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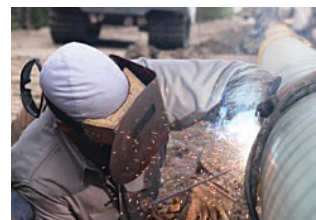
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## ON THE COVER

A large diameter cured-in-place pipe installation in the southeastern U.S. (Photo by Sandy Buller, Buller Productions, www.bullerproductions.com)

# EDITOR'S LOG



By Robert Carpenter, Editor-in-Chief

## The Trump Bounce Effect

Before the November presidential and congressional elections, remember how all the so-called financial experts and talking heads kept telling America that if, by some fluke, Donald Trump was elected president, the stock market would plummet, the economy would slow and markets would stagnate due to the undefined nature of his policies and direction?

Further, many economists predicted that commerce in general would suffer as the unpredictable and somewhat radical position statements made by Trump – including relationships with foreign trading partners – would isolate America. Businesses would most likely hasten their departure to foreign lands for manufacturing, the so-called experts believed.

I freely admit that it is way too soon to see if Trump's plans succeed in the long term. His concepts represent a certain amount of risk and an unknown quantity of reward. Will the new president and Republican Congress be able to work in a cooperative, productive manner? Just how effective will the Democrats' minority be in their efforts to hang onto their traditional liberal legacy? It's a lot to be determined amidst much uncertainty.

But there's also a lot to be said for hope that accompanies fresh direction, new ideas and positions reflective of Americans outside of traditional, glamour centers like California, New York City and Chicago.

Interestingly, Wall Street and the financial markets adjusted quickly. Indeed, following Trump's election, the stock market experienced a very brief decline (the blink-and-you'll-miss-it type of decline) and then strongly rallied to bring the markets up to record levels. While the rapid boom slowed, the markets, at the time this column is going to press, have displayed stability as if they, too, are waiting to see what the future will behold. There has not been a mass exodus to move manufacturing to other countries. In fact, famously Carrier decided to hold onto 1,000 U.S. jobs and other major

Call it hope if you will, but the business climate for underground infrastructure seemed to flip on a dime post-election, and promise for a good 2017 is suddenly more prevalent.

corporations are actively re-evaluating their justifications for leaving the country.

Ironically, these so-called experts that predicted a Trump win would mean disaster for the stock market have quickly moved on and are grasping at a new theory: that a newly elected president typically receives a positive "bounce" from both markets and the public. In trying to trivialize the significance of Trump's election, they theorize that the Trump bounce is lower than the norm so that probably bodes poorly for the country.

I don't buy that, but in all fairness, we are in new territory here with President Trump representing a very different approach to government. But there is no denying that there has been a very positive business bounce for underground infrastructure markets and others.

I've spoken with many manufacturers and contractors since November and they all have reported a striking increase in business just since the election. Business activity for markets such as sewer, water and HDD suffered through a somewhat dismal 2016 until the election. Call it hope if you will, but the business climate for underground infrastructure seemed to flip on a dime post-election, and promise for a good 2017 is

suddenly more prevalent.

In this issue, we publish our 20th Annual Municipal Sewer & Water Survey (page 12) in which municipal officials are queried regarding a variety of issues. Foremost among the results are spending projections. Not surprising, the Trump bounce was apparent with municipalities as well. After seeing their spending drop substantially in 2016 – despite assurances from then President Obama that all was well – cities, like much of the country, disagreed and were reluctant to invest despite overwhelming needs. Now, most of the muni survey respondents anticipate that their budgets will rebound somewhat in 2017, roughly 5.2 percent overall.

If Trump and Speaker of the House Paul Ryan's grand \$1 trillion infrastructure plans are developed, it will still take time to see positive results trickle down to actual implementation. But even slow growth with a genuine promise of steady, future benefits would be a welcome tonic to the long-suffering sewer/water industries.

But we, as an industry, can't afford to sit back and assume that we'll get our fair share of funding. As always, roads, bridges, air and rail industries are posturing to capture the lion's share of whatever funding benefits materialize. Industry organizations will be tasked with bringing the spotlight upon the plight of decaying or inadequate sewer, stormwater and water infrastructure. It will be their responsibility to rally together and present a compelling case for the absolute need to invest heavily in the forgotten underground utility infrastructure.

It typically takes up to two years for a new president's policies to have any kind of significant impact. But if we see progress in 2017, we could be in for exciting years ahead. Let's hope the Trump bounce continues.





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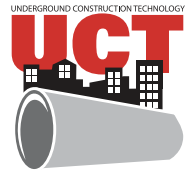
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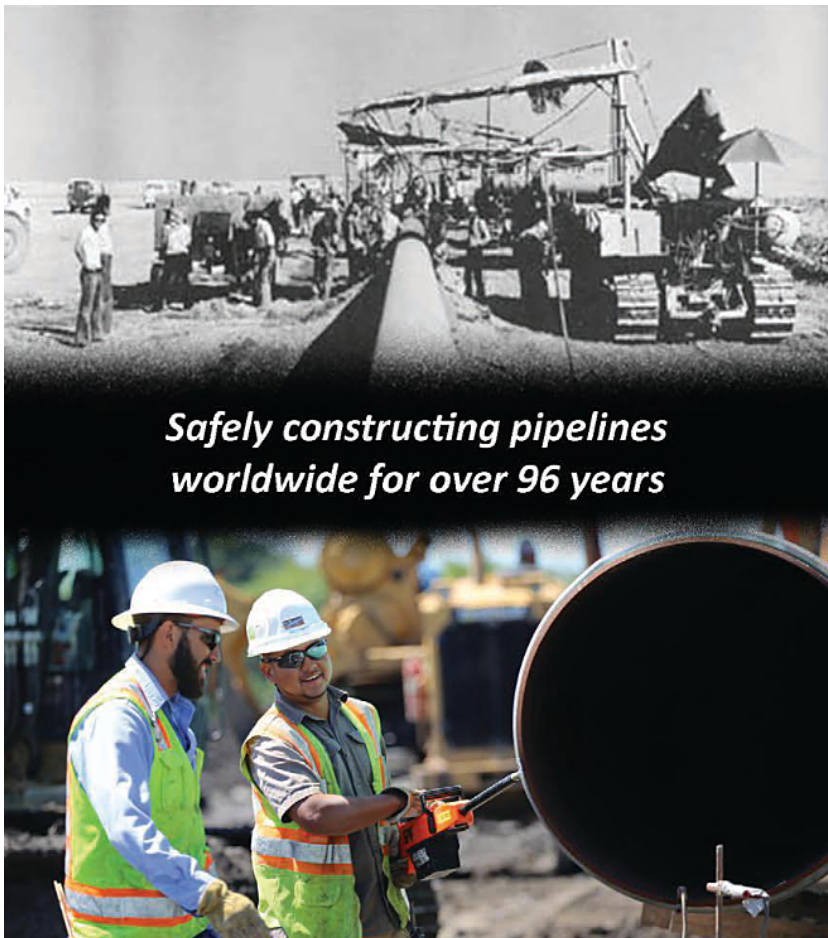
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## EPA Announces WIFIA Program For Financing Large Water Projects

The U.S. Environmental Protection Agency (EPA) announced the new Water Infrastructure Finance and Innovation Act (WIFIA) program that will provide long-term, low-cost credit assistance in the form of direct loans and loan guarantees to creditworthy water projects.

WIFIA provides another option for financing large infrastructure projects – generally at least \$20 million – in addition to the State Revolving Funds and bond market. The new program is available to state, local, and tribal governments; private entities; partnerships; and State Revolving Fund programs.

EPA estimates that funds appropriated to the WIFIA program can be leveraged at a ratio greater than 50 to one, which means the \$17 million program budget could allow EPA to make approximately \$1 billion in loans and stimulate about \$2 billion in total infrastructure investment.

Projects are evaluated using criteria such as the extent to which the project is nationally or regionally significant, helps maintain or protect public health or the environment, protects against extreme weather, and serves regions with significant water resource challenges. epa.gov



## NJ American Water Invests \$5.8 Million In Water Mains

New Jersey American Water is investing more than \$5.8 million in approximately 20,800 feet of new (ductile iron) pipe to replace water mains that were installed as far back as the 1920s. Construction and street restoration will be completed in the spring and summer of 2017.

“With the installation of the new water mains, New Jersey American Water customers should experience increased water flows for residences and fire protection, and continued improvement in reliability,” stated Thomas Shroba, senior director of Operations, North Region. “These water main improvements are part of New Jersey American Water’s multi-million dollar program to accelerate the renewal of water infrastructure that is reaching the end of its useful life.”

New Jersey American Water, a subsidiary of American Water, is the largest investor-owned water utility in the state, providing high-quality and reliable water and/or wastewater services to approximately 2.7 million people.

## WRF Publishes Report On Infrastructure Funding



The Water Research Foundation (WRF), a leading sponsor of innovative research supporting the water community, has published a new report to help utilities assess several new and emerging capital financing alternatives. The report indicates that while new options may help, utilities still need sufficient and sustained revenue to pay for the financing, and that revenue will need to come from service rates.

Final deliverables from the project, *New and Emerging Capital Providers for Infrastructure Funding (#4617)*, include 11 case studies covering financing alternatives such as green bonds, century bonds, public-private partnerships, public-public partnerships, private placements, WIFIA, self-financing, and integrated financing.

The project also produced an interactive decision support tool to assist utility finance managers in assessing the potential applicability of the various new and emerging capital financing alternatives highlighted in this research report.

## In Memoriam



**Glen Barton**, former Caterpillar Inc. chairman and CEO, died Oct. 24, 2016, in Peoria, IL, at age 77

Barton retired in 2004 after nearly 43 years of Caterpillar service. Starting as a college graduate trainee and rising through the ranks in numerous marketing, general management and executive positions, he left a legacy of leadership at the company.

During his career, he served on the Dean’s Engineering Advisory Council at the University of Missouri-Columbia, and the boards of directors for Inco Limited and Newmont Mining Corporation. He was a global advisor to The Conference Board and a trustee of the Malcolm Baldrige National Quality Award Foundation. Barton also served as a member of the Business Roundtable, the Illinois Business Roundtable and the U.S. President’s Export Council.

Barton graduated from the University of Missouri-Columbia with a bachelor’s in civil engineering, and completed the Stanford University Executive Program.



**Winston Johnson**, El Paso Energy and natural gas industry leader, died Nov. 3, 2016, in Las Cruces, NM.

He worked at El Paso for 32 years, retiring as the company’s vice president of Engineering. During his career, he was involved with many organizations and received a number of awards, serving as chairman of the Gas Machinery Research Council for six years, receiving a distinguished service award in 2004, and serving as chairman of the Pipeline Research Council International for four years.

Even after his retirement, he continued to provide a wealth of knowledge to the natural gas industry.

Johnson earned a Master’s from New Mexico State University in mechanical engineering. Throughout the years he gave back to the school by serving on an engineering advisory board and establishing an endowment scholarship.



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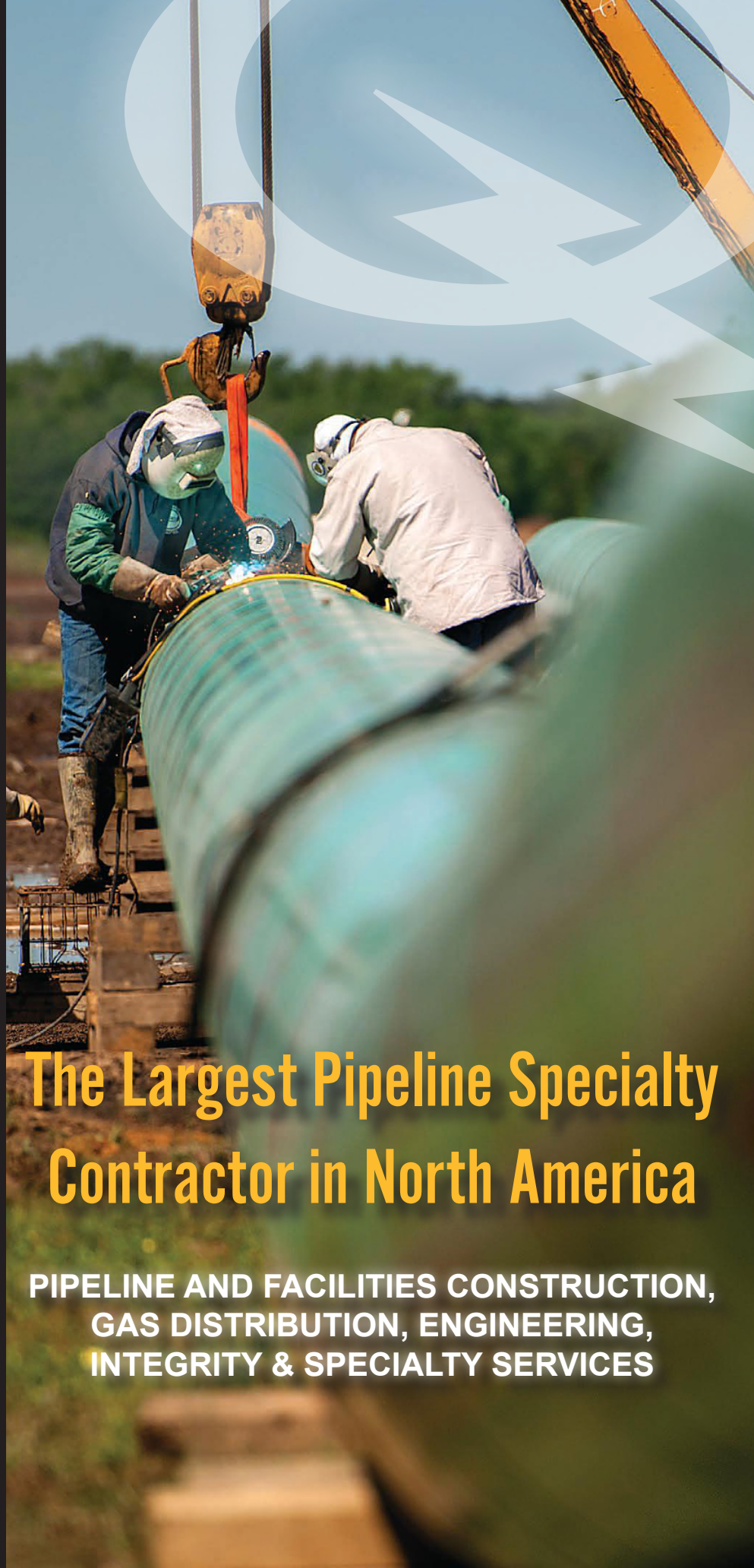
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## Corps Ignores Pleas To Restrict Pipeline Construction Permits

The Army Corps of Engineers turned back efforts by environmental groups to limit availability of nationwide permits (NWP) that pipelines use when they want to build facilities that cross streams and tributaries but cause insubstantial environmental damage. The Corps issued its revisions to 50 NWPs in early January, including changes to NWP 12, which is used by gas and oil pipeline companies. The activities eligible for NWPs, which allow companies to commence construction faster than if they had to apply for an individual permit, cover discharges of dredged or fill material that cause only minimal adverse environmental effects. NWP 12 covers utility projects that would have up to a half-acre of "loss of waters of the US."

Key issues were whether to adjust the half-acre limit, whether NWPs should be available for one large pipeline project that crosses many water bodies, and how fast a Corps district office must respond to a preconstruction notice (PCN) which a pipeline company must submit in order to obtain an NWP. A PCN is required when the project meets one of seven factors. NWP 12, like other NWPs, lists numerous "general conditions" which must be adhered to before a project qualifies for NWP.

Environmental groups had pressed the Corps to allow NWP 12 to expire without reissuance. The Corps ignored that request. The Interstate Natural Gas Association of America (INGAA) said the elimination of NWP 12 would be contrary to congressional intent, and increase costs for pipeline construction dramatically. One study cited by the INGAA concluded that, on average, it takes an extra 475 days to obtain

an individual permit versus an NWP. That same study concluded that the average cost to prepare an NWP application is \$28,915 versus an individual permit application which, on average, costs over \$271,596 excluding the cost of mitigation, design changes, costs of carrying capital and more.

The fallback position of the Sierra Club and its allies was to ask the Corps to change the wording of NWP 12 so that a pipeline company could not use it for large projects such as TransCanada's Gulf Coast Pipeline – the southern half of the Keystone XL pipeline – which crossed 2,227 waters over many miles. "This marked the first time the Corps had approved a major project in this way using NWP 12," said numerous environmental groups under the Sierra Club's leadership.

The environmental groups alleged that since using NWP 12 to permit the Gulf Coast Pipeline in 2012, the Corps has verified several other major pipelines in the same way. For example, four Corps district offices verified the 600-mile Flanagan South crude oil pipeline through 1,950 waterways in four states under NWP 12. The Corps verified the 1,168-mile Dakota Access Pipeline through North Dakota, South Dakota, Iowa and Illinois using NWP 12. Pipeline projects like these should undergo an individual Section 404 permit review under the Clean Water Act," the groups wrote.

The Corps turned a deaf ear to that request, too. In allowing the use of NWP 12 for major projects, the Corps explicated its interpretation of the meaning of "separate and distant crossing of waters of the United States." The utility line activities authorized by NWP 12 are similar in nature because they involve linear pipes, cables or wires to transport physical substances or electromagnetic energy from a point of origin to a terminal point.

The Corps also stood fast on the current half-acre threshold. INGAA had supported its continued application arguing it and the PCN requirements are "appropriate, well-supported by the record, and fully

ensure that activities authorized by those NWPs will result in no more than minimal individual and cumulative adverse effects."

### Timeframe, wording at issue

The compliance start date for the new federal safety requirement on underground gas storage facilities doesn't go into effect for one year, but the arrival of the Trump administration in Washington could result in an extension of that deadline. That is what groups such as the INGAA and the American Petroleum Institute (API) hope for. While they support, for the most part, the incorporation of industry voluntary standards into the federal pipeline safety laws, they argue that the 12-month implementation deadline is too short.

