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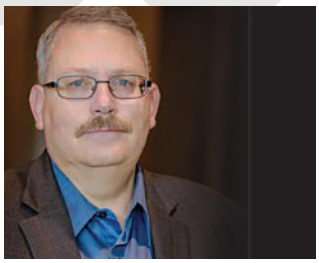
DEPARTMENTS

ON THE COVER

Rehabilitation of a buried manhole with limited access because of underground piping adjacent to active refinery units at this Phillips 66 facility in Ponca City, OK.

EDITOR'S LOG



By **Robert Carpenter**, Editor-in-Chief

Making A Triumph Out Of Tragedy

For a surprisingly large number of contractors and manufacturers in the infrastructure markets, the first half of 2016 has seen a tepid advance, even with favorable economic winds at their backs. Must be an election year.

There are exceptions. The horizontal directional drilling market (primarily small to medium rig range) continues at a frantic pace thanks to the fiber boom that only seems to be accelerating. Gas distribution contractors and utilities are finding crews stretched so thin that there is concern over being able to tackle the amount of work on the horizon (see related article on the development of a Workforce Initiative, page 32). While there is some concern that the electric grid rebuild and expansion may be peaking, for now that market, too, is very strong.

Of course, energy transmission pipeline work is slowing – hardly unexpected. The price of oil domestically has clawed its way back up to $50 per barrel, but that's probably not enough to spur much activity.

Specifically, I'm pondering the plight of sewer and water markets which seemed to be mired in the all-too-familiar lack of funding refrain. But now we need to consider the fallout from lead pipe issues and the opportunity that has fallen into this industry's lap – if we are willing to unite and pursue.

Flint, MI, has brought the pathetic status of water infrastructure piping systems back into national focus in a very public and personal manner. First the tragic byproduct of lead poisoning in Flint suddenly threw doubt on the condition – and safety – of every water system in America. Next, cities around the country were admitting they were still using some lead pipe, and public outrage and concern accelerated.

The result is that our often forgotten infrastructure is, for the moment, no longer being overlooked. It is ironic that a tragic event has led to public awareness for what can only be considered an infrastructure crisis. But will we get the right answers and course of action? Just talking about throwing money around isn't enough. As a country, we must recognize that the perils of lead are only the tip of the iceberg for the entire sewer and water infrastructure industry. There are dangers around every bend of the pipe, and ignorance and oblivious attitudes from elected officials can no longer be tolerated. Turning a blind eye to the risks of the forgotten infrastructure is no longer acceptable.

As a country, we must recognize that the perils of lead are only the tip of the iceberg for the entire sewer and water infrastructure industry. There are dangers around every bend of the pipe and ignorance and oblivious attitudes from elected officials can no longer be tolerated. Turning a blind eye to the risks of the forgotten infrastructure is no longer acceptable.

Congress cannot ignore the public furor. Multiple efforts in both the House and Senate are trying to deal with the situation. Some of the ideas being introduced are well-conceived and reasonable; others are political knee-jerk reactions to public criticism.

Congressional considerations range from small funding targeting just the Flint situation, to massive funding across the nation, specifically in terms of reinvigorating the Clean Water Act. Other actions being weighed include, in no particular order: increased inspection to determine status of existing lead pipe; inspection to determine just who is still operating lead pipe; how much lead pipe is still in use; and my favorite, initiating a ban on the use of all lead water pipe in America. Just think of the pending tidal wave of disruption to water systems if they had to replace all lead pipe in a short period of time. Contractors and pipe suppliers are already salivating over the prospects.

Of course, most likely the majority of these ideas will never survive the political process. However, it is clear that something will work its way through the legislative channels and it could be very good news for those involved in water infrastructure installation and replacement.

This should not be a short-term fix. Rather, industry should do its best to use the lead pipe issue as leverage to present the case and overwhelming need for continued attention and support for both water and sewer piping infrastructure.

The window of opportunity is brief. Sadly, in our modern world of constant connection, news flows in massive waves over the public psyche. Memories fade, moving on to focus on the latest tragedy or indignation. While many Americans are still fearful when it comes to using tap water at their house, that level of concern will fade as well.

As an industry, we should not concentrate on just Flint or lead pipe. Rather, we should use this circumstance and fallout as the impetus to build momentum for the greater good of replacing and modernizing our piping infrastructure. Hopefully, Flint was an isolated incident, never to happen again. But it could, unless we are willing and committed to tackle the overarching issue of updating America's underground infrastructure.

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Reader Feedback

The following comments are in response to the May Editor's Log column titled *Lead Pipe Spurs Panic Mode*, written by *Underground Construction* Editor-in-Chief Robert Carpenter.

Just wanted to let you know that I think your lead pipe editorial in this month's (May) issue was excellent. You brought out the issues of public education and funding extremely well! I also think the Ray Bahr Jr. Standard Bearer article will be a classic.

Ted DeBoda, P.E.
Executive Director
NASSCO Inc.

I just read the Lead Pipe article from the May issue. I like the opening and approach to the reality of the issue with lead pipes and educated voice and tone of article opening.

Nice article, concise, accurate and mature perspective to the audience.

Jeff Wage
Vice President
McLaughlin

Your "Lead Pipe Spurs Panic Mode" commentary is right on target. It's just too bad that the people of Flint, MI, had to endure a life-threatening crisis before hysteria ensued and actions to repair and replace horribly dilapidating infrastructure increase. Actually, it's more accurate to say 'actions might increase.'

For decades, those of us within the industry and in official capacities have known about the dire state of degradation in our underground water pipelines. Many of us have dedicated ourselves to continued outreach and education to key decision makers; yet very little has been done, despite the fact that advanced products and installation methods are available today that can reduce installation time, achieve cost-savings and provide long-life, leak-free water delivery systems.

One such product is high-density polyethylene (HDPE) pipe which provides proven reliability and lengthy life-cycle performance. Attributes of this pipe material include environmental-friendliness, water conservation capability, and versatility in installation methods. State-of-the-art applications like horizontal directional drilling (HDD), open trench, sliplining, pipe bursting, jack and bore, among others, are key factors to implementing smarter upgrades to systems and accomplishing faster rehabilitations. Materials selection is a critical part of the process; and improved solutions are available now.

As you said, water utilities without motivation and finances do not take action. Perhaps further enlightenment about practical, affordable, highly developed pipe material options can spur quicker action and can prevent further pandemic terror.

A. (Tony) Radoszewski, CAE
President
Plastics Pipe Institute
Read this article online at:
www.uconline.com/2016/05/03/lead-pipe-spurs-panic-mode.

Editor's Note: Feedback from both our print and online readers is welcome. Please send comments to rcarpenter@oildom.com

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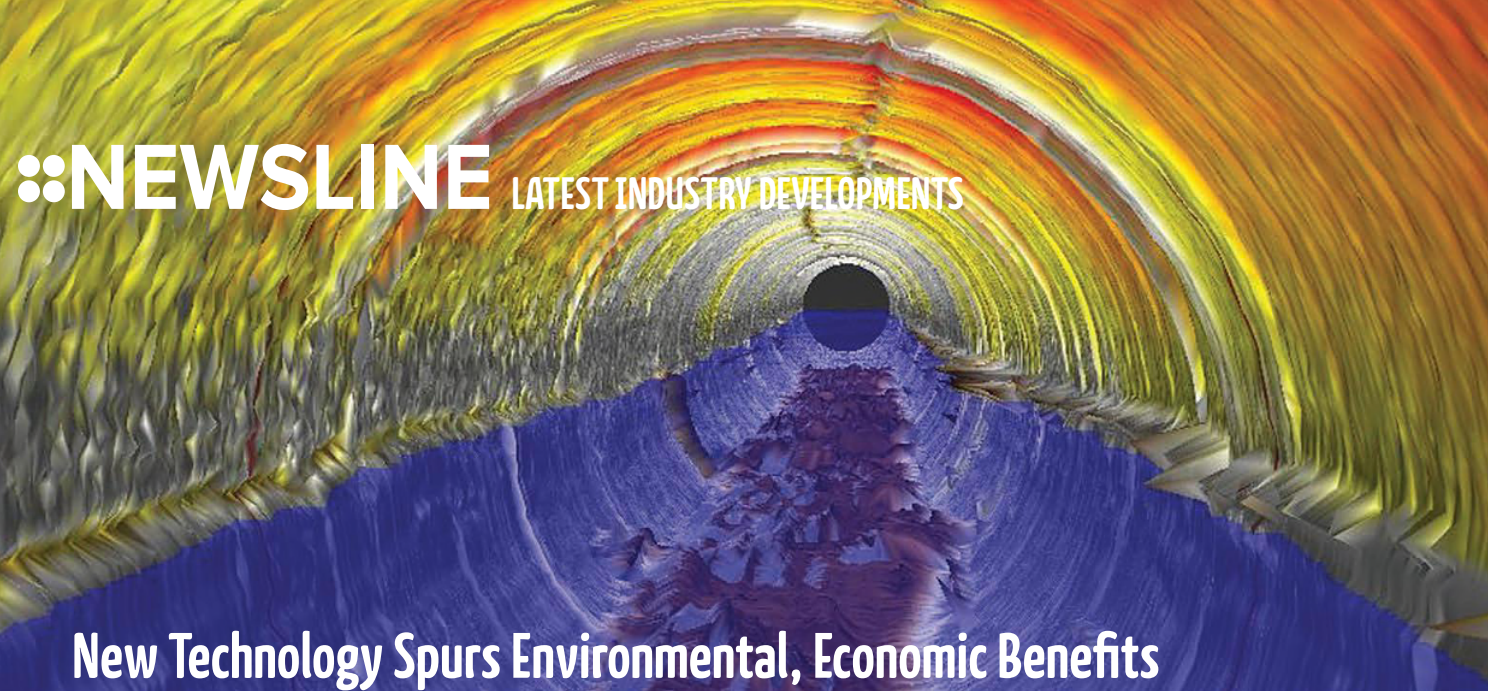

New Technology Spurs Environmental, Economic Benefits

The Fort Worth (Texas) Water Department earned a 2016 Texas Environmental Excellence Award – the highest environmental honor in the state – in the category of Innovative Operations/Management for its Interceptor Condition Assessment Program (ICAP), This new technology allows for more effective inspections of the 262-mile matrix of large-diameter sanitary-sewer pipes which lie beneath the streets of Fort Worth along the Trinity River.

Catastrophic failures and collapses of large-diameter sewer pipes are a financial burden, as well as an environmental concern, and make keeping track of the integrity of the matrix beneath the city quite a daunting task. Over the course of the past 10 years, Fort Worth has relied on age, records of operations and other documented activities to assess the health of the interceptors, with inspections and improvements limited to costly bypasses and extensive cleaning in order to facilitate the inspections with the help of remote cameras. The most notable shortcoming of this expensive and laborious maintenance was its inability to accurately assess the severity of pipe degradation.

The solution was a promising new technology incorporating HDTV with both sonar and laser technology to develop a better picture of the health of each leg of the system, that allowed inspection of the interceptors in almost half the time of previous inspection protocols. The better lens allowed for a better assessment, and data was compiled to score the inspected pipe based on remaining useful life.

Since its inception, the city of Fort Worth's ICAP has inspected 49 percent of interceptors with the new technology, allowing the city to prioritize replacement and repair more efficiently than ever before. The program's primary goal is preventing the environmental threat of collapses. ICAP estimates this technology has resulted in 59 percent fewer sewage overflows, significantly reducing environmental impacts. In addition, the financial benefit has been overwhelming.
Historically, maintenance was scheduled from manhole to manhole. However, the specificity of information ICAP is able to provide to the city allows Fort Worth to concentrate only on segments in need of repair, saving millions of dollars in unnecessary replacement. The program also allows the city to strategically schedule pipe cleaning based on lines with demonstrated restricted flow. That alone is anticipated to save the city more than $15 million over the next decade.

Fort Worth's implementation of ICAP is the largest-known implementation of the technology worldwide. The proactive approach to environmental protection will continue to serve as an innovative model system for cities across the globe. www.teea.org.

Pennsylvania American Water To Acquire New Cumberland Wastewater System

Pennsylvania American Water, a subsidiary of American Water, announced it reached an agreement to acquire the wastewater assets of the Borough of New Cumberland in Cumberland County, earlier this year.

Pennsylvania American Water and the Borough will seek approval of the acquisition from the Pennsylvania Public Utility Commission (PUC) and its necessary approvals from the Pennsylvania Department of Environmental Protection. The signing of the purchase agreement – with a total value of approximately $23 million – is the result of negotiations between officials of Pennsylvania American Water and the Borough. The Borough Council unanimously voted in favor of acceptance of the proposal in March 2016, after the initial issue of a request for bids in January 2016.

Pennsylvania American Water President Kathy Pape said the company and its employees are excited to expand their wastewater service to provide for New Cumberland customers, which includes approximately 3,100 residents.

Pape said long-term rate stability is one of the most important benefits for wastewater customers, who faced the potential of substantial rate increases if the Borough continued operation of the system. Under the purchase agreement, Pennsylvania American Water will not change wastewater rates earlier than Jan. 1, 2018, with a maximum 2.5 percent increase in 2018 and 2019. The company's rates are regulated by the PUC and future rate changes would need review and approval of the PUC.

In addition, the purchase agreement allows the Borough to eliminate all debt, which stands at approximately $16 million, by retiring outstanding bonds within the next three years.

Pennsylvania American Water also committed to invest $2 million in wastewater and/or water improvements within New Cumberland over the next five years. The company will partner with the Borough to determine areas where aging facilities can be replaced in conjunction with street and sidewalk improvements.

The transaction is expected to close by the conclusion of 2016, pending regulatory regulations. 610-670-7789, www.amwater.com.

Stantec Acquires MWH Global

In the second quarter of 2016, Stantec announced the completion of its acquisition of MWH Global – a 6,800-person engineering, consulting and construction management firm focused on water and natural resources for built infrastructure and the environment. This acquisition expands Stantec's position as a global leader in water resources infrastructure, while developing more presence in key markets including the United Kingdom, Australia, New Zealand, and South and Central America.

Bob Gomes, Stantec president and CEO, said the acquisition is an important step in Stantec's continual journey toward being renowned as a top global design firm.

"MWH brings new geographic presence, acclaimed industry reputation, and most importantly, shared values in a dedication to communities," Gomes said.

With nearly 200 years of recognized industry history, MWH has supported some of the world's most technically significant water and natural resource infrastructure projects, including:

- Serving as the lead designer on the Panama Canal Third Set of Locks Project in Panama.
- Providing asset management, design and construction strategies, as a part of an alliance of industry-leading organizations, for the Thames Water Asset Management Programme 6 in the United Kingdom.
- Performing as the construction manager for the Austin Water Treatment Plant No. 4 in Texas, which effectively treats 50 million gallons of water daily from nearby water resources.

"By combining the talents and expertise of our employees, we have forged an even stronger team to address our clients' most challenging issues in water and infrastructure," said Alan Krause, MWH chairman and CEO.

Along with its global network of staff, MWH brings capabilities that are new to Stantec, including its Engineering and Technical Services group, which provides water-related design services to key hydro-power, oil and gas, mining and industrial clients. MWH further contributes construction management, program management, and management consulting business services related to water infrastructure.

Executive leaders from Stantec and MWH are working together to develop an integration strategy that identifies and leverages the firms' combined strengths. In combination, Stantec will maintain approximately 22,000 team members distributed across more than 400 offices located around the world. 949-923-6085, www.stantec.com.

PG&E Tests Safety Drones For Infrastructure Inspections

Pacific Gas and Electric Company (PG&E) announced its current testing of unmanned aircraft systems (UAS), or drones, to enhance the safety and reliability of its electric and gas services. The Federal Aviation Administration (FAA) authorized PG&E's use of drones to assist with electric and gas infrastructure inspections.

PG&E announced two separate testing programs to further explore the viability of safety drones in monitoring electric infrastructure in hard-to-reach areas, as well as to detect methane leaks across its 70,000-square-mile service area. The drones are inconspicuous and controlled by operators through remote control commands. The aircraft are always flown within the sight line of operators over PG&E's electric and gas infrastructure.

The company recently conducted its first test flight with the drones at the Balch Powerhouse, a hydroelectric facility located in the high Sierra Mountains outside Fresno, CA. Current situations require PG&E employees to use fall-resistant equipment to assess facilities like Balch Powerhouse, due to the elevation and sharp vertical angles of the terrain. Drones are able to accomplish such inspections with ease and without risk to employees.

In addition, PG&E is working with NASA's Jet Propulsion Laboratory (JPL), the University of California, Merced's Mechatronics Embedded Systems and Automation (MESA) Lab, and Pipeline Research Council International to conduct testing of NASA's Open Path Laser Spectrometer sensor on a drone. The miniature methane sensor is similar to the technology developed to find life on Mars and is 1,000 times more sensitive than most technology available commercially.

PG&E has been encouraged by recent testing results, and the utility believes drones can supplement its current abilities to access and monitor remote infrastructure, as well as the ability to be equipped with a wide variety of sensors to detect leaks and structural issues. 415-973-5930, www.pge.com.

Survey Says While Water Rates Rise, Infrastructure Remains In Jeopardy

A survey published by Circle of Blue – an award-winning network of journalists and researchers, who report on water and worldwide resource issues – reported the price of municipal water in the United States is rising faster than any other city household expense.

The network's annual water rates tracked the municipal water and other city service prices for 30 major cities across the U.S. The survey concluded that at a time of increasing stress, utilities are working hard to balance widespread conservation with bringing in enough revenue to reinvest and rebuild aging infrastructure.

The released report highlighted the high stakes for the country's water and wastewater systems, all while escalating risks are driving water quality and supply to the top of the public agenda. The issues are numerous, including leaky pipes that waste trillions of gallons of water each year, droughts and floods that bring financial devastation, lead contamination incidents that reveal the risks to public health and economic well-being due to the outdated infrastructure that delivers and treats the nation's water supplies.

Meanwhile, water industry groups estimate up to $1 trillion is needed over the next 20 years to simply repair aging pipes nationwide.

Study Reveals Pipelines Can Assist Manufacturing Revival

The Pennsylvania Energy Infrastructure Alliance (PEIA) – a broad-based coalition of labor, agriculture, manufacturing and other business interest, which support private investment in pipeline and other energy infrastructure developments – responded to a new study by IHS Economics and the National Association of Manufacturers (NAM) Center for Manufacturing Research. That study revealed that domestic natural gas strengthens manufacturing, and encourages manufacturing growth and employment in the United States.

The study entitled, "Energizing Manufacturing: Natural Gas and Economic Growth," states that even as natural gas production reshapes the U.S. economy and redefines the country's competitive advantages, room for growth still abounds as there is a geographical disparity in natural gas supply and demand. Furthermore, the study cites new pipeline and processing infrastructure as the keys to connecting new supply sources with fresh and expanding sources of demand, especially in the manufacturing industry.

In response to the study, Trish McFarland, founding member of PEIA, explained that pipelines connect gas fields in the western part of Pennsylvania to the processing facilities located in the eastern part of the state.

"In other words, we're all in this together," McFarland said. "Pipelines are helping to fuel an economic and manufacturing revival in Pennsylvania."

Jeff Kotula, another founding member of PEIA, described the history of manufacturing as the bedrock of southwestern Pennsylvania's economy and the resurgence of that sector in current times.

Pennsylvania is currently witnessing a renaissance as new businesses and industries rush to take advantage of the affordable, abundant energy supplies the state has to offer.

Businesses and manufacturers in Pennsylvania are benefitting from the cheaper energy prices made possible by the state's oil and gas reserves, said David Black, president and CEO of the Harrisburg Regional Chamber and also a member of PEIA.

In addition, the state's shale plays are leading the revitalization of the commonwealth's economy by boosting domestic energy production, lowering energy costs for consumers and creating family sustaining careers for residents, according to PEIA member Linda Thompson.

"Manufacturing is a big part of our state's economy and we must take the necessary steps to ensure its long-term vitality," Thompson said. "It is time for Pennsylvania to take its place as a global energy leader and invest in modern energy infrastructure that helps grow our manufacturing industries, contributes to a strong economy and enhances the quality of life we enjoy."

PEIA supports investments to modernize energy infrastructure to ensure access to low-cost energy to power the local economy and ensure the utmost safety and health of the local communities. The coalition believes investments in new and existing pipelines will benefit the community through job opportunities, new industries and new access to affordable energy long-term. info@paallianceforenergy.com, www.paallianceforenergy.com.

Debate Continues Over Northeastern Pipelines

The rejection of the Constitution Pipeline by New York and the withdrawal of the proposed Northeast Energy Direct pipeline from Kinder Morgan shined a light on Northeast's public debate over the need for natural gas and the infrastructure developments needed to deliver it.

The natural gas industry represents the region with a steadfast position supporting energy and pipeline infrastructure to meet the region's electricity needs, reduce carbon dioxide emissions and keep its economy healthy. On the other hand, environmental groups and a slew of others are equally firm in their position that renewable energy and energy efficiency are enough to cover the region's needs, and have met the natural gas industry with the refusal of essentially all pipeline proposals.

The impact of the Constitution Pipeline and Kinder Morgan decisions will most likely continue to be felt at a great magnitude considering just under 20 natural gas pipelines are under consideration in the region at the time of this article.

