM
- An open cut approach to the project would require removal of mature trees and temporary access construction for numerous driveways.
- Dewatering at each shaft versus along the entire trench would better limit risk and reduce costs.

AEW staff reviewed the bids and the alternate technologies. Ultimately, they were convinced that the use of PTM was the financially responsible choice. It was the only viable option for achieving the city’s

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The longer life and expanded maintenance options provided by VCP serves the long-term interests of the community.

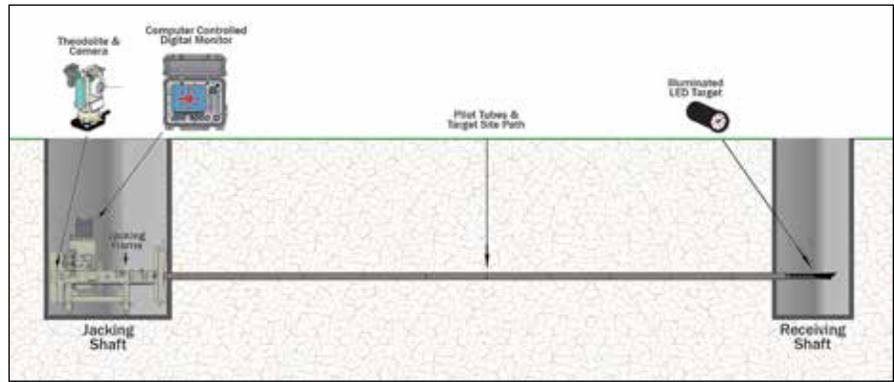
goals of protecting the existing utilities, old growth trees and other natural features while minimizing community disruption and completing the project on time.

Equipment & Set Up

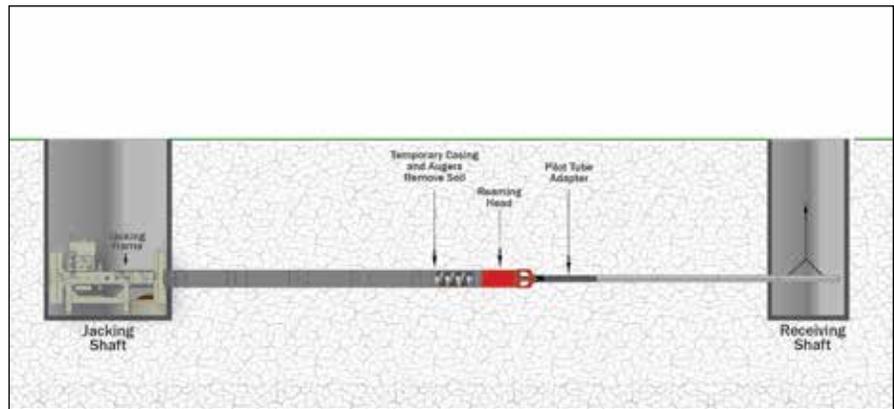
After being awarded the project, MK Construction went to work identifying the appropriate equipment for installing the 21-inch relief sewer. Because of the urban setting with residential homes on narrow single-family lots, the mature landscaping and multiple utilities, smaller equipment footprints were prioritized.

Of the available guided boring machine options, the Akkerman GBM 4800 Series system was identified as the best option for the complexities of this project. The system included a 26-inch powered reaming head, a P150 Power Pack and a 2325D lubrication pump. The jacking frame with this system is just 12 feet in length, which allowed MK Construction to limit the size of the jacking shafts.

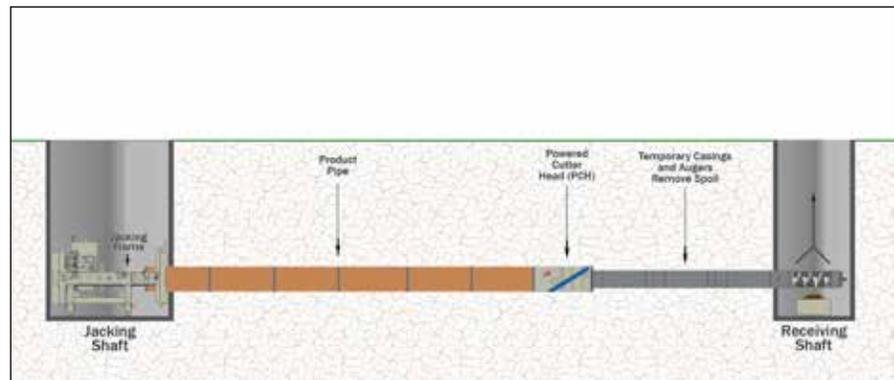
The length of the pipe was also a consideration. In this mature, urban area, shorter lengths were needed to minimize the size of the jacking shafts. Vitrified Clay Pipe (VCP) Jacking pipe is specially made for trenchless installation, coming in 1- (3.28 ft.) and 2-meter (6.56 ft.) standard lengths. With the 12-foot jacking frame, MK Construction used 8-foot jacking pipe section lengths for this project.



PTM STEP 1: Installation of pilot rods



PTM STEP 2: Installation of auger casings



PTM STEP 3: Installing the product pipe

The Pilot Tube Method

MK Construction excavated the jacking pits and receiving shafts and maintained them using a sheet piling and whaler system (for a rectangular structure).

Once the shaft construction was complete, the First Step (see PTM STEP 1 above) for the installation was to install the 4-inch pilot tubes on line and grade. During installation of the pilot tube, the ground was displaced by the slant-faced steering head and no spoil was removed.

The pilot tube was directed on line and grade by rotation during advancement. The hollow stem of the pilot tube provided an optical path for the camera to view the LED target displaying the head position and steering orientation. This step established the centerline of the new sewer installation; all remaining steps followed the path of the pilot tube. Once the pilot tubes reached the reception shaft, the theodolite, video camera, and monitor guidance system were no longer needed and were removed from the jacking pit.