The industry hopes the Pipeline and Hazardous Materials Safety Administration (PHMSA) will realize the problem and change it on its own, without political pressure having to be put on the Trump administration. If not, there could be industry-sponsored litigation. The PHMSA interim final rule (IFR) issued in December has wiggle room built in allowing the agency to make changes based on public comments, which were due on Feb.17.

Don Santa, president and CEO of the INGAA, said, "INGAA strongly supports PHMSA regulation of natural gas storage based on consensus standards. We are quite concerned, however, that the 12-month implementation period outlined in the interim final rule is unrealistic. Extensive effort will be required to implement a structured and documented integrity management program across the roughly 400 underground gas storage facilities in the United States."

The standards will directly apply to approximately 197 interstate facilities and 203 intrastate facilities. INGAA's board in February 2016 supported voluntary adoption of these consensus standards.

While the timetable for implementation is the big concern for industry groups, some players such as the American Gas Association

(AGA) want additional changes. Christina Sames, vice president of operations and engineering for the AGA, said the association, which fully supports incorporating by reference the American Petroleum Institute's Recommended Practices 1170 and 1171 into federal law, also wants a change in the timetable as well as reversal of the IFR's language that makes all non-mandatory provisions in the Recommended Practices mandatory.

Maybe not surprisingly, environmentalists think the IFR stops short of needed protections in the wake of the Aliso Canyon gas storage field leak, which prompted Congress to enact the new safety requirements PHMSA is implementing. "The new standards offer scant or no detail on many safety precautions, creating immediate challenges for the state and federal regulators enforcing these new policies," argued Adam Peltz, attorney, Climate and Energy Program, Environmental Defense Fund. "To bridge this gap, PHMSA will need to both beef up the rule and rely on state expertise to ensure all gas storage wells are held to uniformly high standards."

Nor does Peltz consider the one-year implementation deadline onerous. "Since the PHMSA rule is essentially the industry's own consensus standards, one would think compliance would be relatively straightforward," he explained. "If PHMSA had adopted a more rigorous rule, we might be sympathetic to calls to extend the deadline, but at this juncture we are not persuaded that the industry needs longer than a year."

PHMSA issued the IFR in December which takes effect on January 18, 2017. But interstate and intrastate pipeline facilities do not have to comply with its requirements until Jan. 18, 2018. Given what are likely to be changes in the attitudes of federal regulatory agencies under the Trump administration, it is entirely possible that PHMSA will rethink the implementation deadline, which may also come under pressure from congressional Republicans. **UC**



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Mott MacDonald





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[www.pipeline-news.com](http://www.pipeline-news.com)

By **Kate Permenter**, Pipeline Editor

# Energy Pipeline Project Announcements

## PROPOSED PROJECTS

**PROJECT: ENABLE OKLAHOMA INTRASTATE TRANSMISSION SYSTEM**

**Owner:** Enable Midstream Partners  
**Status:** Project is in the early stages  
**Type:** Construction of 20-inch pipeline and associated metering facilities  
**Miles:** 77  
**Location:** Oklahoma  
**Start:** 2018

**PROJECT: 2018 NGTL SYSTEM EXPANSION PROJECT**

**Operator:** NOVA Gas Transmission Ltd. (TransCanada subsidiary)  
**Status:** The Canadian government recently approved this project with 36 conditions attached  
**Type:** Construction of 20-inch to 48-inch pipeline, one new compressor, 35 new and expanded meter stations and other associated facilities  
**Miles:** 55  
**Location:** Alberta and British Columbia  
**Start:** 2018  
**Completion:** 2019

**PROJECT: 2017 NGTL SYSTEM EXPANSION PROJECT (8 SECTIONS)**

**Operator:** NOVA Gas Transmission Ltd. (TransCanada subsidiary)  
**Status:** The National Energy Board has completed the review of the 2017 NGTL System Expansion Project and has submitted its final report to the Government of Canada  
**Start:** 2017  
**Completion:** 2018

**Section 1: Grande Prairie Mainline Loop 2 – McLeod River Section**

**Type:** Construction of 48-inch pipeline  
**Miles:** 22  
**Location:** Edson, Alberta

**Section 2: Saddle West Project**

**Type:** The looping of 36-inch existing mainlines, the addition of five compressor units at existing station sites and new metering facilities  
**Miles:** 18  
**Location:** Alberta

**Comments:** Project will increase capacity on the northwest portion of the system by 355 MMcf/d

**Section 3: Northwest Mainline Loop No. 2 – Bear Canyon Section**

**Type:** Construction of 36-inch pipe installed as a loop of the existing Northwest Mainline  
**Miles:** 18  
**Location:** Saddle Hills County, Alberta

**Section 4: Liege Lateral Loop 2 – Pelican Lake Section**

**Type:** Construction of 30-inch pipe installed as a loop of existing pipelines and will connect to the Liege Lateral Loop 2 – Thornbury Section  
**Miles:** 35  
**Location:** Wabasca, Alberta

**Section 5: Kettle River Lateral Loop – Christina River Section**

**Type:** Construction of 24-inch pipe and tie into the existing Kettle River Lateral  
**Miles:** 12  
**Location:** Fort McMurray, Alberta

**Section 6: Otter Lake Compressor Station Unit Addition**

**Type:** The addition of a 30-megawatt compressor unit  
**Location:** Manning, Alberta

**Section 7: Northwest Mainline Loop – Boundary Lake Section**

**Type:** Construction of 36-inch pipe installed as a loop of the existing Northwest Mainline  
**Miles:** 56  
**Location:** Clear Hills County, Alberta

**Section 8: Alces River Compressor Station Unit Addition**

**Type:** Addition of a 15-megawatt compressor unit to the existing Alces River Compressor Station  
**Location:** Grande Prairie, Alberta

**PROJECT: GLASS MOUNTAIN PIPELINE EXTENSION**

**Owners:** SemGroup and NGL Energy Partners  
**Status:** Project is currently seeking right-of-way acquisition and the satisfaction of all necessary federal requirements  
**Type:** Extension of the 215-mile Glass Mountain Pipeline System that delivers crude from the Mississippi Lime and Granite Wash plays to Cushing, OK  
**Miles:** 44  
**Location:** Cushing, OK  
**Start:** 2017  
**Completion:** 2018





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By Robert Carpenter, Editor-in-Chief

# New Political Direction Brings Cautious Optimism

After experiencing an uptick in municipal sewer and water infrastructure spending in 2015 and budgeting for the trend to continue into 2016, America's municipal personnel were, for the most part, sorely disappointed. But municipal personnel are anything if not resilient, and there is a strong anticipation that infrastructure funding could fare better in coming years as the United States transitions to new political leadership. This information and a wealth of insight into 2017 was examined through the results of *Underground Construction's* 20th Annual Municipal Sewer and Water Infrastructure Survey.

The exclusive survey presents a detailed look at the current spending plans for America's cities, along with insights and perspective on industry topics and technology. The survey reflects only information regarding sewer, water and stormwater piping infrastructure and does not include figures or data on pumping stations, treatment plans, etc.

Conducted in October and November of 2016, the survey polled U.S.-only municipalities about their 2017 infrastructure funding plans, as well as perspectives on technologies, trends, industry issues and working relationships with consulting engineers and contractors.

Survey results came from all 50 states plus the District of Columbia, and were weighted for regional population density and city sizes to develop a nationwide benchmark that would allow for statistical extrapolation.

The smallest cities participating in this year's survey included Graettinger, IA, with a population of 850, and the Village of Necadah, WI, sporting 890 residents. At the other end of the spectrum, large metropolitan cities such as Los Angeles, New York, Honolulu, Seattle, Phoenix, Denver, St. Louis, Chicago, Dallas, Houston, Atlanta, Miami, Pittsburgh, Tampa, Baltimore, Cincinnati and many more submitted information.

## Spending struggles, hopes

For 2016, the year of high hopes for continuing budget increases never materialized. Some areas saw their infrastructure spending slashed by as much as 18 percent, while other cities saw little if any growth in the capital expenditures for 2016. Nationwide, sewer and water spending fell 4.2 percent in 2016.

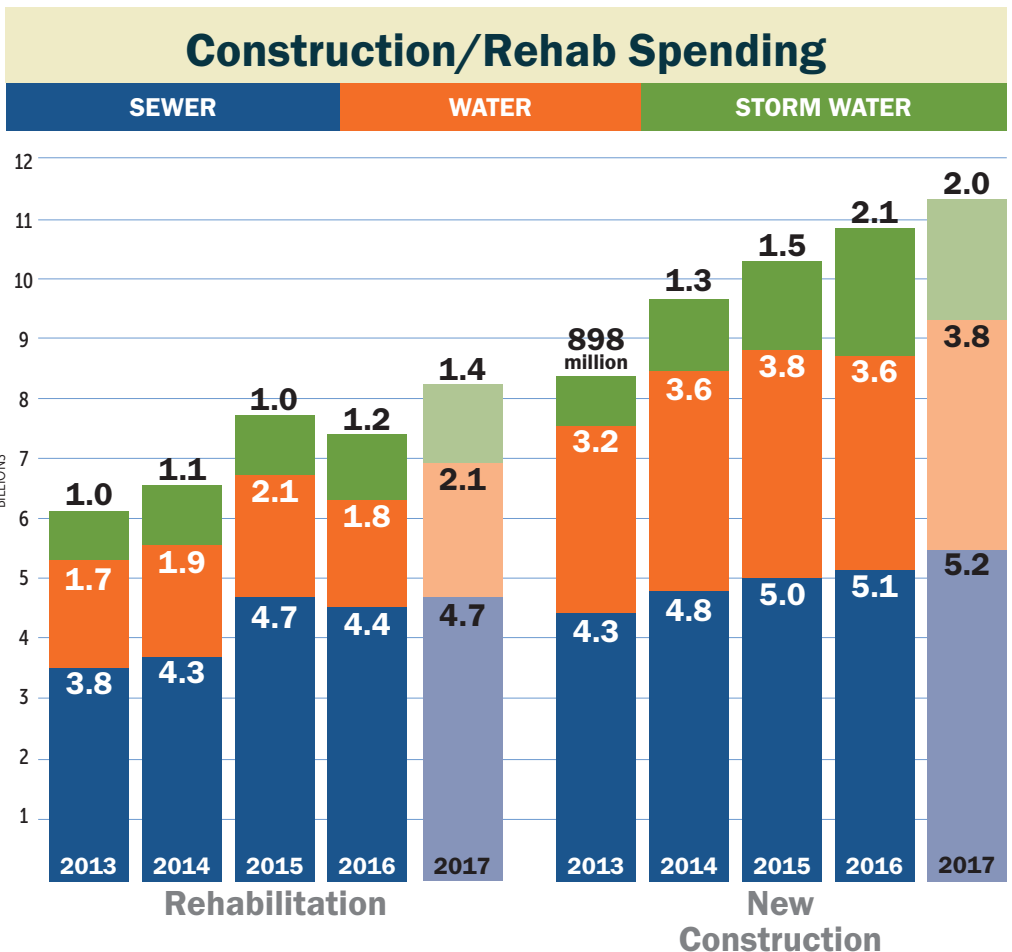
"Our budget was supposed to be increased again in 2016, but that all went out the window," said one municipal official from the Northeast. "Our overall city budgets were down and so a lot of our planned spending was cut."

Another city official from California lamented that "we had high hopes for this year (2016) but

the money just went away. Several important projects had to be kicked down the road – again." This Midwest respondent added, "We started 2016 with an aggressive plan before the budget was gutted." And a Southeast municipal manager commented, "Our budget was flat at best. I don't know if it was election jitters or what, but pretty much all of the city budgets in our state stepped back on infrastructure funding."

Indeed, going into 2016, city municipal managers estimated spending nearly \$19 billion on sewer/water piping infrastructure, but as the year went by, many projects were delayed or indefinitely postponed and overall spending plummeted to \$18.2 billion.

Projecting forward into 2017, cities are cautiously optimistic that funding levels would experience a positive rebound. In total, survey respondents push 2017 spending estimates to \$19.2 billion, a 5.2 percent increase over 2016. Several cited high hopes for dramatically increased spending over the next several years, particularly if the \$1 trillion investment concept rolled about by new President Donald Trump and the Republican Congress comes to fruition. Trump and Speaker of the House Paul Ryan are both committed to such an investment spread over several years through a combination of government monies and leveraging public/private partnerships. To date, no specific formula for doling out the funds has





been announced, but some survey participants want to make sure sewer and water markets are not overlooked in lieu of roads, bridges, railroad and airports.

"If money does become available, we've got to make sure that sewer and water get their fair share!" declared this Mid-Atlantic respondent.

### Funding

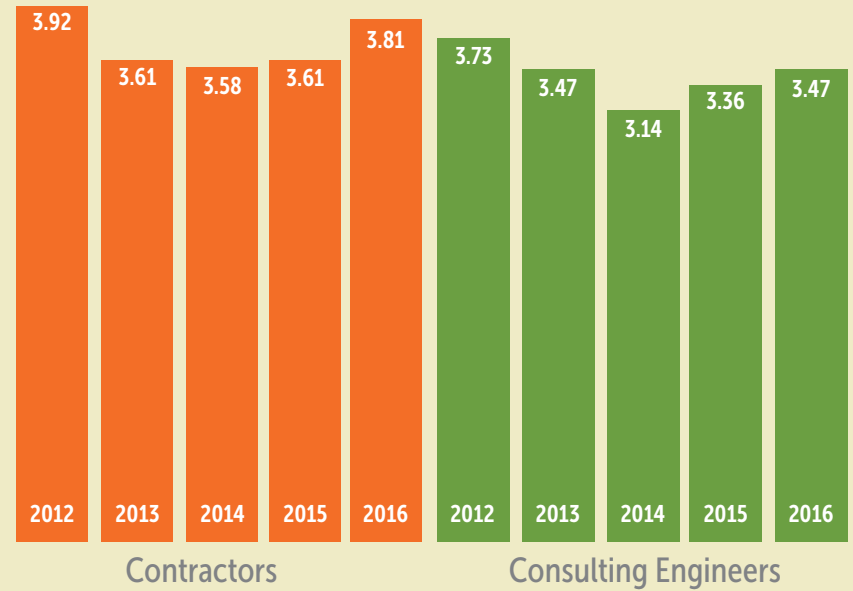
As is often the case, the most important issues facing sewer/water agencies in 2017 by far is lack of adequate funding to address pressing needs, both for new and replacement construction, as well as rehabilitation. That lack of funding takes on many faces, according to municipal respondents.

"Infrastructure projects – or rather the lack of them – is our biggest challenge," cited this Midwest official. "We have a severe lack of funding just to make water distribution and sewer collection improvements," said a Southwest muni respondent.

"We need funding for our large rehabilitation projects," lamented this Midwest manager. "Our biggest challenge is not letting infrastructure decline anymore," said this Texas respondent.

A Northeast city official said his organization is

### Personnel Performance Rating (per municipalities)



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having trouble “working within our budget to accomplish maintenance and new items.”

A Northeast survey respondent claimed budget woes across all departments for his city are creating major issues for the sewer/water departments: “The government tax cap is causing local officials to take money from utilities to make up the difference!”

However, in a sarcastic vein, this Midwest respondent claimed that “We’re doing great. As of late 2016, we will have all our lead service lines replaced!”

Another face to inadequate budgets is the growing national workforce crisis. Contractors have already documented and are working to address a severe shortage of skilled labor. The issue is apparently emerging as a major problem for municipalities as well – especially when budgets for retention and hiring are tight.

“We’re not replacing retiring employees due to lack of funding,” complained this official from the Pacific Northwest. A Southwest city respondent pointed out the biggest challenge is hiring “qualified employees, employee retention and paying employees more to attract better candidates.” Echoed another Southern city representative, “keeping a well-trained and experienced staff,” poses a major challenge.

Other areas of prime concern for cities include onerous federal regulations and negotiated Consent Decrees. “Timely meeting our EPA Consent Decree requirements and overall federal regulations will be our greatest challenge,” stated this Central U.S. municipal official.

## Inside the numbers

Survey information reports that cities hope to spend about \$11 billion in 2017 on new and replacement construction for underground pipes. Sewer comprises \$5.2 billion, water \$3.8 billion and \$2.0 billion of that total. About \$8.2 billion is anticipated to be spent on pipe rehabilitation including \$4.7 on sewer, \$2.1 for water and \$1.4 billion for stormwater. Overall, that represents about a 5.2 increase in 2017 anticipated spending.

One of the bright spots in 2016

Until details begin to emerge regarding the proposed \$1 trillion infrastructure investment – such as when will money be available, how much will sewer/water agencies receive, what is the formula for funds allotment, etc. – cities will have to largely continue finding their own funding mechanisms

was the culvert replacement and rehabilitation market. A strong increased spending emphasis in that area is anticipated to continue in 2017. Significant public attention combined with a variety of federal regulations have brought culvert maintenance and repair to the forefront of public awareness.

While water construction and rehabilitation receded in 2016, a jump in rehabilitation and replacement of water lines is expected for 2017, according to survey respondents. There has been a steady, dramatic increase in public perception and concerns over public water supply – and that was before the lead pipe issue in Flint, MI, became a national horror story evoking Congressional action. While most of the national fallout was overblown and unfounded, nonetheless, there is plenty of Congressional and public outrage remaining over the situation. In 2017, industry should expect immense pressure to be exerted upon water agencies to upgrade their systems and replace any lead pipe still in use. Where the money will come from is still an unknown.

Until details begin to emerge regarding the proposed \$1 trillion infrastructure investment – such as when will money be available, how much will sewer/water agencies receive, what is the formula for funds

## When Using Trenchless Methods, What % is:

CIPP	50%
Point repairs	41%
Spray-type coatings	29%
HDD	24%
Chemical root control	29%
Sliplining	17%
Pipe bursting	24%
Lateral lining	20%
Pipe ramming	9%
Folded pipe	14%
Microtunneling	3%





allotment, etc. – cities will have to largely continue finding their own funding mechanisms. As was discussed earlier, that remains a huge issue – and problem – for municipalities.