The Constitution Pipeline was denied a water quality certification permit by the New York State of Environmental Conservation (DEC) in late April, claiming the project would adversely impact 251 streams as well as disturb wetlands. The four companies behind the pipeline – Williams Partners, Cabot Oil & Gas, Piedmont Natural Gas and WGL Holdings – pledged to pursue all available options to fight the decision made by the state. In December 2014, the 125-mile pipeline that would serve as a connector for natural gas production in northeastern Pennsylvania and markets in the Northeast, was granted approval from the Federal Energy Regulatory Commission.

When Kinder Morgan voluntarily withdrew its proposal to build a $3.3 billion pipeline in the region, the company cited, through its subsidiary Tennessee Gas Pipeline Co., failure to win adequate commitments for the Northeast Energy Direct project from local gas and electric distribution companies to purchase the natural gas.

While the two projects were thwarted by differing decisions, the natural gas industry, environmental groups and lawmakers claim the decisions could significantly impact the region's energy future.

Martin Durbin, executive director of market development at the American Petroleum Institute (API), told Bloomberg BNA the decisions create uncertainty for companies hoping to invest in the region's pipelines.

Durbin suggested the natural gas industry and its supporters must do a better job of making a case for pipelines in the Northeast through explanations of economic development benefits, the reduction of carbon emissions and the simple need for energy.

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By **Stephen Barlas**, Washington Editor

INGAA Says Aspects Of New Methane Emission Limits Troublesome

The Environmental Protection Agency's (EPA) new rule requiring transmission pipelines to plug methane leaks at compressor stations includes some softening of earlier-proposed requirements, but will still impose substantial costs as companies move to repair leaks at new or modified compressors and controllers. The rule was issued under the Clean Air Act, and represents the Obama administration's next step in limiting greenhouse gas emissions, of which methane is the most environmentally hazardous. Natural gas pipeline companies will have to both reduce methane emissions and plug equipment leaks when they become apparent.

In terms of concessions that the EPA made, it decided to not finalize requirements for pneumatic pumps used at compressor stations. After considering information in the record and comments on the proposed rule, the agency determined information about the prevalence of pneumatic pump use at compressor stations is not reliable at this time. In a statement, Don Santa, president and chief executive officer of the Interstate Natural Gas Association of America, said that while he is disappointed the EPA proceeded with the rule, he was pleased "that EPA listened to our concerns about the time frame for repairs at compressor stations."

Kyle Isakower, vice president of regulatory and economic policy, American Petroleum Institute, said, "It doesn't make sense that the administration would add unreasonable and overly burdensome regulations when the industry is already leading the way in reducing emissions. Imposing a one-size-fits-all scheme on the industry could actually stifle innovation and discourage investments in new technologies that could serve to further reduce emissions."

Pipelines must use a technology known as optical gas imaging to conduct a leaks survey. Optical gas imaging equipment uses a special camera to "see" emissions of methane and VOCs. Owners/operators may use Method 21 as an alternative to optical gas imaging. For new and modified compressor stations, operators must conduct the initial survey within one year after the final rule is published in the Federal Register, or within 60 days of the startup of a new or modified compressor station, whichever is later. Monitoring must be repeated quarterly following the initial survey.

Santa said the INGAA remains very concerned about EPA's insistence on quarterly monitoring at compressor stations. Moreover, he is disappointed that the value of EPA's decision to allow a more economic leak-detection method – Method 21 – was undermined by the very low leak threshold of 500 ppm.

"The rule does nothing to integrate new scientific data on methane emissions from this sector, which clearly shows that very few large leaks account for the vast majority of emissions," added Santa. "Rather, EPA accepted a leak detection and repair approach, which is much more costly and less effective than the directed inspection and maintenance (DI&M) approach proposed by INGAA."

The EPA does not break out what it thinks will be the cost of compliance to the transmission industry. Rather, its estimate includes a number of sectors within the oil and gas industry, such as hydraulically fractured gas well completions and equipment leaks at natural gas processing plants. Those sources have emission limits for volatile organic chemicals, but not GHGs. That said, the total capital cost, not reduced to account for methane capture, would be $250 million in 2020 and $360 million in 2025.

Faster Approval Of LNG Exports Close To Passage

The House passed a bill (H.R. 4909) which would require the Department of Energy to make a decision on an application to export liquid natural gas (LNG) within 30 days after either of two federal agencies completes an environmental review of the project. Those agencies are the Federal Energy Regulatory Commission and the United States Maritime Administration. The provision was dropped into a much larger, must-pass bill called the Fiscal 2017 National Defense Authorization Act (NDAA). It passed the House by a vote of 277-147 with bipartisan support, which bodes well for its prospects in the Senate.

The Senate will almost certainly pass a fiscal 2017 defense authorization bill. It is not clear whether the LNG provision will be included in that bill. If not, it will be an issue for the House-Senate conference committee. But the Senate has already passed an energy bill (S. 2012) which includes an amendment that would force the DOE's hands after 45 days.

The LNG export applications at issue are those for export to countries with which the U.S. has no free trade agreement. Where such agreements do exist, the DOE essentially approves the export application automatically. But applications to non-FTA countries have often been held up for years at the DOE.

"U.S. LNG exports will create American jobs, significantly strengthen the global energy marketplace and bolster our strategic alliances," said American Petroleum Institute Executive Vice President Louis Finkel. "Action by the U.S. House of Representatives to approve LNG exports provisions as part of the defense authorization bill further cements the critical role U.S. energy plays at home and abroad."

Domestic manufacturers have opposed the speeding up of LNG export approvals to non-FTA countries for fear that some of the cheap gas they are enjoying will be diverted abroad, where it attracts higher prices.

Electronic Reporting To OSHA For Utilities, Construction

The new requirements from the Occupational Safety and Health Administration (OSHA) just keep coming. A few months ago, it was the silica final rule. Now the agency says companies will have to send injury and illness reports which they already prepare to the agency in electronic form. The rule has different requirements depending on a company's size. Businesses with 250 or more employees must send their Forms 300, 300A and 301 to OSHA or OSHA's designee on an annual basis. Smaller companies with 20 or more employees but fewer than 250, in certain designated industries, will have to electronically submit information from Form 300A. Those designated industries include utilities and construction.

There will apparently be two options for reporting. One would be an OSHA developed web-based reporting system where companies go online and fill out forms. The other would be companies using the same web portal but transmitting forms they have already prepared with their own software. The initial reporting deadline is Jan. 1, 2017, so there is a lot to be done to clarify these data reporting issues in the next few months.

OSHA estimates that this final rule will have economic costs of $15 million per year, including $13.7 million per year to the private sector, with costs of $7.2 million per year in electronic submission for affected establishments with 250 or more employees, and $4.6 million in electronic submission for affected establishments with 20 to 249 employees in designated industries. With respect to the anti-discrimination requirements of this final rule, OSHA estimates a first-year cost of $8 million and annualized costs of $0.9 million per year.

Those anti-discrimination requirements relate to three new mandates:

- Requires employers to provide certain information on injury and illness reporting to employees.
- Clarifies that employer reporting procedures must be reasonable.
- Prohibits employers from retaliating against employees for reporting work-related injuries and illnesses. ■

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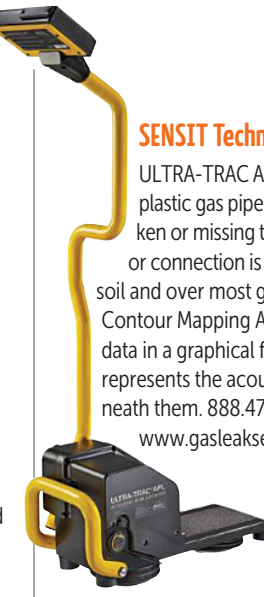

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by Eben M. Wyman

DCA/AGA Workshop

Dives Into New Issues, Workforce Development

The Distribution Contractors Association (DCA) and American Gas Association (AGA) recently held the Third Annual DCA/AGA workshop in Chicago. The workshop has grown in interest, attendance and in the range of issues addressed by a host of panels and speakers. These sessions discussed ways to improve communication and cooperation between gas distribution utilities and the contractors who work for them.

This year's workshop also provided an effective forum for an evolving conversation about workforce capacity challenges in the underground construction industry, and the establishment of a new coalition to address those issues. The agenda included other topics, such as efforts to improve and facilitate compliance with operator qualification programs, best practices in horizontal directional drilling operations, issues related to the fusion process in gas distribution construction, federal policy regarding post-construction inspections, and discussion of the latest and greatest in new technologies used in the natural gas pipeline and distribution industry.

The 2016 workshop attracted more than 160 industry representatives from various industry sectors around the U.S. As always, attendees walked away with a wealth of information and ideally a better sense of how industry is faring as it faces a range of both new and enduring challenges.

At the first DCA/AGA Workshop in 2014, the initial discussion of operator qualification (OQ) programs evolved into a larger conversation about arguably the biggest challenge facing the construction industry today. Panel discussions about OQ compliance led to claims from the audience such as "I can't even find enough qualified people to do the work." It wasn't long before DCA members and utility reps alike knew there was much more to talk about.

Since then DCA has established a workforce development initiative to address capacity issues within the underground utility construction industry. To kick off the 2016 workshop, Mark Bridgers of Continuum Capital, who was retained to lead the new workforce effort on behalf of DCA, provided an overview about the status of the underground utility workforce and how it is positioned to meet the workforce demands that will come with the billions of dollars in gas distribution projects on the horizon.

While this potential workload is filled with opportunities, concerns about the "greying workforce" continue. Bridgers recalled hearing comments from local distribution company (LDC) representatives saying they "have 25 years of work and I might make 10 of them," and that 38 percent of natural gas and electric workers are eligible to retire in the next 10 years. This is an industry that has enjoyed an increasing workload at a time when virtually all other construction sectors have suffered.

As a result, worker demands from 2008-2015 have stretched resources to the point that expansion of construction crews has become problematic. Crews have been divided and subdivided. Experienced workers are now crew leaders, and those under them don't have the same experience as in years past.

Establishment of UCWA

In response, DCA formed the Underground Construction Workforce Alliance (UCWA) to bring utilities and contractors together to identify areas (both geographic and industry-specific) that need workers, and where that labor can be found. (See details on page 32)

The UCWA has set both short-term and long-term objectives, starting with building a coalition of industry trade associations, pipeline companies, unions, manufacturers and suppliers. When the UCWA is fully represented, the coalition will work collectively on the long term goal of resolving the workforce and field leadership needs through 2025.

The overview by Continuum Capital set the stage for a broader discussion by a panel of the UCWA Leadership Team, where representatives from Michels Corporation, Atmos Energy, Miller Pipeline and Vermeer Corporation discussed initial UCWA strategy and activities. It was clear early in the discussion that both contractors and LDCs are changing their approaches to recruiting and retaining quality workers.

Across the board, finding and recruiting those who provide skilled labor, such as fusers, welders and even general laborers, is no easy task. Echoing a central part of Continuum's presentation, shortages of supervisors and foremen are becoming a bigger problem as existing industry resources are stretched further and further.

The underlying image problem facing the industry remains a major challenge. The stigma that accompanies being a part of the "construction industry," whether working for the gas company, a construction contractor or equipment manufacturer, continues to prevent many young people from giving energy and construction a close look. Recognizing the promising future offered by this industry, these shortsighted misconceptions must be confronted head on.

On the utility side, LDC budgets are growing, and gas distribution programs are expanding and accelerating. The proverbial 800-pound gorilla in the room is not a lack of financial resources or even the steady stream of federal and state regulations, but the gap between the anticipated workload and the human resources needed to get the job done. Additionally, the increasing demand is speeding up the timeframes for moving quality workers into supervisory roles.

Because of continuous technological and operational improvements, adjustments in OQ programs are always being considered, and utilities see capacity challenges both internally and within contractor crews. A panelist representing LDCs said that he has seen capital spending doubled and tripled over the past five years,

and will probably double and triple again over the next decade. Panelists also agreed that these problems are recognized at the highest level of leadership within the LDCs and contracting firms, both union and "open shop."

A contractor on the panel pointed out that 10 years ago a select few utilities were aggressively replacing old distribution pipe, and now many if not most are speeding up their replacement programs, stretching the workforce further. The increasing role played by contractors was highlighted when a utility rep said he didn't anticipate "a big return to more in-house crews."

Audience questions

The panel addressed a number of questions from the audience regarding workforce impacts on OQ programs, the importance of offering multilingual training, the effectiveness of job fairs in attracting potential workers, and effective use of construction equipment simulators.

Representatives of utilities and contractors alike suggested that gas utilities strive to better anticipate workloads as much as possible. While this requires enhanced communication about the amounts and types of projects on the horizon, the result will be better coordination of internal and contractor personnel and project planning.

The problem of recruiting younger, "millennial" workers remains. While many potentials want to start out in a supervising capacity, the need for skilled workers is what is sorely needed. The reluctance to accept entry-level work can be addressed by showcasing state-of-the art equipment and technologies that excite new-generation workers.

It was also suggested that training programs may exist that could warrant UCWA endorsement. Additionally, employers must work to not only recruit, but retain quality workers. Training, testing and qualifying workers who leave the industry in just a few years doesn't benefit industry. New workers need to know that energy and construction work is not just a job, but a promising, well-paying, long-term career.

The UCWA currently includes a mix of contractors, utilities and equipment manufacturers, and while the players are competitors in the field, all have put aside their corporate agenda for the betterment of the overall industry. The panel discussion of the UCWA led to dozens of workshop participants volunteering to participate. It was clear that while UCWA has an ambitious and challenging agenda, the coalition is truly needed to begin closing the gap between the anticipated workload and the shortage of workers needed.

HDD preparation

A continuation of last year's discussion of HDD practices, training and use of technology was featured on the recent workshop. A panel of contractors and equipment manufacturers discussed a range of issues, and it was clear that players in the HDD industry are not spared from workforce capacity challenges. Panelists effectively continued to address the workforce issue, applying "real life" impacts to the discussion.

HDD contractors on the panel echoed earlier remarks about industry recruitment. Local colleges and trade schools are always considered a priority, but many construction employers go after even younger prospects, looking at high school students as well. In addition to targeting students, the panel suggested using local unions and apprenticeship programs, as well as employment programs for veterans, such as "Helmets to Hard Hats," which offer opportunities to help vets make the often difficult transition from the battlefield to the workforce.

Once recruiting a candidate for HDD work, an elaborate onboarding process follows. HDD and other trenchless operations is highly skilled work, and considerable training and preparation are needed before sending new workers into the field. Ensuring sufficient "knowledge, skills and abilities" (KSAs) is at the forefront of these programs, both with regard to a pipeline operator's

OQ program as well as requirements from federal agencies such as the Department of Transportation (DOT), Environmental Protection Agency (EPA), and Occupational Safety and Health Administration (OSHA).

KSAs are demonstrated by all new drill operators through testing and evaluation, including the ability to recognize abnormal operating conditions. After classroom and/or computer-based training, new workers are often brought into the field for on-the-job training. Contractors on the panel said they keep a close eye on those who may have been out of the field for too long and probably need additional training as technologies continue to improve. Additionally, new recruits should be evaluated individually and job functions applied where compatible skill sets are found. Contractors on the panel said a hands-on approach is critical, and it is important to know the people working on HDD projects.

There was ample discussion about evolving technologies and new educational opportunities available for players in the HDD industry, where curriculum is much different than 10 or 20 years ago. Arizona State University (ASU) offers a new curriculum dedicated to HDD, where students and interns prepare for future work on behalf of municipal governments, pipeline operators and construction contracting firms. Programs like this offer real promise for young prospects, as savvy construction employers are increasingly hiring people right out of school.

Manufacturers of HDD equipment are opening training centers that offer available machines for training purposes, as contractors continue to up their game in terms of recruiting and training new workers through considerable use of new and improved simulators.

Panelists underscored the need to address shortsighted perspectives in the past about a lack of attention to safety and training by the HDD industry. All panelists agreed that a minimum of six months of training is needed to become a reliable drill operator, and questions from operators and/or regulatory authorities about the preparation and onboarding process should be directed to the contractor. HDD stakeholders must be vigilant about misperceptions about HDD practices, equipment, fluids and disposal methods, and the individuals involved in HDD operations. At the same time, "cowboy contractors" who cut corners should and will be removed from the market through not only government oversight but the market demand for quality work.

Regarding damage prevention to gas facilities, the goal of "zero damages" is now embraced by virtually all involved in HDD work. At the same time, the panel agreed that it takes cooperation and communication from both contractors and utilities to meet that goal. The panel wrapped up its discussion by presenting a question asked by some with a stake in utility construction, but a lack of understanding about the importance of HDD. "Do we really need HDD?" one panelist asked rhetorically. The answer from the audience was a resounding yes.

Options for OQ compliance

Compliance with OQ programs has been a central issue behind holding joint workshops with AGA members and DCA contractors. The progress made by the American Society of Mechanical Engineers' (ASME) B31Q standard has offered both gas utilities and their contractors viable options to ensure compliance with OQ programs held by pipeline operators. A member of the B31Q Committee provided workshop participants an overview of the committee's history, makeup, an update on the standard, and the latest issues under consideration.

ASME's B31Q Committee was formed in 2003 following the public notices from the Pipeline and Hazardous Materials Safety Administration (PHMSA) and the National Transportation Safety Board (NTSB) about concerns with the final rule on OQ, which was some eight years in the making and required documented training and testing of those working on natural gas and hazardous liquid pipelines. The committee worked to develop a technically sound and holistic consensus standard for the qualification of pipeline personnel, both in-house and contractors. The first edition of the B31Q standard was issued in 2006.

Since then, the B31Q Committee, which consists of gas and liquid pipeline operators, contractors, labor organizations, OQ vendors and federal and state regulators, has met regularly to update and fine tune the standard. The fourth edition is expected later this year. It was reported that according to PHMSA, "if you meet the ASME standard, you meet regulatory requirements."

A primary interest in B31Q lies in the standard's covered task list, which is central to compliance with differing OQ programs. Under B31Q, covered tasks are those that impact the safety and integrity of a pipeline. Covered tasks are technically justified and must be considered clear and durable over time, offering both prescriptive and performance-based options.

The B31Q Committee is currently considering adjustments to the standard as PHMSA is proposing to expand the scope of the rule to include new construction and additional requirements regarding program effectiveness section to the OQ regulations.

OQ regional report

The presentation on B31Q standard segued to a broader discussion of OQ issues, where stakeholders from several regions of the U.S. reported on current efforts to improve and enhance "portability" of OQ programs. Attendees heard from representatives from Northeast, Midwest, and West Coast, where industry groups continue to provide forums for open discussion about OQ programs and methods to comply with them.

Many pipeline operators are looking for ways to enhance the value of OQ programs, including regular examination of qualification exams, tailoring testing to differing learning styles, and cooperative efforts in dealing with newcomers to the industry. These inclusive approaches are paying off both in operators' compliance with federal regulations as well as contractors' compliance with OQ programs maintained by different customers.

The panel also addressed a growing issue in the OQ conversation. There is agreement by both operators and their contractors about sufficient qualification methods for about 80 percent of covered tasks. However, since DCA and AGA have held these workshops, many have indicated that the 80/20 percent ratio is no longer accurate. Many workshop participants said that 90/10 percent may be a better description of agreement about adequate qualification techniques. While the remaining 10 percent is considered a big hurdle in the OQ process, these discussions have proven to move the industry players closer together on OQ compliance.

Fusion issues

In a shift from workforce capacity and OQ-related issues that are commonly addressed at these workshops, a panel consisting of a DCA contractor, an AGA member utility and an employee of a large pipe manufacturer representing the Plastics Pipe Institute, delved into a range of issues surrounding the fusion process of polyethylene (PE) pipe.

PE represents more than 95 percent of the piping installed in today's gas distribution market, providing reliable and resistant fusion joints with a prolonged design life. However, the fusion process of PE pipes and fittings has been put under the microscope in several states where there have been regulatory implications. This panel took a hard look at some of the surrounding issues on what is an increasingly hot industry topic.

Some states have seen changes in regulatory requirements that include mandatory peer inspection of all fused joints. Operators and contractors are doing this voluntarily in some areas. One company explained that dozens of people can be involved in hours of elaborate, hands-on fusion training. Some operators are now requiring electronic tracking of every fuse, which is a huge undertaking but does provide specifics about fusing procedures in the event of a future pipeline incident. In some cases, requirements for third-party review have become peer reviews of not only fuses but all mechanical fittings.

Panelists discussed some technical issues with regard to electrofusion, including the scraping process, maintenance of scrapers, oxidation, use of alcohol to clean fuses, possible sources of contamination and the need for ongoing training in an industry with a high turnover rate. It was recommended that gas utilities regularly communicate changes in fusion procedures, and that fusion trainers ensure that they are aware of appropriate standards applied from operator to operator. Contracting crew leaders need to strictly follow fusion procedures as prescribed by the operator.

There was not much support for establishing a new standard for fusing PE pipe, but the audience and panelists agreed that communication about the process can always be improved. Recognizing the regional differences that come into play when dealing with the fusion process, panelists strongly recommended that regional gas associations get together on this issue. Regional gas association members and contractors working in those areas would learn a lot from each other on fusion, as well as other issues relating to OQ and pipeline safety.