Pushing the product pipe into place



The Powered Reaming Head in place and ready to follow the path of the pilot tubes

The Second Step was to follow the path of the pilot tube with an 11-inch OD reaming head. The front of the reaming head was fastened to the last pilot tube in the same manner the pilot tubes fasten to each other. Eleven-inch OD thrust (auger) casings advanced the pilot tubes and reaming head and transported the spoil (displaced ground around the pilot tubes) to the jacking shaft for removal. Once removed from the jacking shaft the spoils were transported off-site. During the installation of the 11-inch casings, the previously installed pilot rods were advanced into the reception shaft for disassembly and removal. This step was complete when the reaming head reached the reception shaft and all spoils were removed.

The Third Step on the 21-inch ID product pipe installation was to install a powered reaming head (PRH) that was modified to grind up nested cobbles around the auger casings; both advanced by the product pipe. The 26-inch OD PRH increased the bore to match the 25.5-inch product pipe OD. The remaining soil around the previously installed 11-inch OD auger casings (step 2) was taken into the PRH and discharged via the reception shaft by reversing the auger flight direction. The final product pipe was then installed directly behind the PRH. As each section of auger casing was removed from the reception shaft, a section of product pipe

was installed in the jacking shaft. This step was complete when the PRH entered the reception shaft and the pipe lined the full length of the bore.

When using PTM for installation, VCP is the practical option for pipe material, MK Construction had the option to bid VCP or RCP jacking pipe. The high compressive strength, low-profile, zero-leakage joints of VCP Jacking Pipe (VCP-J) make it the obvious choice. The average compressive strength of VCP-J is 18,000 psi, so the pipe itself can resist the high jacking forces generated as the pipe is pushed through the ground, eliminating the need for an external casing pipe. Without the larger diameter steel casing, cost savings are realized not just by the elimination of the casing, but by a reduction in excavation and transportation of spoils.

VCP-J has the same lifecycle as all VCP and enables a greater range of cleaning options for long term operations and maintenance of the system. More municipalities are choosing to install a premium pipe to realize these long-term benefits.

Conclusion

The low-impact, high-accuracy installation made possible by PTM gives the owner, engineer and contractor greater control over the alignment and grade of

the sanitary line while preserving the community's surface assets. The longer life and expanded maintenance options provided by VCP serves the long-term interests of the community.

The new pipeline was tested for acceptance using both a low-pressure air test and a CCTV inspection per the city's and engineer's specifications. The VCP lines showed no deficiencies and passed the "air-test" per ASTM C828 Standard Test Method for Low-Pressure Air Test of Vitrified Clay Pipe Lines. Line and grade specifications were also realized.

"We're thrilled when engineers and contractors get experience with the Pilot Tube Method of Guided Boring, said Jeff Boschert, President of the National Clay Pipe Institute. "Once they realize the pinpoint accuracy and minimal surface impact of the process, they become some of our best representatives." 🏗️

ABOUT THE AUTHOR:



Steve Matheny, P.E., joined Logan Clay Products LLC in 2016 as a business development engineer after more than 30-years in the field, working for

municipalities and manufacturers. He is currently consulting on multiple projects throughout the Midwest. Many of those projects will employ the Pilot Tube Method for installation.

DES MOINES SEMINAR SEPTEMBER 6, 2018:

GUEST PRESENTATION

"Trenchless Technology in Des Moines"

Mr Steve Naber, P.E., City Engineer,
City of Des Moines IA

PRESENTATIONS

Welcome Address,

Leonard Ingram, PWAM, MSTT Executive Director

Pipe Bursting,

Dave Holcomb, TT Technologies, Inc.

Guided Boring Using Pilot Tubes - Methodology and Case Studies,

Jeff Boschert, P.E., National Clay Pipe Institute

Force Main Inspection Programs,

Zach Matyja, P.E., RJN Group, Inc.

New Standards For Testing & Certifying Cured-In-Pipe (CIPP) As Watertight,

Chuck Hansen, Electro Scan, Inc.

Fold and Form PVC Liners For Culvert Rehabilitation,

Robin Hershman, IPEX USA LLC

Sealing The Collection System With A Focus On Main-To-Lateral Rehabilitation,

Pete Tortorici, LMK Technologies LLC

Multi Sensor Inspection,

Ed Diggs, Pipeline Inspection Partners Corp. (PIPC)

The Connected Jobsite,

Cory Mass, Vermeer

Rehabilitating Collapsed Brick Sewers in Omaha, Nebraska,

Brian Culich, AP/M Permaform

CIPP - Is It Safe?,

Kaleel Rahaim, Interplastic Corporation

Internal Joint Seals - Where, When, How,

Jeremy Keininger, Miller Pipeline Corporation

Pressure Pipe Condition Assessment Technologies For Water Mains And Wastewater Force,

Lisa Douglas, P.E., Ace Pipe Cleaning, Inc.

CIPP Point Repairs And Connection Liners - When, Where And Why,

Shane Jacobson, Central Iowa Televising

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MSTT Seminars Promote Trenchless Technology across the Midwest!

Trenchless Technology, SSES and Buried Asset Management Seminars hosted by MSTT in locations across the Midwest have a solid reputation as premier educational events, with knowledgeable industry presenters on a wide range of trenchless technology topics.

As part of the MSTT mandate to "promote Trenchless Technology through education for the public benefit", the seminar programs are designed to inform public officials, engineers, utility company personnel, designers, and contractors



Mr Steve Naber, City Engineer, Des Moines IA, describes Trenchless Technology work in his city

involved with the construction, rehabilitation, and management of underground infrastructure assets, in the Midwestern states.

MSTT Trenchless Technology, SSES and Buried Asset Management Seminars are excellent opportunities to learn about the latest trends and technologies in trenchless underground construction. With educational and informative trenchless presentations, product demonstrations, networking and ideas, the seminars provide relevant technical knowledge with immediate value and application. Adding a little fun and excitement to the seminars, at the end of each session there is a draw for two fresh 100 dollar bills, and draws for door prizes donated by the exhibitors.