Inevitably, one of the funding sources is boosting user fees. Historically, city councils have been averse to raising sewer and water rates in lieu of dealing with public complaints. This practice has often led to years between rate hikes. When rates are raised, it is mainly to catch up with inflation rather than address infrastructure issues. But as infrastructure woes have deepened, municipal governments are more willing to face the new reality that user fees must more closely reflect true maintenance costs. Still, cities are averaging almost four years between rate hikes for sewer, and three years before boosting water rates.

To illustrate just how much of a problem funding represents, the survey asked for an estimate of how much additional funding over current budget plans is needed to meet the many needs of both construction and rehabilitation of water and sewer infrastructure in 2017. That amount was a whopping \$151 billion – for just one year. As one respondent from the western Mountain region observed: “Sure hope that stimulus is for real – it can’t come soon enough.”

Asset management efforts continue to be a significant area of concentration for cities. Only 31.2 percent said they have a program fully in place; however, that does reflect an increase over the 29.9 percent with a program entering 2016. More than 48.4 percent of cities report actively developing at least a partial asset management program, while 20.2 percent have no plans to implement a program at this time.

Maintaining, rehabilitating and replacing manholes are ongoing challenges for virtually all municipalities, large and small. As such, plans call for replacing or rehabbing 194,000 manholes in 2017.

In addition to funding woes and onerous government/EPA regulations, which were both cited as top concerns by 71.4 percent of respondents, 53.9 percent of cities said that retaining and attracting qualified employees has become a major problem. Other areas of concern mentioned prominently were community relations and safety issues.

### Trenchless perceptions

The survey also measures impacts from trenchless construction and rehabilitation methods. During budget-crunching times, trenchless rehabilitation gained ground as a cost-effective and successful stop-gap measure to stretch dollars. However, many survey respondents still express the belief that trenchless tends to be more expensive and with 2016’s belt tightening, some cities reverted to simply digging down to problem areas for repairs and dealing with related pavement and social costs. Still, trenchless work has gained growing

and irreversible footholds in all aspects of construction and rehabilitation in the United States and abroad. The survey revealed that 51.8 percent of cities prefer to use trenchless for rehab, and for new construction, trenchless is used in about 25 percent of projects.

Municipal personnel were also asked about their perception of the quality and efficiency of a variety of popular trenchless methods, using a

scale of 1 (low) to 5 (high). Achieving the highest performance rating for 2017 are standard water/steam cured-in-place pipe (CIPP) and horizontal directional drilling (HDD) with ratings of 3.8. However, another method of CIPP, ultra-violet light cure, is still new enough to industry that many respondents simply have very limited experience of the technology, so it received a rating of only 2.2. Still, that marked a performance rating

## PIPE BURSTING PROS DEPEND ON HAMMERHEAD

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increase of 2.0 in 2016.

Also rating well were manhole epoxy spray-on coatings at 3.7 followed by point repairs, chemical root control and pipe bursting at 3.6.

Historically, the municipal survey also asks city personnel to rate their contractor and consulting engineering partners. These relationships are critical to the success of virtually any project regardless of whether it's open-cut or trenchless. With tight budgets, municipalities count on their contractors and engineers to provide up-to-date, comprehensive solutions and options for their pressing needs. The survey tracks year-to-year ratings so contractors and engineers can gauge their perceived value to the municipal markets. The ratings are based on a scale of 1 to 5, with 5 being the highest mark.

## Rating engineers

For the second consecutive year, consulting engineers saw their rating climb – 3.47 compared to 3.36 last year. That continues a remarkable rebound from a low rating of 3.14 in 2014.

When asked what is the most important aspect of working with consulting engineers, quality was cited by 93.4 percent of all respondents – a huge jump from a year ago, when only 41.9 percent cited that factor. Several of the respondent comments linked quality with field experience. Understanding new technology was cited by 62.2 percent, and productive

relationships with contractors are considered very important by 60.6 percent. Surprisingly, cost considerations were cited by less than half of the respondents.

As usual, city personnel had plenty of suggestions for how engineers could do a better job of working with sewer/water agencies. “Engineers need to put seasoned personnel in these positions and not engineers right out of school. Field experience speaks volumes,” stressed this Midwest official. A Southeast survey participant advised, “Stop using politics to get work. Let quality be the tool used to increase workload.”

“Engineers should design projects with the ease of future operations and maintenance in mind,” suggested this Texas respondent. “Engineers need to fully understand the scope of work and find new technologies and innovative ways,” added this Southwest city staffer. Further, said this person from the North Central area, engineers must get better at “anticipating, understanding the needs of the program.”

A respondent from the Mid-Atlantic region encouraged engineers to “not be afraid to speak up with owners when their point of contact is being onerous or making bad decisions.”

## Rating contractors

Prior to 2016, contractors saw their performance rating essentially flat-line for the past three years. However, after 2016, municipal personnel



gave contractors a big boost in their rating, climbing from 3.61 to 3.81.

Like engineers, city officials see quality as a major need in the work with contractors. It was cited by 92 percent of all respondents. Following closely behind is the need for overall experience, which was cited by 88.8 percent of cities. Apparently, timely completion of project is also an issue, as 79.3 percent of muni personnel emphasized that quality.

This East Coast city official wants contractors to “complete projects and not leave the punch list hanging out for a protracted period of time.” A Midwest respondent stated succinctly, “deliver jobs on time and within the budget.” Another Midwest city staffer recommended that

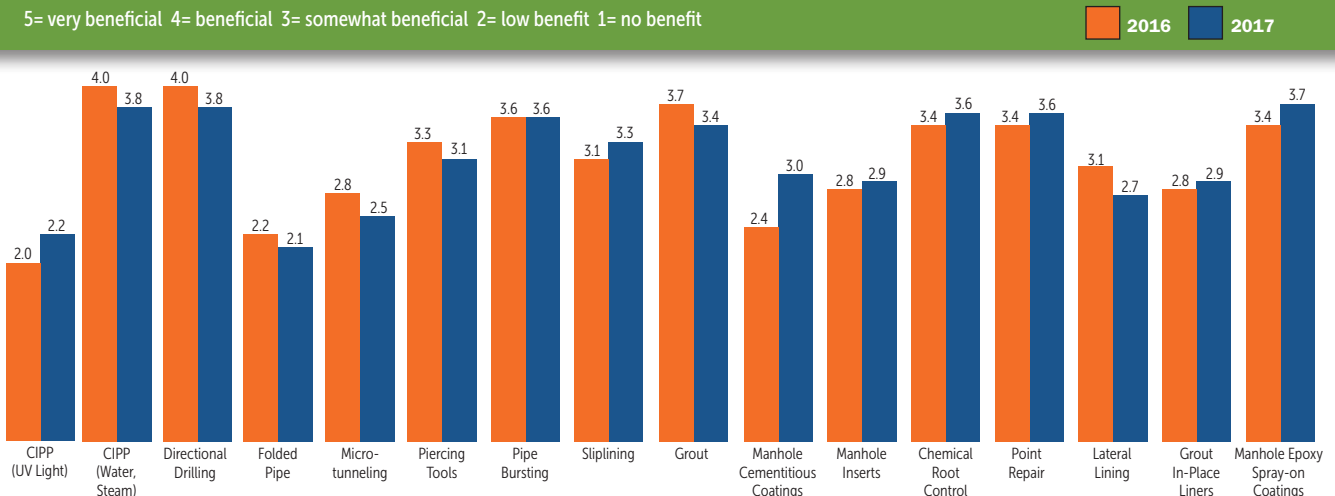
contractors “be more prepared to abide by the rules and regulations of the city. Have the appropriate tools on hand to do the job most efficiently. Have trained and experienced laborers that know what they are doing.”

A city official from the West Coast said that “we need more contractors that can do a variety of trenchless methods. We normally only get one or two bids.”

This Southwest city respondent pointed out how contractors could do a better job when working with municipalities: “Effective communication, quality work executed on time, use skilled personnel and provide timely response to public issues.” **UC**

## How Municipal Personnel View Various Trenchless Techniques

5= very beneficial 4= beneficial 3= somewhat beneficial 2= low benefit 1= no benefit







# LaValley Unveils HDD Tonghand



By Jeff Griffin, Senior Editor

An exit-side pipe breakout and handling system for horizontal directional drilling (HDD) installations is being used by a growing number of drilling contractors.

"We've taken a different approach with Tonghand," said Jason LaValley, founder and president of LaValley Industries. "Mounted on an excavator, Tonghand easily breaks or makes pipe joints and its gull beam design arms move out of the way to make and break reamers and subs. As a pipe handler, it easily moves pipe joints around the job site."

Tonghand safely and efficiently makes, breaks and moves pipe with no need for back-breaking wrench-

es or placing personnel in danger zones.

"A single operator," LaValley said, "can perform all functions from the safety and comfort of the excavator cab. No other exit-side tool or equipment can match Tonghand's versatility."

Tonghand is now available from LaValley Industries, and was displayed for the first time at the recent 2017 Underground Construction Technology Conference & Exhibition in Fort Worth, TX.

Tonghand mounts on any brand excavator of 30 to 36 metric tons. The patented TongVise easily breaks joints with up to 120,000 foot-

pounds of torque. It can accommodate pipe from 6½ to 10 inches outside diameter. Patented rotation arms allow threading and unthreading all drill pipe connections. A gull-wing design allows roller arms to be moved out of the way to easily make and break reamers up to 60 inches.

In-cab controls provide complete and efficient control of all functions, and allow the operator to set the value of each torque. An easy-to-read monitor displays torque values.

Used as a pipe handler, Tonghand can precisely place drill rod on HDD rigs, racks or trucks.

Tonghand has a lifting capacity of 16,000 pounds. It weighs 8,300

pounds (shipping weight is 9,100 pounds). Shipping dimensions are 100 inches long by 60 inches wide by 101 inches high.

Based in Bemidji, MN, LaValley Industries manufactures and markets pipe-handling equipment, including the Deckhand for lifting, positioning, stringing and lowering pipe into trench. Deckhand has HDD arms for handling directional drilling pipe, weld positioning arms, and custom lifting equipment to meet specialized requirements.

**FOR MORE INFORMATION:**

LaValley Industries  
(218) 444-3030, [lavalleyindustries.com/](http://lavalleyindustries.com/)







By Jeff Griffin, Senior Editor

# Pipe Plugs

## Help To Prevent Cedar Rapids Flooding

In late September 2016, rising waters of the Cedar River initiated a state of emergency in Cedar Rapids, IA.

Memories were still fresh of the great flood of 2008, the worst in the city's history. The Cedar River crested at 31 feet, which is 19 feet above flood stage, inundating more than 1,000 downtown blocks and surrounding areas. More than 300 public buildings and 900 businesses were damaged with total flood cost placed at \$5.4 billion.

Eight years later, the remnants of Hurricane Paine in the Gulf of California dumped heavy rains in parts of Minnesota and Northern Iowa, giving Cedar Rapids only four days' notice to prepare for flood crests of more than 25 feet.

To implement the city's Flood Response Plan, a 24-hour-a-day Incident Command Center was established in the city's central fire station.

Immediate action was taken to design and construct a temporary flood protection system for both sides of the river to protect low-lying areas that have been redeveloped since the 2008 flood.

Above-ground measures included installation of Hesco sand-filled barrier walls at various locations based on projected river levels. Placed end-to-end, the length of these barriers exceeded nine miles. Earthen berms reinforced with clay were constructed, and more than 400,000 sand bags were filled and positioned to hold back rising waters. These efforts, along with traffic control and evacuations, public safety measures, and communications and public outreach were coordinated from the command center.

### Proactive steps

Just as important were proactive steps. "In the flood zone, we have 29 miles of storm sewers with 45 connections to the river," said Dave Wallace, Cedar Rapids utility engineering manager. "We had to prevent flood waters from backing up into the storm sewer system and flooding streets, homes and businesses from underground. With only four days' notice before the expected crest, we had to work fast."

Creative measures were required to prevent flood waters from entering underground piping before

rapidly rising waters rose above their entry points to the river. Crews built manhole "cones" that capped storm water intakes and manholes to prevent water from the rising river being released onto the streets.

"We built 300 of the cones, and it took two days," said Wallace. "We estimated another 1,500 cones were needed, and there simply wasn't time to construct them before underground pipes were flooded."

The solution also included placing inflatable plugs inside pipe entry points. About 60 plugs were inserted into entry ends of storm sewer pipes ranging in diameter from 12 to 48 inches. These rubber "bladders" were inserted mechanically and then filled with air to help seal off the pipe.

### Plugs

The plugs, primarily from Cherne Industries, were provided by United Rentals Trench Safety.

"The company carries pneumatic plugs as part of its large inventory of pipe testing equipment," said Andy Stoullil, sales representative in the company's Des Moines branch. "The logistics of immediately assembling the number of plugs in the sizes

needed, in such a short time period, definitely was a challenge (see sidebar)."

Other emergency measures included plugging four storm sewer pipes with concrete and four others with sandbags. Another storm sewer pipe was plugged with compacted clay at a critical point in order to stave off the water and prevent flooding to the NewBo District, a low-lying area of redevelopment that includes restaurants, commercial property, housing and the surrounding downtown district.

Wallace credits the plugging efforts with significantly reducing floodwater damages.

Local contractors, material and equipment suppliers, the Cedar Rapids fire and police departments, the Iowa National Guard, other organizations, and individual citizens played key roles in fighting the flood waters.

Preventive efforts and other factors combined to lessen the impact of the 2016 flood:

- Massive preventive steps were quickly and effectively implemented.
- No heavy rains fell on the flooding area which would have great-





## United Rentals, Cherne Provide Pipe Plugs

Preventing water from the rising Cedar River from entering the city of Cedar Rapids' storm sewer pipelines and overflowing into the streets was a critical element in the city's efforts to mitigate damage from the flood that hit in late September 2016.

Sixty-six inflatable plugs ranging in diameter from 12 to 24 inches were provided by United Rentals Trench Safety. And with only four days' notice of the expected flood crest of the river, delivering the plugs quickly was imperative.

"We received the first call at 3 p.m. Friday, Sept. 23, from Joy Huber, city of Cedar Rapids fleet service manager," said Andy Stoullil, of the Des Moines United Rentals Trench Safety location. "The initial request was for 35 plugs in diameters of 12 to 24 inches. I coordinated with Eli Hofer, our branch manager in Omaha, who assembled the order with a combination of United Rentals inventory and a purchase of additional plugs from Cherne Industries. Cherne opened its warehouse in Des Moines early Saturday morning, and we sent a truck to pick up the equipment. The truck was loaded at 6:30 a.m."

Three hours later, the truck arrived in Des Moines and driver Mitch Davis and Stoullil transferred the plugs to a third-party carrier and made the first delivery mid-day Saturday – less than 24 hours from receiving the request from the city.

Late the evening of the same day, Cedar Rapids City Engineer Nate Kampman inquired about 60- and 72-inch plugs.

"We had both of those sizes in stock in Des Moines," Stoullil said, "and got them on a truck at 11 p.m. that night. They were delivered by 2 a.m."

Sunday afternoon, Stoullil received another call from Huber requesting another 30 to 35 plugs in the 12- to 18-inch range.

"United Rentals purchased these from Cherne, which opened its warehouse again on Sunday afternoon," said Stoullil. "We loaded the plugs on our truck at 3 p.m. on Sunday and delivered to Cedar Rapids by 8 p.m. that evening."

City personnel and contractors installed the plugs at the access ends of the pipes.

A lower than expected flood crest of the river, lack of heavy rains during the flooding period, construction of above-ground barriers, and the steps to keep



water from flooding through buried storm system infrastructure combined to greatly restrict flood damage.

In addition to city personnel, including members of the fire and police departments, city office workers, suppliers like United Rentals, area contractors and individual volunteers played an important part in holding floodwaters in check.

"Our trench safety team members put aside their weekend plans to help ensure that the residents of Cedar Rapids would be protected from a natural disaster. We are proud to be part of a company that steps up for our communities," concluded Stoullil.

There are 80 United Rentals Trench Safety locations throughout the U.S. which inventory pipe plugs and pipe testing equipment, along with air test kits, hydrostatic test pumps, manhole vacuum test kits and joint test kits, and consultation and engineering assistance on safe placement and removal of pipe plugs. United Rentals Trench Safety also is a primary provider of trench shielding and shoring rental systems in North America.

Based in Minneapolis, MN, Cherne Industries is a leading manufacturer of pipe plugs and testing equipment.

### FOR MORE INFORMATION:

United Rentals  
(203) 622-3131, [www.unitedrentals.com](http://www.unitedrentals.com)

Cherne Industries  
(800) 843-7584, [cherneind.com](http://cherneind.com)

ly increased the likelihood of a breach in the temporary levee structures and a much wider area being impacted.

- The river crested more than 2½ feet lower than expected, at 22 feet above flood level.

The 2016 flood goes down as the second-highest crest in the history of Cedar Rapids. However, compared to the 2008 flood, the recent one resulted in minimal direct water damage, Wallace said. While precautionary evacuations were put in place, homes and businesses were widely untouched by floodwaters due to the measures that were so quickly put into place.

Cedar Rapids continues to pursue permanent flood control, and has adopted a master plan that calls for a system of gates, levees, and permanent and removable walls on both sides of the river. Work is already underway to construct earthen levees, pump stations and detention basins in some of the city's lowest lying areas.

Information about Cedar Rapids' permanent flood control system is available on the city website, [cityofcr.com/floodcontrol](http://cityofcr.com/floodcontrol).





By Jeff Griffin, Senior Editor

# Many Positives From DIRT Report



Know what's below.  
Call before you dig.

The latest Damage Information Reporting Tool (DIRT) report released by the Common Ground Alliance (CGA) contained the good news that efforts to reduce accidental damage to the nation's underground utility infrastructure and build awareness of the free 811 service are making significant progress.

Damages to underground facilities decreased 9 percent, and One-Call locate requests increased 8 percent in 2015 from the previous year. These improving numbers are even more impressive considering they occurred during a period when construction activity was up – housing permit activity increased 15 percent, and construction spending on infrastructure increased 4 percent – thereby raising the opportunity for accidental utility hits.