While portability is needed in the industry, pipe fusion is not a task that is portable from operator to operator. All panelists agreed that strict adherence to operator's procedures, and regular training and retraining is fundamental to the process. Panelists concluded by pointing out that while issues relating to the fusion process are technical in nature, the importance of recruiting, training and retaining quality fusers is a must.

Post-construction inspections

Last year, DCA's Government Relations Committee expressed serious concern about a proposed rule change from PHMSA dealing with post-construction inspections of natural gas transmission and distribution pipelines. The main concern was not with the end goal behind the rule change, but the disparaging discourse regarding the contracting community as the rule change was developed.

A preliminary overview with a history and timeline of the rule change was provided to the audience in advance of a panel discussion. The inspection rule change stemmed from a petition in 2010 by the National Association of Pipeline Safety Representatives (NAPSR) encouraging PHMSA to restrict contractor crews from inspecting their own work. PHMSA included language to adjust the inspection rule in a 2011 proposed rule on miscellaneous pipeline safety issues, but restricted individuals from inspecting their own work, whether they are in-house employees of a pipeline operator or contract personnel. In March 2015, the rule change was included in the final miscellaneous rule.

However, PHMSA issued a subsequent notice six months later staying the compliance date indefinitely. PHMSA explained that the compliance date was put on hold in response to concerns by public gas utilities, many of which have five or fewer workers per crew, making compliance overly burdensome. In addition, PHMSA noted NAPSR's ongoing objection to contractor personnel being involved in inspection of the work of their crews. NAPSR's position, according to PHMSA, was that the rule change "appears to apply to operator construction personnel as well, which was not NAPSR's original intent since, in its experience, operator personnel have less of an incentive to accept poor-quality work."

It was not surprising to anybody in the room that DCA takes exception to NAPSR's position. A panel including contractors, a pipeline operator and a state pipeline inspector representing NAPSR then discussed issues related to the increasing role of contractors in pipeline construction, the underlying reasons behind NAPRS's position and the status of the rule change.

Almost immediately following the release of the final "miscellaneous" rule, PHMSA put together a working group to discuss implementation of the inspection rule and its impacts on the pipeline industry. The panelist from NAPSR indicated that the information in the September Federal Register Notice that halted the compliance date came directly from discussion of the working group, and that the future of the rule change is uncertain at best because of staff changes at PHMSA and the fact that discussions among the working group have stalled.

Changed industry

DCA contractors started out saying that for the most part, contractors already require individuals other than those performing the work to perform post-construction inspections. Contractor panelists also stated that pipeline contractors today are much different than 10 to 20 years ago. The contracting industry has undergone significant transformation where increased training, OQ compliance, documentation/recordkeeping and other factors have improved the contractor workforce considerably.

Additionally, DCA pointed out that while PHMSA regulations are subject to pipeline operators, the impacts of the pipeline safety regulations and the liability that comes with them are passed directly from the operators to the contractors working for them. The notion of contractors being restricted from inspecting the work of their crews is impractical and shortsighted, the DCA representatives said. Gas utilities would be losing a valuable resource if PHMSA were to remove contractor personnel from the inspection process.

DCA also stressed that to require third-party inspections would be impractical and would unnecessarily call for a host of new inspectors who don't necessarily have the experience needed to inspect the growing number of distribution construction projects, almost all of which are contracted out. One panelist noted that in today's gas construction market where the onus of regulatory requirements, liability and other responsibilities related to safety management and quality management programs are placed squarely on the contractors, accepting poor quality work is not an option.

The utility panelist generally agreed, saying that safety and quality of work is "at the head of every contactor's responsibility." He also said that his company and many other operators are moving forward with their inspection programs, but are "having problems with finding quality inspectors." The utility representative also stressed that he considers his contractors as partners, and that both sides must work to build on these partnerships to ensure maximum effectiveness, and a safe and reliable pipeline system.

The NAPSR representative said that he would "probably agree with many of the elements discussed" and that "contractors want to do a good job." NAPSR provided a firsthand account of the working group's discussions about the inspection rule, and said that calling out the contracting community was not a consensus shared by all NAPSR inspectors. At the same time, NAPSR believes there is poor quality work happening is some cases, where bad actors "need to be weeded out."

NAPSR indicated several issues remain to be addressed, including the scope of a final inspection rule, sufficient qualifications of inspectors, required documentation and other specific provisions that need clarification. All panelists agreed that while there is usually objection to one-size-fits-all regulations, the inspection rule is one where the rules should apply consistently to all players involved.

New technologies

The last panel of the workshop brought in several equipment manufacturers and technology experts to evaluate a range of technologies used in the pipeline construction indus-

try, from locating and mapping technologies to mobile devices that will improve communication among field personnel, as well as enhance training and testing methods for an increasingly mobile workforce.

The need for faster, safer, more profitable technologies is nothing new, but the demand for accelerated data collection and dissemination has never been higher. The need to be able to transfer information from a job site to a project owner using fiber networks is becoming the norm. Tracking information about piping systems, fusion data and even inspection information are increasingly important as inspectors struggle to be in several places at the same time.

As was discussed during the panel on HDD operations, technologies are constantly improving. Locating tools are not changing dramatically, although there is a much better ability to determine depth of underground facilities. Panelists agreed that information regarding HDD and utility locating data is now able to be integrated much quicker than even a few years ago. Today's worksites need to get critical data from the field to office, and vice-versa.

Challenges facing technology industries range from data overload and the need to capture, retrieve and analyze it, to mitigating confusion that comes with mobile devices that are getting smaller and faster, and the impacts on those in the field. Ensuring that customers get enough, but not too much, information is an ongoing struggle as technologies continue to develop. Of course, these factors vary in importance depending on who is using the technologies. Younger millennial workers tend to be more tech-savvy than experienced workers who are invaluable in today's pipeline workforce, but might not adapt to state-of-the-art tablet technologies used increasingly in today's market.

Common themes coming out of the technology panel were the need for:

- Data management – accelerated collection, analyzation and dissemination of key data to, and from, the jobsite.
- Simplicity – evolving technologies are becoming the norm, but understanding and providing assistance is needed for older, experienced, but less tech-savvy personnel.
- Acceptance to change – change is disruptive but often good for industry. Industry leaders need to stop and take a hard look at new technologies.
- Speed – communication systems that quickly share data in time-sensitive situations (i.e. excavation damage, pipeline failure, methane leaks, etc.).
- Accuracy – technologies are fundamental to HDD and GPS evolution; accurate determination of depth is key to safety and project effectiveness; better use of "as-built" documentation.
- Mobility – enhanced communications and convenience in training/testing programs that require sign-off verification is both key and readily available.

The DCA/AGA Workshop concluded with most believing that many issues had been addressed and progress was made, and as always, many issues still to consider. The event has grown in attendance each year and the agenda has been broadened to expand on important topics and approach new areas of interest.

Plans are already underway for the Fourth Annual DCA/AGA Utility Workshop, scheduled April 17-19, 2017, at the Four Seasons Hotel in Chicago.

For any comments or suggestions, please forward to eben@wymanassociates.net.

Second In A Series

by **Jeff Griffin** Senior Editor

Building A Culture Of Safety

Working in construction carries potential dangers, and the level of danger varies with the type of work being performed – certainly underground construction poses risks specific to that industry.

No one wants to get hurt, and owners and managers of construction firms want to keep their workers from harm. Yet, safety records clearly show that some organizations do a better job than others when it comes to implementing safety efforts that significantly reduce accidents.

Establishing safety practices, training, and rewards for accident-free work are a few basic steps most companies use. So why do employees of some companies post better safety records than others?

The answer seems to be that the safest construction organizations have developed a culture of safety.

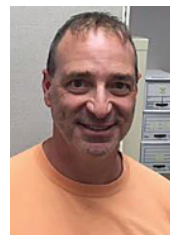
What is a safety culture? How is it developed? Why is it essential?

This second in a series of articles on the topic shares input from representatives of two underground construction companies with enviable records of safety: Matt Ory, director, safety and health, ElectriCom Inc.; and Butch Magers, safety director, Kenneth G. Myers Construction (KGM).

How do you define "safety culture" as it applies to your organization?

Ory, ElectriCom Inc.– A safety culture represents a company-wide effort to help reduce workplace incidents and injuries. Participation is needed from every employee at every level – top to bottom – within the company to accomplish this. Every employee must know his or her role and what's expected regarding safety and health. Accountability is a big key to achieving a culture of safety excellence.

Matt Ory



Butch Magers

Magers, KGM, Magers – Safety culture is the attitude and awareness shared among all employees – from the company president, to the equipment operator with 40 years of experience and newest laborer – that, just like the stickers on the company vehicles proclaim, "Safety is First."

What is the first step in creating such a culture?

Ory, ElectriCom – The senior management team must take the first step. A commitment to the cause must be demonstrated. The president of our organization has developed a Safety & Health Mission Statement. This statement demonstrates his commitment and his role in the safety and health process within our organization. It states that: "It is my responsibility as president to promote and ensure the safety of our workplace…"

Magers, KGM – New employees begin their career with safety orientation; an introduction of industry hazards; and discussion and training in identifying work hazards, eliminating hazards, and safe procedures and practices in dealing with hazards. During this orientation, the seed for the Safety First culture is planted and fertilized with the knowledge that although each employee is primarily responsible for his own safety, the entire company stands beside him or her in safe work practices. From the beginning, every employee is encouraged to speak up and never look the other way when dealing with safety.

Can a small- or medium-sized organization create and implement a safety program, or do outside experts need to be involved?

Ory, ElectriCom – Any organization can create and implement a safety program. However, I strongly believe that a true safety professional is needed to create, implement and facilitate an effective safety process.

Magers, KGM – Yes, with today's deep well of information available through the internet in text, pictures and video, it is very possible. There are tons of useful websites to choose from. We recently completely revised and overhauled our safety manual which originated in 1994. We did this completely in house and are proud of the finished product. That said, we are always open to any outside influence or expert who can help us perform our work safely.

How does a formalized safety program fit into building a safety culture?

Ory, ElectriCom – A successful safety program will detail the operations, guidelines, policies, best practices and expectations for employees at all levels. It's important that the safety program within any organization is not viewed solely as a binder that sits on the safety director's desk. It should be viewed more

Participating Contractors

The two contracting companies participating in this article are active members of the Power & Communication Contractors Association.

ElectriCom, Paoli, IN, is an independently owned utility construction contractor serving the power and telecommunications construction, gas line distribution and right-of-way services markets.

Kenneth G Myers Construction, Green Springs, OH, provides construction services for fiber optic infrastructure, telephone and communications, line construction, cable and satellite television construction, as well as aerial cable construction services.

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as a process. It must be developed, reviewed and amended as needed. Employees should be able to participate in this process.

Magers, KGM – In many ways, the safety program and the safety culture build each other. They feed each other and grow together. The program involves 6 a.m. safety meetings, and the culture grows from these meetings when new employees see the company president right beside them at 6 in the morning, talking about safety. The culture feeds the program when employees are empowered to bring new products and ideas forward, and introduce them to the safety program.

What part does training play? How important is continuing, regular training?

Ory, ElectriCom – Training is one of the most important elements of any safety and health program. Training enables employees to learn their jobs properly and reinforces safety policies and procedures. Safety training also provides an opportunity to effectively communicate safety principles and management's commitment to safety. Progress through various craft and technical job levels depends largely on the safety training that the employee receives on the job. It is necessary to instruct employees in doing all phases of their jobs in a safe manner to enable them to advance within their profession. Employees found deficient in the necessary skills to perform their job safely must be recognized, re-trained, reclassified or released.

Magers, KGM – After safety orientation comes on the job training, which begins when a new worker is introduced to a veteran foreman. The foreman is given specific instructions to show the new employee the right way to do the work. This practice puts a lot of responsibility on the foremen and veteran crew members, but company management is right there aiding the training process and monitoring it with onsite inspections and consultations. Regular and refresher training is important, and is executed with monthly safety meetings, weekly safety handouts along with quizzes, and daily job briefings. We also take advantage of Ohio BWC safety training classes, and local safety council meetings and seminars.

How does management "sell" safety to its employees?

Ory, ElectriCom – Within our organization, it's important that management "walk the walk." Our management teams are just as involved – if not more so – in the company safety process as any employee. Besides allocating time, money and resources, they also are involved in the day-to-day operations. Our management team members attend regular safety meetings, conduct field safety observations, participate in accident investigations, and develop regular safety and health related communications for employee distribution. This sends a very important message that the responsibility for safety is not limited to the safety department.

Magers, KGM – The company president and top management standing in front of the employees on a Monday morning at 6 a.m. and reinforcing the Safety First ideal sells the safety program very well. Management backing up a crew after the crew refuses to complete or start a project due to safety issues beyond company control puts these words into action. These are the actions that sell the safety program and culture.

Does recognition of safety achievements encourage safety?

Ory, ElectriCom – We believe it does encourage and promote safety. It also provides transparency. I produce a monthly Safety Performance Report which provides a "snapshot" of all things relating to safety at our company. It details several categories, including number of safety observations conducted by the safety department, number of safety observations conducted by management, average score of the safety observations out in the field, number of recordable incidents, safety statistics, short-term goals, long-term goals, breakdown of monthly safety observations (non-compliant findings), and a summary of the monthly safety committee meeting. It is important that everyone is on the same page when it comes to safety and health. We need to know where we are and where we're going, and this report serves as a safety scorecard for the company.

Magers, KGM – Safety performance is recognized verbally at monthly safety meetings. Any injuries or near misses are documented and discussed so they might be avoided in the future. As of now, awards are not part of the program, in order to avoid non-reporting of incidents.

How can employees at every level be encouraged to be responsible for safety?

Ory, ElectriCom – Buy-in is critical to any successful safety and health process. Employees should feel motivated and empowered to participate in that process. Employee-run safety committees are a great starting point and a great tool for safety communication. Most of the discussion is centered around field-related safety issues. The committee also is a liaison between the field and management. Employees at all levels have the ability to provide insight on field safety issues, recommend policy changes, attend safety and health training sessions, and interact frequently with the safety department and members of the management team.

Magers, KGM – From the first orientation, it is instilled into employees that they are Number One. That is, they are the primary person responsible for their own safety. The safety director, company president, even their foreman, will not be with them every moment of every day; only the employee can control each movement, each action and each thought. Employees are directed to speak up and be part of the safety solution, and never look the other way. The first hand-signal taught to new employees is the all stop signal and this empowers even the newest employee to bring a stop to a bad situation.

How can a safety program evolve with changing needs?

Ory, ElectriCom – After implementing any safety and health initiative, there must be a review process. Is it working? If so, what can we do to ensure continuing success? If not, what can we do to achieve the desired results? A main function of a safety professional is to stay current with all federal, state, and industry rules and regulations. Communica-

tion and transparency are important to ensure the successful evolution of any safety and health policy. Never forget the employees. There is a wealth of internal knowledge just waiting to be tapped.

Magers, KGM – Communication. Crews need to communicate to safety management about things they are seeing in the field. Maybe they have noticed another company using a new product or a new procedure. Conversely, safety management needs to keep the crews advised of any developments in safety and any changes in safety standards.

What are the most common mistakes management makes in attempting to develop a culture of safety?

Ory, ElectriCom – Common mistakes are:

- Not realizing that it all starts inside the company and must come from the top down.
- Setting unrealistic safety and health goals.
- Too much focus on Safety Statistical Results (Incident rate, DART rate, EMR).
- Too much emphasis on lagging indicators versus leading indicators.
- Dangerous safety incentive programs. For example, incentive programs based on a single measure, such as number of accidents, can create a culture of under reporting which can become potentially dangerous.

Magers, KGM – There are times when we do not pay enough attention to the newer employee. Younger crew members sometimes can feel ignored by management. Sometimes, only the foreman's point of view is taken into consideration. It's very possible to miss out on some great fresh ideas from younger employees.

How would you describe your organization's safety culture? How is it being sustained?

Ory, ElectriCom – ElectriCom's safety culture is built on the principals of participation, knowledge, transparency and accountability. Employees at all levels are encouraged to participate in the safety and health process. Our employee-run safety committee is a great vehicle for involvement. Training is one of the most important elements to building and sustaining our safety culture. As previously mentioned, training is designed to enable employees to learn their jobs properly, and reinforce safety policies and procedures. Transparency is vital. The Safety & Health Process at ElectriCom belongs to all involved. If a policy change needs to be made, everyone must be included in the process, from the draft to implementation. Lastly, but certainly not the least important, is accountability. Failing to hold ourselves and others accountable for safety and health related issues sends the message that safety is not important.

Magers, KGM – Like the fiber optic cables we install, our safety culture is bidirectional. That is, our safety culture is sustained through communications from both directions – from the company president to the newest employee, and from the newest employee to the company president – with all of our employees representing a point of information scattered throughout our safety communication path.

FOR MORE INFORMATION:

ElectriCom
800-483-5941, www.electricominc.com

Kenneth G. Meyers Construction
419-639-2051, www.kgmyers.com

St. Louis Gets an Upgrade: Laclede Replaces 235 Miles of Pipelines

by Chris Horner Contributing Writer

Like many utilities operating in urban areas, The Laclede Group is faced with aging infrastructure. The company is tackling this challenge head-on by undertaking a major upgrade to natural gas distribution systems operated by its three subsidiaries: Laclede Gas in St. Louis, MO, Gas Energy in Kansas City and Alagasco in Alabama.

The Laclede Group spent nearly $300 million for capital projects in its 2015 fiscal year, of which about $135 million went to pipeline replacement projects for all three utilities. During that time, Laclede Gas replaced 81 miles of pipe in the St. Louis area, 73 miles in the Kansas City area, and 81 miles in Alabama. The company expects to upgrade a similar amount of pipelines in 2016.

St. Louis

In St. Louis, Laclede Gas is replacing a low-pressure, cast-iron piping system that is decades old. The work is taking place in the city of St. Louis and the inner ring of surrounding suburbs, including Wellston, Pagedale, University City, Maplewood, Clayton and Lemay. Many of the residential gas meters on this system were installed inside basements, and this program involves moving about 100,000 meters outside the homes to provide easier access for inspections.

"We have a master plan that takes a systematic approach to pipe replacement," said Craig Hoeferlin, Laclede Group's vice president of Operations Services, who oversees engineering for the company.

The company assesses several factors, including maintenance history, to determine which areas to replace first. "We only want to be in any particular neighborhood once," Hoeferlin said.

Laclede is replacing larger-diameter cast-iron pipe that operates at a pressure of 0.25 pounds per square inch (psi) with smaller diameter polyethylene plastic pipe operating at an industry-standard 60 psi. Performance Pipe is supplying the pipe for the project.

Given the congested nature of the work, the company has opted to use horizontal directional drilling (HDD) technology. This is an environmentally friendly process that allows for the installation of pipelines without the need for open excavations. It reduces overall restoration costs due to the minimal impact on landscaping, yards and paved areas.

A typical St. Louis crew usually consists of four construction employees, a small track excavator, pipe fusion machines and Vermeer HDD equipment.

After locating other utility lines, the crew opens a small hole in the street, performs the directional bore – usually about 300 feet – and pulls the new pipe through once the bore is complete. The crew opens small holes in the yard or street in front of each house to bore the service line. The 1-inch service lines are tied into the 2-inch main using fusion or mechanical fittings.

After tie-ins are complete, the new pipe is air-tested to at least 90 psi as required by state and federal regulations. The cast-iron mains are left in place, as is standard industry practice.

Awareness campaign

The Laclede Group created an awareness campaign that included online advertising through digital video, billboards and bus shelter graphics to inform customers about the upgrade program.

In addition to advertising, the company conducted extensive community engagement efforts. Company representatives met with St. Louis city officials in advance of construction to detail the program and provide information. Crews placed door tags on affected houses, and signs at work sites that tied back to the ad campaign.

This Alagasco worker helps feed HDPE pipe for gas line replacement.

Laclede's right-of-way department worked with the city of St. Louis, St. Louis County, Missouri Department of Transportation and other key entities to get all necessary permits. "Coordination with all parties is key," Hoeferlin said.

In St. Louis, Laclede is using all company crews for construction. Missouri Gas Energy has contracted with Infrasource and Miller Pipeline for pipe replacement work in Kansas City and surrounding areas, while also hiring new in-house crews for the projects.

FOR MORE INFORMATION:

The Laclede Group,
314-342-0500, www.thelacledegroup.com

Performance Pipe,
800-527-0662, www.performancepipe.com

Vermeer Corp.,
888-837-6337, www.vermeer.com

Campaign Informs Community, Highlights Employees

Imagine seeing an illustrated version of your face smiling from a billboard dozens of feet above a St. Louis highway. That was the experience a handful of Laclede Gas employees had when the company unveiled the advertising campaign to support its pipeline upgrades program.

An ad campaign for a gas line replacement project? Not your typical approach. But this campaign combined elements of community awareness with employee engagement.

"We know from experience that informed customers tend to be more satisfied customers," said Christine Johnson, Laclede's marketing communications manager. "Historically, we haven't done much advertising, but our research showed we had an opportunity to inform them [the public] about the important work we're doing every day to serve them better.

"These ads show customers that we are making our system even safer and more reliable," Johnson said. "When they see our crews on the street, we want them to know that it's Laclede improving the system."

In Alabama, Laclede company Alagasco has replaced 81 miles of pipeline during fiscal 2015.

In addition to connecting with customers, the ad campaign provided an opportunity to showcase and engage employees. About a half dozen Laclede employees were featured on billboards, bus shelters, online video, door tags and signs at work sites. The ads themselves have a bit of a retro feel.

