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Douglas Klamerus
Water Division Maintenance
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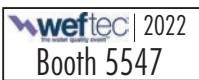
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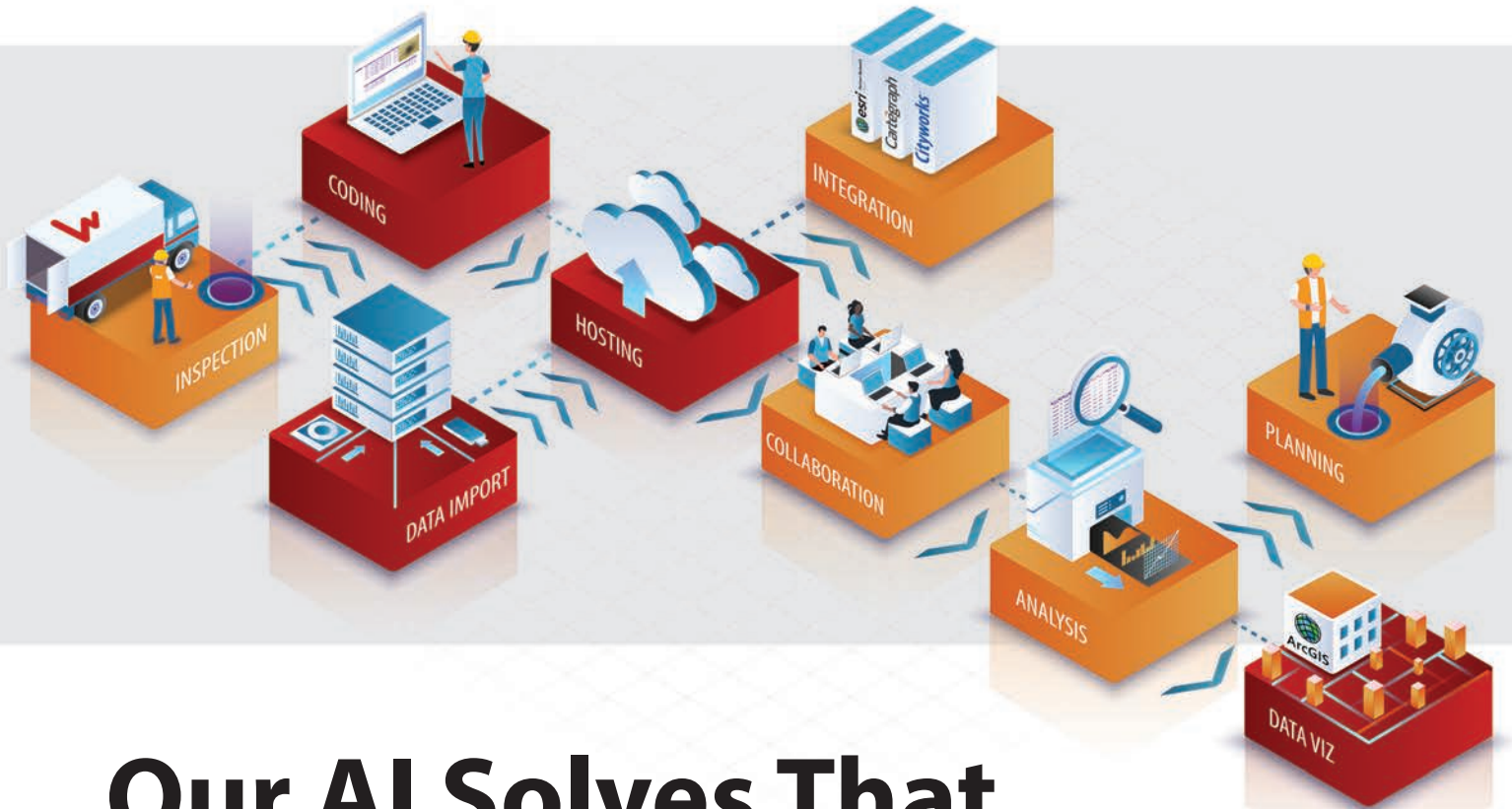


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- ◆ **STAYING SAFE:** Don't settle for good enough

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Published monthly by:

COLEpublishing

PO Box 220
Three Lakes, WI 54562



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Office hours Mon.-Fri., 7:30 a.m.-5 p.m. CST

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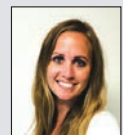
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Luke Laggis



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READY FOR TOMORROW

Good planning is the key to getting past the problems of today.