These statistics are based on solid research. CGA's DIRT program encompasses every aspect of damage prevention, gathering and analyzing critical information in order to make specific recommendations to industry stakeholders about how to best protect buried facilities.



For the first time, the 2015 Report matched and weighted multiple data submissions pertaining to the same event. This new methodology, along with a record number of event submissions (more than 363,000), and a higher Data Quality Index score than either the 2014 or 2013 reports, makes the 2015 DIRT Report the most comprehensive and accurate account of the state of damages to underground infrastructure ever compiled.

"The expanded methodology of the 2015 DIRT Report represents a new benchmark in damage prevention," said Bob Kipp, CGA president. "The volume and quality of DIRT data increases every year, strengthening the insights we glean from the report. The data science points in our 2015 analysis are the most comprehensive picture of how and why damages occur across the country.

"For the first time ever, damage prevention stakeholders will also be able to use the data analysis and

visualization platform Tableau to examine the DIRT data sets most relevant to their type of work, location, root cause or other variables."

The interactive 2015 DIRT Dashboard powered by Tableau is accessible to the public through the CGA website ([commongroundalliance.com](http://commongroundalliance.com)) and contains seven individual dashboards that can examine 2015 data through the lens of a specific element, such as damage characteristics by state, root cause analysis, etc.

Each dashboard visualization allows users to sort information through additional filters, giving damage prevention stakeholders a powerful tool for looking in-depth into where they can have the biggest positive impact.

The key to its success, said Kipp, has been acceptance by stakeholders that accident information they submit is absolutely confidential. Stakeholders today are comfortable in providing information.

## Kipp Leaves Strong Legacy For CGA

In 2001, Bob Kipp left his position as president and chief executive officer of BCI Inc., a telecom firm, to take charge of a new organization dedicated to preventing accidental excavation damage of underground utility infrastructure, the Common Ground Alliance.

Prior to that, Kipp had been in the telecommunications industry in Canada.

To achieve success at CGA, Kipp brought together the varied stakeholders with vital interests in protecting buried infrastructure, and led CGA to the position of North America's leading organization in planning and coordinating efforts to reduce damages to North America's underground infrastructure.

Therefore, Bob Kipp deserves a tip of the hard hats from all those who provide, build and maintain the underground utility infrastructure.



Since its establishment in 2000, CGA has become the leading organization in gathering research and developing programs to prevent damage to North American underground infrastructure by promoting effective damage prevention practices through shared responsibility among all stakeholders.

CGA is a member-driven association of 1,700 individuals, organizations and sponsors from every facet of the underground utility industry. Its 16-member board of directors represents each stakeholder group in the association.

Among the organization's many accomplishments is the annually updated CGA Best Practices Guide to damage prevention, and its role in establishing the nationwide call-before-you-dig number, 811. The DIRT program was established in 2003.

Although significant progress is being made to limit damage to buried infrastructure, much remains to be done. Even with declines in incidents during a period where construction activity was up, the 2015 DIRT report also estimates there were approximately 317,000 damages in the U.S. in 2015.

The three primary root causes were:

- Notification practices not sufficient
- Excavator practices not sufficient
- Locating practices not sufficient

However, the industry and CGA are clearly on the right path to address these issues.

"Through 2016, the 811 numbers all are heading the right way," said Kipp. "One change is that One-Call centers are steering users to the internet, and that is improving access and balancing of workloads."

To make the internet more useful for One-Call, more apps are becoming available – to access locate information on smart phones, for example. Also, the number of people using Best Practices is increasing.

"Our advocacy committee makes information, documents and studies readily available at no cost, and that's important for states that don't have the funds to do their own studies," he pointed out. "Public information and educational programs are effective, and Cox Communications will unveil an 811 hot air balloon at our annual meeting in March.

"Participation of sponsors remains strong, and that's in spite of the economic downturn for those in the energy sector. Much of our funding comes from those companies, and there have been a lot of mergers, yet their support still is there. Many One-Call centers are limited in financial support they can provide, but they are making up for it by sponsoring educational events."

A positive development, according to Kipp, is the launch by a separate not-for-profit entity of the Gold Shovel Standard, which certifies and monitors a contractor's excavation safety performance. Under the program, a utility provider

would require an excavating contractor to have Gold Shovel Standard Certification to do work for the company.

Kipp believes the next steps to limit damage to underground facilities will be regulation and enforcement.

"Some states have limited regulations regarding excavation, and in many cases there is no enforcement of regulations that are in place," he said. "Chapter 7 of our Best Practices deals with

compliance. Our members approved these Best Practices more than 15 years ago and believe in their effectiveness. States with effective enforcement programs have lower incident rates than those who don't."

Kipp, the only president CGA has had, will step down when Sarah K. MaGruder Lyne takes over Jan. 23. He will remain for a three-month transition period with his term officially ending on April 30, 2017. (See page 45 for more details.)

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## Underground Equipment Maintenance

# Keeping Your Compact Excavator Platforms In Top Operating Condition

By Jeff Griffin, Senior Editor

Compact excavators and their multiple attachments are among the most versatile types of construction equipment used for a variety of underground utility construction tasks.

Keeping compact excavators in top condition and on the job is essential for maximum productivity and to protect the value of the machine. As part of our ongoing series on equipment maintenance, Underground Construction asked manufacturers for compact excavator maintenance tips, emphasizing the platforms that host excavating components and attachments.

**Volvo Construction Equipment Product Manager John Comrie** said without proper maintenance, equipment owners can expect a lot of downtime and, in addition, machines will incur more than normal wear and tear which will negatively impact resale value. While it may seem a headache to complete daily maintenance checks – especially on what feels like always tight timelines – those small steps make a significant difference to the bottom line in terms of uptime and resale value.

A daily walk-around should include a check of fluids, like engine oil and hydraulic oil, as well as the air filter to ensure it's not time for a change-out. Another important

daily maintenance consideration is cleaning the tracks at the end of the day, especially when it's cold and wet or muddy. Mud sticking on the tracks overnight will freeze in cold temperatures and quickly wreak havoc on the tracks. Keep the battery in good working order and keep terminals clean, ensuring the cables are tight. Finally, operators should fill the fuel tank at the end of each day. That will help control condensation inside the tank. During the winter, that condensation turns to water which can also turn to ice, leading to frozen fuel lines and fuel-related components.

Keeping the undercarriage clean and free from dirt and rocks will greatly increase its longevity. During service internals – normally every 250 hours – it's a good practice to check the undercarriage for wear. Special tools are available that make it quick and easy to check wear on rollers, sprockets and tracks. Depending on track type – rubber or steel – checking that pad bolts are tight can save on unwanted downtime.

The electrical system also requires a routine check, including the wiring harness and fuse box, to ensure there isn't dirt or dust built up which could cause a short and a fuse to blow. Winter days also get

dark early, so it's very important to keep lights in working order to help ensure safety.

Ice or dirt build-up can lead to an unsafe machine. For machine safety checks, ensure the cab itself is kept clean. When windows get dirty and wet, ensure an adequate supply of de-ice is available to provide high visibility around the machine for safety.

Colder climates require more frequent maintenance due to the build-up of debris/mud that will affect the tracks and the undercarriage. Keeping the machine clean is one of the most important factors. As the climate changes to colder ambient temperatures, the operator should refer to the manufacturer's manual to make sure the correct grade of oils and fuel are being used. Frequent checking of the antifreeze condition could save an engine.

Several options are available to help contractors who are consistently working in subzero temperatures to keep their machines protected from those rough conditions and ready to run regardless of temperature. Engine block heaters are on most engines these days, and additional heating systems are available for fuel and hydraulic tanks. A diesel-fired cab heater with a timer can provide the operator with a warm cab and ice-free windows.

It is common knowledge that machines that are well-maintained and well-looked after will sell for 30 to 50 percent more than a machine that has been abused. It should be emphasized again that keeping the machine clean is extremely important because dirt that is moist will turn to ice, causing real headaches not just to the undercarriage, but to foot actuated valves in the cab, cables for engine speed or engine stop. The list will go on and on with problems that could occur. Preventing them will save much money in the long run.

Finally, at the end of the work day, take a few minutes to do a walk-around; do a quick inspection, take note of any defects and notify the service department if something is wrong. It could prevent unnecessary downtime in the morning.

**Bobcat Company Marketing Manager John Archibold** believes preventive maintenance is critical to a business. Developing a comprehensive maintenance plan that incorporates the following six maintenance tips will allow owners and operators to focus on the most important part of a company's business – the job.

Tip 1: Read the Operation and Maintenance Manual. It explains in great detail the machine's safety features, instrumentation, controls, ser-





vice schedules, maintenance points and much more.

**Tip 2:** Understand proper fluid levels and correct filters for each machine. Fluids, including engine oils, coolant, hydraulic fluid, grease and drive motor lubricants need to be inspected on a regular basis. Using the wrong lubricants can lead to expensive and unnecessary repairs, so it is important you work with the equipment dealership to match excavator fluids to the proper ambient temperatures and to the manufacturer's recommendations.

For example, synthetic or synthetic-blended oils are formulated with additives that can extend oil change intervals and promote longer engine life. These oils have better cold-weather starting and lubricating performance, as well as additional wear protection during high-performance operation.

Numbers 1 and 2 ultra-low sulfur diesel fuel are the most common specifications in the industry. The 2 grades should be used at temperatures above 15 degrees Fahrenheit. A blended or No. 1 diesel fuel and/or anti-gel additives are recommended when temperatures drop below that.

To protect today's advanced excavator components, it is important to follow published interval schedules for engine, air, fuel and hydraulic system filters, and to purchase original equipment manufacturer (OEM) filters compatible with each machine. Changing filters on a consistent basis can help reduce potential

system contamination and extend the life of core components.

**Tip 3:** Check the battery. Today's compact construction machines constantly draw on the battery. If you disconnect the battery during non-working seasons, such as winter, be sure it is reconnected properly and is fully charged.

**Tip 4:** Inspect the track undercarriage. It is vital to keep compact excavator undercarriages clean to help minimize any material buildup that can contribute to wear. During a visual inspection, examine wear on components to make sure idlers and rollers are functioning properly.

Complete a full undercarriage inspection for excessive or uneven wear, as well as look for damaged or missing components. During a routine machine inspection, check the tracks to see if any components look out of place or need repairs. Look for signs of damage or cuts to rubber tracks.

Inspect the rollers, idlers and drives for oil leakage. Oil leaks could indicate a failed seal, which could lead to a major failure in the rollers, idlers or track drive motors. Many manufacturers' idlers and rollers are permanently sealed and lubricated to provide uptime protection and reduce maintenance costs.

If compact excavators are being operated in colder climates, mud, dirt and other debris may collect and freeze causing problems to the undercarriage. Routine and proper cleaning of the undercarriage helps to prevent unplanned downtime and reduces potential wear later.

**Tip 5:** Prepare attachments ahead of time. Attachments are an important driver for utilizing excavators and require the same attention to maintenance as the machine itself. Complete a visual check of the hydraulic hoses, cylinders and guards on the attachments, which can help determine if damage or wear has occurred. Everything that engages with the ground, from bucket cutting edges to trencher teeth, should be checked for wear and damage.

Operate only those attachments that are approved for use with the corresponding excavator. Connect the attachment and operate it briefly to make sure the attachment works properly before using it on a job site. Check attachment-specific fluid levels, and change fluids as needed.

**Tip 6:** Create a planned maintenance schedule. Work with the compact equipment dealer to establish a planned maintenance (PM) contract to better assess what equipment and tools are needed to keep excavators up and running. A PM contract can help control the cost of ownership.

The dealership service team should know what parts are needed, and ensure that scheduled maintenance is performed in a timely convenient manner. Additionally, a PM contract can schedule easy-to-follow service intervals and document that each item is completed weekly, monthly, quarterly or as scheduled.

**John Deere Product Marketing Manager Mark Wall** said it pays to conduct routine maintenance on compact excavators – especially

with the large variety of attachments and applications available. Equipment owners and operators should seek manufacturers' guidelines to determine the routine maintenance schedule for each machine. In addition, pay attention to:

- Track sag. Proper track tension will prolong undercarriage life.
- Oil change intervals. Use oil sampling to help determine if manufacturer oil change intervals are correct for the application. Frequent change of attachments could introduce more contaminants into the hydraulic system.
- Draining the water off the fuel tank. Today's emissions-compliant engines use fuel to cool components. Warm fuel in the tank on cool days could result in condensation in the tank. Drain the water from the tank per the manufacturer's recommendation and fill the tank at night to help prevent condensation.
- Diesel exhaust fluid (DEF) levels/cleanliness. Keep the DEF clean. Manufacturers have gone to great extents to make sure the system uses clean DEF per guidelines. Keep DEF supply, transfer pump and nozzles clean.

**FOR MORE INFORMATION:**

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## Underground Construction's Annual Congressional, Regulatory Outlook

By Stephen Barlas, Washington Editor

# New Administration Brings Promise Of Positive Change For Underground Infrastructure

The ascension of the President Trump administration holds much promise for the underground construction industry both in terms of regulatory and spending decisions. But the word “promise” implies uncertainty, and the policies Trump mentioned obliquely on the campaign trail, as well as the objectives of congressional Republicans, could end up short of their full flowering because of the exigencies of politics in Washington.

A key example of where the shovel could hit the concrete, politically speaking, is President Trump’s frequent vow to spike infrastructure spending. There are a couple of uncertainties here. First, “infrastructure” has not been defined. There is no question the term applies to roads, highways and bridges. But does it apply to drinking water and sewer systems? There will be an infrastructure task force headed by an outsider, meaning not a cabinet-level official. Will there be a political tug of war between this task force and the federal cabinet departments and agencies, primarily the Department of Transportation and the Environmental Protection Agency, which fund the current infrastructure building programs?

It is not clear whether any infrastructure stimulus will touch the two key underground construction programs: the Clean Water and Drinking Water State Revolving Funds CWSRF/DWSRF). Those, like highway construction, are funded via annual congressional appropri-

tions that have not been set for fiscal year 2017, which started Oct. 1, 2016. During the campaign, Trump promised to triple funding for both programs. One water lobbyist in Washington suggests that Trump’s commitment to tripling the SRF funding may take place over the four years of his term, not in one year. Given GOP and Trump concerns about the size of the federal deficit, it is hard to imagine that a 300 percent increase will be bestowed on the SRFs, even over four years. But as one observer noted, “No one thought he was going to become president, either.”

Of course, Trump also talked about bypassing annual appropriations and aiding infrastructure via an investment tax credit that Commerce Secretary nominee Wilbur Ross has said would cost \$137 billion and stimulate about \$1 trillion of private investment. Would that private investment find the SRFs? Moreover, that tax credit would explode the federal deficit, a result not likely to go over big with House GOP budget hawks, who have one of their own, Republican South Carolina Rep. Mick Mulvaney, in the critical position of director of the White House Office of Management and Budget.

In announcing Mulvaney’s appointment, Trump said, “Right now, we are nearly \$20 trillion in debt, but Mick is a very high-energy leader with deep convictions for how to responsibly manage our nation’s finances and save our country from drowning in red ink.”

### WIIN

Amidst the excitement over potential funding boosts to underground water infrastructure construction, there is a tendency to forget that Congress actually passed an infrastructure bill in the waning days of the last Congress. The Water Infrastructure Improvements for the Nation (WIIN) Act (S. 612) authorizes \$100 million in funding to address health impacts of lead contamination in communities like Flint, MI. The bill says a city can qualify for the funds if it has been given a presidential emergency declaration. Currently, only Flint fits that bill. However, if Flint fails to spend that money after 18 months, whatever is left over would go to disadvantaged communities in the U.S. that have had statewide emergency declarations. The bill also provides \$20 million in credit subsidies for the Water Infrastructure Finance and Innovation Fund, with the goal of obligating at least \$700 million in secured financing for water infrastructure projects across the country. All water systems are eligible for financing.

Final fiscal 2017 funding levels for the SRFs will be set in the spring. As important as those numbers will be, they pale in importance compared to sales of municipal bonds, proceeds from which are the major means for cities and towns to raise money to fix drinking water and sewer systems. Municipal bonds are popular with investors because their interest is exempt from federal taxes. In cal-

endar 2015, for example, localities raised \$33 billion from municipal bond sales to finance water projects. According to the Association of Metropolitan Water Agencies, over the past 10 years, cities and towns have used tax-exempt municipal bonds to finance nearly \$258 billion worth of water and sewer infrastructure projects. But in February 2016, President Obama, in his last budget request, proposed taxing the value of the federal tax exemption at the rate of 28 percent. Republicans have talked about either eliminating the exemption or scaling it back in the context of any tax reform legislation, which Congress seems determined to move forward on early this year.

Also at the top of the congressional agenda is the canceling of federal regulations deemed too intrusive. Some of these rules are construed by those in construction sectors to affect them negatively. A key target is the so-called “Waters of the U.S.” rule issued by the EPA in 2015. It expanded the list of bodies of waters subject to the jurisdiction of the Clean Water Act, meaning anyone wanting to build near those waters, such as a gas, water or sewer pipeline, would have to obtain a federal permit. The expansion extended permitting requirements to the headwaters of navigable waterways and their tributaries, and waters next to rivers and lakes. It defined tributaries for the first time, listing them as “water features with bed, banks and ordinary high water mark, and flow downstream.”



That was among the rule's more controversial provisions. Twenty-seven states filed a joint lawsuit against the final rule, one of them being Oklahoma, where Attorney General Scott Pruitt has been nominated by Trump to be EPA Administrator. Trump termed the rule "extreme" and "unconstitutional." It never went into effect because of the lawsuit, now in a federal court of appeals. But Congress could pass legislation making the rule moot, and is probably likely to do so.

The Army Corps of Engineers issues nationwide permits (NWP) to authorize activities under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899 that will result in no more than minimal individual and cumulative adverse environmental effects. Those NWP allow companies building pipelines to forego obtaining individual permits for construction projects that cross multiple streams, for example, as long as

the construction around the various waters involves minimal dredging, filling or excavation. On Jan. 6, the Corps renewed its 50 NWP, including NWP 12 which addresses utility lines (see page 8). Changes the Corps had proposed in 2016, and requests for additional changes from anti-pipeline quarters, resulted in a flood of 54,000 comment letters. An amazing 53,200 of those pertained to NWP 12.