"We want to convey our modernization efforts for the future while giving a nod to the past," Johnson said. "Our employees are proud to work at Laclede and serve our customers, and this campaign highlights this sentiment."

by **Dr. Tom Iseley** TTC Director

TTC Establishes China Partners

Dr. Les Guice, president of Louisiana Tech University, recently signed two Memorandums of Understanding (MoUs) establishing strong partnerships in China. The first partnership is with the Wuhan Industrial Technology Research Institute of Geo-resources and Environment Co. Ltd, (IGE) which is located in Wuhan Future City, China. This MoU establishes mutual understanding and trust for both parties to engage in cooperation for research and development, training, personnel exchange, technology transfer for areas relating to trenchless technology, clean energy, advanced materials and gem resources.

The second MoU is with the following two organizations: Tianjin Qingcheng Waterworks Engineering Co. Ltd. (TQCW) and Tianjin Hua Miao Research & Design Institute of Water & Wastewater Co. Ltd. TQCW has purchased over 12, 200 square feet of prime office space in the prestigious business district of Tianjin, China. Tianjin is a neighboring mega-city to Beijing. This space has been dedicated to the establishment of the Trenchless Technology Center – Tianjin (TTC-TJ) through the MoU partnership agreement.

Qing Ma is the owner and managing director of TQCW. The establishment of the TTC-TJ is the fulfillment of a vision he has had to meet the growing needs of China's underground water and energy infrastructure through ensuring that the best technical solutions are accessible. TTC-TJ will work jointly with TTC – LA Tech to continue to provide leadership for the global trenchless technology industry. Ma's vision is to ensure that decision makers at all levels and in all segments of the industry are aware of options for meeting the challenges of underground pipe and cable networks.

This vision will begin with building a web-based learning tool which will provide decision makers with the information needed to select various appropriate applicable technical solutions. After the decision makers have developed a short list of possible solutions, they can come to TTC-TJ where the representatives can see exhibits related to these technical solutions. Since these exhibits will be installed permanently, they can be interactive to the maximum extent possible to allow the decision makers to get a hands-on experience. TQCW has committed to conducting demonstration and pilot projects to validate the technical solutions being displayed. The results of these projects will be provided to the decision makers.

From left to right: Karly Wu, Dr. Leo Liao, Dr. Les Guice, Qing Ma, Dr. Tom Iseley and Xiaonan Wu.

The TTC-TJ conducted the opening ceremony on April 7. Dr. Tom Iseley stated "On behalf of TTC, it is my honor to participate in this event. Over 26 years ago, when I helped to establish TTC at LA Tech, I could never imagine that I would be in Tianjin to assist with the establish-

ment of a China TTC. I greatly admire the vision of Ma Qing and his commitment to insure that China has access to the best business practices and technical solutions to meet the future challenges of the underground infrastructure. I am grateful that he has invited me and TTC to be a partner to achieve this vision because this is the same vision that I had when TTC was established.

"The challenges that we face are not unique to China and America. These are global challenges. The TTC-TJ will be a global trenchless technology industry milestone. Nothing like this exists in the world today. It is truly a unique concept. I am excited to be involved, and I am committed to do all that I can to ensure that it is highly successful," Iseley said.

"On Feb. 21, Ma Qing, Ma Guojun, Wu Xiaonan and I met with Dr. Guice, where he expressed how pleased he was to see this agreement be finalized. He shares my enthusiasm in working with TTC-TJ."

The execution of these two MoUs further establish TTC's commitment to be a resource to meeting the challenges of the international underground infrastructure with the best science and business practices. When TTC was established in 1989, the first externally funded project was by an organization from Europe. In 1991, when the Industry Advisory Board (IAB) was established, it consisted of international firms, and this remains true today. TTC believes this diversity to be a strength. The IAB of TTC is very important because it consists of dedicated industry leaders who invest financial support of $10,000 per year. For more information regarding the TTC and IAB, visit www.ttc.latech.edu

The international commitment of TTC provides value to most of the IAB members. They are always represented and are presented with many unique opportunities that can be leveraged off the extensive relationships which TTC has developed. This often saves much time and money when expanding into the international market.

TTC Utility Investigations School 2016

After introducing the TTC Auger Boring School in 2015, TTC is launching another specialty school this summer – the TTC Utility Investigations School (UIS). TTC teamed with the American Society of Civil Engineer's Utility Engineering and Surveying Institute (UESI) to provide an intensive five-day course which will give attendees the knowledge and tools to provide competent utility investigations in accordance with accepted national standards. The course will cover, all in the context of ASCE-38, utility system configurations, geophysics for finding utilities, proper records research, achieving utility quality levels, project documentation and more.

Jim Anspach, founding governor of ASCE's UESI, and chair of ASCE-38, has a special role in the development of this school. Anspach is an advisor and has been instrumental in developing the curriculum and identifying the best instructors.

"ASCE has recognized that Utility Engineering is a missing task discipline from our educational curriculum," Anspach said. "One important aspect of that discipline, utility risk management for projects, is embodied in part through the use and proper application of the ASCE 38 Standard. Yet all too often, there is no avenue to learn the principles that govern the use of this standard.

"I am delighted that TTC and ASCE have begun this series of educational opportunities for those professionals and others under their direct responsible charge," Anspach stressed.

At the end of this short course, students will receive five continuing education units and a certificate of completion.

Registration for the school is ongoing. To find out more about the school and to register online, please visit the school web page www.ttc-specialtyschools.com/uis.

Colorado School of Mines/ Trenchless Technology Center Geotechnics for Trenchless Construction Short Course

For 26 years, the TTC has served as a global leader for the development of technologies influencing almost every aspect of trenchless construction methods. TTC prepares future leaders and decision makers of the underground infrastructure industry

As part of that effort, in April the TTC held four-day mini-seminars at Louisiana Tech University where TTC provided complimentary registration for students, faculty and staff at Louisiana Tech University and also contractors, consulting engineers, public utility personnel, managers, foremen and equipment manufacturers. These mini- seminars were instructed by the foremost microtunneling experts in the industry.

The Colorado School of Mines, in partnership with Trenchless Technology Center, will hold the first course in a series of microtunneling short courses on Nov 1-3, 2016. This three-day course will cover all aspects of geotechnical engineering for microtunneling and trenchless construction and will be instructed by the foremost microtunneling industry experts. This knowledge building course is intended for owners, consulting engineers, contractors, public utility personnel, equipment manufacturers and suppliers involved in the planning, design, construction and management of microtunneling projects. The course will consist of classroom lectures and hands-on practical sessions. The next courses will cover all aspects of microtunneling projects from equipment to design and construction.

CSM will award 3.0 CEUs upon successful completion of this course. The course is organized by the Colorado School of Mines Center for Underground Construction and Tunneling and by the Trenchless Technology Center at Louisiana Tech University. For further information about the course content please visit www.csmspace.com/events/trenchless. UC

Industry Advisory Board (IAB)

The Industrial Advisory Board (IAB) is a body composed of industry leaders, contractors, associations, media, education and public works representatives. The IAB is a valuable resource for the Trenchless Technology Center in strategic planning and program development, while also providing the Center with industry perspectives.

The IAB is engaged in identifying and prioritizing current and future needs of the trenchless technology industry, monitoring progress of specific projects, reviewing research results prior to dissemination, assisting in projects, assisting in transferring information to the public, and promoting construction education and the interaction of students with the industry.

Industry Members:
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TTC Announces 2nd Annual

Auger Boring School

The Trenchless Technology Center has announced details for its second annual Auger Boring School to be held Oct. 3-7 at the National Trenchless Technology Research Facility at Louisiana Tech University in Ruston, LA.

The school is being sponsored by *Underground Construction* magazine, American Augers, Baroid Industrial Drilling, Barbco, Brierley Associates, Midwest Mole, McMillen Jacobs Associates, Thompson Pumps, Permalok, Northwest Pipe Company and Lincoln Builders, Inc.

"We're developing the school to provide students with the knowledge and background needed to understand the important components of auger boring operations that are required to produce successful projects," said Tom Iseley, Ph.D., P.E., TTC director and professor of civil engineering at Louisiana Tech.

The school is an intensive five-day course about auger boring methods for pipeline installation, a well-established and perhaps most common trenchless application. It includes both classroom and field training. The school covers all aspects of auger boring projects, from design to construction, with a special focus on safety. The curriculum is taught by the foremost auger boring experts in the country.

Jadranka Simicevic, TTC assistant director, is coordinating the event. She said the course is designed for contractors, project superintendents, foremen, crew members, estimators, public officials, engineers, educators, highway department personnel, public utility personnel and representatives of regulatory agencies.

"Anyone who is involved with the auger boring industry will profit greatly by attending this course," said Simicevic.

Broad education, training

The school consists of classroom lectures (modules) and hands-on practical sessions. Lectures are given in designated classrooms on Louisiana Tech campus. Practical sessions are held in Louisiana Tech labs and at the field testing site located behind the TTC National Trenchless Technology Research Facility at South Campus. A state-of-the-art outdoor facility has been constructed for hands-on training.

The field operations include two auger boring installations performed from a shallow pit into a wide soil box built next to it. The bottom half of the soil box is below the ground surface and the remaining part is above. A concrete slab inside the pit holds two launching pads, one used with steerable and the other with a non-steerable auger boring machine.

The soil box built on the opposite side of the auger boring machines is 36 feet long and filled with varied soil types including clay (dirt), dry sand, wet sand and gravel (crushed concrete).

Steel pipe joints, 20-feet long, are used in the field operations. One boring installation uses 24- inch pipe joints that require traditional welding and the other a 30-inch Permalok steel interlocking pipe.

On the last day of school, another auger boring installation from a pit (8 feet deep) into the ground is performed in the afternoon after the exam and graduation. Attendees who have to leave early because of travel are not required to participate. Those who stay have a true real-life auger boring experience.

The Trenchless Technology Center at Louisiana Tech University is a cooperative research center for academia, government and industry. TTC's mission is to advance trenchless technology by serving as an independent source of knowledge, research and education in the field of trenchless construction.

FOR MORE INFORMATION:
Trenchless Technology Center,
(800) 626-8659,
www.latech.edu/tech/engr/ttc/
or contact
Jadranka Simicevic,
TTC Assistant Director, jadranka@latech.edu

Course schedule (tentative)

Day 1: Introduction, Planning and Design

Classroom
- History & Capabilities of Auger Boring
- Delivering a Successful Project
- Value Added Project Approach. Part I: Pre-Design
- Value Added Project Approach. Part II: Design
- What Happens When Any of Value Added Steps Fails
- Pit Construction
- Dewatering
- Safety

Field
- Pit Construction, Dewatering, Safety

Day 2: Soils & Drilling Fluids

Classroom & Labs
- Initial Project Planning
- Subsurface Investigations in a Value Added Process
- Lubrication and Stabilization Fluids

Day 3: The Construction Process

Classroom
- Theory of 'Steering a Bore'
- Introduction to Practical Session: Steerable AB with Welded Steel Casing Safety

Field
- Steerable Auger Boring with Welded Steel Casing–Hands On Experience

Day 4: Special Applications, The Construction Process

Classroom
- 'Other' Pipes Installed with Auger Boring
- Introduction to Practical Session: Non-Steerable Auger Boring with Permalok Pipe
- Safety

Field
- Practical Session: Non- Steerable Auger Boring with Permalok Casing– Hands On Experience.

Day 5: Construction Management & Course Wrap-Up

Classroom
- Construction Management
- Safety
- Course Wrap-Up
- Exam
- Lunch and Graduation Ceremony

Field
- Demo: Auger Boring in Real Site Conditions. Novel Electric Auger Boring Machine

UNDERGROUND CONSTRUCTION WORKFORCE ALLIANCE

UCWA

Who Will Do The Work?

Coalition Formed To Address Underground Workforce Development

by Eben M. Wyman

In 2015, the Distribution Contractors Association (DCA) formed a team of underground pipeline contractors and gas utility representatives to evaluate and address workforce capacity challenges facing the underground pipeline industry. The new initiative, labeled "Who Will Do the Work?" led to the establishment of the Underground Construction Workforce Alliance (UCWA), which was discussed at length at the 2016 joint Utility Contractor Workshop held by DCA and the American Gas Association (AGA).

According to Continuum Capital, a management consulting firm retained to lead the new "Who Will Do The Work?" effort on behalf of DCA, the oil and gas industry will invest significant resources in gas distribution and pipeline infrastructure: from $65 billion in 2020 to $80 billion in 2028. At the DCA/AGA Workshop, UCWA members provided an overview of the underground utility workforce and how well it is prepared to meet the workforce demands that will come with the billions of dollars in pipeline projects on the horizon.

Gas distribution operators have observed capital investment doubling and tripling over the past five years, and many expect more of the same over the next decade. About 15 years ago, only a few large utilities were aggressively replacing old distribution pipe. Now, many, if not most, are expanding and accelerating their replacement programs, stretching the workforce along the way. While meeting this workload challenge is a good problem for the industry to have, ensuring a robust and qualified workforce must be considered a top priority.

Almost 40 percent of natural gas and electric workers are eligible to retire in the next 10 years. Meanwhile, demands on a shrinking workforce from 2008-2015 have strainted resources to the point that expansion is problematic. Construction crews have been divided and subdivided, experienced workers are now crew leaders, and new subordinates don't bring the same experience to the field as their predecessors did only a few years ago.

Core concepts

UCWA is working to identify areas (both geographic and industry-specific) where workers are needed, and where they can be found. UCWA is currently building a coalition of industry trade associations, pipeline companies, unions, manufacturers and suppliers. When the coalition is fully represented, UCWA will develop an effective team strategy for resolving the workforce and field leadership needs through 2025, focusing on five core concepts while developing an effective strategy, including:

- Forecasting supply (available labor & supervision) and demand (capital spending)
- Awareness and recruiting
- Training
- Placement
- Retention and career development.

Industry representatives are invited to participate in the effort. UCWA's Leadership Team, Planning Team and a number of Implementation Teams are developing and implementing strategy, tactics and actions in local areas. After identifying and evaluating specific "hot spots" in New England, Texas, Ohio, Pennsylvania and California, the Leadership Team has agreed to initiate UCWA activities in Columbus, OH, Philadelphia, PA, and parts of New England. While the current focus is on the underground natural gas pipeline industry, UCWA leaders may decide to expand the scope of the coalition efforts to include other industries in the future.

Identifying and recruiting skilled labor (i.e. fusers, welders), as well as general laborers, is not simple. In addition, shortages of supervisors and foremen are increasing as existing industry resources are stretched further and further.

The underlying image problem facing the industry remains a tough nut to crack. The stigma that accompanies being involved in the construction industry, whether working for the gas company, contractor or equipment manufacturer, continues to discourage young people (and their parents) from giving underground construction fair consideration. Recognizing the promising future offered by this industry, these shortsighted misconceptions must be addressed sooner, rather than later.

Recruiting younger, entry-level workers continues to present a significant hurdle. Millennials, as this age group is categorized, tend to have unrealistic expectations, wanting to start out in a supervising capacity.

Employers must work to not only recruit, but retain quality workers. Investing time, money and resources to prepare and qualify workers who leave the industry in a matter of a few years doesn't address the root problem. New workers need to know that energy and construction work is not "just a job," but a promising, well-paying, long-term career.

Team Members

The DCA's Underground Construction Workforce Alliance Leadership Team members are:
Doug Banning, Miller Pipeline
Rob Darden, Distribution Contractors Association
Peter Fojtik, Michels Corporation
Chuck Shafer, NiSource Gas Distribution
Kyle Slaughter, Atmos Energy Corporation
Dave Wisniewski, Vermeer Corporation
Eben Wyman - Wyman Associates

Work vs. resources

On the utility side, budgets are growing and gas distribution programs are accelerating. The problem is not a lack of financial resources or even ongoing federal and state regulations. A real challenge lies in the gap between the pending workload and the human resources needed to get the job done. This increasing demand has also fast-tracked the transition of many skilled workers into supervisory roles.

Both utilities and contractors are taking proactive steps to facilitate entry into the underground construction industry, as well as to retain quality people over time. Examples include participating in job fairs to attract potential workers using construction equipment simulators, offering multilingual training, and leveling the workforce with anticipated workloads to the extent possible.

Representing a good mix of contractors, utilities and equipment manufacturers who are competitors in the field, the UCWA Leadership Team members have put aside their corporate agendas to better the industry in general. As discussion have continued, dozens of volunteers have stepped forward looking to participate in the initiative.

While several players in Congress have recognized the challenges facing the energy workforce, and legislation is being considered to provide federal grant assistance in the future, industry organizations are preparing for a "21st Century Energy Workforce," the UCWA coalition is not waiting. "Who Will Do The Work?" is up and running and welcomes your participation and support.

To learn more about this industry effort, contact Rob Darden, 972-680-0261, rdarden@dcaweb.org; Mark Bridgers, 919-345-0403, MBridgers@ContinuumCapital.net; or Eben Wyman, 703-750-1326, eben@wymanassociates.net.

ABOUT THE AUTHOR: *Eben Wyman is principal of Wyman Associates, a government relations firm located in the Washington, D.C. Metro area. Wyman Associates represents a number of clients in the gas pipeline, power, broadband, telecommunications and water/wastewater construction industries. Contact him at eben@wymanassociates.net.*

by **Jeff Griffin** Senior Editor

HDD Rescue

Proprietary System Frees Pipe String Stuck During Backream

Recovery work continued through the night.

Long, deep directional drills beneath bodies of water are challenging for horizontal directional drilling (HDD) contractors with the equipment and personnel able to perform this type of work, and each project has elements that set it apart from others.

Bobcat Contracting LLC recently installed 18,000 feet of pipeline to carry crude oil, including a 6,000-foot HDD crossing under the Corpus Christi, TX, ship channel. The project was owned by Magellan Midstream Partners, L.P.

The Corpus Christi Ship Channel is a 45-foot deep expressway to the Gulf of Mexico for both boats and fish. Extending more than 20 miles from the Port of Corpus Christi to connect with the Aransas and Lydia Ann channels near Port Aransas, the channel then goes through the pass between Mustang Island and St. Joseph Island.

"The long pilot bore got off to a good start," said David Latimer, Bobcat Contracting estimator/project manager. An American Auger 1 million-pound rig was used to drill the pilot shot. The entry point was near the water, adjacent to a road and had plenty of space for the drill rig and support equipment. The 10 5/8-inch pilot bore proceeded down at an angle, leveled off a depth of 180 feet under the ship channel and proceeded to the exit point.

The pilot hole was completed in 14 days, but difficulties arose with backreaming to enlarge the pilot hole.

Stuck

At 1,700 feet into the reaming process, a frac-out occurred. After every effort to stop it failed, the decision was made to shift from pull to push reaming. That was initiated from the entry point with the 1 million-pound drill rig. The push ream proceeded for 3,000 linear feet before the drill string and reamer became stuck in the hole.

When the HDD contractor was unable to free the pipe and reamer with the drill unit, a 1-million-pound hammer was added. In addition, a 330,000-pound American Auger drill was brought to the exit side of the hole to push. But even with all this equipment working at the same time, the drill string and reamer could not be moved.

In such situations, the hole may be abandoned and a new bore made adjacent to it. However, in this case, the job would have had to be re-permitted through the U.S. Corps of Engineers, taking as long as 45 days.

"That couldn't be done," Latimer said, "because it would cause us to miss the contract's completion date. Liquidated damages would be assessed for each day past the deadline, and the daily cost would be substantial."

Hard Rock Directional Drilling was called in to retrieve the pipe.

Magellan and Bobcat had considered running a donut setup typically used for fishing HDD pipe. This involves welding two rings of pipe – donuts – to the side of drill pipe with water jets on the pipe as it is slid over the stuck drill pipe downhole, using the donuts as guides. The drilling mud washes over the stuck drill pipe to break it free.

"But the hole had not been completely reamed, and a donut could not pass through un-reamed portions of the pilot hole," said Leo Aguirre, HardRock's big rig superintendent.

Proprietary help

Ultimately, Hard Rock used proprietary tooling to free the stuck drill string. Hard Rock Division Manager Cory Baker said the process required drilling a second HDD pilot bore with a special guidance system that allowed the bore to be immediately adjacent to the stuck drill string.

HardRock brought in a 500,000-pound pullback Vermeer D500x500 and started drilling from the exit side next to the stuck drill string.

"We drilled to approximately 2,000 feet and started getting a lot of resistance, so we decided to trip out and move the drill unit to the entry side," said Baker.

"We worked from the entry side for a couple of days and decided to bring in a second rig to work on the stuck drill pipe from both sides at once. We brought in a Vermeer D330x500 with 330,000 pounds of pullback and set it up on the exit side. When we reached 3,000 feet on the exit side and 1,700 feet on entry side, we got drilling mud flowing from entry side to exit side," he explained.

"With finesse, big power and a little bit of luck, the drill string became free," said Mario Diaz, HDD big rig foreman.

Start to finish, the recovery process took 14 days, with HardRock crews working two 12-hour shifts per day.

Once the pipe was free, Hard Rock trailed rods until the previously stuck reamer exited. At that point, backreaming was resumed. The pipe pulled in from entry to exit in four days, and the HDD segment was completed prior to the deadline.