Now running as a compact and accessible single day event, the MSTT seminars are jointly sponsored with either the local ASCE or APWA section and/or branch. Registration fees for the seminars include program materials, all day refreshments,



MSTT Trenchless Technology seminars are great networking and educational opportunities

CINCINNATI SEMINAR DECEMBER 19, 2017:

“Everyone is focussed on networking and learning in a small classroom setting. Being together in the same room for a full day promotes informal networking”

- Leonard Ingram, PWAM, MSTT Executive Director.”

breakfast pastries, lunches, networking, and a PDH Certificate. Special thanks go out to the food sponsors at the December 19, 2017 seminar in Cincinnati OH, and the September 6, 2018 seminar in Des Moines IA: **Brown and Caldwell, Electro Scan Inc., Inflowseal Company, Interplastic Corporation, Miller Pipeline Corporation, Pipeline Inspection Partners Corporation, RJN Group.**

MSTT Executive Director Leonard Ingram believes the seminar programs are essential in fulfilling the MSTT mission

to promote the growth of trenchless technology in the Midwest:

“Everyone is focussed on networking and learning in a small classroom setting. Being together in the same room for a full day promotes informal networking. We’ve seen MSTT seminars have really helped grow the business of trenchless technology across the Midwest over the years. They promote greater understanding and acceptance of different trenchless applications, and underline the critical importance of systematic buried asset management”



The seminar in Cincinnati OH concluded with a live demonstration by the Inflowseal Company



For information dates and locations of the proposed 2019 MSTT Trenchless Technology, SSES and Buried Asset Management seminars planned for the Midwest, visit:

www.mstt.org

GUEST PRESENTATION

“Cincinnati’s Trenchless Technology & Asset Management Program”

Mr. Randy Schneider, P.E., Operations & Maintenance Engineer, City of Cincinnati OH

PRESENTATIONS

Welcome Address and “Liquid Assets” Overview Video,
Leonard Ingram, PWAM, MSTT Executive Director

Buried Asset Management Institute - International (BAMI-I) Certification Program,
Leonard Ingram, PWAM, BAMI-I Treasurer

Replacing Failed Gravity Sewers With Pressure Sewer Systems,
Keith McHale, P.E., Covalen Co.

Fold and Form PVC Liners for Culvert Rehabilitation,
David Ohayon, IPEX USA LLC

Internal Joint Seals - Where, When, How,
Jeremy Keininger, Miller Pipeline Corporation

Guided Boring Using Pilot Tubes - Methodology and Case Studies,
Jeff Boschert, P.E., National Clay Pipe Institute

Condition Assessment Case Studies,
Keith Bair, Brown and Caldwell

Multi Sensor Inspection,
Ed Diggs, Pipeline Inspection Partners Corp.

Bypass Pumping,
Patrick Witt, Rain For Rent

The Quick Lock Mechanical Sleeve For Point Repairs,
Brian Browne, P.E., Buckeye Pipe Inspection, LLC

Fiber Optic Installation By Micro-Trenching,
Matt Di Iorio, Ohio Underground, DBA Ditch Witch Mid-States

Inexpensive Sewer Inflow Removal,
Gene Rigby, Inflowseal Company

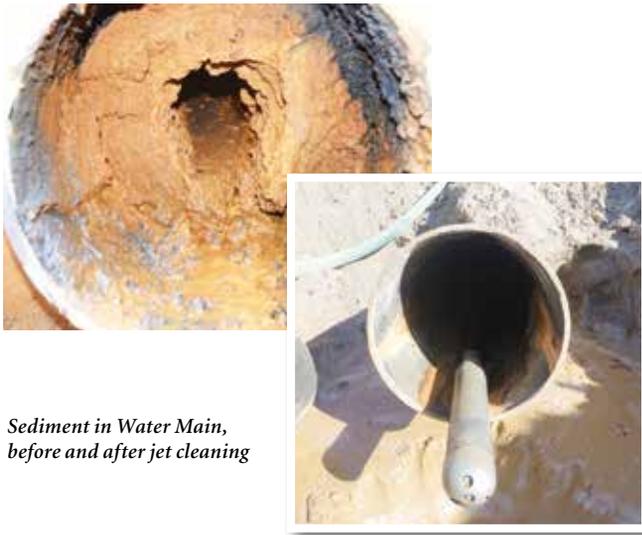
+ DEMONSTRATION OUTSIDE - Inflowseal Company



RAW WATER TRANSMISSION MAIN INTERNAL CLEANING PROJECT NETS BIG RETURN ON INVESTMENT

By: Lisa Douglas, P.E., Carylon Water Group
Mark Wade, P.E., BlueWater Solutions Group

De Soto, Kansas is a small city southwest of Kansas City, with approximately 6,000 citizens. It was experiencing an alarming rise in pressure on a critical water main asset. An observed pressure increase of 70-psi on the raw water transmission main that traversed under the Kansas River, was a concern. The City owns and operates the 16-inch ductile iron transmission main that transfers raw water from a well field on the north side of the Kansas River to a terminating point on the south side of the river. It connects to a transmission main that transfers untreated ground water from a total of 5 active wells, 3 north and 2 south of the river.



Sediment in Water Main, before and after jet cleaning

The critical water main, supplies the water to the City's water treatment plant and was constructed in 1960s by the Department of Army, as part of a Defense Department facility. The main has been in continuous operation since and had not been externally or internally inspected, except for valves and vaults that were easily accessed.

The rise in pressure was a significant issue and indicated potential problems within the pipeline, such as partial collapse of the buried pipeline, leakage under the river or blockages inside the pipeline. To address this issue, the City of De Soto contracted Ace Pipe Cleaning through engineering consultant BlueWater Solutions Group, to perform an internal inspection to assess the overall condition of the pipeline. Results of the inspection

revealed the increase of pressure was due to build-up of sediment over 55 years of continuous service. The original pipeline assessment turned into a critical pipeline cleaning project. A new approach had to be developed to clean out the silty deposits from the well field that had formed within the pipeline.