The application of NWP 12 to oil pipelines crossing Indian tribal lands was among the most controversial issues, and seemed to reflect the current animosities raised by the Dakota Access and Keystone XL pipelines. Activities authorized by NWP 12 must comply with general condition 17, tribal rights; and general condition 20, historic properties. The Corps modified general condition 17 to make it clear that the district engineer who receives a preconstruction notification under NWP 12 must complete consultations with affected

tribes before he or she makes a decision on whether to issue the NWP verification.

Probably as partly an outgrowth of opposition to the Dakota and Keystone XL pipeline projects, many commentators wanted the Corps to eliminate NWP 12 and force proposed pipelines to get individual Corps construction permits, even if they posed little environmental damage. The Corps declined to do that.

### Frac-outs

One change the Corps did make to NWP 12 was to allow remediation of inadvertent returns of drilling fluids that can occur during horizontal directional drilling operations. The district engineer may add conditions to the NWP authorization to specify entry and exit points for the drilling equipment.

Also, likely to be completed in 2017 are new federal standards

related to underground natural gas storage facilities. The Pipeline and Hazardous Materials Safety Administration (PHMSA) is simply proposing to incorporate current American Petroleum Institute recommended practices 1170 and 1171 by reference into the pipeline safety regulations. Recommended practices 1170 and 1171 outline standards for the design and operation of solution-mined salt caverns used for natural gas storage, and functional integrity of natural gas storage in depleted hydrocarbon reservoirs and aquifer reservoirs. The only industry concern is how fast PHMSA expects compliance with the standards. The agency has proposed one year from publication of the final rule. The Interstate Natural Gas Association of America wants a much longer compliance timetable. Like many regulatory issues up for grabs, the Trump administration may have something to say about that. **UC**

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# PCCA

## Tackles Members' Top Issues in 2017

The Power & Communications Contractors Association (PCCA), following another strong year for both the association and the markets it serves, moves into 2017 with a full agenda. Priorities include increasing advocacy efforts in Washington, D.C., addressing the shortage of qualified workers in the industry, and providing opportunities for members to meet with their colleagues from around the country and learn more about running successful construction businesses.

The PCCA will hold two meetings in 2017: its 72nd Annual Convention, in March, in Puerto Rico; and the Mid-Year Meeting in September, in Santa Barbara, CA.

These efforts are being led by 2016-2017 PCCA President Todd Myers, Kenneth G. Myers Construction Co.; the Government & Industry Affairs Committee, chaired by Jerrod Henschel, Michels Corporation; the Education Committee, chaired by Heath Sellenriek, Sellenriek Construction; and the 10-Year Planning Committee, chaired by Steve Sellenriek, Sellenriek Construction. Also, lending their time and wisdom are President-Elect Jim Dillahunty, Hengkels & McCoy; 1st VP Larry Pribyl, MP Nexlevel; 2nd VP Dave Aubrey, Okay Construction; Treasurer John Fluharty, Mears Group; and Secretary Bob Breeden, ElectricCom.

### Pounding the DC pavement

The PCCA Board voted in July 2015 to greatly expand its government relations efforts and to hire experienced industry advocate Eben Wyman to lead the charge. In 2016, the Government & Industry Affairs Committee, or PCCA's "citizen lobbyists" as Wyman calls them, traveled to D.C. on four occasions to meet with lawmakers, congressional staff, federal agencies, owners' groups and other industry associations. At these meetings, PCCA not only advocates on behalf of its members, but also educates people about power and

communication construction, and gathers information about initiatives that will impact the industry.

One initiative in 2016 that could tremendously impact the power and communication construction industry, as well as the greater excavation community, is the proposed Gold Shovel Standard (GSS). This new certification and monitoring program is intended to reduce damage to underground facilities during excavation, but instead singles out excavation contractors and subjects them to a new layer of training, reporting and information-sharing requirements. GSS began in the gas industry and is now being peddled in virtually all underground infrastructure markets.

PCCA, as a member of the Common Ground Alliance, believes that damage prevention is a shared responsibility among all stakeholders involved in the process, not just excavators. The PCCA position is that damage prevention requires mandatory participation in the one-call process (no exemptions), timely and accurate locating of facilities, and "potholing" by contractors. In the coming year, PCCA will continue promoting these three pillars of damage prevention and working with other excavation groups to oppose unfair burdens on the excavation community.

PCCA plans to maintain an aggressive advocacy agenda in 2017 and will be working with the President Trump administration and new Congress to facilitate infrastructure spending, tax reform and regulatory relief. In fact, the Trump transition team recently contacted a PCCA contractor for feedback on what the new administration can do to remove roadblocks to power and communications projects. The PCCA member relayed the importance of streamlining the electric transmission permitting process. For the broadband side, he sent them PCCA's position papers supporting accelerated distribution of FCC resources and the need to en-



PCCA 2016-17 President Todd Myers, Kenneth G. Myers Construction Co.

sure that broadband speed standards keep pace with consumer demand. PCCA is eager to maintain this dialog and be a resource for the new administration.

Who will do the work?

When talking to utility contractors about the issues that keep them awake at night, it doesn't take long before they get around to the acute shortage of qualified workers in the industry. It's an issue that cuts across all PCCA membership types: power and communication, contractors and vendors, big companies and small, privately and publicly owned, and in all regions of the country.

In 2016, PCCA created the PCCA Education & Research Foundation, in part to address the workforce shortage in the industry.

The association is moving forward with several initiatives aimed at alleviating the worker shortage. First,

PCCA established a fund to provide up to four scholarships per year for children of PCCA members and their employees. PCCA has begun accepting applications and will award its first scholarships for the start of the 2017-'18 school year.

At the same time, the PCCA Education Committee has been working on plans to develop and endorse a utility construction curriculum for technical schools and community colleges that can be transported around the nation. PCCA member Sellenriek Construction, in Jonesburg, MO, has been working on such a curriculum with the State Technical College of Missouri, and PCCA is developing a curriculum approach that can be implemented by other PCCA-member companies in their areas.

PCCA believes that one large obstacle to entry into the construction



industry for graduating high school students is their parents' desire for their children to get a college education. These two initiatives target that belief with both funding of higher education and the development of a higher education curriculum that directly addresses utility contractors' needs.

### Meetings

In 2016, PCCA held its 71st Annual Convention in March at the Ocean Reef Club in Key Largo, FL, where 375 attendees enjoyed topical educational sessions, the Annual Associates Exhibit, a rousing keynote from NFL and Vietnam War veteran Rocky Bleier, and plenty of good times for which PCCA is famous. PCCA also feted outgoing President Tim Killoren and honored the late Ken Atkinson with induction into the PCCA Hall of Fame.

The 2016 Mid-Year Meeting drew

more than 200 association members and their families to the Kalahari Waterpark in Sandusky, OH, in July. The meeting program was filled with educational opportunities, including sessions on employee motivation, retention and productivity; making sense of the 2016 elections; and a Leadership Development Program refresher on financial management. The Mid-Year also featured the induction of Herb Fluharty in the PCCA Hall of Fame, the always-popular Construction Industry Roundtable, the PCCA Golf Tournament and several relaxed networking events.

PCCA has two meetings slated for 2017: the annual convention, March 17-22, at the El San Juan Resort & Casino in Carolina, PR, and the Mid-Year Meeting, Sept. 20-23, at the Bacara Resort & Spa in Santa Barbara, CA.

For more information on the meetings and to learn more about PCCA, visit [pccaweb.org](http://pccaweb.org).

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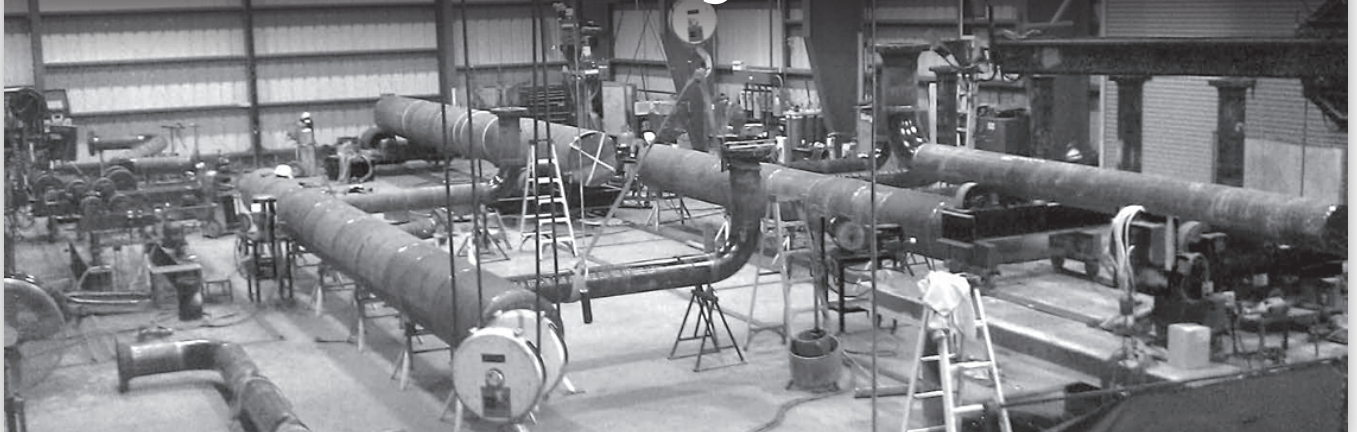
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## Jobsite Geo

By Amster Howard

# Soil Testing: Updating Specifications

Project documents pertaining to soil testing for pipeline construction often do not reflect the latest version of the American Society for Testing and Materials (ASTM) standards (or others). This may cause conflict with regulatory agencies, third-party inspection forces, testing agencies, and the contractor's understanding of how the specification documents apply to the project. Some of the more common outdated references to ASTM standards involve soil classification, soil plasticity, Proctor compaction tests and the nuclear density gauge.

In addition to project documents, the latest version of soil testing standards should be referenced in trade association and manufacturer's manuals, guides and instructions.

### Soil classification

The Unified Soil Classification System (USCS) is the most common soil classification method used in civil construction works. The ASTM standards for the USCS are:

- D 2487 Classification of Soils for Engineering Purposes (Unified Soil Classification System)
- D 2488 Description and Identification of Soils (Visual-Manual Procedure)

In 1982 significant revisions were made to these two standards. However, many specifications and project documents still have not incorporated these changes that were made more than 30 years ago.

The 1982 changes include using precise numbers from laboratory tests, requiring the presence of 30 percent or more sand or gravel before adding the descriptive term sandy or gravelly, and re-defining organic clay and organic silt. Additionally, the names for the soil groups were formalized; for example, there is a specific definition for what silty clay means.

Some very plastic soils are difficult to compact, and may shrink and swell when dried or when water is added. Many specifications limit soils suitable for construction to those with a plasticity index (PI) of 40 or less. The PI is the difference between the liquid limit and the plastic limit of the soil and is a convenient representation of its plasticity characteristics. The percent compaction required for embankments (i.e. 98 percent or 95 percent Proctor) is sometimes based on the PI of the soil. In other cases, the liquid limit is used as a criterion.

ASTM D 4318 Standard Test Methods for Liquid Limit, Plastic

### ASTM Designations

ASTM publishes procedures for testing soils yearly. The standards are revised frequently and are required to be re-approved every five years. If your project documents reference ASTM standards, the applicable standards are those that were in effect the year your specifications were issued. An exception would be specifications that refer to ASTM standards with year designations. Each standard has a date; for example, ASTM Designation D 9999 – 02 (2007). The first date reference 02 indicates the current standard was last revised in 2002. The second date (2007) means the 2002 version of the standard was re-approved in 2007.

Limit and Plasticity Index of Soils first appeared in 1983. This standard replaced D 423 Method of Test for Liquid Limit of Soils and D 424 Method of Test for Plastic Limit. These latter two standards were withdrawn in 1982, yet are still inappropriately referred in some project documents.

One of the significant changes made in 1983 was the emphasis on wet preparation of the soils for testing. Wet preparation refers to a test protocol that maintains the soil at its natural moisture content. Dry preparation allows letting the soil air-dry for testing. The soil is dried to facilitate screening the soil. The tests are performed on soil passing the No. 40 sieve.

The liquid and plastic limits of some soils that have been allowed to dry before testing may be considerably different from values obtained on non-dried samples. The liquid and plastic limits of soils are often used to correlate or estimate the engineering behavior of soils in their natural moist state. In these cases, soils should not be permitted to dry before testing. This is particularly true for soils suspected of having enough organic matter to affect the engineering properties.

You should be aware that D 4318 states, unless specifically requested, the tests shall be performed using the wet preparation method. However, the wet method is more expensive than the dry method and,



for most construction projects, is not warranted. Accordingly, the project documents, when referring to D 4318, should state that the dry preparation method is to be used.

### D 698 Method D

The percent compaction (e.g. percent Proctor) is based on comparing the in-place density of a soil to its maximum density determined in a standard laboratory test. To be representative, the percent compaction should be determined using soil with the same characteristics. Since gravel size particles may significantly affect compaction, the gravel content is key for the comparison. The laboratory compaction tests use cylinders that are restricted in size and are, thus, limited to a maximum particle size that should be tested. To ensure that the percent compaction comparison is characteristic of the soil, gravel can mathematically either be added to, or subtracted from, the

soil. This is sometimes referred as a rock correction.

Early versions of ASTM D 698, Laboratory Compaction Characteristics of Soil Using Standard Effort, had a method D, in which the gravel fraction is physically replaced with a finer fraction and the test performed to get a maximum density. Method D was eliminated almost 40 years ago. The last standard containing Method D was the 1978 version. The current ASTM D 698 still warns that Method D is inappropriate to determine the maximum density of soils containing oversize fractions. The same method D was also included in ASTM D 1557 (modified Proctor) and the prohibition is repeated in the current versions of D 1558. However, some current specifications still incorrectly list Method D as an accepted method.

The proper methods for incorporating a rock correction are detailed in ASTM Manual 70, Quality Control of Soil Compaction.

Up until 2007, there were two separate ASTM standards for using a nuclear gauge density to determine the in-place density and moisture content of soils:

- D 2922 Density of Soil and Soil-Aggregate In Place by Nuclear Methods (Shallow Depth)
- D 3017 Water Content of Soil and Rock In Place by Nuclear Methods (Shallow Depth)

These two standards have been replaced by D 6938 In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

In addition to combining the two standards, D 6938 contains significant revisions for using a nuclear gauge to measure in-place density and water content. Specifications and contract documents should now be referring to this standard to ensure that the project construction control program is consistent with the latest procedures.

### Summary

The ASTM standards pertaining to soil classification, soil plasticity, Proctor tests and nuclear density gauges have been revised. The current versions should be referenced in the project documents for earthwork.

For most pipeline projects, the project documents should state that the dry preparation method is to be used when referring to ASTM D 4318 (Atterberg limits).

### REFERENCES

ASTM Manual 70 (2011) Quality Control of Soil Compaction  
Howard, Amster (2015) Pipeline Installation 2.0

*ABOUT THE AUTHOR: Amster Howard is a civil engineering consultant from Lakewood, CO. This article is based on an excerpt from his book Pipeline Installation 2.0. For more information, go to Pipeline-Installation.com.*

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by Amster Howard

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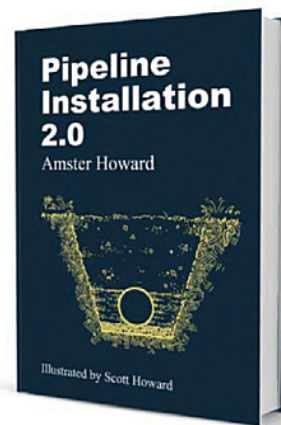
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# APCA Looks To Strong Future

By **Jeff Griffin**, Senior Editor



Sean Renfro

The American Pipeline Contractors Association (APCA) closed out the year 2016 stronger than ever and with a high level of optimism for the energy policies of a new president and administration.

“Over the past 12 to 18 months, APCA members were involved in building the majority of new natural gas infrastructure projects to support LNG export facilities along the Gulf Coast, as well as several flow reversal projects, which generally consist of taking older pipelines that were initially built to transport natural gas from the Gulf Coast to the Northeastern markets,” said Sean Renfro, APCA president. “Later, flow design was reversed to enable the gas flow from the Utica/Marcellus Shale plays to the LNG export facilities along the Gulf Coast areas of Louisiana and Texas.

Also, several of the APCA member companies have been involved with improving the nation's energy infrastructure by building several hundred miles of new pipelines and compressor/pump stations that will supply gas and oil to existing manufacturing plants, and will also be used to convert some older existing power plants to natural gas as a fuel gas source.

“In addition to all of the new infrastructure being built throughout the United States,” Renfro said, “our members always are heavily involved in improving the pipeline and facility owners' assets with enhanced integrity management programs, and by providing maintenance and construction crews to improve the infrastructure's integrity.

“Finally, there were a few projects built by APCA member companies to supply gas to growing Mexico markets.”

#### OSHA alliances

APCA continues to participate actively in its alliance with OSHA, which is a vehicle for APCA and OSHA to provide association members and others

in the pipeline construction industry with information, guidance and access to training resources to help protect the health and safety of employees. It also acts to reduce and prevent accidents related to the operation of equipment such as bulldozers, excavators and trenchers, and from hazards of hydrostatic testing.

APCA makes this information available via its website and other outreach programs.

“Safety professionals from our regular members and associate members,” he continued, “meet quarterly to discuss best practices, industry challenges, and new regulations and initiatives. They are then either communicated to others in the industry or further discussed with OSHA.”

Looking ahead, Renfro said he believes President Trump and his incoming administration will support and promote domestic growth initiatives in the energy sector for which APCA regular members and associate members provide services.

“I think the uncertainty in the industry related to the prior administration will be challenged by the new administration,” he said. “This will encourage domestic production for the United States to become self-sufficient and less dependent on foreign production to fulfill our nation's needs for oil.”