While hole condition is the key to not getting stuck, unforeseen things can happen to anyone at any time.

"Unfortunately in the HDD business, it's not a matter of if, but when," Baker added. "Everyone has been stuck at one time or another. It takes finesse, muscle and luck to get free. Luck is the cheapest, so I'll take that any day."

Based in San Antonio, TX, HardRock is a leading provider of comprehensive directional drilling services that include pre-bore planning, bore engineering and design, and infrastructure installation.

Bobcat Contracting, headquartered in Hillsboro, TX, is a single-source supplier of energy services with three divisions: pipeline and fabrication, crane, and electrical and instrumentation. Oil and gas services include pipeline construction and maintenance, terminal and tank farm construction, fabrication, hydrostatic testing and ancillary services.

FOR MORE INFORMATION:

Hard Rock,
210-403-2086, www.hardrockhdd.com

Bobcat Contracting,
254-582-0205, www.bobcatcontracting.com

American Augers,
(800) 324-4930, www.americanaugers.com

Vermeer Corp.,
(888) 837-6337, www.vermeer.com

WATERWORKSNEWS

American Water Seeks Approval Of Plan in WV

West Virginia American Water filed an application with the Public Service Commission of West Virginia (PSC) seeking approval of an Infrastructure Replacement Program (IRP). The purpose of an IRP is to address the national challenge of aging infrastructure by directing additional investment to areas where improvements are needed.

The company seeks cost recovery on $32.5 million of its planned $107 million of capital investments in 2016 and 2017 through the proposed IRP with a separate charge on customers' bills effective Jan. 1, 2017. If granted, the charge would be calculated as a percentage of the total monthly bill, representing an increase of 1.9 percent or 89 cents per month for the typical residential customer using 3,204 gallons.

The scope of the proposed program is structured around seven categories of facilities, including water mains, meters, valves, hydrants, and certain plant, tank and booster station investments. The purpose is to prudently invest in reinforcing, strengthening and providing resilience to the transmission and distribution system. A detailed list of individual infrastructure replacement projects organized by district is included in the filing and outlines the specifics of the company's plan to invest $16.5 million. The planned upgrades will replace more than 22 miles of water main this year, along with hydrants, valves, manholes, services and other qualifying projects.

The proposal includes multiple consumer protections, such as annual reconciliations, annual caps, cumulative caps and earnings limits. Charges stemming from this program would be calculated annually until rolled into the company's rates in a future rate case, at which time the IRP charge would reset to "zero."

The PSC will conduct a review of West Virginia American Water's IRP application, and the company has requested that an order be issued within a six-month period. If approved, the company anticipates filing its annual IRP plan by July 1 of each year.

West Virginia American Water, a subsidiary of American Water (NYSE: AWK), is the largest water utility in the state, providing water services to approximately 550,000 people.

Texas Water Development Board Names Executive Administrator

The Texas Water Development Board (TWDB) recently named Jeff Walker as the new executive administrator.

Walker currently serves as the deputy executive administrator of Water Supply and Infrastructure. His areas of responsibility include state water planning, project development, financial assistance, project funds disbursement, water use and population projections, and facility needs assessment.

He has served in various positions at the TWDB for more than 25 years, including as director of Project Development, team lead for Financial Assessment, financial analyst, and agricultural conservation specialist.

Walker holds a Master of Business Administration from Texas State University and a Bachelor of Science in agricultural economics from Texas A&M University.

The TWDB is the state agency charged with collecting and disseminating water-related data, assisting with regional planning and preparing the state water plan for the development of the state's water resources. The TWDB administers cost-effective financial assistance programs for the construction of water supply, wastewater treatment, flood control, and agricultural water conservation projects.

Texas City Receives $12 Million For Reclaimed Water System

The Texas Water Development Board approved by resolution financial assistance in the amount of $12,770,433, consisting of a $11,220,000 loan and $1,550,433 in loan forgiveness, from the Clean Water State Revolving Fund to the city of Weatherford, TX. The city will be able to finance the design, acquisition and construction phases of a reclaimed water system.

In addition to the savings from the loan forgiveness, the city could save approximately $1,280,000 over the life of the loan by using the Clean Water State Revolving Fund.

The project includes improvements to the city's wastewater treatment plant, as well as financing of a reuse water pump station, a reuse water line and an outfall structure. UC

by **Jeff Griffin** Senior Editor

Innovative Design Leads To Trenchless Solutions

An "Impossible" Project Completed On-Budget, Ahead Of Schedule

Many sewer line replacement and rehabilitation projects could be classified "routine" because they are relatively straightforward with few complications.

Even so, no two projects are exactly alike, and most have challenges and issues that must be addressed. In some cases, problems may seem impossible to overcome.

An example in the "impossible" category was a project that replaced 6,700 feet of severely deteriorated sewer main running through an oil refinery operating 24 hours a day, seven days a week. Therefore, work had to be accomplished without halting or interrupting the refinery's operations.

The more than one-mile-long section of pipe going through the Phillips 66 refinery is a critical element in the sewer system of Ponca City, OK, serving a drainage basin that includes 570 acres of mixed commercial and residential land, along with the Phillips 66 refinery office complex, research and development facilities and the refinery itself.

"The nearly 100-year-old section of vitrified clay pipe had been a continuing source of trouble for years," said J. Bret Cabbiness, P.E., president of Cabbiness Engineering LLC, the project's engineering firm. "It was a frequent source of backups. There were broken and missing pipe segments, and large amounts of groundwater inflow and infiltration (I&I). For decades, city leaders, refinery management and local citizens were frustrated that a sensible and affordable construction solution for this failing sewer line might not ever be designed."

Ponca City Utility Authority called on Cabbiness Engineering to develop a feasible solution to replace the sewer line without interfering with the refinery's operations. The $1.6 million project designed by the Cabbiness team was completed under budget and ahead of the six-month completion deadline.

Restrictions

As Cabbiness engineers began the design process, there were obvious restrictions to consider.

"One option not available was to request the Phillips 66 refinery to shut down and relocate refining units," said Cabbiness. "With the added challenge of the project being

Below: Cured-in-place installation underneath an existing refinery process unit.

located within an oil refinery operating at full capacity, the design had to take into account the refinery's stringent safety requirements and operational restrictions that construction would encounter. [See sidebar for details.] This challenge required us to establish viable construction sequencing regarding the refinery's around-the-clock operations.

"The project also brought the challenge of dealing with refinery equipment and refinery support components that had been constructed over the top and adjacent to the existing sewer main."

A third design challenge was the rehabilitation of a portion of the existing sewer that crossed underneath multiple, highly active Burlington Northern Santa Fe (BNSF) Railroad tracks inside the refinery.

The first step in planning was to locate the existing manholes and identify connecting sewer mains. A survey was augmented by detailed drawings of refinery equipment, known pipelines and storage tanks, underground utilities and Phillips 66 monitored groundwater levels. A previous closed-circuit television inspection report provided by the refinery, and interviews with refinery staff and various Ponca City personnel, helped complete the project's background information

Flow monitoring of the existing sewer line upstream and downstream of the project's boundaries was conducted to confirm average daily flows and peak sewage flows. This information shed light onto two significant elements that had to be considered in the project design: actual contributing flows from a fully developed drainage basin, and peak flows that included I & I of storm water and groundwater within the refinery's property boundary.

During the development of the required Oklahoma Water Resource Board (OWRB) and Oklahoma Department of Environmental Quality (ODEQ) preliminary engineering report, the Cabbiness team quickly ruled out two design alternatives: direct burial of pipe below grade in an open trench, and construction of a bypass pump station.

"Direct burial of pipe in an open trench was ruled out because of the

Above: Typical situation of an inaccessible manhole inside the refinery.
Below: Midpoint access pit excavation on existing sewer main that crossed under refinery fire protection system pond and under active refinery units.

Safety On A Challenging Construction Site

With a public sewer line traversing an oil refinery's highly secure and sensitive private property, planning engineers and construction personnel faced out-of-the ordinary job-site challenges.

"Safety was paramount for the construction crews, inspection staff and Phillips 66 employees," said J. Bret Cabbiness, P.E., president of Cabbiness Engineering LLC.

Cabbiness proposed to the Phillips 66 refinery management and Ponca City leadership that all those involved in the project adopt the refinery's construction safety policies, operational procedures and accepted refinery construction practices.

"The refinery's construction safety policies," Cabbiness said, "are more stringent than normal municipal projects for obvious reasons. We felt as a design team, we had to respect the unique construction environment and do everything possible to ensure that everyone came home safely every night after work."

All project personnel, including the engineering design team, owner representatives and construction contractors were required to complete site-specific Phillips 66 safety training and conform to special, personal-protective equipment requirements while on site.

"No exceptions regarding safety would be allowed," he said. "Any incident of non-compliance would subject that person to immediate expulsion from the project.

"Prior to submitting bids, all construction contractors were pre-qualified by documenting that they had the proper safety training, construction experience and expertise, as well as having all necessary construction equipment to provide the safest work possible."

Other project requirements included a separate, on-site safety coordinator and project manager to ensure all of the safety protocols were followed and that daily refinery construction permitting procedures were completed to ensure that all refinery unit operators were aware of construction activities and personnel that were on site.

"The project was completed without any safety violations or safety instances," said Cabbiness.

number of unknown, underground piping conflicts expected, and the possibility of impacting unknown, environmentally sensitive areas from nearly a century of refinery operations," said Cabbiness. "Another factor was the escalated construction costs of these methods working within the refinery property.

"Although a new sewer lift station would address the city's sewage flow, it would have left the refinery to combat the remaining problems of the existing sanitary sewer. Also, the initial capital cost and long-term maintenance costs of a sewage lift station further prohibited this option from being selected."

Trenchless

Therefore, the project clearly called for trenchless construction.

"After evaluating design alternatives, an innovative, trenchless rehabilitation approach was developed that combined the use of pipe bursting and cured-in-place pipe (CIPP)," said Cabbiness.

Pipe bursting provided the best option to pull in a new pipe because of the number of offset joints, missing or broken pipe and pipe-protruding obstacles. Where access to the existing sanitary sewer line was limited by the proximity of existing refinery pipes or vibration-sensitive refinery equipment, CIPP was utilized.

Temporary bypass pumping was part of the overall construction plan, making a separate bypass system unnecessary.

Flow studies had found the existing sewer pipeline (ranging in size from 12 inches, 18 inches and 24 inches) to be slightly oversized for the expected average daily and peak flows.

"By pipe bursting a smaller outside diameter pipe inside the existing pipe's larger diameter, the risk of a bursting head becoming stuck or hung up was virtually eliminated," said Cabbiness. "Although the design reduced the new pipe's interior diameter, the major improvement of the pipe's coefficient of friction, along with the accepted reduction of sewage design flows, substantiated this innovative design. New pipe installed was in diameters of 12, 16 and 20 inches."

While most of the project was accomplished by pipe bursting, CIPP was used in areas where underground vibration of pipe bursting posed the risk of damaging sensitive refinery equipment above the pipe.

Primary contractor Urban Contractors, Oklahoma City, performed the pipe bursting, as well as construction of new manholes and rehabilitation of existing manholes.

Due to the numerous, undocumented piping systems expected within the nearly 100-year-old refinery site, pipe bursting access pits were hydro-excavated by a refinery-approved subcontractor prior to the start of construction, allowing the project to stay on schedule. In three known instances, existing manholes had been buried by past refinery expansions and improvements. Several other manholes were located, but inaccessible for construction.

In addition to inaccessible manholes, other flow obstructions were found during the design process, including lightning protection grounding rods driven through the existing sewer, steel plate weirs constructed inside existing manholes, several pieces of broken pipe creating in-line blockages, protrusion of protective concrete caps into the pipe joints, protruding service connections, and a blind junction box.

Static bursts

With access to the sewer manholes, static pipe bursting provided the best result. This eliminated two major sources of groundwater infiltration and simplified the sewer system for future maintenance.

"The average length of pipe bursting was about 300 feet," Cabbiness said. "In a few instances, we had pulls that extended to nearly 500 feet because of the manhole locations and existing refinery buildings, and other refinery equipment and refinery units."

A 10-peson Urban Contractors crew made 14 bursting pulls on the project, using TT Technologies bursting equipment.

The project design required the pipe to withstand the fallout from hydrocarbon-impacted soils created by refinery operations in decades past. The pipe selected was SDR 19 HDPE DIP.

"The refinery had cleaned and mitigated most, if not all, of the areas adjacent to the existing sewer and the area was in good standing with ODEQ and the EPA," Cabbiness said. "Hence, we worked closely with Phillips 66 and the regulatory agencies to ensure we followed necessary protocols and procedures if we encountered any hydrocarbon-impacted soils."

Pipe was fused in predetermined staging areas outside the active refinery units and was pulled to the construction area with special permission and coordination from the refinery staff.

Insituform was the subcontractor for CIPP segments. The specified liner had a special CIPP resin that is inert to hydrocarbons. CIPP runs were from manhole to manhole, and lining was cured with standard hot water procedures.

"Completing the sewer rehabilitation project within the established six-month construction period was critical to the refinery's continuous 24-hours a day, seven days a week operation," Cabbiness emphasized.

Beating the deadline

"As it worked out," he continued, "Urban Contractors finished nearly two months ahead of schedule. A majority of the credit for early completion goes to the contractor's construction crews and management, city and refinery on-site field representative, and our design team's field

Below: Preparation for a 12-inch HDPE pipe-bursting pull under an existing refinery process unit.

Fire Water Ponds Pose Additional Challenges

In addition to the various complications of working inside an operating oil refinery, fire water ponds at the Phillips 66 facility created other design and construction challenges.

After fire pond levels had been temporarily lowered to access two manholes under a pond's surface, it was discovered that in a previous attempt to waterproof the underwater manholes, a two-foot thick, concrete block had been constructed over each manhole lid. Therefore, the concrete blocks were demolished to provide access to the manholes and the sanitary sewer main.

Another construction anomaly was a secondary sewer collection main that had collapsed beneath the pond and was allowing extensive pond infiltration into the existing sewer system.

Six major contributors of continuous inflow and infiltration (I&I) were located in the ponds – the two manholes, two severely leaking joints, one broken secondary sanitary sewer main and one collapsed 18-inch sanitary sewer main segment submerged in groundwater.

Due to the constant presence of water in the fire pond and a high groundwater table, preliminary estimates indicated that the rehabilitation of these segments of the sanitary sewer main reduced the amount of I&I by as much as 100 gallons per minute.

representatives, all working together for the common good of the project.

"The elimination of I&I by trenchless construction decreased the actual sewage flow in the sewer main, reduced the amount of wastewater being treated at the city's wastewater treatment plant and saved the Phillips 66 refinery approximately $254,000 a year in sewage treatment costs, as well as the cost to replace all the lost water from the fire water storage ponds from their deep underground wells.

"Moreover, the project eliminated the city's upstream sewer main backups in the entire drainage basin. This not only saved the city money, but also brought relief to residents who had been continuously impacted. Truly, it was a win-win-win situation for the residents, the refinery and the city of Ponca City."

Following completion of the project, Dr. Hong Fu, director of Ponca City environmental services, praised the program.

"Many people in our community, the Phillips 66 Refinery staff and even our own city government had for years believed there was no viable or financially feasible solution to this important and much-needed project.

"Not only were the various trenchless rehabilitation designs meticulously analyzed, but both the project budget and construction schedule were held completely intact as planned and never compromised. All of this was realized by the Cabbiness Engineering team regularly visiting the job site to offer innovative design and construction solutions, and to help coordinate any necessary field changes as they were discovered," Fu said.

"The city of Ponca City is pleased to have had Cabbiness Engineering as our engineer of record for this project, providing the much needed vision and engineering expertise to solve this once thought un-solvable problem."

FOR MORE INFORMATION:

Cabbiness Engineering,
405-310-6435, www.cabbinessengineering.com

Urban Contractors,
361-854-3101, www.urbaneng.com/

TT Technologies,
(800) 533-2078, www.tttechnologies.com

Insituform,
(800) 234-2992, www.insituform.com

Above: Final manhole inspection for trenchless rehabilitated sewer line under refinery piping.

Award-Winning Project

The Phillips 66 Refinery/Ponca City sewer main replacement project has won several engineering awards for Cabbiness Engineering:

- ACEC Oklahoma 2014 Grand Conceptor Award for the best project in the state of Oklahoma
- APWA Oklahoma 2015 Public Project of the Year
- ACEC National 2015 National Recognition Award
- APWA Oklahoma 2015 Environmental Public Project of the Year (less than $5million)

Bypass At Its Best

Team Of Experts, Equipment Needed For Pump Station Rehab

By **Hunter Powell** Senior Applications Engineer, Southeast Region, Xylem Dewatering

The Wastewater Department of the city of Tampa, FL, is responsible for the collection, treatment and disposal of more than 55 million gallons of wastewater per day (mgd) from more than 100,000 customers in Tampa and the surrounding suburbs. Central to the operation is an advanced wastewater treatment plant with a capacity of 96 mgd. The department also operates and maintains the complex maze of sophisticated infrastructure that feeds into the plant, including about 1,800 miles of gravity and force main sewer lines, 225 pumping stations, 30,000 manholes and 667 air release valves.

As part of the Wastewater Department's proactive maintenance program, it was determined that the Krause Pump Station (built almost 40 years ago) had exceeded its designed life expectancy and was in need of rehabilitation. The local contractor, Vogel Bros. Building Co. and the pump experts at Xylem, were brought in to assess the project, design a robust bypass plan and implement the bypass while the station was being rebuilt.

"We were thrilled to get the pump station project as our experience with wastewater and industrial projects aligned perfectly," said Darren Vogel, PE, project manager at Vogel Bros. "And we knew our relationship with Xylem would pay off, as they are pump rental and dewatering experts."

No room for error

The average daily flow at the Krause Pump Station is 20 mgd. But over the years, there had been wet weather spikes to greater than 50 mgd. To ensure that the bypass was robust and could handle any amount of anticipated flow rate, the specifications and design plan called for a system capable of handling a 100-year storm event, or 64 mgd.

To implement the bypass, the design incorporated the use of four manholes: two of them in the middle of downtown Tampa under the expressway, and two of them along the Hillsborough River. These locations had very little room for the bypass equipment. To complicate the project further, a request to the city for a complete road closure was denied, so the placement of the pumps and bypass equipment had to be done in such a way that traffic would not be hindered.

In order to ensure that the bypass would be operable and could handle the flow, redundancies were put in place as part of the plan.

"The last thing we wanted to do," continued Vogel, "was to have a sanitary sewer overflow event at some point while the bypass was in place. We took every precaution and incorporated back-up equipment into the system, just in case."

As primary equipment for the bypass, the plan called for three Godwin electric CD400M Dri-Prime pumps, one Godwin electric DPC300 pump and a Godwin electric CD150M pump. The electric pumps were all tied in to a generator, as a back-up in case of a power outage. A bank of seven Godwin diesel pumps, equipped with fuel cubes, was also put in place for complete redundancy of the bypass.

Getting it done right

A typical solution to moving pumps and oversized equipment into place on a job site is with a crane. But since the primary location was under the expressway and a crane couldn't fit in the work space, Xylem used a rotator extender truck with a telescoping boom to place the equipment where it needed to be on site.

Once in place, each of the primary electric pumps was installed with a Godwin Variable Frequency Drive (VFD), to adjust pump speed for optimal efficiency and to save energy costs. The pumps were integrated together to work sequentially, with each pump activated only as increased levels in the wet well – identified by Godwin level transducers – called for additional pump activity.

Since the bypass was situated in a busy traffic area under an expressway, space had to be optimized as much as possible. With the city not eager to close a busy road for an extended period of time, the plan also called for the use of tapping saddles on the main trunk bypass line. This saved enough room to be able to keep one lane of traffic open for the duration of the bypass project.

"The team at Xylem pulled together a terrific bypass solution. It was efficient, redundant and they brought in the right rental pumps for the job," Said Vogel. "The City of Tampa was very happy with the outcome. The bypass put their mind at ease, and allowed them to focus on getting the Krause Pump Station rehab completed in a timely manner. It was a win-win for everyone."

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Godwin Pumps,
(856) 467-3636, www.godwinpumps.com

Top: The fuel cubes, lower right and left, were used as part of the back-up redundancy of the system for the diesel driven pumps. **Bottom:** Space was limited under the expressway and along the river.

NASSCO STANDARD ★ BEARERS

Andy Drinkwater

EDITOR'S NOTE:

NASSCO just completed its 40th anniversary and continues to set standards for the assessment and rehabilitation of underground infrastructure. As the association continues its phenomenal growth, this series profiles those who have made significant contributions and impacted the continued acceptance and growth of trenchless rehabilitation methods. This is a bi-monthly installment in a series of articles exploring the history of NASSCO through the eyes of industry leaders.

This month, NASSCO honors Andy Drinkwater, a long-time WRC civil engineer who was instrumental in transforming a WRc publication into the basis for NASSCO's PACP. This first-person story by Drinkwater describes his career and initial work on bringing PACP to the United States.

I started my civil engineering career in the city engineer's department of the city of Manchester, England, a large city with a current population over 2.5 million. As a graduate, I spent time in the various engineering sections and found that drainage was by far the most interesting – every problem was different and most needed to be thought through. You simply couldn't just refer to a design manual.

My experience while with Manchester's drainage department included learning an extensive amount about drainage systems, both large and small, city center and residential, design and operation.