To complete the cleaning from the well field and underneath the river, a lightweight Penetrator jetter nozzle was used. At first, utilizing a 190-gpm water-jetter truck seemed to be the answer to clearing away all sediments that had solidified in the raw water main. After 1,700 feet was cleaned and clear of sediment, the water-jetter truck reached a steep portion of the water main that went underneath the river. The change in elevation required more force to propel the jetting operations. To better clean the main, a larger 290-gpm water-jetter truck was brought in to complete the cleaning of the more difficult stretch under the river.

To successfully clean the remaining 5-mile stretch of dual transmission pipelines from the south of the river to the water treatment plant, a change in the cleaning process was made by employing pigging instead of jetting for this portion of water main. Two different types of pigs were utilized, swab and disc style pigs. The swab pig (pictured below) is made of a light density, polyurethane foam and is flexible and easily degradable and easily maneuverable as a first pig launch in a pigging operation. The disc pig, (pictured below) is much denser and is covered with a more



Disc Pig/Swab Pig

durable polyurethane foam, molded with circular grooves to help remove the more stubborn pipe wall buildup and to maneuver any unknown bends, as there were no as-builts for the pipelines.

The original plan was to make two passes of each pig, to clean out each of the twin mains. However, after the successful pass of the first swab pig, the conclusion was that one of each style of pig



Disc Pig exiting the water main



Replaced twin water mains after pigging was completed



Disc Pig being inserted into one of the dual line water mains

would suffice. The cleaning of the twin pipelines was completed successfully after the two passes of pigging were completed.

As part of the project installations of the pig launching stations, the dual transmission mains were also un-manifolded to allow for continued water treatment when one of the mains was down for cleaning or maintenance. This new capability will assist with extending the life of this linear asset and help better manage the City's water demands. The results of the water main cleaning provided a great return on investment that will also assist with the continued use of these linear assets. The water pressure returned to operating pressures of 80 psi, back down from 150 psi. Water production capacity at the treatment plant increased from 800K gpd to 3MGD. This increase has allowed the City to

To successfully clean the remaining 5-mile stretch of dual transmission pipelines, pigging instead of jetting was employed.

consider an opportunity to sell excess water supply capacity to other communities in the Region. In addition, plant operation during the high demand season has decreased from 24-hours per day to 8-hours per day, helping to conserve energy and wear and tear on the water treatment plant equipment. The water main was found to be in such good shape, that it surpassed any remaining useful life expectation. Mixing processes have also been optimized thanks to the increase of process flow at the plant providing more efficient chemical usage. The continued maintenance plan of periodic cleaning, cost savings and additional potential revenue will provide continued and uninterrupted service for years to come for the City of De Soto. †

ABOUT THE AUTHORS:



Lisa S. Douglas, P.E., is the Vice President Water Services Division of the Carylon Water Group. For more than 15 years Lisa has specialized in pipeline condition assessment technologies and consulting for both gravity and pressure pipe. She is licensed civil engineer and a graduate of Missouri University of Science and Technology.



Mark Wade, P.E., is President of BlueWater Solutions Group. He currently provides senior-level technology and project management oversight for a number of pipeline assessment and rehabilitation projects, particularly large-diameter conveyance systems, throughout North America.



PIPE BURSTING ON THE NORTH SHORE:

City of Duluth MN Productive In-House Program is Gaining Momentum & Fans

By: TT Technologies Inc.

The City of Duluth, Minnesota, is facing a problem familiar to many municipalities around the country, an aging and slowly failing infrastructure. The issue has made itself known in the city's water services area through multiple water main breaks every year.

The city, with a population of 86,000 people, provides drinking water to its residents through a system comprised of roughly 430 miles of water main. The system is made up of a wide range of pipe materials including cast iron, ductile iron, steel, HDPE, and PVC. Some pipes within the system date back to the late 1800s, but according to Engineering Technician Scott Hegg, many of the mains the city is replacing were installed in the early 1950s.

He said, "Post WWII era pipe is the biggest problem for us. Much of it is late 1940s to 1950s cast iron pipe and we have a big cathodic problem here. Galvanic corrosion is a problem that results in the failure of many water mains. The corrosion often occurs in systems where cast iron pipes are combined with copper services in certain ground conditions and climates. Duluth fits that description. We suffer from corrosive soils and lack of cathodic protection. We have plenty of main breaks during the year."

With an aging water infrastructure and the amount of repairs that need to be made, the city began looking at less expensive ways of updating its water system. Hegg said, "We decided to look at doing the projects in-house. With limited budgets, we're trying to do more with what we have. We can't put pipe in the ground fast enough. We talked to different people and did some research on pipe bursting. The cost of pipe bursting is almost half the price of open cut. TT Technologies came



The City of Duluth developed an in-house pipe bursting program focused on replacing deteriorating cast iron water mains

up in several instances so we decided to give them a call."

Pipe Bursting Specialist Mike Schwager, TT Technologies, Aurora, IL, has been

working with the City of Duluth as they have built a very effective program over the last several years. He said, "The city started with static pipe bursting and has

never looked back. They realized that the crews doing open cut and repair work on the broken water mains could do the bursting and that is where we are today. We outfitted them with a Grundoburst 800G static pipe bursting system, which is well suited for the pipe diameters and working conditions that are found in Duluth.”

Engineering a Trenchless Solution

The Engineering Division for the City of Duluth is part of the Public Works and Utilities Department. The division is responsible for overseeing design and construction of public projects located in and affecting the public right-of-way, including surface transportation, bridges, driveway and alley access, traffic signals, parking, and utility infrastructure. The task of assembling a pipe bursting team and executing it effectively also is under the care of the engineering division.

Hegg said, “Our city utility crews perform all the bursting work from start to finish on the projects from the installation of the temporary water service, which is usually comprised of a 2-inch overland PE line. Right down to all the prep, pit digging, machine setting, everything. Then when the burst is complete crews will test and chlorinate the new line and put it back in service and finish restoration.”

The City of Duluth has a very extensive and detailed ArcGIS mapping system for all of the city’s utilities. The system’s recorded information even includes every water main breaks. Hegg said that in order to determine a priority for bursting, the last ten years of records are reviewed and the segments of the system that have the largest number of water main breaks get the priority.