Renfro said attendance at the 2016 APCA annual convention in San Diego set a record, and a strong turnout is expected for the 2017 convention at Aruba in March. His two-year term as president will end at that meeting for Renfro, who is senior vice president of Sunland Construction Inc. At that time, William Schettine, CEO of Meridien Energy, will assume the APCA presidency.

APCA was established in 1971 as a regional alliance of seven contractors for the purpose of promoting mutual interests and addressing concerns of the pipeline industry. It has evolved into a national association of merit shop pipeline and station contractors dedicated to promoting the mutual interests of its contractor and associate members, and the pipeline industry.

J.D. Lormand is association executive director. Information on APCA and its programs are available at [americanpipeline.org](http://americanpipeline.org). **UC**



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# Easy Apps

By Jeff Griffin Senior Editor

## For Underground Contractors

“There’s an app for that,” it’s often said.

With literally millions of apps available worldwide and more being introduced every day, it seems there must be an app for everything.

Yet, for many small- and medium-sized businesses, available apps often don’t satisfy specific needs, especially of specialist businesses. Without an information technology (IT) professional or IT staff, many business owners make do with off-the-shelf software applications that do not completely meet their needs.

An option is a do-it-yourself app that can be designed to cover very specific segments of business operators. A recent entry in this market is FileMaker Inc., a subsidiary of Apple.

Introduced in August 2016, FileMaker claims that by making custom app development easier, its new product is enabling companies to streamline their operational processes to be more efficient and boost productivity.

### What’s included

FileMaker consists of a free Service Bundle Toolkit and an Idea To iPad Bundle for sale directly from FileMaker and Apple stores. Purchase of the bundle includes 10 hours of consultation with a FileMaker expert. Apps developed with FileMaker work

seamlessly across iPad, iPhone and Windows.

The free tool kit includes an e-book that walks you through the process of creating a custom app and starter app to help businesses begin addressing the most common “pain” points.

The Idea To iPad Bundle includes an annual license of FileMaker Pro Advanced software to create custom apps, annual license of FileMaker Server to deploy custom apps, 10 hours of consultation with a FileMaker Business Alliance professional developer, and support of a Customer Success Manager to maximize the value of the 10-hour consultation.

Customer teams are seeing great results with custom apps that they build themselves.

“FileMaker custom apps,” said Ann Monroe, vice president of worldwide marketing, “are quick and easy to build and deploy, and the potential cost-savings is huge. With custom apps, our customers are reducing manual processes, data entry errors and inefficient tasks. They are communicating better, sharing information more fluently, and boosting revenue and productivity.”

FileMaker has been available a relatively short period of time and the company could provide no clients using the application for segments of

underground construction, but the potential for that market is viewed as promising. While FileMaker is attractive to small businesses, it also is being used by large companies involved in construction.

### Custom

For example, Braun Electric, a heavy industrial electric contractor in Bakersfield, CA, has developed several custom apps with FileMaker.

“Applications should be designed around people and processes, instead of people having to change the way they work in order to utilize an application,” said Jeff Coghlin, Braun Electric’s IT manager. “This is why we decided to build our own FileMaker application to fit our processes.”

Braun’s first project with a custom FileMaker application was to digitalize one of its most critical and complex business processes: job safety analysis (JSA). Of course, safety is a priority in underground construction and organizations in that field face several very job-specific challenges.

As they are with many companies, all of Braun’s JSA information and forms had been printed on paper. For Braun, that required two, three-ring binders. When there was a change to an existing procedure or a completely new process was created,

new sheets of paper had to be printed, laminated and hole-punched for every binder in the company – including those carried in the 300-plus company vehicles – and the old sheets collected, a task requiring two to three weeks.

Today, the process is accomplished electronically.

The company’s custom FileMaker app for iOS enables team members to track permits, the number of times that safety personnel visit a crew, ensure proper personal protective equipment is used, review site diagrams and much more. With on-site, detailed information, team members can collaborate better to consider all the factors involved and improve safety.

Benefits, he said, include delivery of a better quality end product at reduced costs and paper use, increased efficiency and productivity, increased customer satisfaction, and an improved safety paradigm that has completely altered the business process.

Following implementation of the safety app, Braun has used FileMaker on several other business processes, including asset management of trucks and equipment.

Ultimately, Coghlin said, Braun Electric plans to employ the FileMaker platform to automate as many as 30 core business processes. UC





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- 10 Utility Contractor water & sewer)
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- 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
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- B \$25,000,001 to \$50 Mil.
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By Edward Alan Ambler & Sam Boyd

# Encapsulation Of Asbestos Cement Pipe Fragments During Pipe Bursting

AM Trenchless, Boyd Tech Inc., Murphy Pipelines and TT Technologies have worked together to develop field tests for application of an encapsulation media to pipe fragments that remain after pipe bursting.

The team worked to develop a fluid media that would be applied to the pipe fragments during pipe bursting procedures to form a coagulated mass that would harden to a density similar to that of workable soil cement. The team will perform field testing to ensure the encapsulation media and pumping system delivers encapsulation fluid to fragments remaining, after pipe bursting asbestos cement pipe to effectively capture them in a coagulated mass.

Regulations governing working with buried asbestos cement pipelines are often not well understood, and interpretations of the rules by everyday regulators can vary significantly from state to state and region to region. Boyd Tech realized the need for a new technological solution that provides positive rehabilitation of the existing asbestos cement (AC) pipe line and minimizes the potential for fibrous release if the remaining AC pipe fragments would be encountered at a later date. Boyd Tech teamed up with AM Trenchless, a recognized leader in technical background, publications and research on AC pipe bursting; Murphy Pipelines,

a leading contractor performing AC pipe bursting throughout North America; and TT Technologies, an industry-leading equipment manufacturer for pipe bursting, to develop a workable solution.

The team worked diligently to develop a method and product for encapsulation of the AC pipe fragments. The specific encapsulation media was required to have parameters to allow future excavation and removal of the AC pipe fragments, but still remain as a bonded and coagulated mass. The media is also required to be workable and pumpable with specific viscosity parameters that allow a standard storage tank and pumping mechanism to deliver the encapsulation fluid through a fluid delivery hose to the longest potential AC pipe bursting run that could be installed by any contractor.

## AC pipe fragments

There are three primary scenarios in which the AC pipe fragments that remain can be encountered during potential future excavation. The first is the crews that are performing the actual AC pipe bursting work, which may or may not include service restoration. The second is a third-party utility installer excavating to install another utility adjacent to the remaining fragments of AC pipe. It is possible a third-party utility installer

could encounter the remaining AC pipe fragments during excavation. However, it is unlikely that the utility installer will install their facility within the close proximity where the AC pipe fragments remain. The third and least likely scenario is for a resident or home owner to excavate directly on top of the AC pipe fragments that remain in the surrounding few inches of soil around the new pipeline.

These three scenarios provide further analysis that the remaining AC pipe fragments are not likely to provide exposure scenarios that exceed National Emission Standards for Hazardous Air Pollutants (NE-SHAP) regulatory exemption limits of 260 linear feet or less. However, innovation and development of the encapsulation method to be used in conjunction with pipe bursting, solidifies safe working practices and completely diminishes the potential for future asbestos fiber release.

Selection of the parameters for the encapsulation material is a delicate task. The material is required to be viscous to allow it to be pumped the distance of the pipe bursting pull, while being re-mixable if the crews encounter a problem during pipe bursting and need to stop the application of the fluid to fix the problem. The encapsulation fluid would have to adapt to widely varying soil conditions that could be

encountered for any existing pipe locations. The encapsulation material will have to fully penetrate the surrounding soils, and then bond and adhere to the AC pipe fragments to keep them contained in a coagulated mass.

The remaining encapsulated coagulated mass would also have to be easy to excavate and move during future work with the remaining production pipe line. If the encapsulation material hardens like a concrete, future excavations would require a cut saw to remove sections of the remaining encapsulated coagulated mass, which would greatly increase the likelihood of asbestos fiber release.

The team sought to establish a preferential field testing schedule, which included isolated field testing on non-production pipelines that could be studied in detail, as well as production pipeline field testing. The team identified the potential to perform the isolated field testing within the TT Technologies equipment yard in Aurora, IL. The isolated field testing yard would mimic an actual pipe bursting project with the necessary equipment, pipe strings, etc. The field testing team then identified a potential field test for an actual production pipeline project with the city of Boynton Beach, FL and Murphy Pipeline.





## REHABTECHNOLOGY

### Testing begins

The team started initial testing in October 2015. Boyd Tech designed and manufactured a specialized fluid distribution head and distribution insert for this testing application. The specialized fluid distribution head and insert were made to quickly connect to fluid hoses, provide a completely sealed internal environment and evenly distribute the fluid 360 degrees around the pipe diameter. The fluid distribution head was machined HDPE and could be directly fused to the production HDPE pipeline. The fluid distribution insert was machined aluminum and fit directly inside the fluid distribution head, and connected a fluid delivery hose passing through the production pipeline.

The fluid delivery system which included the mixing and pumping machine, the distribution head and insert, and the fluid hose running through the production pipeline were tested immediately prior to performing the pipe bursting operation. The pipe bursting operation was successfully completed and encapsulation fluid media was observed to be delivered throughout the entire pipe bursting run as evidenced by the fluid pouring out when the expander head made it to the machine pit.

The EncapsulAC fluid starts as a dry powdered material that is mixed

with water prior to pumping through to the fluid delivery system and distribution head. It is a proprietary blend of inert ingredients that are not harmful to the environment in any way. EncapsulAC maintains low enough viscosity to allow pumping for long distances in low head conditions and small-diameter fluid hoses, but sets quickly into a gel-like substance to enable full circumferential penetration into the soil surrounding the AC pipe fragments and production pipeline. It hardens to a natural clay, soil-like structure in the absence of groundwater, but immediately re-absorbs water when present. EncapsulAC ensures workability in the future for the encapsulated mass because it does not harden like cement.

After a successful first day of field testing, the team continued the second day with minor variations in the process. As soon as the pipe string was pulled into place, the encapsulation fluid delivery system was again tested prior to starting the pipe bursting operation. The team was delighted to witness full 360-degree fluid delivery and adequate pressure available to deliver the fluid to the surrounding pipe fragments and soil.

Test holes were excavated in the middle of both pipe run segments to expose the pipe burst vitrified clay pipe (VCP) and the surrounding

soils. Care was taken to not disturb the remaining fragments of VCP pipe and surrounding encapsulation media. Visual observation was made as to how far in the surrounding soil the encapsulation fluid penetrated. The contrast of the encapsulation media to existing ground conditions was also observed. The color of the encapsulation media as identified by Boyd Tech does not occur naturally in any ground conditions, and will therefore give any excavator pause if encountered in the future.

### Checking fragments

Actual fragments of the remaining VCP were excavated to observe the successful encapsulation of the remaining pipe fragments. It is necessary to fully surround the remaining fragments of VCP if this technology is to be applied to remaining fragments of AC pipe that could potentially be worked with in the future. The team focused on delivering the process from theoretical to actual and was happy to observe full penetration of the encapsulation fluid into the soil surrounding the VCP pipe fragments, as well as complete encapsulation of the entire remaining pipe fragment. The pipe fragment was then carefully removed for continued observation as the encapsulation fluid was allowed to harden.

After successful testing of the encapsulation fluid in TT Technologies' yard, the team was poised to conduct field testing on live production pipeline projects. Boyd Tech began work with Murphy Pipelines and the city of Boyton Beach to evaluate project specifics and help deliver a successful demonstration test for encapsulation of the remaining AC pipe fragments.

At the time this article was published, the additional field testing in Boyton Beach was underway. Additional methods of fluid delivery that incorporate pre-chlorinated mechanisms have been created by the project team to provide multiple ways to ensure adequate encapsulation fluid delivery to surround the remaining AC pipe fragments. The team is very pleased with the results of the current encapsulation process and is very positive that regulators, municipalities and owners of AC pipe inventory will view this additional measure as the best defense from future asbestos fiber release and the preferred method to rehabilitate asbestos cement pipe.

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## Illinois Community Utilizes Economical Grouting Solution By Tom Fuszard

Communities and sewage districts looking to save on repairs to leaking laterals are finding chemical grouting a great option. For pipes that are structurally sound, it is often the best method to use. Sugarloaf Township, IL, used this process and discovered that the project paid for itself within approximately two months.

Located in St. Clair County in southwest Illinois, Sugarloaf Township is just outside the Village of Dupo and not far from the Mississippi River. The township contracts with Dupo for sewage treatment. According to Dennis Fouch, head of operations and maintenance, the township's system was installed around 1980. It is comprised of 19 lift stations and about 15 miles of 8-inch pipe (mostly SDR-35) and serves 980 customers.

Fouch, who started in early 2015, likes to look for problems to solve. He found a big one in early 2016. The system was delivering about 8 to 10 million gallons a month of sewage. At \$3.67 per thousand gallons, the bills were "getting out of hand," Fouch said.

Each lift station has two pumps which should run about an hour a day each. He discovered that at one lift station (H, on State Street), each pump was running as much as 1.6 hours per day. Inspecting the pumps and impellers revealed nothing wrong.

Unable to televise and rehabilitate their pipes with internal resources, the township called in contractor Visu-Sewer Inc. which had assisted them in the past.

Televising discovered numerous issues, according to Jon Kremer, senior design engineer at St. Louis-based Gonzalez Companies LLC, the township's contract engineering firm. Many of the laterals connected to the mains by way of a tee. Some of the tees had rotated and broke; in other cases, the laterals had separated from the tees. It's the proximity to the Mississippi River that puts the pipes at risk, Kremer said. The water table is only about two feet down. During certain times of the year the whole area becomes super-saturated. Traffic loads cause manholes to settle and pipes to crack.

The only corrective measure available to the township, Kremer said, would be to dig up and replace the laterals. That process could run as high as \$5,000 per lateral, including excavation and repaving.

### Correct solution

Visu-Sewer offers a host of services to solve problems in a sewer system, according to Barry Howell, business development specialist for Visu-Sewer Missouri LLC, in East St. Louis, IL. For this project, the company quoted lateral sealing services.

Working manhole-to-manhole, Visu-Sewer first televised and cleaned the mains as needed. Next, Visu-Sewer sent in the lateral grout packer. This device can be maneuvered to fully envelope a portion of the lateral and the connection, even one at a 90-degree angle. The portion of the lateral to be grouted is isolated by inflating the packer on both sides of the lateral connection and extending a bladder up the lateral to isolate the first five feet (or more). The isolated area is first pressurized up to a maximum of five psi for 15 seconds.

"If the pressure in the void area drops more than two psi in 15 seconds, the lateral has failed the test," Howell explained. "If a lateral fails a pressure test and it's bleeding off air, we know it's also got enough gap that water is perking."

At that point, Visu-Sewer pumped Avanti AV-100 acrylamide gel grout into the isolated area.

With nowhere else to go, the grouting material is forced through the cracks, fills the voids and merges with the backfill material. The two-part liquid solution gels in under a minute, creating an impermeable barrier outside the cracked or separated joints. "I call it installing outside gaskets," Howell said.

Then the sewer specialist re-applied the air pressure test. After confirming that the area is sealed, the team extracts the packer and moves

on to the next lateral.

The entire project, which entailed inspecting about 30 laterals and rehabilitating seven, took two days. "It's an excellent rehabilitation tool for structurally sound laterals that just leak," Howell said.

One aftereffect of chemical grouting is extraneous gelled grout that peels away gradually over time from the interior of the pipe after a successful procedure. Randy Belanger, sales manager for Visu-Sewer in Pewaukee, WI, said this excess material is a natural consequence of the grouting process.

Some grout forms between the packer and inside wall of the pipe. "This residual grout breaks off over time and flows downstream," Belanger explained. "The sealed connection is still fine. The sealing process takes place outside the pipe, and is not affected as this residual grout washes away."

Chunks of the rubbery material vary in size, but usually are small. They are captured by the intake screens and don't present a problem for the treatment plant or pumps.

Can a small leak make a difference? Howell offers this formula: A leak of 1 gallon/minute equates to 1,440 gallons a day. That's 525,000 gallons a year. If your cost is \$1.50 per thousand gallons – a conservative figure, he admits, when compared to Sugarloaf Township – that simple leak adds \$787 a year in



treatment costs alone.

"I describe it as a death by a thousand cuts," Howell explained.

### Impressive results

After rehabilitation, the flow rate at lift station H dropped 18,000 gallons a day. With the rate now at \$4.17/thousand gallons, the repair means even more to the township's taxpayers.

"We're saving all kinds of money by fixing that problem," said Foutch, estimating the project paid for itself in two months. "As of right now, I'm 100 percent happy; so is the board."

Those are the kinds of results that are typical with this process. "It has been our experience that we can take their money, their budget, and really stretch it if we just do grouting where grouting is indicated," Visu-Sewer's Howell said. "It is really a budget stretcher."

Not only do communities save money with grouting, but these repairs help them meet EPA's standards regarding clean water at treatment plants.

Kremer of Gonzalez Companies said communities need to be cognizant of their sewage flows, even with newer systems. Referring to Sugarloaf Township, he said they "went on a mission to locate: to find these things and repair them."

Howell added that while grouting is typically a great option, it's not the only one. Each situation is unique, he advises, so make sure you evaluate thoroughly. Then decide on the best solution.

In an era of tight budgets, it's important for communities to be mindful of all their options. Chemical grouting can save a tremendous amount of time and money.

### ABOUT THE AUTHOR:

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### FOR MORE INFORMATION:

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Avanti International  
(800) 877-2570, avantigrout.com

## Proper Bidding Ensures A Successful Grouting Procedure

While it's good to save money on pipe rehabilitation projects, going for the lowest bid without well-written specifications can actually hurt over time.

Visu-Sewer's Randy Belanger said that bids typically don't call for a set amount of grouting material per connection/joint or project, which leaves it up to the contractor to estimate the failure rate and the amount of grout needed. Each leak is unique, however, and requires a varied amount of grout to be sealed thoroughly. Under many project specifications, there is no allowance beyond the estimated industry average – and, therefore, no incentive – for pumping additional material when needed to complete the job properly.