Nearly 35 years ago, I took the knowledge gained from my years at Manchester and began working for WRc [Water Research Center] where I initially worked on flow surveys and hydraulic modeling of sewer systems.

The WRc is based in Swindon, England, about 60 miles west of London, where much of my current focus includes applied research for water companies in the United Kingdom (UK) regarding FOG and wet wipes. Considerable research

has been done on both of these topics. In the case of wipes this has been necessary because manufacturer tests that conclude the wipes are "flushable" do not translate to real-life sewer environments. This leads to blockages and has become such a concern that it is now leading to an ISO technical specification on the flush-ability of wet wipes. I serve as the UK technical lead expert who liaises with quite a number of people around the world on this subject. It is proving to be quite an interesting project, although I often think I must have done something terribly wrong in a previous life to be spending my days studying the topic of baby wipes!

Other areas of my work include serving as an expert witness. When something has gone wrong in a sewer system, pumping station or treatment facility, which may have led to flooding or other problems, I often get called in as an independent investigator to work out what caused the failure. Quite often the culprit is FOG and wet wipes, so my responsibilities are very much related. The greatest take-away from these failure issues is to better understand what went wrong and share information regarding what we can all learn to prevent them from occurring again in the future. The key to unlocking some of these mysteries is the accurate and effective inspection of sewer systems, specifically the CCTV recording of both sewer conditions and operational features.

PACP

At WRc we develop manuals and standards, one of which is the Manual of Sewer Condition Classification, which covers how to code a CCTV survey in a sewer or drainage system. While the classification is designed for the UK market, it is widely used worldwide. Identifying a need to address the unique sewer conditions within North America, Mike Burkhard, who was NASSCO's executive director at the time, contacted WRc in 1999 about developing a coding system specific to this

region, which would later be known as the Pipeline Assessment and Certification Program, or PACP.

At Mike's request, that year I traveled to the U.S. with a colleague to better understand the unique contributors to sewer conditions that were, up until then, somewhat unfamiliar to us. Some examples included the use of Orangeburg pipe, which is not used in the UK, as well as different pipe material types which result in different failure mechanisms.

Additionally, the extreme temperatures experienced in Florida and California are not experienced in the U K; therefore, specifications at the time did not address hydrogen sulfite attacks in concrete sewer systems when the temperature exceeded 20 or 25 Celsius, or 70 to 80 degrees Fahrenheit. In helping to develop PACP, we also had to convert everything to the imperial system since the UK specifications were based on metric measurements.

I returned to the UK full of new knowledge about North American sewer system conditions and developed a presentation addressing coding of these conditions, which my colleagues and I presented to NASSCO in Atlanta on Sept. 11, 2001. During the presentation one of the people I was presenting to, who incidentally I had worked with many years earlier in Manchester, nudged me and said "Something big is happening in New York. We may need to stop the presentation." I had no idea what he was talking about, but soon the entire world was informed about the tragedy. A few days later, I was on the first flight that was allowed to return to the UK from Atlanta.

Since then, PACP has been fully developed and used successfully throughout North America. I have kept very much in contact with NASSCO, and have had the pleasure of working with the last three executive directors, starting with Mike, then with Irv Gemora and Ted DeBoda.

In order to keep pace with continually changing conditions and technologies, PACP has been modified over the years and WRc has been very much involved in those modifications. Our involvement was heightened with the recent release of PACP Version 7. We were asked by Ted (DeBoda) to take a comprehensive look at the program. He wanted to make sure it had as much integrity as possible to ensure NASSCO's mission to set standards for the assessment, maintenance and rehabilitation of underground infrastructure was maintained. We evaluated the entire program and, while we did not find any errors, we did find a number of things that were slightly inconsistent and addressed those inconsistencies to improve PACP even more.

Standards are an international issue. That is why we are asking NASSCO to return the favor and provide input as we update some of our manuals, including our Drain Repair book and Sewerage Risk Manual for the North American market, both of which will benefit greatly from the information and experience of NASSCO. Providing healthy infrastructures to our local communities is where it begins; coming together to ensure global integrity and healthy water and wastewater systems for people everywhere is where organizations like WRc and NASSCO can make the greatest impact. UC

REHABTECHNOLOGY SELECTION GUIDE

CURED-IN-PLACE-PIPE

Company	Product/Type	Mainline, Lateral Sectional	Inversion/Cure Process Range (in)	Pull-In Diameter Range (in)	Inversion Diameter
Applied Felts	Felt Liner	lateral	steam, water, ambient cure	4-108	4-108
C.I.P.P. Corp.	Felt Liner	lateral	steam, water cure	4-108	4-108
HammerHead Trenchless Equipment	HydraLiner CIPP	lateral	air/ambient, water, steam	N/A	2-12
Infrastructure Repair Systems	Point Repair	sectional		3-100	
Inliner Technologies	CIPP	lateral, mainline	steam, water, uv cure	4-120	4-120
Insituform Technologies	CIPP	lateral, mainline	air, water inversion steam, water cure	4-108	4-108
LMK Technologies	Lap Liner	main, lateral	ambient		4-24
	T-Liner	main, lateral	air/steam, ambient		6-36
	Shorty	main, lateral	air/steam, ambient		6-24
	Stubby	main, lateral	air/ambient		6-36
	Performance Liner Lateral Liner	lateral	air/steam, ambient		2-8
	Push-In-Place Spot Repair	lateral	air/steam, ambient		4 & 6
	Invert-In-Place Spot Repair	lateral	air/steam, ambient		4 & 6
	Performance Liner Sectional Inversion	sectional	air/steam, ambient		6-42
Liner Products	Felt Liner	lateral, mainline	air, water inversion, steam, water cure	4-120	4-120
Masterliner	CIPP	mainline, lateral, sectional	steam, water, air cure	up to 75	up to 75
MaxLiner	Felt Liner	lateral	steam, ambient cure	3-10	3-10
Mississippi Textiles	Felt Liner		air, water inversion steam cure	6-96	6-96
National Liner	CIPP		air, water inversion water, steam cure	4-108	4-108
Perma-Liner	Perma-Main	mainline	water inv./steam cure	6-24	
	Perma-Lateral	lateral	air inv./ambient cure	2-12	
	Perma-Liner	sectional		6-52	
	Sectional Point Repairs			6-54	2'-30'
	Perma-Patch	lateral spot		4-6	
Premier-Pipe USA	Felt Liner	lateral			4-108
PrimeLine Products	PrimeLiner	lateral	ambient cure	2-8	
RS Technik	RS CityLiner	mainline	steam, water cure	6-42	6-42
	RS Blueline	mainline	steam, water cure	4-42	4-42
	RS MaxLiner	lateral			2-12
	RS MaxPatch	sectional	ambient cure	4-24	

GROUT-IN-PLACE-PIPE

Company	Product	Diameter Range (in)
Danby	Panel Lok	36-180
National Liner	3 - S	36+
Sekisui SPR Americas	SPR Process	36 +

SPRAYED-IN-PLACE-PIPE

Company	Product	Pipe Diameter (In.)	Type Pipe	Insitu/ New Pipe
3M	Scotchkote 269	4-12	water	insitu
AP/M Permaform	Permacast PL-8000 (centrifugally-cast-concrete)	30-120	metal, concrete, clay, brick culverts, sewer pipe	insitu
IPR	Eco-Cast	36-120	culverts, storm drains, DOT	
The Strong Co.	Storm Seal			
Warren Environmental			metal, concrete	

SPIRAL WOUND PIPE

Company	Product	Diameter Range (in)
Contech Engineered Solutions	SPR PE	30-118
Danby	Panel Lok	36-180

UV-LIGHT CURED-IN-PLACE-PIPE

Company	Product	Diameter Range (in)
C.I.P.P. Corp.	BKP Berolina	up to 36
Layne Inliner	Inliner STX	6-48
Reline America	Alphaliner	6-52

FOLDED PIPE

Company	Product	Pipe Type	Diameter Range (in)	Pre-Heating
American Pipe & Plastics	AM-LINER®	PVC	6-12	Yes
Insituform	InsituGuard	HDPE	4-48	No
Miller Pipeline	EX Method	PVC	6-12	Yes

SLIPLINING

Company	Model	Diameter (in)	Pipe Material	Available Lengths
Advanced Drainage Systems (ADS)	N-12 HDPE	4-60	high density polyethylene	13', 20'
	SaniTite HP	12-60	polypropylene	13', 20'
	HP Storm	12-60	polyethylene	13', 20'
Contech Engineered Solutions	A2 Liner	12-36	PVC resin (12454)	12.5', 14', 22'
	DuroMaxx	30-120	steel reinforced polyethylene; aluminized steel type 2, aluminum	14', 24'
	ULTRA FLO	18-102	polymer pre-coated aluminized steel type 2, aluminum	10'-48'
	CMP	6-144	polymer pre-coated	10'-48'
	ALSP	5'-40'	aluminum structural slate	4.5' plate lengths
	Tunnel Liner Plate	4'-15'	steel or aluminum	18" plate lengths
	Other	8'-102'	other plate & bridge products	
HOBAS Pipe USA	CCFRPM	18-126	centrifugally cast, fiberglass-reinforced polymer mortar	20' standard, shorter available
ISCO	Snap-Tite	6-63	HDPE	2'-50'
Underground Solutions Inc.	Fusible PVC Pipe	4-36	PVC	20', 30', 40'
U.S. Composite Pipe South	Flowtite	4-156	filament wound fiberglass-reinforced plastic mortor	10'-40'

GROUT

Company	Product	Viscosity	Application
Avanti Intl.	AV-100 Chemical Grout	1-2 cP in solution	Sewer joint sealing, service lateral connections, soil stabilization, hazardous waste containment, controls groundwater in mines, tunnels & subways.
	AV-202® Multigrout	3200-6000 cP in solution	Seals leaks in large cracks or joints in concrete, dams, structures, manholes & pipe penetrations.
	Ultrafine	water/cement ratio of 0.6/1 by weight	Pumice-based cement increases compressive strength of soils, soil stabilization, forms low-permeability grout curtains, seal seeping mines, dams & tunnels.

	AV-118 Duriflex	1-2 cP in solution	Sewer joint sealing, service lateral connections, soil stabilization, hazardous waste containment, controls groundwater in mines, tunnels & subways.
	AV-160 SuperGel	1-2 cP in solution	Sewer joint sealing, service lateral connections, soil stabilization, controls groundwater in mines, tunnels & subways.
	AV-248-LV Flexseal LV	150-250 cP	Flexible hydrophobic withstands wet/dry cycles, seals leaks in fine to medium moving cracks and joints in concrete structures.
	AV-248 Flexseal	550-830 cP	Flexible hydrophobic withstands wet/dry cycles, seals leaks in medium to large moving cracks & joints in concrete structures.
	AV-248-HV Flexseal HV	1000-1200 cP	Flexible hydrophobic withstands wet/dry cycles, seals leaks in large moving cracks & joints in concrete structures.
	AV-275 SoilGrout	100-120 cP	Fills voids outside a structure or joints & cracks in concrete structures, soil stabilizer.
	AV-315 MicroFoam	50-200 cP	Seals leaks in fine cracks or joints in concrete retaining walls, parking structures, tunnels & mines.
	AV-330* Safeguard	350-750 cP	Seals leaks in medium to fine cracks or joints in subways and tunnels, tie-backs & slurry walls, manhole & pipe penetrations.
	AV-333* Injectaflex	350-750 cP	Seals leaks in medium to fine cracks or joints in concrete structures, subways, manholes, pipe penetrations.
	AV-350 Multigel	275-450 cP	Soil stabilization around manholes, pipe joints, service laterals, tunnels, dams.
	** UL certified for use with potable water*		
Pipeline Renewal Technologies	Jansen Process	130-280 cP	Sealed, structural repair of lateral conncetions and localized mainline damage.
Prime Resins	Prime Flex 900 XLV*	250-350 cps	Sealing leaks in extremely tight hairline cracks.
	Prime Flex 900 MV	650-700 cps	Sealing active leaks in concrete (cold joints, cracks, failed water stop). Tough and flexible. No catalyst or accelerator needed.
	Prime Flex 910	35-50 cps	Soil stabilization; curtain wall grouting; sea wall leak sealing. Hydrophobic, forms watertight, rock hard mass.
	Prime Flex 920*	120 cps	Soil stabilization, permeation grouting, void filling, gushing leak sealing, below-grade curtain grouting. Hydrophobic.
	Prime Flex 940*	450-600 csp	Sealing active leaks in joints and cracks. Hydrophobic flexible foam.
	Hydro Gel SX*	440-550 cps (20 cps at 8:1)	Sealing leaks; point repair grouting. Hydrophilic; for wet, below-grade environments such as manholes
	Prime Flex 985 (LX20*)	270-280 cps	Rigid polyurethane foam. Fills voids in/around structures; fills abandoned underground storage tanks and pipes.
	AR 800*	1-15 cps in solution	Soil stabilization, sealing joints and leaks in potable water pipes and waste water pipes. Hydrophilic, acrylate (acrylamide-free), elastomeric gel, primarily for geotech uses. Wide window of variable set time-field adjustable. Excellent penetration in sandy/silty soils. For void fill when expansive pressure is not desired.
	AR 870	2-7 cps in solution	Sealing leaks in concrete; sealing wastewater lateral joints and leaks; controlling water in tunneling ops, elevator pits, below-grade structures.
	Precision Lift 4.0/4.75	270-280 cps	Compaction grouting, slab lifting. Hydro insensitive, polyurethane structural foam.
	Rock Grout 9200	190-200 cps	Soil stabilization, compaction grouting. Fast-reacting. Creates dense, hard fill material required for anchoring and binding aggregate.
	Prime Permeation Grout	35-50 cps	Soil stabilization, curtain wall grouting, sea wall leak sealing. Hydrophobic.
	VF 3.5	270-280 cps	Soil stabilization, void filling, slab lifting. Hydro insensitive.
**Independently tested and verified to meet NSF/ANSI Standard 61 for contact with potable water.*			
Sealing Systems	Aqua Seal	440 cps "B" side 200 cps "A"	Aqua Seal is an extremely reactive two side component hydrophobic polyurethane water stop system that can be injected into flowing water.

GROUTING EQUIPMENT

Test Seal & Packers

Company	Model	Pipe Diameter (in)	Type
Logiball	2001 J Series	6-21	round pipe (vcp, acp, concrete, pvc)
	CMP Series	4-144	round pipe collapsible mainline test & seal packers
	Elliptical series	(14 x 23+)	test & seal grouting packers for elliptical concrete pipe
	Box Culvert series	up to 120	custom made packers for box culverts
	Flexible Push/Pull	4-10	flexible packers w/3-5ft grouting span
CUES	Low Void	6-18	round
	Collapsible	24-96	round

Test Seal Lateral Packers

Company	Model	Mainline Pipe Diameter	Lateral Diameter
Logiball	2001L series	6"-30"	4"-6"; 60' long possible
CUES	Logiball	6"-30"	3"-8"

INTERNAL JOINT SEALS

Company	Product	Seal Application Size (in)	Seal Operating Pressures (psi)
Cretex Specialty Products	Internal Manhole Chimney Seal	20-48	
	Internal Pipe Joint Seal	24-48	
	External Manhole Joint Seal	32-120	
	HydraTite Seal	18-218	300 psi internal 150 psi external
LMK Technologies	CIPMH	up to 36	
Miller Pipeline	Weko-Seal	18-216	150 psi external 300 psi internal

MANHOLES

Company	Coatings	Inserts	Liners	Inverts
AP/M Permaform	Yes	Yes	Yes	Yes
No-Dig manhole solutions since 1975 provided through world-wide network of highly trained applicators. PERMAFORM, PERMACAST, CON^{MIC}SHIELD and COR+GARD offer the "hole" solution.				
Containment Solutions	No	No	Yes	No
Non-corrosive fiberglass manhole rehab liners slide into existing manholes to save time and money. Manhole bases with adhesive channels also available.				
Cretex Specialty Products	Yes	Yes	No	No
Leading manufacturer of mechanical internal and external manhole frame-chimney seals, internal joint seals, PRO-RING, external joint wraps, lid plugs, gaskets, inflow dishes and more.				
Danby	No	No	Yes	Yes
HOBAS Pipe USA	No	Yes	Yes	No
Segmental sections are utilized to rehabilitate manhole shafts. The corrosion resistance and high strength composite make liner insertion quick and easy. Manhole T-base systems are available.				
Infrastructure Repair Systems	Yes	No	No	No
Infragard, a durable topcoat and Chim Coat; a flexible mastic, trowel-on 100% solid epoxy rehab material.				
Linabond	No	No	Yes	No
LMK Technologies	No	No	Yes	No
A stretchable, one-size fits most CIPP lining is designed to structurally renew manholes while eliminating inflow at its source. CIPMH can be installed as a chimney seal or full-depth manhole lining.				
Miller Pipeline	No	Yes	No	No
Perma-Liner	No	No	Yes	No
Press-Seal Gasket	No	Yes	Yes	No
Quadex Sewer	Yes	No	No	No
Raven Lining Systems	Yes	No	Yes	No
Raven Lining Systems offers products that are solvent free 100% solids, ultra high-build epoxy coating for new and rehabilitted water/wastewater infrastructures.				
Reliner/Duran	No	No	No	Yes
Sealing Systems	Yes	No	No	No
Sealing Systems manufactures a variety of manhole rehab products: manhole inserts, coatings (external and internal) and chemical grout.				
Sauereisen	Yes	No	No	No
Sauereisen manufactures an array of cements, calcium aluminate, 100% solids epoxies, urethanes and polyurethane grouts for stopping water inflow and preventing corrosion in wastewater manholes.				
SpectraShield Liner Systems	Yes	No	No	No
Systematic layering of polymer resins stops infiltration, prevents corrosion, and has a 10-year warranty.				
Standard Cement Materials	Yes	No	Yes	Yes
Standard Cement Materials manufactures and installs cementitious liners and epoxy coatings in manholes, lift stations and wet wells as a certified MBE.				
Strong Company	Yes	No	No	No
Manhole rehab solution since 1989. The fast, cost-effective solution for stopping infiltration, restoring structural integrity and protecting against corrosion.				
Terre Hill Composites	No	No	Yes	No
Warren Environmental	Yes	No	No	No
Warren Environmental is a blender of specialty non toxic epoxy systems for the lining and rehabilitation of manholes, pipes and other potable and wastewater structures.				