Hegg said, “About ten years ago, we started using anode bags on all our repairs, which has helped to reduce the number breaks significantly, but now, we’re trying to catch up with main replacement.”

Challenging Conditions

Duluth has a short working season for water main work due to frost and weather, so it is difficult to predict when work can

start each year. Hegg said, “It all depends on when the frost gets out of the ground. That often that means May or June, depending on the harshness of the winter, before crews can really get moving. We wrap up construction by late August as first frosts often occur in early September. We got just under 2,000 feet this year, as we had crews tied up on another major main relocation project.

Schwager said, “For 2017 and 2018 a majority of the mains were in Eastern

Duluth’s ‘Lakeside’ neighborhood. This is the older part of town that overlooks Lake Superior. The area is all hillside, with water system piping that is 70-years-old and prone to main bursts every winter and spring. The hillside adds to the problem, as houses get flooded when an uphill main breaks and the water runs rapidly downhill.

“The cross streets had limited access and two of them were dead end streets high on the hillside. This was

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The city chose trenchless pipe bursting to limit disruption on its narrow streets and neighborhoods

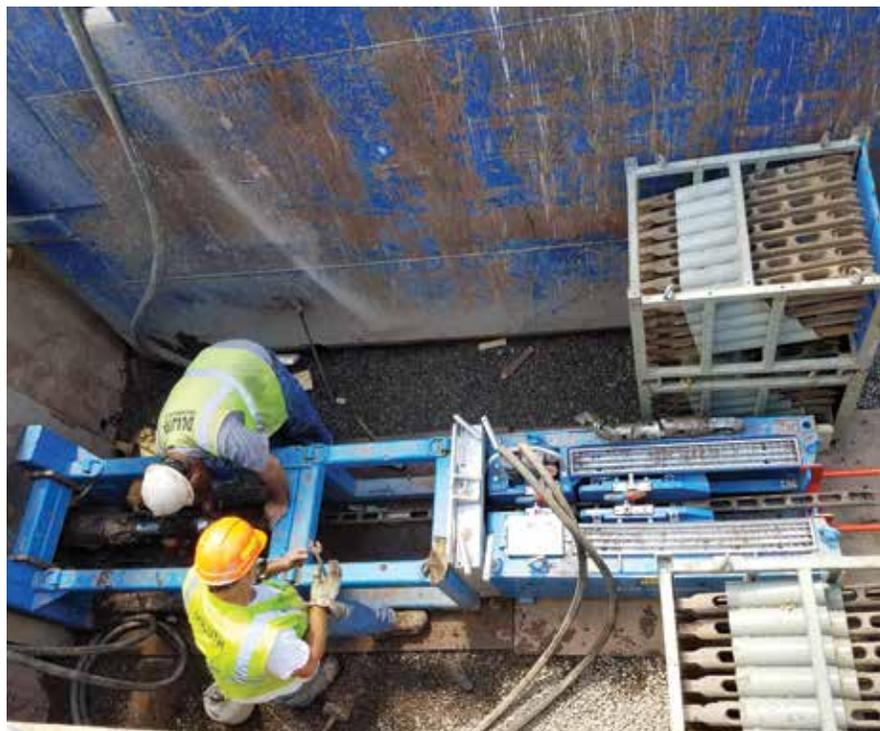
a difficult neighborhood to work in with heavy digging equipment, plus the need to maintain access to emergency services. The city crews do a great job of constructing a new water main system under these types of conditions.”

According to Hegg, the average pipe depth for most of the water work is 6 to 8 feet. Crews try to keep burst lengths around the 500-foot mark. This keeps the amount of staged product pipe reasonable in the residential settings. Crews are bursting 6-inch cast iron and in most scenarios, upsizing to 8-inch HDPE.

Before any bursting is done, crews excavate any valves. Hegg said, “There are going to be repair clamps and we’ve been successful bursting through those, but we remove the valves. We also remove and ductile iron repairs that are longer than five feet. But if we know there’s going to be a small section of ductile, we just add a third cutting wheel to the bursting configuration to account for that.”

Bursting crews try to organize bursting projects so that a centralized pit can be utilized to burst in both directions. Once

one bursting run is complete crews will rotate the hydraulic bursting unit 180



Crews utilize a Grundoburst static pipe bursting system from TT Technologies. Over the past two years crews have replaced nearly 6,000 feet of 6- and 8-inch water main

degrees and burst in the other direction.

With most of the services being copper, crews typically just reconnect to the new HDPE main. Hegg said occasionally they would come across an old lead service on the homeowner’s side of the curb stop. The city will work with the homeowner on a case-by-case basis to replace those old service lines.

Pipe Bursting Program Results & Residential Response

The city has completed its pipe bursting for this year, and crews had a productive summer. Hegg said the program has been a success so far, but he wants to increase production in the coming years. He said, “Right now we range between 1,800 and 3,000 feet per year. Over the past two years the pipe bursting program has completed somewhere around 5,000 to 6,000 feet of 6- and 8-inch water main. We hope to get up to the point where we’re bursting a mile of pipe every year.

“Next year we’re talking about bursting 6-inch cast iron main and replacing with 12-inch DIPS HDPE. We are doing this to increase capacity.

The residents have a very favorable

**“Everyone is just surprised at the speed.
It’s faster, it’s cleaner, and its less
excavation, less restoration.”**

- SCOTT HEGG, ENGINEERING TECHNICIAN, CITY OF DULUTH

opinion of pipe bursting. Hegg said, “Just the fact that we have less of the road torn up lets them go through their everyday life a little easier. They’re able to get in and out of the neighborhoods while we’re working on the project. There have been a few residents that have welcomed the work with open arms. Everyone is just surprised at the speed. It’s faster, it’s cleaner, and its less excavation, less restoration.”

Hegg continued, “One of the advantages of working as an in-house entity is the direct line of communication we have with the residents, our customers. It’s

good to have the opportunity to build the relationships between the city crews and the general public and show them that we’re out there and we’re looking after them.”