A better method of bidding, Belanger said, involves specifying an assumed failure rate and an estimated per-gallon quantity of grout material per failure. In addition, adding a per-gallon line item to the bid form for additional grout needed beyond what is called out in the base bid will ensure each failure is thoroughly grouted. This would encourage contractors to pump the amount of material needed for each seal without additional unexpected cost. The final per-lateral cost would reflect any additional grout needed throughout the project.

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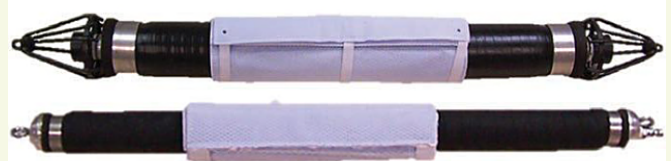
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Top: Mainline point repair system; Bottom: Lateral point repair system



Field testing shows the strength of IRSI repairs; the original pipe cracked, but the IRSI repair stayed intact.



# SPIDER Scanner

## Provides New Perspective For Manhole Inspection

CUES, a leading manufacturer of closed-circuit television pipeline inspection equipment, has introduced an innovative new wireless manhole scanning technology called the SPIDER scanner.

The SPIDER scanner is the only truly wireless, color, manhole inspection technology in such a lightweight and compact form, said Pierre Mikhail, director of CUES manhole inspection division.

"The SPIDER scanner provides a new outlook on how manhole data is collected and applied," said Mikhail. "While other cameras and inspection devices use a payout reel to determine how deep the camera is in a manhole, the 30-pound, tether-less, self-contained SPIDER typically is deployed using a telescopic mast or tripod for stability.

"It is operated with a tablet computer which controls scanners and lights. This technology frees manhole scanning from problems associated with inaccurate, poorly calibrated cable counters and poorly managed cables. SPIDER does not require a truck or data/power cable for operational use. Scanning data is recorded on the unit."

SPIDER collects millions of three-dimensional (3D) points during each manhole scan that provide engineering and survey quality information about manhole geometry and condition. Information gathered can be used for structural assessment, pre- and post- rehabilitation analysis, hydrological surveys and for general condition assessment.

SPIDER is available now through CUES distributors and was unveiled at the recent 2017 Underground Construction Technology Conference (UCT) in Fort Worth, TX.

SPIDER produces 3D, textured point cloud renderings of manhole geometry to provide visualization that can be imported into a wide range of 3D viewers and can be delivered in these file formats:

- 3D MPEG video



By Jeff Griffin, Senior Editor

SPIDER collects millions of three-dimensional (3D) points during each manhole scan that provide engineering and survey quality information about manhole geometry and condition.

- Point Cloud which can be converted to Surface Model, CAD Model and Virtual Model
- MACP Report using a NASSCO certified software

SPIDER provides a 190-degree field-of-view live video stream, an ideal tool for infiltration and inflow studies that depend on live video to detect moving water.

Based in Orlando, FL, CUES manufactures and sells closed circuit television video (CCTV) inspection, rehabilitation, pipe profiling equipment and asset inspection/decision support software for sanitary and storm sewers, industrial process lines and water lines. CUES also designs, manufactures and sells a broad range of pipeline rehabilitation and profiling equipment.

FOR MORE INFORMATION:  
CUES  
800-327-7791, [cuesinc.com](http://cuesinc.com)



### 3-D COLOR WIRELESS MANHOLE SCANNING



ACCURACY  
< 5 mm

SPEEDS  
17 ft / min

WEIGHT  
28 lbs

CABLE  
none

The CUES SPIDER Scanner is the first wireless and color manhole inspection technology of its kind, built in a lightweight and compact form factor.

- The *only* COLOR 3-D point cloud manhole scanner
- Weighs less than 28 lbs
- True wireless scanner (no power or data cable)
- Scanner operates at 17 ft/min
- Tablet-operated
- Creates a 3-D color CAD model of the manhole and a 360 degree video
- Measure the manhole model with at least 5 mm accuracy



"The Standard of the Industry"



• • • • • [www.cuesinc.com](http://www.cuesinc.com)



# TECH TIPS

FROM NASSCO

TECH TIPS BY NASSCO IS A BI-MONTHLY ARTICLE ON TRENDS, BEST PRACTICES AND INDUSTRY ADVICE FROM NASSCO'S TRENCHLESS TECHNOLOGY MEMBERSHIP PROFESSIONALS.

## INSPECTION TECHNOLOGY FOR OUTFALLS, SIPHONS, AND FORCE MAINS

By NASSCO Member Michelle D. Beason, PE, National Plant Services Inc., a Carylton Company

Robotic cameras utilizing Closed Circuit Television (CCTV) have been used since the 1960s to inspect sewer main lines, but CCTV cameras can only clearly inspect the pipe interior above the water line. Submerged assets such as outfalls, siphons, and force mains have historically been much more difficult to inspect due to the inability to remove these assets from 24/7 service, and due to the technology limitations that hinder a detailed inspection while in service. Consequently, these assets have mostly operated without any inspection, and with very little maintenance, since they were first constructed. However, there are more sophisticated technologies that can provide valuable information about these important submerged assets.

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NEW 2D AND 3D SONAR TECHNOLOGY PROVIDES MUCH GREATER DETAIL UNDER WATER BY USING MULTI-BEAM IMAGING TECHNOLOGY THAT CORRECTS FOR MOTION AND POSITION CHANGES OF THE DEPLOYMENT PLATFORM TO CREATE HIGH DEFINITION IMAGES.

### Sonar Profiling

Sonar is an acoustic testing method that provides a scan of the submerged portion of an asset. Sonar can profile the interior of a siphon or outfall, providing information on the level of debris inside of an asset, and also the structural integrity of that asset. However, as sonar will only report on what the acoustic wave hits, anything hiding underneath piles of debris or grease will not be discovered. Typically, sonar is first deployed to determine if a submerged asset needs cleaning. If there is debris in the asset, cleaning should follow so that an unobstructed sonar scan can be obtained, then the asset is re-inspected with sonar.

Sonar can be deployed on a floating raft, tractor platform, Remotely Operated Vehicle (ROV), or in a sonar cage. Sonar Profiling provides a circumferential profile scan, or 'slice', of the pipe interior, but results cannot be PACP coded as it is difficult to clearly identify the exact nature of a defect because of the one-dimensional view. Sonar does provide one of the best evaluations of wastewater assets that cannot be removed from service, and where lack of water clarity would prohibit an underwater inspection with a CCTV camera. If an asset can be cleaned, bypassed, and dewatered, CCTV inspection is still the best method to assess the condition of a submerged asset through visual identification and PACP coding of all defects. Sonar profiling can be completed in sewers and chambers that are 8" and larger.

### 2D and 3D Sonar

New 2D and 3D Sonar technology provides much greater detail under water by using multi-beam imaging technology that corrects for motion and position changes of the deployment platform to create high definition 2D and 3D sonar images under water. Multi-beam sonar operates in a very similar way to laser scanning. In fact, the sonar point

cloud can be exported and joined with LiDAR data (3D Laser that measures the pipe above the water line) to create above and below surface models. The technology uses thousands of overlapping narrow beams to create a continuous 360° profile to create a dense 3D point cloud. This technology was designed to be mounted on a lightweight ROV to provide mobility and control to the sonar unit, and was invented for the inspection of dams and deep underwater structures, but can be used for large diameter outfall inspections, tunnels, and sewer lines. The minimum range for the 2250KHz sonar system is approximately 1.6 feet from the sonar transducer, which equates to a pipeline that is at least 4 feet in diameter.

Where water turbidity is low, and the water is essentially clear, ROVs have been a successful technology to deploy CCTV and sonar to inspect large diameter assets. Powerful lighting on the ROV can typically illuminate a pipe interior sufficiently to perform a CCTV Inspection and PACP coding of defects. Sonar can also be added to the ROV to simultaneously obtain sonar data. ROVs are either controlled via a fiber optic cable or can be free-swimming.

### Live View CCTV, Leak Detection and Pipe Wall Scanning

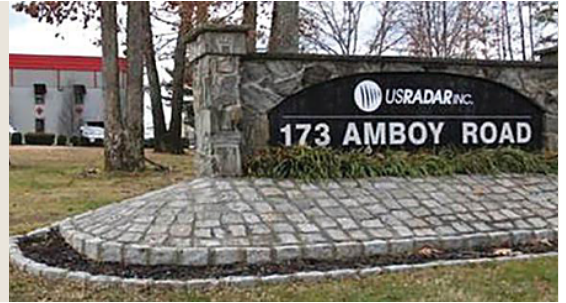
Several newer technologies provide live CCTV, leak detection via a hydrophone, sonde for locating, and pipe wall thickness scanning. These tools can be vital for small diameter force mains, siphon inspections, and water mains that cannot be removed from service, although CCTV results are limited by water turbidity. One such technology only needs a 2-inch insertion point, and the asset can remain live and in service with up to 230 psi operating pressure. Inspection range is for pipelines from 3 inches, up to 45 inches in diameter.

## US Radar Opens New Facility And Training Center

Ground-penetrating radar (GPR) manufacturer US Radar Inc. has moved to a new 16,000-square-foot facility in Morganville, NJ, with expanded office and warehouse space, and increased capabilities for research and development, production and customer training.

The building is set on six acres of land, some of which will become onsite training grounds for users of US Radar subsurface locating systems in various industries.

"We designed our training course with the typical operator in mind, and to make it easier for aspiring locators to understand what to look for," said Ron LaBarca, US Radar president. (732) 566-2035, [usradar.com](http://usradar.com)



## SAUEREISEN

### PPG To Distribute Sauereisen Wastewater Substrate-repair Products

PPG has reached an agreement to distribute several wastewater infrastructure-repair products manufactured by Sauereisen, a leading global producer of corrosion-resistant materials for industrial applications.

Products PPG will offer include:

- RestoKrete substrate resurfacer No. F-121, a water-resistant, high-strength substrate-repair material engineered to prevent inflow and infiltration in concrete or brick manholes.
- RestoKrete No. 208 filler compound, an epoxy-based mortar designed to fill voids, irregularities and air pockets in concrete.
- RestoKrete No. 209, an epoxy-based filler compound formulated to provide a smooth surface specifically for application of epoxy monolithics by filling voids, irregularities and air pockets in concrete and steel.
- RestoKrete No. 209FS filler compound, a faster-setting version of the No. 209 product.

"Sauereisen's materials are heavily specified in wastewater applications and preferred by engineers around the world," said Tony Persutti, PPG water and wastewater business development manager, protective and marine coatings. "Adding their products to the PPG portfolio gives our customers more convenient single-source access to world-class solutions from two globally recognized companies." (888) 977-4762, [ppgpmc.com](http://ppgpmc.com)



Felling Trailers president/CEO, Brenda Jennissen, congratulates the winning bidder, Patrick Stepan.

### Felling Trailers

Felling Trailers conducted its fourth online auction to benefit a non-profit organization - this time the American Brain Tumor Association (ABTA).

To bring awareness of and support to the ABTA, Felling Trailers manufactured a FT-3 drop deck utility trailer, one of its most popular trailers, and auctioned it online for seven days.

Tredit Tire generously donated the wheels and PPG Commercial Coatings donated the custom metallic grey paint for this trailer and cause. One hundred percent of the \$2,250 winning bid benefits the ABTA, the first and is now the only national organization committed to funding brain tumor research, and providing support and education programs. (800) 245-2809, [felling.com](http://felling.com)

### Terramac

Terramac, a leading manufacturer of innovative rubber track crawler carriers, expands its representation in the North American market, adding three new companies to its dealer network.

Power Equipment Company, a subsidiary of Bramco Inc., headquartered in Louisville, KY, will offer the versatile Terramac product line for sale or rent, as well as full-service maintenance and parts, in Arkansas and Tennessee, across a wide range of industries.

Oklahoma City-based Kirby-Smith will provide Terramac crawler carriers to serve the pipeline industry with customizable equipment that accommodates various pipeline applications.

Tri-State Truck & Equipment will offer both standard and customized Terramac units to serve a wide range of industries, including general construction, environmental, mining and utility, in Montana and

Wyoming. (630) 365-4800, [terramac.com](http://terramac.com)

### Shurtape

Shurtape, one of the nation's leading manufacturers of pressure-sensitive tape, recently partnered



with Dura-Bond, one of the premier suppliers of gas transmission pipeline, to develop CP 901 High Performance Masking Tape.

The specialized tape is designed to meet the rigorous pipe production process. Masking tape is applied to pipe ends after the heating phase to keep them free of protective coating, a necessity as the protective coating can interfere with the ability to weld pipes in the field.

CP 901's high-tack rubber-based adhesive system offers quick stick and strong adhesion for high-speed production, and sticks well to itself to prevent coating damage due to loose tape ends. Its durable crepe backing resists charring up to 450-460 degrees for short time durations (1-2 minutes) while moving through the coating booth, and its splice-free feature means there is less worry about tape breakage. (888) 442-8273, [shurtape.com](http://shurtape.com)

### Solaris/Water Midstream Partners

Solaris Midstream Holdings LLC will merge the operations of its Solaris Water Midstream subsidiary into Water Midstream Partners LLC (WMP), a Dallas-based provider of water midstream services to producers working in the Midland Basin of West Texas.

Following the transaction, Solaris Water will provide water gathering and disposal services to more than 20 E&P operators who have dedicated approximately 50,000 acres to Solaris Water's assets. The WMP assets include more than 35 miles of commercial saltwater gathering pipelines serving multiple producers in Midland, Howard, Martin and Dawson counties. In Midland County, the combined Solaris Water and WMP systems will become the 100,000-barrels-per-day Solaris North Midland County Saltwater Disposal System.

Current WMP president, B.G. Clark, will become the chief operating officer of Solaris Water and will oversee day-to-day operations.



# PEOPLE



## Toro

The Toro Company has named Rick Rodier vice president of Sitework Systems Business. Rodier has been with Toro since 1987 and has held a variety of operational, marketing and business management roles, most recently as general manager of Sitework.

He was also named the 2017 chairperson for The International Construction and Utility Equipment Exposition (ICUEE), and serves as a director on the Construction Equipment (CE) Sector Board of AEM.

## Louisiana Pipeliners

The Louisiana Pipeliners Association closed out 2016 by electing new officers, reinstating board members and announcing it raised more than \$100,000 for the scholarship fund.

Serving the association in 2017 will be President Monique Roberts, Zedi US; Vice President Tim Dronet, Mott MacDonald; Secretary John

Mire Jr., Power Performance; and Sergeant at Arms Rick Bucher, Chet Morrison Contractors.

The Board of Directors includes: Mark Roberts, past president; Nicky Smith, Allison; Tommy McNulty, Spectra Energy; Forrest Schopp, Kinder Morgan; and Jeremy Smith, Energy Transfer.

The 2017 President Roberts is the daughter of Mark Roberts (past president) and, along with Board of Director's Smith, was the first recipient of the scholarship program.

## Herrenknecht



Martin Herrenknecht (right) was awarded the Werner von Siemens Ring during a ceremony at the Berlin-Brandenburg Academy of Sciences and Humanities.

Martin Herrenknecht, engineer, founder and leader of Germany-based Herrenknecht AG, received the prestigious Werner von Siemens Ring, an award that recognizes outstanding technical innovations and achievements.

Through a variety of groundbreaking innovations and optimizations in large tunnel boring machines, Herrenknecht has become an international market leader. Over its 40-year history, the company has mastered more than 3,100 tunnel projects in over 80 countries, and has regularly marked new records and milestones, including the largest, longest, smallest and deepest projects.

In remarks at the ceremony, Sigmar Gabriel, Germany's vice-chancellor and federal minister for economic affairs and energy, referred to Herrenknecht as an exemplary figure: "He is an inventor and founder, a technical pioneer and an entrepreneur, and with the success displayed by his company, he is one of the representatives of this country's economic strength."

will retire March 31, after more than 41 years with Caterpillar.

Related and additional changes in the executive ranks include:

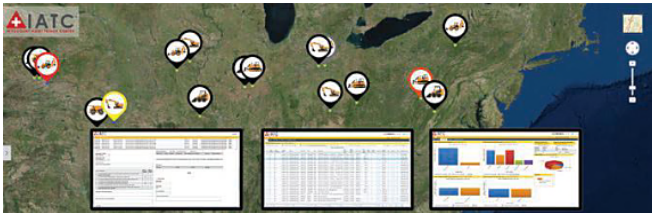
- Tom Pellette, president of the Construction Industries Group, has replaced Umpleby.
- Bob De Lange, vice president of the Excavation Division, replaced Pellette.
- Zack Kauk, worldwide product manager for medium excavators, replaced De Lange.
- Billy Ainsworth has added the role of senior vice president and strategic advisor to the Executive Office to his existing responsibility for Caterpillar's Rail Division.



## Hyundai

Michael Fuller has joined Hyundai Construction Equipment Americas Inc.'s marketing

team as a product specialist and sales trainer focusing on excavators. He brings 19 years of experience in the construction equipment industry, including 13 years as a customer support technical representative at a major OEM.



## John Deere Teams Up With Foresight Intelligence

John Deere is adding Foresight Intelligence's Intelligent Alert Triage Center (IATC) to its stable of construction data solutions for dealers. IATC helps dealers and customers better manage daily machine alerts by consolidating, prioritizing and providing workflow for them within a knowledge-based triage platform. It enables dealers to easily capture, consolidate and prioritize diagnostic trouble codes, oil sampling results, preventative maintenance alerts and more, into one centralized and secure portal.

"Teaming up with Foresight Intelligence allows our dealers to be even more proactive by managing machine health before a customer is aware of an issue," said Jena Holtberg-Benge, director, John Deere WorkSight. "IATC further enhances the power of John Deere WorkSight and is another tool for our dealers to increase customer uptime and create a sustainable competitive advantage."

In addition to monitoring and understanding machine health, IATC's advanced analytics allow dealers to track individual and branch performance from ticket statistics, and easily identify successful activities and areas for improvement based on real-time data. They can also collaborate across dealerships to rapidly deliver solutions.