REHABTECHNOLOGY SELECTION GUIDE

CCTV EQUIPMENT

REMOTE INSPECTION SYSTEMS

Company	Model	Pipe Size (in)	Pipe Length (ft)	Video	Camera	Adjustable Focus
CUES	Digital Universal Camera DUC	6-60	2,000	side scan color	mailine	virtual
	MP 2020 Push System	2-12	100-300	color	mini	no
	ProScout	4-24	1,000	color	mini/mainline	yes
	Inspector General	2-200	1,000	color	mini/mainline	yes
	Qube	4-200	1,000	color	mainline	yes
	Evolution Mainline	2-200	4,000	color	mini/mainline	yes
	Workhorse Mainline	2-200	4,000	color	mini/mainline	yes
	LAMP Lateral & Mainline	6-36	1,500	color	mini/mainline	no
	LAMP II Lateral & Mainline Probe II	6 relined-36	1,500	color	mini/mainline	no
	OZ II & Nitelite	6-200	N/A	color	mainline	yes
	Pipe Ranger Transporter	7-60	2,000	N/A	mainline	N/A
	Lite Stick	4-24	N/A	color	pole	no
	Quickzoom	4-48	100	color	pole	yes
	Sonar	8-1,200	2,800	color	mainline	N/A
	Laser Profiler	6-90	N/A	N/A	mainline	yes
	Shorty Transporter	6-36	1,500	N/A	mainline	N/A
	OZIII/Compact Pipe Ranger	5-30	1,500	color	mainline	yes
	OZIII/Ultra Shorty III	5-30	1,500	color	mainline	yes
	OZIII	5-72	N/A	color	mainline	yes
	Ultra Shorty 21 Transporter	6-36	1,500	N/A	mainline	N/A
	WTRIII Wheeled /Track Transporter	6-30	1,500	N/A	mainline	N/A
	K2 Series	6-200	1,200	color	mainline	yes
	Ultra Shorty III Track Transporter	5-30	1,500	N/A	mainline	N/A
	Steerable Mudmaster	24-200	2,000	N/A	mainline	N/A
Envirosight	ROVVER X 95	4"+	+1,650'	color pan/ tilt/zoom	lateral, mainline	yes
	ROVVER X 140	6"+	+1,650'	color pan/ tilt/zoom	mainline	yes
	ROVVER X 400	24"+	+1,650'	color pan/ tilt/zoom	mainline	yes
	ROVVER X Laser	8"+	+1,650'	color pan/ tilt/zoom, side-scan	mainline	yes
	ROVVER X Digisewer	8"+	+1,650'	color side-scan	mainline	yes
	QuickView	6"+	+400'	color zoom	manhole, mainline	yes
	VeriSight Pro	2"+	+330'	color	drain, lateral	yes
	VeriSight Pro 360	4"+	+330'	color pan/ tilt	drain, lateral	yes
	JetScan HD Video Nozzle	6"+	as long as jetter hose	color	mainline	no
R.S. Technical Services	1500 Series	1.50-6	400	color	mini cam	local
	1300 Series	2.25-18	1,000	color	mini/mainline	local
	Omni-Eye III	6-72	2,500	color	mainline	remote/ auto
	NovaSTAR	6-72	2,500	color	mainline	remote/ auto

LATERAL INSPECTION SYSTEMS

Company	Model	Pipe Size	Pipe Length	Air/Electric	Material	Motion
CUES	LAMP	6"-36"	1,500'	electric	all pipes	extend/retract into lateral from mainline
	LAMP II	6" relined-36"	1,500'	electric	all pipes	extend/retract into lateral from mainline
	Note: both units simultaneously inspect mainlines.					
Envirosight	ROVVER X SAT	6"+	500'	electric	all pipes	extends 150' into lateral from mainline; performs pan/ tilt inspection
HammerHead Trenchless Equipment	PortaVision	2"-6"	200'	electric	all pipes	

CUTTERS

Company	Model	Pipe Size	Pipe Length	Air/Electric	Material	Motion
CUES	Kangaroo	6"-15"	1,000'	air/electric	all pipes	in/out-up/ down-rotate
	Giant Kangaroo	10"-30"	1,000'	air/electric	all pipes	in/out-up/ down-rotate
	Schwalm Self Propelled Cutter	6"-12"				
	Schwalm Self Propelled Cutter	8"-24"				
LMK/Schwalm Robotic Systems	Talpa 2060	6"-12"	600'	air/electric		360°
	Talpa 1330	8"-24"				
Pipeline Renewal Technologies	Micro	3'-6"	100'	air	any	clamping, arm rotation, arm bend
	Micro Pro	3"-6"	100'	air	any	self-propelled, clamping, arm rotation, arm bend
	Micro Premium	3"-6"	100'	air	any	self-propelled, clamping, arm rotation, arm bend
	PC200	8"-28"	300;	air	any	self-propelled, arm rotation, arm bend, tool pivot

TRENCHLESS PIPE REPLACEMENT

LATERAL SYSTEMS

Company	Model	Type Drive	Host Pipe Diameter (in)
HammerHead Trenchless Equipment	PortaBurst PB30 Gen2	hydraulic	2-6
	PortaBurst Lightning	hydraulic	2-6
	HydroBurst HB3038	hydraulic	2-6
	HydroBurst HB5058	hydraulic	2-12
	3" HammerHead Mole Pipe Bursting Tool	pneumatic	4
	5 1/8" HammerHead Mole Pipe Bursting Tool	pneumatic	4-6
TT Technologies	Grundotugger	hydraulic	4-6
	Grundoburst 30TX	hydraulic	up to 6
	Grundoburst 50TX	hydraulic	up to 10
	Grundocrack PCG85	pneumatic	4
	Grundocrack PCG95	pneumatic	4-6
	Grundocrack Mini-Atlas	pneumatic	4
	Grundocrack PCG130	pneumatic	4-6

PIPE REAMING

Company	Description
Nowak Pipe Reaming	Replace existing non-metallic pipe with HDPE or restrained joint PVC, non-disruptively, with up to double diameter size increases in any soil condition, rock, and non-reinforced concrete encasement included, using an appropriately sized directional drill.

PNEUMATIC SYSTEMS

Company	Model	Tool Diameter (in)	Tool Length (in)	Host Pipe Diameter (in)	Host Pipe Type
HammerHead Trenchless Equipment	3" SR	3	52	4	ACP, VCP, RCP, concrete, cast iron
	5.125" SR	5.13	66	6	ACP, VCP, RCP, concrete, cast iron
	5.75" SR	5.75	79.5	6	ACP, VCP, RCP, concrete, cast iron
	7" AR	7	81	6-10	ACP, VCP, RCP, concrete, cast iron
	8" AR	8	105	8-12	ACP, VCP, RCP, concrete, cast iron
	12" AR	12	89.2	10-18	ACP, VCP, RCP, concrete, cast iron
	16" AR	16	85.5	12-24	ACP, VCP, RCP, concrete, cast iron
	20" AR	20	108.4	18-26	ACP, VCP, RCP, concrete, cast iron
	24" AR	24	109	20-30+	ACP, VCP, RCP, concrete, cast iron
	8" AI	11.44	32	6-10	ACP, VCP, RCP, concrete, cast iron
	12" AI	14.75	36.8	8-12	ACP, VCP, RCP, concrete, cast iron
	SR - Screw Reverse; AR - Air Reverse; AI - Air Impactor				
TT Technologies	PCF 130	5	53.5	6-7	ACP, VCP, RCP, concrete, cast iron
	PCF 145	5.75	63	7-8	ACP, VCP, RCP, concrete, cast iron
	PCF 180	7	66.5	8-10	ACP, VCP, RCP, concrete, cast iron
	PCF 220	8.5	77	10-12	ACP, VCP, RCP, concrete, cast iron
	Mini-Atlas	5	36	6-7	ACP, VCP, RCP, concrete, cast iron
	Titan	5.75	61	6-7	ACP, VCP, RCP, concrete, cast iron
	PCG 130	5	50.5	6-7	ACP, VCP, RCP, concrete, cast iron
	PCG 145	5.75	60	7-8	ACP, VCP, RCP, concrete, cast iron
	Olympus	7	66.5	6-8	ACP, VCP, RCP, concrete, cast iron
	PCG 180*	7	66	8-12	ACP, VCP, RCP, concrete, cast iron
	Hercules	8.5	75	8-12	ACP, VCP, RCP, concrete, cast iron
	HV 220*	9	79	10-12	ACP, VCP, RCP, concrete, cast iron
	Mini-Gigant	10	49	10-12	ACP, VCP, RCP, concrete, cast iron
	Gigant	10	79	12-16	ACP, VCP, RCP, concrete, cast iron
	PCG 270*	11	84	14-16	ACP, VCP, RCP, concrete, cast iron
	Koloss	14	92	16-24	ACP, VCP, RCP, concrete, cast iron
	Goliath	18	112	22-30	ACP, VCP, RCP, concrete, cast iron
	Taurus	24	144	32-42	ACP, VCP, RCP, concrete, cast iron
	**Reversible*				

PUSH TECHNOLOGY

Company	Model	Pipe Diameter Range (in)	Thrust (tons)	Pit Size (ft)	Host Pipe Types
Tenbusch	B-500	Clay&DI 6-12; Steel 6-18	140	9 x 9	AC, VCP, Cast Iron, DI, RCP, PVC, HDPE, Truss Pipe, Steel
	B-600	Clay&DI 6-15; Steel 6-22	192	9 x 9	AC, VCP, Cast Iron, DI, RCP, PVC, HDPE, Truss Pipe, Steel
	B-700	Clay&DI 6-12 Steel 6-18	140	9 x 14	AC, VCP, Cast Iron, DI, RCP, PVC, HDPE, Truss Pipe, Steel
	T-1000	Long joints of DI to 12" DIA	192	varies	AC, VCP, Cast Iron, DI, RCP, PVC, HDPE, Truss Pipe, Steel
	T-1500	Long joints of DI to 16" DIA	250	varies	AC, VCP, Cast Iron, DI, RCP, PVC, HDPE, Truss Pipe, Steel
	T-2000	Long joints of DI to 24" DIA	375	varies	AC, VCP, Cast Iron, DI, RCP, PVC, HDPE, Truss Pipe, Steel
	MB - 330	Clay&DI 6-10 Steel 6 -15	125	4 x 10	AC, VCP, Cast Iron, DI, RCP, PVC, HDPE, Truss Pipe, Steel
	MB - 340	Clay&DI 6-10 Steel 6 -15	125	4 x 14	AC, VCP, Cast Iron, DI, RCP, PVC, HDPE, Truss Pipe, Steel
	MB - 3040	Clay&DI 6-27 Steel 6 -36	375	9 x 14	AC, VCP, Cast Iron, DI, RCP, PVC, HDPE, Truss Pipe, Steel
	MH - 100	Clay&DI 6-8	62	in manhole	AC, VCP, Cast Iron, DI, RCP, PVC, Pipe, Steel, HDPE, Truss

STATIC SYSTEMS

Company	Model	Type Drive	Thrust (ft/lbs)	Pullback (lbs)	Power Unit	Host Pipe Diameter (in)	Host Pipe Types
HammerHead Trenchless Equipment	PortaBurst PB30 Gen2	hydraulic	N/A	60,000	13 hp/20 hp Power Pack*	2-6	ACP, VCP, RCP, PVC, concrete, cast iron
	PortaBurst Lightning	hydraulic	N/A	60,000	13 hp/20 hp Power Pack*	2-6	ACP, VCP, RCP, PVC, concrete, cast iron
	HydroBurst HB3038	hydraulic	76,000	60,000	20 hp diesel Power Pack	2-6	ACP, VCP, RCP, PVC, concrete, cast iron, ductile iron, steel
	HydroBurst HB5058	hydraulic	100,000	100,000	20 hp diesel Power Pack	2-8	ACP, VCP, RCP, PVC, concrete, cast iron, ductile iron, steel
	HydroBurst HB100	hydraulic	20,000	196,000	70 hp diesel Power Pack	3-16	ACP, VCP, RCP, PVC, concrete, cast iron, ductile iron, steel
	HydroBurst HB125	hydraulic	40,000	250,000	70 hp diesel Power Pack	6-20	ACP, VCP, RCP, PVC, concrete, cast iron, ductile iron, steel
	HydroBurst HB175	hydraulic	25,000	346,000	70 hp diesel Power Pack	8-24	ACP, VCP, RCP, PVC, concrete, cast iron, ductile iron, steel
	**gas/diesel*						
TT Technologies/ Grundoburst	400S (manhole)	hydraulic	80,000	90,000		4-8	
	400G	hydraulic	80,000	90,000	pack	4-8	iron
	800G	hydraulic	100,000	173,000	pack	6-12	iron
	1000G	hydraulic	155,000	225,000	pack	6-20	iron
	1250G	hydraulic	250,000	225,000	pack	6-20	iron
	2500G	hydraulic	396,000	570,000	pack	24-48	iron
	30TX	hydraulic	60,000	60,000	pack	4-6	iron
	50TX	hydraulic	100,000	100,000	pack	4-8	iron

WINCH SYSTEMS

Company	Model	Pull Force (tons)	Winch Line Diameter (in)	Line Length (ft)
HammerHead Trenchless Equip.	HydroGuide HG2.5	2.75	0.500	3,200*
	HydroGuide HG5	5.51	0.500	3,200*
	HydroGuide HG12 (hydraulic boom)	12	0.625	2,000*
	HydroGuide HG12 (hydraulic boom w/track pkg.)	12	0.625	2,000*
	HydroGuide HG12 (hydraulic boom w/track & stabilizer pkg.)	12	0.625	2,000*
	HydroGuide HG20	20	0.875	2,000*
	**Usable length*			
TT Tech./ Grundowinch	RW 1500	1.5	5/16	600
	RW 4002	4	7/16	650
	RW 5000	4	1/2	2,100
	RW 10*	10	5/8	2,300
	RW 10X	10	5/8	2,300
	RW 20	20	7/8	2,300
	RW 206	30	7/8	2,300
	RW 40	40	1 1/4	2,600

SPOT/POINT REPAIRS

Masterliner

Improve flow characteristics of deteriorated pipe using Masterliner's Sectional Pipe Renewal System for a strong leak proof system in a matter of hours. Once the area is identified and the area is cleaned, Structural Spot Repair is pulled into place through an existing manhole. The repair process now begins. Curing is accomplished by inflating with air, steam or water. Within minutes, the customized resin crosslinks to form a hard impermeable pipe. The Structural Spot Repair is fully cured and the system is now flowing smoothly. The pipe is tightly sealed with the Masterliner system, eliminating the need for any future repair. 888.344.3733, www.masterliner.com

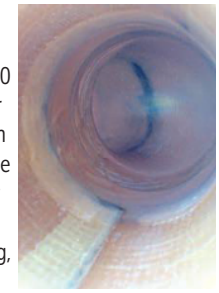
Perma-Liner Industries

The Perma-Liner Sectional Lining System is designed for 6- to 60-inch diameter pipelines. The materials are pulled into place through existing manholes and are ambient cured in three hours or heat cured in as little as 1 ½ hours. Installations average 1-5 installations per day. The Perma-Liner Sectional Point Repairs can be installed to repair 2- to 10-foot areas on average, but can accommodate lengths up to 30 feet. The Sectional Point Repair materials are sold in kit form to eliminate waste, measuring and bulk storage. Installation equipment is compact and user friendly. 866.336.2568, www.perma-liner.com

LMK Technologies

LMK's Performance Liner Sectional System meets the design calculations found in ASTM F1216 Appendix XI and the standard practice of ASTM F2599-11. It is a one-step, air-inversion spot repair process that prevents resin contamination and loss. This system renews mainlines from six to 42 inches in diameter and from three to 100 feet in length. When installed with Insignia O-Rings, the sectional spot repairs offer a watertight and structural repair. 815.433.1275, www.lmktechnologies.com

Infrastructure Repair Systems



The new IRSI trenchless 90 degree Elbow Spot Repair seals joints, cracks or even missing pieces of pipe. The center portion of the new liner is a flexible material with fiberglass for a strong, smooth, unobstructed curve – even in the "90". Liner ends are fiberglass and felt with IRSI patented Velcro straps and closure. No shrink epoxy resin system cures in two hours. Push/Pull Elbow Carrier. Available in 3-inch to 6-inch by 2-, 3- and 4-foot lengths. 877.327.4216, www.irsi.net

Logiball

Logiball has been supplying the trenchless point repair market with reliable bladders for over 25 years. Bladders are custom built for your needs and are available for 3- to 36-inch pipes in different lengths. Whether you are working in mainlines or laterals, Logiball has affordable and reliable bladders you can count on. 800.246.5988, www.logiball.com

INTERNAL JOINT SEALS

Miller Pipeline

The WEKO-SEAL internal joint seal technology is used extensively for internally resolving joint leakage, punctures and crack repairs in pipelines ranging in diameter from 18 inches and larger. This man-entry repair system uses a flexible rubber leak clamp that ensures a non-corrodible, bottle-tight seal around the full inside circumference at every installed location, while offering significant savings over conventional external repair methods using individual excavations. Miller's experienced confined space technicians use time proven techniques to provide permanent, flexible, leak-proof repairs complete all installations. 800.428.3742, www.millerpipeline.com

Cretex Specialty Products

Cretex Specialty Products offers HydraTite Internal Joint Seals for your sanitary sewer or storm water systems. HydraTite is a mechanical, trenchless remediation system for the repair of pipe joints consisting of a proprietary rubber seal and stainless steel retaining bands. The HydraTite System is a recognized method of joint repair by AWWA manual M28, and has been widely accepted and approved by engineers, municipalities and DOTs. 800.345.3764, www.cretexseals.com

Aegion Wins $8 Million Contract

Aegion Corp. has been awarded an $8 million contract from the city of Montgomery, AL, for its Infrastructure Solutions platform. This project is the second and final phase of a wastewater pipeline rehabilitation project in the Econchate Basin.
800-325-1159, www.aegion.com/

SAK Construction Begins Multiple Baltimore/D.C. Projects

SAK Construction (SAK), a national pipeline rehabilitation and tunneling services contractor, is beginning work on $21.7 million of contracts won throughout the Baltimore, MD, and Washington DC regions. SAK is repairing the sewer and pipeline infrastructure in these metropolitan areas by utilizing state-of-the-art trenchless technologies, including CIPP (cured-in-place pipe) pipeline rehabilitation.

SAK was awarded the following projects as low bidder:

District of Columbia Water and Sewer Authority

- G100: Local Sewer Rehabilitation 1 - a $5.25 million contract for the rehabilitation of approximately 140 manholes and the replacement of existing sewer mains throughout the District of Columbia. Using CIPP, SAK will rehabilitate 15,000 linear feet of sanitary sewer pipeline, with diameters ranging from 12 inches to 24 inches. The project is underway and will conclude in 2017.
- Rehabilitation of Sewers Under Buildings Phase 2 - a $3.6 million contract for the structural repair of sanitary sewer, and combined sewer and storm water pipes under buildings at 19 sites throughout the District of Columbia. SAK will use CIPP, shotcrete and other methods to repair pipes ranging from 10-inch diameter to 108-inch height.

Baltimore County

- Herring Run Basin 31 - a $2.04 million contract for the rehabilitation of sewer lines in the Ridgeleigh Community, also known as The Oaks, situated near Loch Raven Boulevard and Joppa Road. The project includes 23,251 linear feet of CIPP pipe rehabilitation and 1,109 vertical feet of manhole rehabilitation. Completion is expected in December 2016.
- Stemmers Run Sewershed Rehabilitation - a $1.52 million contract for the rehabilitation of 23,665 linear feet of sewer pipeline and 882 vertical feet of manhole rehabilitation on the north east side of Baltimore City. SAK will use CIPP as the solution with completion expected in September 2016.
- Jones Falls Basin BC09 Sewer Rehabilitation - a $2.74 million project located on the north side of Baltimore City for the rehabilitation of sewer lines between I-83 North, I-695, Timonium Road and York Road. A train system bisects the work area. SAK will use CIPP to line 34,868 linear feet of sewer lines and will rehab 1,588 vertical feet of manholes. Jones Falls BC09 is to be completed by February 2017.

City of Baltimore Bureau of Water and Wastewater

- SC 937 Chesterfield Ave, Herring Run Sewershed - a $6.59 million contract to rehabilitate a segment of the sewer system in Baltimore City. SAK will use CIPP to line 11,861 linear feet of sewer line and install 249 vertical feet of new manholes, 1,191 linear feet of new 8-inch PVC pipe, and 1,409 linear feet of new 16-inch ductile iron pipe. Work is to be completed by June 2018.

These projects reflect strong national demand for pipeline rehabilitation resulting from America's aging infrastructure. Collapsing, malfunctioning or inadequate water mains, sanitary sewers and storm sewers produce a variety of serious problems and threaten the water supply.
636-385-1000, www.sakcon.com.

ASTM Committee Renews ASTM F2561

In April, the ASTM International committee F17, Plastic Piping Systems and subcommittee F17.67, Trenchless Plastic Pipeline Technology, voted to renew the ASTM F2561 standard of practice an additional five years. ASTM F2561 was first published in 2006, first renewed in 2011 and now again in 2016.

ASTM F2561-16 is the standard practice for rehabilitation of a sewer service lateral and its connection to the main using a one piece main and lateral cured-in-place liner. The practice covers the requirements and test methods for the reconstruction without excavation. The lateral pipe is accessed remotely from the main pipe and from a lateral cleanout, if available. A resin impregnated one-piece main and lateral CIPP lining is installed by the use of air and inversion. The CIPP liner is pressed against the host pipe by pressurizing a bladder and is held in place until the thermoset resin has cured. The result is a verifiable non-leaking structural continuous, one piece, tight fitting, corrosion resistant connection lining and seal that extends over an 18-inch section of the mainline and into the lateral for a predetermined length.

LMK Technologies is one of two industry companies that provide a lining system that fully meets the ASTM F2561 standard of practice. The patented, T-Liner Main-to-Lateral Connection System, has been installed in over 50,000 service laterals by a growing network of independent distributor-contractors based throughout the United States, Canada and Europe.

T-Liner incorporates the use of Insignia hydrophilic swelling gasket seals at the connection and the lateral termination. When exposed to water, the gaskets swell in 36 to 48 hours providing a verifiably sealed system, preventing water from re-entering the collection system.

"To have a prestigious body of industry experts continue to renew the ASTM F2561 standard since 2006 indicates that the T-Liner lining system provides the highest degree of quality and long term results," according to LMK Vice-President of Sales, Rick Gage. "We continue to educate the marketplace about the need to utilize ASTM standards when developing any construction or rehabilitation project. Using an ASTM standard ensures that the rate payers and owners are getting full value for their money."
815-640-9302, www.lmktechnologies.com,

RapidView Announces New Dealers

RapidView IBAK North America is excited to announce two new dealers. Sewer Equipment of Illinois is now the exclusive dealer for RapidView IBAK pipeline inspection and rehabilitation equipment in Northern Illinois and the state of Wisconsin. Additionally, Sewer Equipment of Kansas will be the exclusive dealer in the state of Kansas.

"These two new dealers share our values, our commitment to quality and respect for our customers. We look forward to a long relationship, and are excited to add two more quality distributors to our growing network of partners throughout North America," said Matthew Sutton, vice president of sales and marketing.
800-656-4225, www.rapidview.com

Sprayroq Announces 2015 Project Of The Year Winners

The results are in from the annual Project of the Year competition among the Certified Partner (SCP) applicators of Sprayroq Protective Lining Systems. The 2015 awards were presented at the Annual SCP (Sprayroq Certified Partners) Banquet on March 18, at Muriel's Restaurant in New Orleans.

Three contractors came away with a Project of the Year designation, in recognition of their innovative approach and excellence in execution on the following projects:

- Empipe Solutions Ltd. of Hannon in Ontario, Canada, for rehabilitation of the Hunter Street Bridge in the City of Peterborough, Ontario
- ABEL RECON of Mountville, PA, for rehabilitation of the Panorama Hills Pump Station in Windsor Township, PA
- Engineered Spray Solutions LLC for rehabilitation of the Elm Drive Lift Station in the City of Casselberry, FL UC

Felling Trailers Helps Honor Breast Cancer Battle

A South Dakota family had a chance encounter with a pink Felling FT-3 trailer a few years after they lost their own daughter to breast cancer. Intrigued, Gerald and Darlene Dinger took down the number for Felling Trailers with the intention of purchasing their own pink trailer in memory of their daughter – Cheryl Stiegelmeier – and for use in their fundraising efforts through Relay for Life, an overnight community fundraising walk benefitting breast cancer research.