Schwager said, “One of the houses on a dead end street had been flooded three times. When crews put a pull pit in front of his lot, the owner was so happy to see that they were going to replace the main that he ran downtown to get their lunch that day. It was not uncommon to have an audience on the days that they were bursting pipe in that neighborhood.”

The City of Duluth team is looking forward to continuing this good, productive work for many years to come. †

ABOUT TT TECHNOLOGIES:


TT Technologies *For more than 45 years, TT Technologies has been the worldwide leader in trenchless technology. TT Technologies’ complete line of trenchless equipment includes piercing tools, guided boring tools, pneumatic, static and lateral pipe bursting systems, pipe ramming tools, bentonite mixing systems, constant-tension winches, directional drills and mini-directional drill rigs. Each year, more trenchless sewer, water, gas and electric rehabilitation and replacement projects are successfully completed with trenchless equipment from TT Technologies than any other. TT Technologies is the leader in trenchless!*



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The graphic features a stylized logo on the left consisting of a yellow circle with a grey pipe-like shape inside. The background is dark with a grid pattern. At the bottom, there is a yellow pipe with a cutting tool at the end, surrounded by brown debris.



MECHANICAL JOINT SEALING SYSTEM PROVIDES SOLUTION TO LONG STANDING ISSUES IN LARGE DIAMETER RCP STORM SEWER

By: Lee Haessig, Cretex Specialty Products

A City in the Midwestern Corn Belt installed a new 84-inch Reinforced Concrete Pipe (RCP) storm sewer collection system in the early 1990s to provide relief from flooding. RCP has for many years had a reputation of having poor, weak or inconsistent joints. The concrete pipe industry as a whole has designed and built joints to meet certain standards, however proper installation techniques need to be employed and workers must be trained to ensure a quality installation of the piping system.

This RCP storm sewer was installed in a historic part of the city and was designed using a confined O-ring gasket joint. These O-ring joints meet the strict requirements of ASTM Specifications C361, Reinforced Concrete Low-Head Pressure Pipe and C443, Joints for Circular Concrete Sewer and Culvert Pipe, using flexible, watertight rubber gaskets. It also meets the requirements of the Bureau of Reclamation specification for the type R-4 joint and is ideally suited for reliable yet economical transmission of water at internal pressure heads of up to 125 feet.

The pipe was designed to be watertight and provide many years of service, but almost immediately the pipe began to show signs of infiltration and exfiltration through the joints. It became apparent that there had been problems during installation of the pipe and the city now was faced with finding a solution to seal

approximately 230 joints in the pipe segment.

Traditional repair methods, such as excavation, were not an economical option, so the city researched a variety of trenchless methods to make the repair from the inside of the pipe, including chemical grout, cured in place pipe (CIPP) and mechanical internal joint seals. In 2010, the city decided to do a trial installation of the HydraTite Internal Joint Seal System for the purposes of evaluation. Two 84-inch HydraTite Internal Joint Seals were furnished and installed by Cretex Specialty Products, a distributor of manhole and pipe joint sealing technologies located in Waukesha, WI. After approximately six years of successful service on the two trial seal installations, the city hired a consulting engineer to design, bid and construct the repairs to all joints in the pipe segment

utilizing the HydraTite Internal Joint Seal System.

In the fall of 2016 the project was put to public bid and awarded to the low bidder, HydraTech Field Services, LLC located in Cincinnati, OH. The bid included furnishing and installing 231 HydraTite Internal Joint Seals of varying sizes, including 215 – 84-inch, 1 – 72-inch, 10 – 60-inch and 5 – 48-inch. There were also bid items for traffic control, storm sewer cleaning, lift hole patching, manhole chimney rehabilitation and other miscellaneous items.

Work commenced in mid-January of 2017 starting with a preconstruction meeting held with the city, the engineering firm and the contractors. Traffic control was then setup and the sewer cleaning contractor started the process of removing sediment from the 84-inch line. In conjunction with the cleaning, all the



Since April 2017 project completion, area has had none of the infiltration/exfiltration problems previously found in the storm sewer collection system

“Since the project was completed in April 2017, the area has not experienced any of the infiltration or exfiltration problems previously found in this storm sewer collection system.”



The system of installation requires technicians verify a proper sealing surface covering the joint, making repairs as necessary

lift holes in the pipe segments were filled with a non-shrink repair mortar. Access to the storm sewer for the material, tools, equipment and crew personnel was

through a single 2.5- by 3.5-foot entryway in the roadway which posed no problems for the HydraTite system. Once the first portion of the pipe was cleaned, the HydraTite internal joint seals, retaining bands and tools were loaded into the pipe through the access point and the installation process commenced.

The system of installation required that technicians verified a proper sealing surface for the seal to cover over the joint and repair if necessary. Each joint was air tested for leakage and was inspected by the engineering firm to verify each joint was watertight and free of any leaks. During the eight week project there were some delays due to weather events such as snow and rain. On those days, the HydraTite Seal installation was not performed due to higher

than normal flow in the pipe; however the project was still completed on time.

Since the project was completed in April 2017, the area has not experienced any of the infiltration or exfiltration problems previously found in this storm sewer collection system. 

ABOUT THE AUTHOR:



Lee Haessig is General Manager at CreteX Specialty Products, and has been with the company for 26 years.

Involved in the underground utility construction industry for over 36 years, Lee is active within many industry organizations, including NASSCO, NASTT & MSTT. Lee is a current MSTT Board Member.

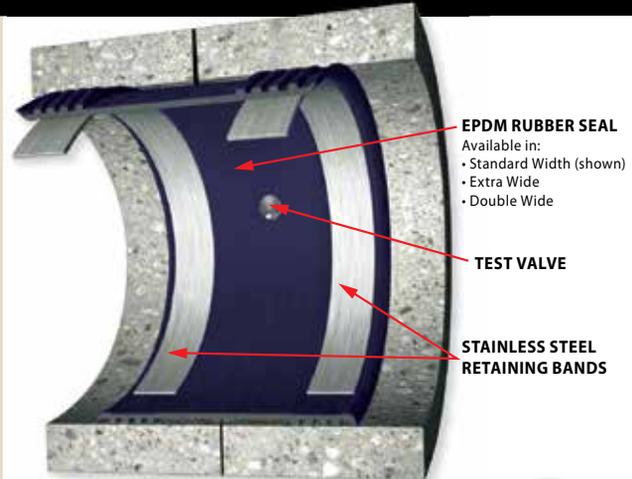


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CURED-IN-PLACE MANHOLE REHABILITATION TO ELIMINATE H₂S CORROSION AND MANHOLE DETERIORATION

By: Ryan Poertner, Ace Pipe Cleaning, Inc.