## Vermeer

Robert "Bob" Vermeer was inducted into the 2016 Association of Equipment Manufacturers (AEM) Hall of Fame, which recognizes and celebrates outstanding individuals in the off-road equipment industry, and their legacy of innovation, service and leadership.

Starting his career at Vermeer in 1974, he rose to assume CEO responsibilities, and has served as chairman of the Board of Directors since 1989. Under his leadership, sales at the company grew nearly 13 times and he contributed to huge productivity improvements.



## Caterpillar

Jim Umpleby, previously Caterpillar group president of Energy & Transportation, joined the Caterpillar Board of Directors and became CEO, succeeding Doug Oberhelman, who



## CGA

Common Ground Alliance (CGA), the stakeholder-run organization dedicated to protecting underground utility lines and the people who dig near them, has selected Sarah Magruder Lyle as its president, the second person to fill this role since the organization's inception in 2000.

Magruder Lyle most recently served as vice president of strategic initiatives for American Fuel & Petrochemical Manufacturers (AFPM), a Washington, D.C.-based trade association. Before that she held positions with America's Natural Gas Alliance, the United States Chamber of Commerce's Institute for 21st Century Energy, American Petroleum Institute, and U.S. Department of Energy.

# EQUIPMENT SPOTLIGHT

## MINI EXCAVATORS



### Bobcat

A popular model in the 3- to 4-ton size class, the Bobcat E32 compact excavator provides unmatched power, excelling in a variety of high-load conditions — due to class-leading multi-function cycle times. The Tier 4-compliant compact excavator features a non-DPF engine solution, first-class operator comfort and ample dig depth and reach. The E32 conventional-tail-swing compact excavator can perform well in tight spaces and under high-load conditions — and sustain travel speeds during pushing and climbing functions. (866) 823-7898, [bobcat.com](http://bobcat.com)



### John Deere

The John Deere 26G compact excavator boasts a 20-horsepower engine that meets Final Tier 4 emissions standards with no operational interruptions. One of the biggest additions is a cab with a new door design for improved entry and visibility to the left side of the machine. The door design also widens the opening for entering the cab. The new cab features more floor space for improved operator comfort, and a larger front window enhances visibility. (800) 503-3373, [johndeere.com](http://johndeere.com)



### Doosan

Tier 4-compliant Doosan DX63-3 and DX85R-3 compact excavators provide operators with precise controls, and exceptional breakout force and productivity. Both models have a 58.6-net horsepower electronically controlled diesel engine. Providing best-in-class, over-the-side lifting performance, the DX63-3 is a conventional tail-swing compact excavator designed to travel between existing homes and along property lines. The larger DX85R-3 is a minimal-tail-swing compact excavator designed to work in congested environments and tight spaces next to buildings or other obstructions. (701) 476-4258, [doosan.com](http://doosan.com)



### Hitachi

With its reduced-tail-swing design, the compact yet powerful Hitachi ZX60USB-5 excavator is perfect for work in congested or confined areas. Operators get a more spacious cab with wider, easier entry and better visibility; a fuel-efficient and reliable engine that meets emission standards; and maintenance that's easier than ever thanks to enhancements such as improved access. Built to the same high standards as our larger mining excavators, the ZX60USB-5 delivers efficiency, reliability and durability to your operation. (844) 809-1508, [hitachiconstruction.com](http://hitachiconstruction.com)

## BACKHOE LOADERS



### John Deere

The John Deere 310SL HL (heavy-lift) backhoe meets today's emission regulations through a rugged Final Tier 4/ EU Stage IV PowerTech Plus diesel engine (110 horsepower), and boasts a five-speed PowerShift transmission with speeds up to 25 mph. It can deliver up to 25 percent more backhoe-lift capacity under normal conditions than comparable K-Series models. The 310SL HL also delivers all the advantages of PCLS hydraulics in the 14-15 foot digging-depth category, enabling operator efficiency and productivity through improved multifunction control.

## PIPE & JOINT FUSION EQUIPMENT



### McElroy

The McElroy Manufacturing TracStar 618 Series 2 is a self-contained, self-propelled, track-mounted vehicle that handles nearly any terrain. It will butt fuse pipe sizes from 6" IPS to 18" OD, and its carriage now shares a common vehicle with the 28, 250 and 412 TracStar sizes. Powered by a powerful diesel engine, it is especially useful on job sites where gasoline is not permitted. (918) 836-8611, [mcelroy.com](http://mcelroy.com)



## KEYHOLE TECHNOLOGY



### Buzzi Unicem

Headquartered in Bethlehem, PA, Buzzi Unicem USA is one of the larger cement companies in the nation. For keyhole pavement repairs and backfill requiring limited downtime, Buzzi Unicem USA offers specialty products using our CSA ultra-rapid hardening cement. The products are Ulti-Grout approved by GTI; Ulti-Pave3, a rapid setting core replacement product; and Utility-Fill One Step, a pour-in-place rapid setting backfill. (610) 882-5000, [buzziunicemusa.com](http://buzziunicemusa.com)



### TT Technologies

The Grundomat is available in 16 models ranging from 1¾-inch to 7-inch diameter for horizontal boring distances from 50 feet to 150 feet. It is easily configured to pull in a wide variety of new pipe materials, and is ideal for water, sewer, landscape and irrigation, gas, electrical and plumbing contractors. Especially suitable for economical last mile installation, the Grundomat's reciprocating stepped-cone chisel head ensures high impact accuracy. The tool serves as a complement and, in many situations, an economical alternative to larger, more expensive directional drilling equipment.

# NEW PRODUCTS

## Xylem Announces Godwin Field Smart Technology

Xylem's Godwin Field Smart Technology (FST) and Godwin PrimeGuard 2 controller provide contractors with crucial pump operating data from a remote location that can significantly reduce or eliminate the need for expensive, onsite personnel to monitor pumps manually.

Xylem's Godwin PrimeGuard 2 is a fully programmable microprocessor engine control system that allows for inputs from flow meters, level transducers, pressure transducers or standard floats. Using the data from any of these systems, Godwin Dri-Prime pumps can be programmed to start/stop automatically with no operator intervention required. Used in tandem with PrimeGuard 2, FST is a premium solution for any contractor.

FST can monitor engine, motor, and pump operation conditions (e.g. operating hours, speed, engine temperature, and fuel consumption), as well as pump parameters such as suction and discharge pressure, sump level and flow data. Pump data can be accessed remotely from any device in the world with an internet connection. FST enables the operator to remotely start, stop and set engine speed, and alarms can be set to alert for operating or performance failures. FST can also be tied back to a SCADA system for ultimate system efficiencies and control.

For more information, drop by the Xylem booth C32426 at CONEXPO 2017 or visit [xylem.com/dewatering](http://xylem.com/dewatering), (800) 247-8674.



## RIGID Offers First One-handed, Battery-operated Pressing Tool



RIGID's new PEX-One 12V Battery tool is changing the way contractors install PEX. At five pounds – 30 percent lighter than other battery-powered tools that can make press connections on PEX – and with a compact design, PEX One is an easy, one-handed and accurate way to make press connections anywhere on the job.

Ideal for accessing tight spaces, the PEX-One provides full power through 150+ presses on a single charge, with a 5-second crimp cycle. The tool can press multiple size fittings up to one inch, and has interchangeable dies with a quick change system. It is compatible with ASTM F1807 copper crimp ring fittings and in the future, Viega PureFlow fittings. A business unit of Emerson, RIGID is a global manufacturer of more than 300 tools that are trusted by professional trades in the demanding commercial, industrial and energy markets to install and maintain the world's infrastructure.

## New Laurini Hammer Crusher Highlights Performance, Safety

Laurini Officine Meccaniche launched its new Hammer crusher for roadbed and backfill. Adaptable to many kinds of terrain, the machine is equipped with a sturdy crawler truck capable of working on steep slopes with up to 70 percent gradient. The 440-horsepower Caterpillar engine meets EPA Tier 4 Final regulations.

A special feature is its ability to crush large pieces of rock and turn them into fine sand, which is then deposited directly in the excavation. Maximum size of rock input is 500 mm, and minimum output is 1-15 mm. The Hammer's production rate can reach 150 m<sup>3</sup>/h.

Based in Busseto (Parma), Italy, Laurini specializes in the design and construction of earth-moving machinery and equipment for national and international pipeline projects.



# NEW PRODUCTS



## New Ditch Witch SK600 Delivers Efficient Power in More Maneuverable Package

To help operators ease maneuverability on tight, compact landscape job sites, Ditch Witch, a Charles Machine Works Company, has introduced the SK600 mini skid steer.

Equipped with an efficient 24.8-hp Kubota diesel engine, this machine delivers maximum efficiency to the attachment for enhanced productivity and versatility on landscape and irrigation jobs. Operators can rely on the SK600 for its ability to handle tasks that require heavy-duty strength and power with a 600-pound rated operating capacity and a 76-inch hinge-pin height.

The SK600 incorporates the Ditch Witch construction-grade design for exceptional durability, longevity and machine return on investment for landscapers and rental companies. With easily accessible maintenance points, operators save time and money keeping the machine running smoothly. Rental companies can also find piece-of-mind with single-point, lockable fuel and hydraulic fluid tanks that improve machine security. [ditchwitch.com](http://ditchwitch.com)



## Melfred Borzall

Melfred Borzall's FastBack is a new system for direct pullbacks without removing the drill head or installing a backreamer. FastBack is a complete system and ideal for fiber installation, where access and space is often a concern. It enables the driller to do several bores a day and allows for multiple duct installation. It's perfect for drillers who need a bigger hole, but don't have time to remove the drill head and attach a reamer.

The FastBack system includes the FastReam housing and blades, the Eagle Eye and Iron Eye attachments used on Eagle Claw and Iron Fist bits, the Quick Swivel used on any Borzall blade, and the Quick Link attachment used when you already have a Borzall blade and swivel.

FastBack increases production, minimizes excavation and restoration costs; and saves time on bores. (800) 558-7500, [melfredborzall.com](http://melfredborzall.com).

## Ring-O-Matic Introduces 3 New Products

Ring-O-Matic's new compact vacuum-excavator unit, FT150, gives rental agencies and start-up contractors an economical, versatile hydro-excavator to use on job sites too small for typical vacuum-excavator rigs. It is also well-suited to the entry-level contractor needing a versatile, yet economical, hydro-excavator with Ring-O-Matic dependability.

FT150's 150-gallon spoils tank mounts easily in the bed of a pickup or can be mounted to a skid-steer via an attachment plate for easy access, even in the tight confines of many urban residential properties.

As an authorized distributor, Ring-O-Matic now offers three Spin Doctor valve exercising models from Hurco Technologies Inc.

All three models – SD-400, SD-800 and ERB-800 – can be mounted to any Ring-O-Matic vac-ex machine to maintain valves 4 to 60 inches. Hurco booms have up to 13 feet of reach with 270-degree side-to-side swing, allowing operators to access multiple valves in close range without repositioning the rig. Operators simply clean debris from in and around the valve fixture with the power of a Ring-O-Matic hydro-excavator and then connect the Spin Doctor exerciser to the valve. The vac-ex machine serves as the power plant throughout the application. Operators can conduct valve and hydrant exercising up to 100 feet away.

The Ring-O-Matic Crack Cleaner scours any crack or crevice clean with high-pressure water in a wide array of applications – without splatter from detritus, soil or other debris. Construction contractors, paving companies and city crews can use it for applications such as expansion joint prep work.

The Crack Cleaner unit's wheeled carriage positions a jet of high-pressure water from a rotary nozzle at optimum height above the surface being cleaned. Brush-like skirts on the carriage create a shielded environment around the unit while it vacuums the water and debris into a vac-ex unit's storage tank. (800) 544-2518, [ring-o-matic.com](http://ring-o-matic.com).



Crack Cleaner



Spin Doctor



FT150





## Vac-Tron

Vac-Tron Equipment introduced the new CV (Competitive Vac) Series of vacuum excavation equipment, which offers high performance, while keeping operation costs to a minimum.

CV GT models: Powered by 27-horsepower Kohler EFI gas engine, 580 cfm@15 Hg, wet/dry filtration with cyclonic separation, 500- or 800-gallon debris tank, 7 Series Claw Door, hydraulic rear door with auto engage safety latch, 200 – 300-gallon water capacities, 3500 psi @4 gpm, water knife and clean-up wand, and 30-foot x 3-inch vacuum hose.

CV SGT High CFM models: Powered by a 37-horsepower Kohler gas engine, 1000 cfm@15 Hg, wet/dry filtration with cyclonic separation, 500- or 800-gallon debris tank, 7 Series Claw Door, hydraulic rear door with auto engage safety latch, 200 – 300-gallon water capacities, 3500 psi @4 gpm, water knife and clean-up wand, 30-foot x 4-inch vacuum hose. (888) 822-8766, [vactron.com](http://vactron.com)

## Akkerman Introduces 1325B Lubrication And Bentonite Pump

Akkerman has added the 1325B Lubrication and Bentonite Pump to its line-up of guided boring lubrication solutions. This hydraulically driven, high-pressure pump provides effective pilot tube lubrication and flushing of cuttings, particularly on long bores and downward slope alignments.

The robust 1325B is ideal for guided boring, guided auger boring and soft rock projects using the Rock Drill Adapter and Tri-Hawk drill bit, as well as for pressure cleaning applications. Its 325-gallon tank presents enough fluid capacity for the average 400-LF bore and can independently agitate, or agitate and pump, to maintain mud viscosity. The pump is powered by an electric start, 14-horsepower Kohler gasoline engine and 1.9-gallon fuel tank.

It is also simple, safe and reliable, with few moving parts, no belts and a shrouded agitator. A stepped platform makes it easy for operators to access or fill the tank, and the battery is located inside a plastic housing to eliminate contact with operators. If the pump runs dry, it will not cause internal damage. The 1325B's relief valve limits the pump's maximum pressure and pressure can be adjusted to match tooling requirements. An in-shaft control pendant comes standard and allows operators to vary flow and pressure as needed. (800) 533-0386, [Akkerman.com](http://Akkerman.com)



## Hi-Vac Adds Options To X-8 Hydro Excavator

Hi-Vac Corporation has improved the power and payload of its popular X-Vac X-8 Hydro Excavator for applications requiring increased weight-bearing capacity. Additional options include a legally loaded 8-cubic-yard debris tank with a dished front head

that should assist in preventing overweight tickets. An 8" vacuum and new 4,000 CFM 27" high-performance blower give the X-8 the power that used to be limited to only larger models of hydro excavators. The X-8 also offers a heated enclosure that makes it a good fit for cold-weather applications, wireless control, cyclone separator capable of less than 10 micron filtration, and a 24,000-pound payload. (800) 752-2400, [x-vac.com](http://x-vac.com)

## BJM Pumps

SKGF Fahrenheit high-temperature/high-endurance submersible pumps are designed to pump non-corrosive or corrosive, solid laden liquids reaching up to 200°F. These BJM Pumps feature innovative RAD-AX Dual Shredding Technology, for both radial and axial cutting, to ensure superior solids handling and optimal performance. They are available in 2-, 3- and 5-horsepower, have GPM to 410 and heads to 42 feet. (877) 256-7867, [bjmpumps.com](http://bjmpumps.com)



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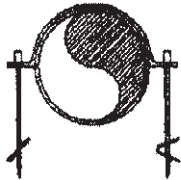
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## CALENDAR OF EVENTS

### Feb. 23-25

Great Lakes Trenchless Association Annual Convention & Training Expo; Bavarian Inn, Frankenmuth, MI; Contact: rpinkus@gassnoffice.com or greatlakestrenchless.com

### Feb. 26-March 1

American Rental Association The Rental Show 2017; Orange County Convention Center Orlando, FL; Contact: (800) 334-2177 or therentalshow.com

### March 5-9

American Pipe Line Contractors Association 46th Annual Convention; Aruba; Contact: (337) 278-0056 or americanpipeline.org

### March 7-11

CONEXPO-CON/AGG and IFPE Expositions; Las Vegas Convention Center, Las Vegas, NV; Contact: conexpoconnagg.com

### March 14-16

Common Ground Alliance Excavation Safety Conference & Expo; The Rosen Shingle Creek, Orlando, FL; Contact: (866) 279-7755 or cgaconference.com

### March 17-22

Power & Communication Contractors Association 72nd Annual Convention; El San Juan Resort & Casino, San Juan, Puerto Rico Contact: (800) 542-7222



### March 21

Pipeline Opportunities Conference; Omni Houston Hotel, Houston, TX; Contact: (281) 558-6930 or kfrancis@uctonline.com

### March 27-29

Distribution Contractors Association Safety Congress; Hotel Monteleone, New Orleans, LA; Contact: (972) 680-0261 or dcaweb.org

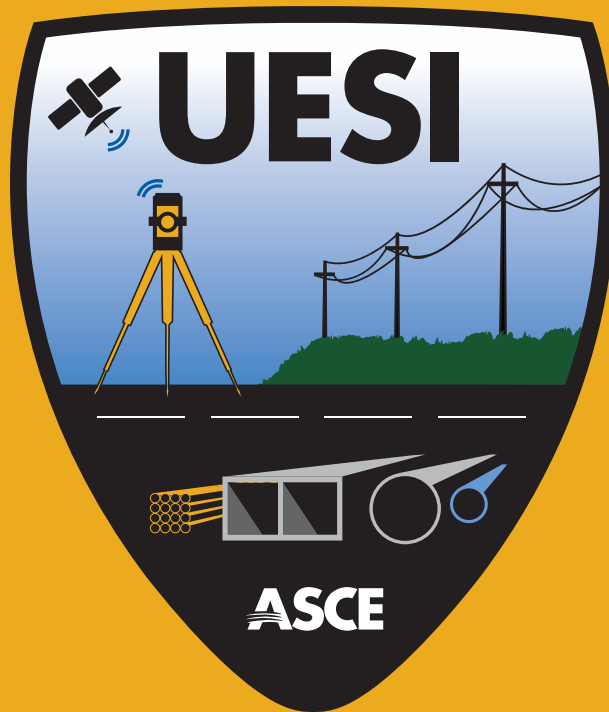
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