When the Dingers made the call to Felling Trailers, a sales consultant was able to get the ball rolling on a customized breast cancer trailer through Albers Sales, an authorized dealer of Felling Trailers in North Dakota. The pink Felling FT-3 features a decal of Stiegelmeier, and since its inception as a part of the family's Relay for Life campsite, the Dingers have been asked to showcase the trailer at a number of community events including a car show.

Felling Trailers is a family owned and operated full-line trailer manufacturer based in Minnesota. Founded in 1974, the company has grown into a factory and office complex from which more than 4,000 trailers are manufactured each year. The company prides itself on its customized trailer division, where industry-leading design techniques are used by experienced metal craftsman to turn Felling customers' conceptual trailer needs into tangible products. 800-245-2809, www.felling.com.

Toro Announces New Dealer In Florida

Toro recently announced a new partnership with Florida-based Southern Drill Supply, which will now offer a full line of Toro underground equipment, including directional drills, trenchers, vibratory plows, compact utility loaders and attachments, compactors, rammers and trench rollers.

Southern Drill Supply was founded in 2009 in Pensacola, FL, and primarily serves the utility construction market in Florida, Louisiana, Georgia, Alabama and Mississippi.

"The partnership with Toro was a natural one – our customers wanted Toro equipment. We were familiar with the products and knew they would be a great addition to what we currently offer," explained Josh Varner, owner of Southern Drill Supply. "We had been keeping our eye on Toro and when the opportunity came to partner with them, we took it. To put it simply, it was a good fit."

Southern Drill Supply strives to provide dependable service and products to a vast array of customers. This new partnership will allow Southern Drill Supply to offer customers high-quality underground and utility equipment solutions across the region. www.southerndrillsupply.com, www.toro.com.

New LAN Office In Oakland

Planning, engineering and program management firm Lockwood, Andrews & Newnam Inc. (LAN) opened its new office in Oakland, CA. Led by David Wemmer, P.E., the location offers water and transportation services to LAN's clients in and around the region.

"Oakland is growing rapidly and is investing heavily in its infrastructure to deal with this growth," said Wemmer, who recently joined the firm as its California rail and transit director. "This office will allow us to service the needs of our clients from their backyard, become more entrenched in the area, and better support the community."

With this addition, Houston-based LAN now has 20 offices around the country, including five in California. (713) 266-6900, www.lan-inc.com.

Alex Rabinovitxh Joins Newpark

Newpark Mats and Integrated Services (NMIS) appointed Alex Rabinovitch as North American Business Development Manager, Utilities and Renewables. In his new role, Rabinovitch works closely with electric utilities, contractors and design/EPC firms to enable deployment of transmission worksite solutions. These include equipotential zone grounding systems, right-of-way access roads, and staging areas to support vegetation clearing, structure foundation construction, line stringing, maintenance and emergency/storm response initiatives.

Prior to joining NMIS, Rabinovitch was responsible for regional and multi-regional sales for manufacturers of overhead and underground power cable products for transmission and distribution applications. He holds a B.S.E. in chemical engineering from Case Western Reserve University. (281) 362-6800, www.newpark.com.

INTREN Earns UCA Contractor of the Year Award

Underground Contractors Association (UCA) of Illinois announced INTREN as the 2016 "Contractor of the Year," in recognition of the company's 25 years as an innovative solution partner, dedicated to building and maintaining energy infrastructure, and culture of stewardship to

UCA, the industry and communities it serves.

UCA is a not-for-profit trade association of contractors and suppliers in the sewer, water, utility and underground industry throughout Illinois. The organization is active in market development, information, education, labor and the promotion of safety. (815) 923-2300, www.intren.com.

LMK Technologies Executive Named To MSTT Board of Directors

Rick Gage, vice president of sales at LMK Technologies, has been named to the board of directors for the Midwest Society for Trenchless Technology (MSTT). The non-profit organization was established in 1998, as a regional chapter of the North American Society for Trenchless Technology, to promote trenchless technology education and its public benefits in Illinois, Indiana, Iowa, Kentucky, Michigan, Minnesota, Missouri, Ohio and Wisconsin.

Over the past 10 years at LMK, Gage has actively worked to educate municipal personnel and specifying engineers about trenchless rehabilitation methods. Throughout this time, he has also served as the direct liaison between LMK and the many government entities, contractors and vendors based in North America, Europe, South America and Asia. (815) 640-9302, www.lmktechnologies.com.

Case Makes Tutela Products Available To Dealer Network

Case Construction Equipment's Tutela Powershift HD all-makes powershift transmission fluid is now available through its dealer network to allow CASE dealers to better service mixed fleet customers.

Tutela Powershift HD is engineered to deliver balanced friction performance to heavy-duty powershift transmissions, clutches and wet-brakes, while protecting axles, final drives and other drivetrain components of today's construction and mining equipment. (866) 542-2736, www.casece.com.

Lowman Named President Of Sharewell Drilling Products

Shawn Lowman has joined Sharewell HDD Services as president of Sharewell Drilling Products LLC. In his new role, Lowman will lead the company's sales, marketing, development and operations of new and existing products.

Lowman has spent the past 25 years in sales, marketing and operations, and the last 10 years focusing on the oil, gas and pipeline industry. In preparation for his new role, Lowman has spent the last three years honing his industry knowledge and gathering valuable contractor experience. However, Lowman said his true passion has always been the manufacturing side of the underground infrastructure industry, prompting his return to that sector of the market.

Sharewell is a leading supplier of downhole drilling tools, guidance systems and services for the horizontal directional drilling industry. Partnering with contractors involved in pipeline, telecommunications and utility projects, Sharewell offers complete solutions for any size HDD project.

Founded in 1984, Sharewell was the first service company in the world dedicated solely to servicing the HDD pipeline and utility industry. Since then, the company has earned customers' trust by consistently delivering reliability, innovation and performance, and by seeking out strategic partnerships to provide the highest quality products and services in the industry. 281-288-2560, www.sharewellhdd.com.

Jeff Wiese Joins TRC

Jeff Wiese joined TRC Companies as vice president and national practice leader for Pipeline Integrity Services. In this role, he will lead the management and delivery of geographic information systems and integrity solutions that help clients develop, operate and maintain critical energy infrastructure safely and reliably.

Prior to joining TRC, Wiese built a 17-year career with the U.S. Department of Transportation's Pipeline and Hazardous Materials Safety Administration (PHMSA), managing a range of programs and collaborating with federal agencies and committees, pipeline companies and trade organizations, state government representatives, public and private sector emergency responders, and public safety and environmental advocates. Wiese is an active member of the Common Ground Alliance, and the External Advisors Group for the Center for Offshore Safety. (978) 970-5600, www.trcsolutions.com.

CH2M Selected As Design-Build Partner

The city of Houston and city of San Jose, CA, each selected CH2M as design-build partner for two major water projects: the $1.2 billion Northeast Water Purification Plant Expansion (NEWPP) and $85 million Cogeneration Facility, respectively.

NEWPP, the largest Progressive Design-Build project of its kind in the nation, includes expanding Houston's existing NEWPP from 80 mgd to 320 mgd through two construction phases, while ensuring high water quality and production rates to meet regional surface water conversion mandates.

The Cogeneration Facility project will provide reliable on-site power and heat, replacing aging equipment at the San José Santa Clara Regional Wastewater Facility that has been subject to increasingly frequent and severe breakdowns. (720) 286-2000, www.ch2m.com.

Parent Holding Company Established For Henkels & McCoy, Others

Henkels & McCoy Chairman, President and CEO T. Roderick Henkels announced the formation of Henkels & McCoy Group, as the new parent holding company of Henkels & McCoy, as well as recently formed HMI Services and H&M Shared Services.

The intent of the holding company formation is to enable future growth while better serving the company's utility infrastructure customers nationwide. HMI Services, through its subsidiary companies HMI Technical Solutions and HMI Communications, will provide solutions for customers in new and expanding geographic markets throughout the United States.

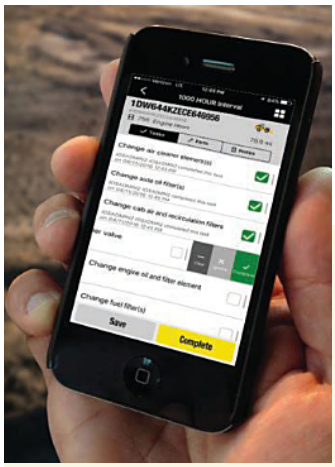
Henkels & McCoy Group is a leading utility construction firm providing critical infrastructure to the power, oil and gas pipeline, gas distribution and communications markets throughout North America. 215-283-7469, www.henkels.com.

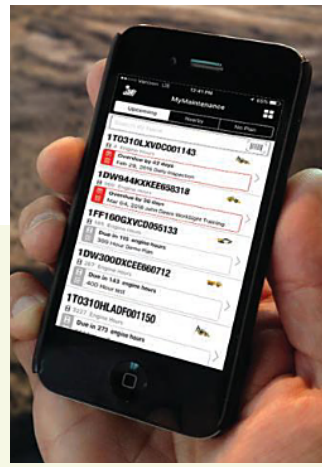
GTI Celebrates 75th Anniversary

The Gas Technology Institute (GTI) celebrates 75 years as a leading research, development and training organization addressing global energy and environmental challenges by developing technology-based solutions for consumers, industry and government.

GTI has provided high-impact technologies and technical insight on critical challenges along the entire gas value chain, and improved ways of producing, transporting, and using energy resources – making them economically and environmentally sustainable, while reducing costs for consumers.

"As we reflect on the past, we are proud of our significant achievements and legacy of natural gas industry leadership," said David Carroll, president and CEO. "Going forward, we will continue our efforts to create a versatile portfolio of energy options, providing a solid foundation for both a healthy economy and a clean planet." (847) 768-0683, www.gastechnology.org. UC





MyMaintenance Joins John Deere's Mobile App Fleet

The MyMaintenance mobile application from John Deere brings fresh innovation to construction maintenance managers working in preventive maintenance and repairs. The app is the newest in John Deere's growing mobile application line, enabling users to view and document maintenance intervals by calendar date or machine engine hours directly from the jobsite or in the workshop.

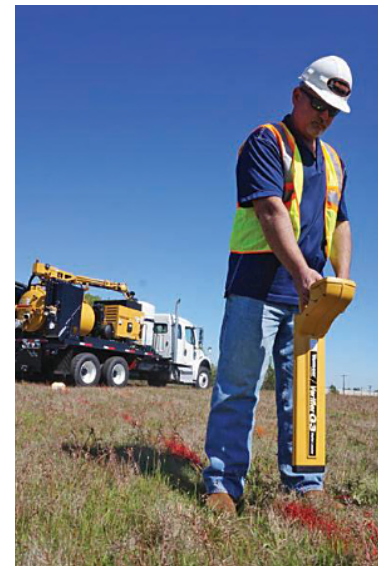
Paul Garcia, product manager for John Deere WorkSight, said the application delivers a plethora of information to users' fingertips, including the ability to view equipment on a map, monitor nearby machines, scan the barcode of a machine to examine maintenance plans, access a parts list for maintenance and track maintenance costs – all of which illustrate the immense value of the app.

"Repairs can also be documented even for machines not enrolled in a maintenance plan, and documenting a machine's maintenance history can help drive higher residual value," Garcia said.

The MyMaintenance mobile application operates exclusively for John Deere equipment loaded with an active JDLink telematics subscription. It is available for download on iPhone from the App Store, and on Android devices from the Google Play Store. 919-747-8680, www.johndeere.com.

SlatTrax

SlatTrax ground protection for skid loaders increases work-crew productivity and provides a professional alternative to plywood and mats. The system includes a hydraulically powered attachment that holds dual spools of Trax, each 36" or 42" wide and up to 100' in length, and rolls out or retrieves each spool in about 2 minutes. SlatTrax works on hills, curves, turf and hard cover. Break-point sections in Trax allow for manual maneuvering. (877) 781-7767, www.slattrax.com.



McLaughlin Verifier G3 Brings Speed, Ease To Utility Locating

McLaughlin is introducing a new utility locator, the Verifier G3, that combines trusted precision with a simple, user-friendly interface. Contractors face congested underground conditions, unmarked utilities and increasingly strict regulations, making accurate, timely locating more important than ever.

With the Verifier G3, users can expect the same core qualities that defined the Verifier G2 product line including a durable design with antennas mounted in rubber isolators to standup to the toughest jobsite conditions, and the exclusive McLaughlin three-year warranty and weather-proof guarantee.

In addition to the separate peak and null locating screens found on the previous Verifier models, the G3 features a new combination screen. This eliminates the need for users to toggle between two screens and enables them to capitalize on the benefits of both functions – the accuracy of peak mode and the user-friendly null mode.

McLaughlin strives to provide the most accurate locating tools in the industry, which is why it maintained the semiautomatic gain adjustment feature. Gain adjustment refers to the receiver's sensitivity to the magnetic field emitted by a utility line.

"The benefit of the semiautomatic gain is that it's a very precise method of locating – especially in congested areas – and the technology is exclusive to McLaughlin," said Matt Manning, product manager of electronics at McLaughlin. "Because manual gain is a more commonly used method of locating, some contractors are hesitant to try the semiautomatic gain feature."

The G3 has dual functionality, which means contractors can engage the semiautomatic gain on congested, urban jobsites where signal distortion is a common challenge, and the manual gain method when working in less congested areas.

Automatic depth, current measurement index

Another feature that adds to the user-friendly nature of the G3 is the addition of an automatic depth and current measurement index. When the user is over a utility line, instead of having to manually press a button, the estimated depth and current measurement index will now be automatically displayed.

The G3 includes a new compass icon. The icon provides a straightforward visual representation of a utility's position in reference to the receiver. The compass icon simplifies the locating process by automatically calculating peak signal and quickly informing the user the direction of the utility path, making it easier to locate the entire line.

The G3 features focus on ease-of-use and upholds the standard of precision and accuracy for which McLaughlin tools are known. Users new to the locating profession will appreciate the streamlined design and simple interface; advanced operators have the option to capitalize on some of the industry's most advanced locating technology – all in one device.

The Vermeer Verifier G3 by McLaughlin is available now in all markets. McLaughlin, (800) 435-9340, www.mclaughlinunderground.com.

McElroy Fintube Machine Leaves Lasting Impression, Makes Russian Debut

McElroy's Extruded fintube machine recently outdid prior performances, demonstrating its ability to offer significant savings to fintube manufacturers due to its capacity to produce quality fintubes using less raw material than before.

The cost efficiency offering from the company's Extruded fintube machine was a major player in the long list of reasons Borkhimmash, a leading supplier of industrial equipment in Russia and Eastern Europe, chose to add a Model B Extruded Machine to its equipment lineup for the production of heat exchanger equipment used throughout the gas, oil and petrochemical industries. It is the first McElroy machine of its kind in Russia.

Prior to Borkhimmash's selection of the Model B Extruded Machine, the company requested testing using aluminum material sourced from Russia with a 0.17-inch wall thickness. While McElroy's disc technology makes it possible to use thinner material while still producing a quality product, the machine had yet to be tested running material thinner than 0.18 inches. When put to the test at McElroy's Tulsa, OK, headquarters, the results did not disappoint.

"It was enlightening to see our machines so easily stretch the limits of what even we thought they could do," said Carlos Alfonzo, global sales manager for McElroy.

With the use of the Model B Extruded Machine, Borkhimmash will increase its fintube product line and customer base. In addition, fintube lengths will be extended from 39.37 feet to up to 59.06 feet.

In May, McElroy continued with its strong involvement in the process, sending technical service representatives to Borkhimmash's plant in Borisoglebsk, Russia, to install and commission the 111-foot extruded machine, as well as providing operator and machine maintenance training to the company's employees. 918-836-8611, www.mcelroy.com.

Hunting Releases HX-1TRN Quick Connect

As part of its continuing commitment to cutting-edge downhole solutions for the horizontal directional drilling (HDD) industry, Hunting's Trenchless Division introduces the revolutionary HX-1TRN quick connect. This product requires just a single, 360-degree rotation to fully connect or disconnect transition subs, starter rods, pulling adapters, backreamers and other downhole tools for both Vermeer and Ditch Witch HDD rigs in the 40,000-pound class and below.

Greg Adkins, Hunting's product design manager, said the secret to the HX-1TRN is its patent-pending Quad-Lead design. "We designed the thread pattern with a lead every 90 degrees, so you have four places to start threading, as opposed to one place with current technology," he said. "Other quick connect products take up to seven rotations to fully connect the tools. The HX-1TRN just takes one."

The HX-1TRN provides the customer with exponential time savings and a safer work environment on every job. "In the world of downhole tooling, there are very few things you can call revolutionary. But the HX-1TRN truly is," said Klane Kirby, general manager for Hunting's Trenchless Division. "We designed it to be compatible with threads on every downhole tool you have in the box. We can't wait for our customers to try it out."

Hunting's Trenchless Division, a subsidiary of Hunting PLC, specializes in the design, manufacture and testing of drill pipe and pipe accessories for use in HDD applications. With strong roots in the oil and gas industry, Hunting's Trenchless Division manufactures its drill pipe to the same stringent standards required in oilfield applications. This includes a precision manufacturing processes and quality assurance programs, resulting in a more durable, longer-lasting end product than any other drill pipe manufacturer in the HDD industry. 337-367-9296, www.huntingplc.com/trenchless.

Bit Brokers International

Bit Brokers International's patent-pending VersaReam, is a bi-directional, expandable/interchangeable blade PDC reamer. With versatility that allows drillers to change the size of their reamer by simply changing blades, VersaReam drills three to five times faster than the traditional roller cone reamers in the right formations. (618) 435-5811, www.bitbrokers.com.

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1. Please select your job title/ job function select only one):

- ☐ **30** Owner
- ☐ **31** President, Director
- ☐ **32** Vice President
- ☐ **33** General Manager
- ☐ **34** Manager
- ☐ **35** Superintendent
- ☐ **36** Supervisor
- ☐ **37** Engineer
- ☐ **38** Public Works Director, Manager
- ☐ **39** Purchasing Personnel
- ☐ **40** Office Manager
- ☐ **41** Foreman & Assistant
- ☐ **99** Other Please specify)

_____

2. Please check the category which best describes your company's activity.

- ☐ **10** Utility Contractor water & sewer)
- ☐ **11** Pipeline Contractor oil & gas)
- ☐ **12** Cable Contractor
- ☐ **13** Gas Distribution Contractor
- ☐ **14** Sub-Contractor
- ☐ **15** Gas Utility Company, Pipeline Transmission Co.
- ☐ **16** Municipality, Public Works water, sewer, etc.)
- ☐ **17** Telecom, Cable Company
- ☐ **18** Electric, Combined Gas/Electric Company
- ☐ **19** Design, Construction including Engineering & Consulting
- ☐ **20** Equipment Manufacturer, Service, Supplier
- ☐ **21** Financial, Legal, Insurance
- ☐ **22** Government, Regulatory, Research, Educational Institute, Industry Association
- ☐ **99** Other Please Specify)_____

3. What is your company's annual construction volume?

- ☐ **A** Over $50 Mil.
- ☐ **B** $25,000,001 to $50 Mil.
- ☐ **C** $10,000,001 to $25 Mil.
- ☐ **D** $3,000,001 to $10 Mil.
- ☐ **E** $1,000,001 to $3 Mil.
- ☐ **F** Under $1 Mil.
- ☐ **Z** None of the above

4. My company is involved in trenchless construction methods

☐ **A** Yes ☐ **B** No

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2016 Calendar of Events

July 17-20
ASCE Pipelines 2016
Sheraton Kansas City Hotel
Kansas City, MO
P: 703-295-6154
E: sscully@asce.org
W: www.pipelinesconference.org

July 20-23
PCCA
Mid-Year Meeting
Kalahari Resort & Convention Center
Sandusky, OH
P: 800-542-7222
W: www.pccaweb.org

July 27-31
Distribution Contractors Association
Mid-Year Meeting
Alyeska Resort
Girdwood, AK
W: www.dcaweb.org

Aug. 15-19
Trenchless Technology Center Utility
Investigations School
Louisiana Tech University
Ruston, LA
W: ttcspecialtyschools.com/uis
Contact: Jadranka Simicevic,
318-257-2744, jadranka@latech.edu

Sept. 12-16
International Pipe Line & Offshore
Contractors Association
50th Annual Convention
Hyatt Regency Paris Etoile
Paris, France
W: www.iploca.com

Sept. 24-28
Water Environmental Association
(WEFTEC)
89th Annual Technical Exhibition &
Conference
New Orleans Morial Convention Center
New Orleans, LA
P: 703-684-2456
W: www.weftec.org

Oct. 3 - 7
Trenchless Technology Center
Auger Boring School
Louisiana Tech University
Ruston, LA
W:ttcspecialtyschools.com/abs
Contact: Jadranka Simicevic,
318-257-2744, jadranka@latech.edu

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