Demo Presentation

One common problem with the wastewater sewer collection systems is Hydrogen Sulfide gas (H₂S). You know, the rotten egg smell you get when you walk past an open sewer or are near the treatment plant. The H₂S is combined with the moisture on the walls of the sewer system and through the process of oxidation create Sulfuric Acid (H₂SO₄). The Sulfuric Acid eats away at the concretes that are typically used to build manhole structures. This could be a pre-cast structure, poured in place structure, or the mortar used to hold the bricks together in a brick structure. As a result, these manhole structures are failing and falling apart over time. H₂S typically has its highest concentrations after

being discharged from a pump station/lift station, resulting in the five to seven (5-7) manholes after the pump station discharge point into the gravity system as the most susceptible to H₂S corrosion and deterioration.

The Metropolitan St Louis Sewer District (MSD) was interested in seeing how the Cured in Place Manhole Rehabilitation System worked to solve their H₂S issues on one particular stretch of their sewer system. Angela Martin, P.E. (Civil Engineer, MSD) oversaw the project and stated, "MSD was looking for a product that could help reduce or prevent corrosion around manhole structures downstream of its force mains. The CIPP bag liners, as well as epoxy coatings,

are being tested and could be a good trenchless repair option in these heavily corrosive environments."

Utilizing the Alternative Lining Technologies Cured in Place Manhole (CIPM) system, Ace Pipe Cleaning, Inc. was able to rehabilitate the manholes downstream of the lift station discharge point in the pilot project area. Surface preparation is a critical part of the installation process. The walls need to be cleaned back to solid substrate by using a pressure washer to remove all loose materials. After the walls have been cleaned, measurements are taken to produce the unique manhole specific liner that will be installed at a later date. Upon completion of the cleaning, the manhole is inspected for active infiltration. If any infiltration is found, it must be stopped prior to the installation. The infiltration could cause washout of the resin during the installation process, which could result in a weakened finished liner. The installation process utilizes on site wet-out of the fiber reinforced CIPM liner and epoxy resin. The combination of epoxy resin and the CIPM liner results in a fully structural water tight manhole installed inside the existing structure. Steam is then applied to cure the resin and complete the process. After completion of the CIPM installation the entry and exit sewer lines are cut out to re-establish flow through the manhole. Any other incoming lines are also opened up to re-establish flow.

The CIPM process can be installed in many different shaped structures. Each liner is built specifically for that manhole



Pre cleaning



Post lining

based on its dimensions. The flowline of the manhole can be lined or unlined. If it is decided that the flowline is to be lined, then bypass must be taken into consideration and planned for accordingly. If the flowline is not going to be lined,

then the flow can continue underneath the liner during the installation and curing process without causing any issues. This decision is achieved through conversation between the contractor and owner to determine what is the best for any given

situation. Good communication is key to any successful project. And it starts prior to a bid or proposal.

The CIPM Liner is designed and constructed with panels of felt, which are coated with PVC. These panels are thermally fused to form a sealed liner, custom made for each structure. Fiberglass panels are added to ensure the liner is structural. Because of this, the CIPM Liner creates a strong, corrosion resistant rim-to-invert liner that extends structure life by 50 years or more. †

ABOUT THE AUTHOR:



Ryan Poertner is General Manager of Ace Pipe Cleaning, Inc. (a member of the Carylton Corporation) a Midwest contractor specializing in Lateral Connection Repair, CIPP Point Repairs, Structural Rehabilitation, Laser/Sonar/HDCCTV Profiling, Sewer Cleaning, among other things. Ryan is a current member of the MSTT Board of Directors.



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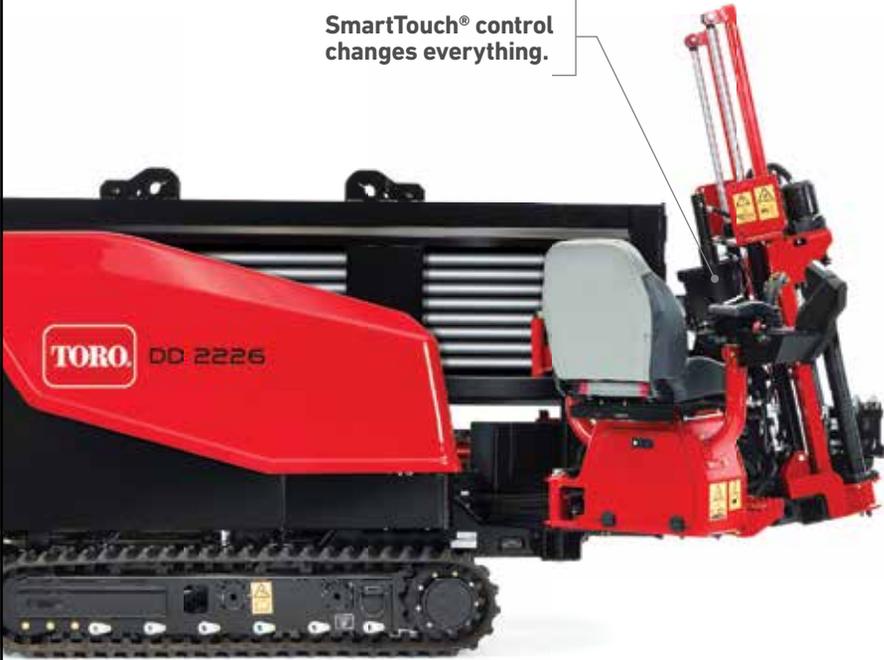
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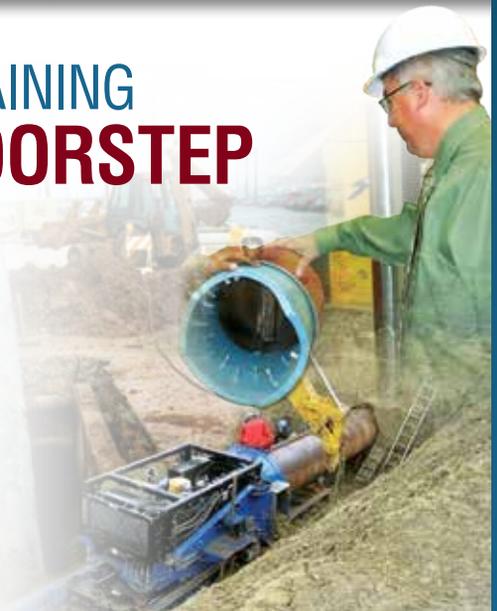
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Forty-five feet below the surface, under a major U.S. interstate in America's heartland, sat a 65-foot high vault hidden away from the public eye containing a complex system of pipes, valves, and infrastructure for drinking water. For years it worked like a well-oiled machine, until it didn't - under immense pressure, one of the 36-inch L-shaped joints of a water main suffered a leak. General contractors had tried to do quick fixes on the exterior of the pipe - first with an external clamp that broke (twice), then by trying to re-weld the clamp onto the outside of the pipe. Nothing they tried was able to keep the leak at bay for long, and repeated repairs were only causing stress to the cast iron, concrete-lined pipe. Shutting down the line to replace the segment would be costly and require customers to be without water for several days. Because of the 90-degree angle of the elbow, lining would not have worked. A long-lasting solution was needed. Enter in Miller Pipeline's own internal joint seal, WEKO-SEAL.

Confined space-certified WEKO-SEAL foreman Patrick Whitehead reported to the site and did his usual pre-job safety checks, daily huddle toolbox talk with the on-site contractors, walked the job site, and assessed the situation. Although he would have to venture nearly 50 feet underground, he was unfazed.

"There wasn't much surface prep because the elbow had a mastic liner," Whitehead said.

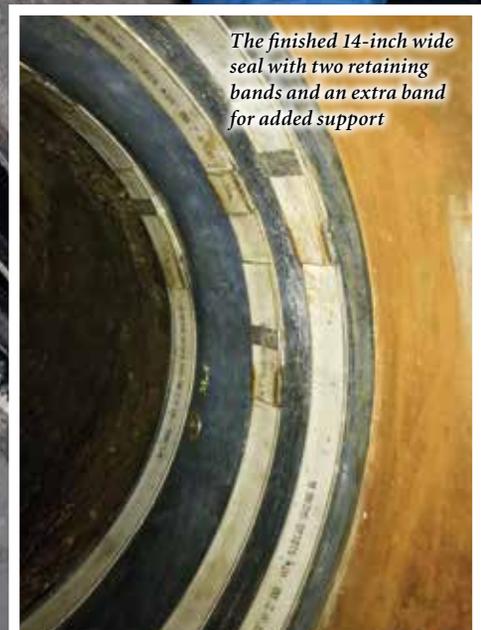
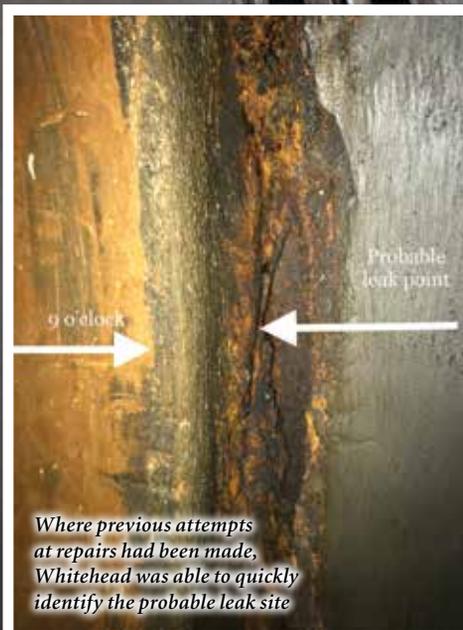
"I could immediately see where it was leaking because the old weld was rusted," Whitehead said.

First he prepped the concrete with quick-curing hydraulic cement, then applied a 14-inch extra-wide WEKO-SEAL, and conducted a successful air test. Once the seal was in place, he applied the standard two stainless steel retaining bands and one extra for added stability. Since the host pipe was a potable water line, all materials used during installation were NSF-compliant.

Had the customer been forced to replace that segment of leaking



After a successful air test, Foreman Jeremy Kieninger screws in the test port plug



pipe, it would have taken days. From start to finish, installing a WEKO-SEAL, guaranteed to be bottle tight, took just over four hours. Just under eight hours if the pre-job inspections and paperwork was added in. This created huge cost savings for the customer, and residents were not without water for more than a few hours.

“A lot of companies don’t even know that going into a pipe and fixing it from the inside is a viable option, and not only is it possible, but it can save them money and time,” Whitehead said, adding that all Miller Pipeline WEKO-SEAL technicians are confined-space trained and ready for emergency response repairs.

Contact Miller Pipeline’s WEKO-SEAL team to see how they can help with any repairs on any type of pipe (including compound angles), carrying any product. Miller Pipeline can custom-create a WEKO-SEAL® to fit almost any pipe. The seal works with a wide variety of pipe shapes including round, elliptical, and rectangular, and it can fit practically any size you might encounter.

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For more information, visit www.weko-seal.com. †



Foreman Chance Barnes applies hydraulic cement before installing a WEKO-SEAL (file photo)



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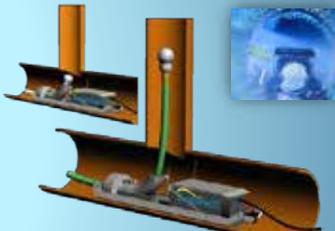


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