Planning has never been my strong suit. In my personal life that's not such a big deal. As an editor, it's something I really have to work at.

I've been doing this long enough to have the tools, resources and confidence to pull things together last-minute when necessary, but it's a terrible way to operate. It's more stressful, and the final product sometimes suffers.

In the publishing world we move from one deadline to the next. It's easy to get caught up in the cycle, ignore everything but the next deadline and get stuck in triage mode, always focusing on the most immediate task rather than looking three or four issues down the road and eliminating potential problems before they arise.



I'm guessing that scenario sounds familiar to a lot of you. It's a pretty easy trap for water and wastewater utilities to fall into: You try to tackle your system maintenance but your attention is often diverted to complaints and emergencies and you get stuck doing whatever it takes to get through the day instead of planning and laying the groundwork to make your systems stronger for the future.

As easy as it is to fall into that trap, it can be incredibly difficult to crawl out because you can't ignore a main break or a sanitary overflow to plan next year's system upgrades. So you deal with inflow and infiltration issues instead of planning an overall strategy for eliminating them. Or you simply accept high water loss percentages because you don't have the time or resources to implement a comprehensive leak detection program.

I understand obviously that there are some significant differences between putting a magazine together and operating a municipal utility, but when it comes to planning and getting ahead, there are some parallels.

I have to put the October issue together before I can move on to November. You have to take care of overflows before you can tackle rehab projects. The next deadline is the most important, just like emergencies will always take precedence over maintenance. But when you operate in that mode everything starts to feel like an emergency. It takes the fun out of the work. It takes some of the promise out of tomorrow.

Faced with growing overflow issues and limited capacity for new development, Greenville, South Carolina (profiled in this issue), was forced to look farther down the road. The 1.3-mile Reedy River Basin Sewer Tunnel is the result of that forward thinking. The largest infrastructure project in the community's history has limited the potential for overflows and ensured capacity for economic development. The utility has improved the long-term viability of the community.

Over the past few months I've spent a lot more time planning. I set specific time aside each week to plan and assign stories, regardless of what I have due that week. And a funny thing happened once I got more serious about that: My job started to feel easier. It became less stressful because I had more stories coming. I finally started getting ahead of the game.

Setting aside a few hours every Wednesday morning might not do as much for you as it's done for me, but you might be surprised by the cumulative effect after a few weeks.

I hope you enjoy this month's issue. ♦

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CHOOSING VALVES

Why Cheaper Isn't Always Better

Engineers often make decisions based on the cost of valves, with utilities focusing on cost-saving measures when working on complex projects requiring diverse valve designs and sizes. But that can mean a tradeoff in desirable physical qualities and performance capabilities of these crucial flow-control devices. mswmag.com/featured

WATER USE REDUCTIONS

Colorado River Utilities Announce Commitment

Large water providers from across the Colorado River Basin recently announced a commitment to substantially expand existing efforts to conserve water, reduce demands and expand reuse and recycling of water supplies. Read more about it in this online article. mswmag.com/featured



INFILTRATION CAUSES SINKHOLE

Crews Repair Manhole in West Virginia

Hidden I&I in Parkersburg, West Virginia, recently set a major event into action, as a garbage truck fell into a sinkhole adjacent to a manhole. Quick thinking and trenchless technology saved the day to return the area to service quickly, limiting the impact to local community businesses while protecting nearby buried utilities.

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COORDINATED IMPROVEMENTS

Rochester's collaborative approach between departments benefits residents and helps minimize disruptions

By Giles Lambertson

The team at Rochester Public Utilities, the city's water services provider, knows a thing or two about good management. The utility won an award from the Association of Metropolitan Water Agencies for exceptional performance in managing its resources to the benefit of its customers.

All this sparkling management in Rochester, Minnesota — maybe it's something in the water.

It might be. The water source for the utility is the Jordan Aquifer, a vast subterranean pool from which seven states draw water. It is a hard water, but a palatable one. "Rochester is blessed with a high quality and abundant supply of groundwater," says Douglas Klamerus, who manages maintenance and construction for RPU's water division.

The water is pulled from 32 wells and released into 20 towers and reservoirs with a total capacity of almost 17 million gallons. The water is of such good quality that it's distributed after chlorine, fluoride and a polyphosphate to combat corrosion are added. This is to say the city has no water treatment plant. "If our source was surface water, it would need treatment," Klamerus says. "There is a significant savings in not having to do so."

Rochester does sit on bluffs above the south fork of the Zumbro River, but that stream does not have sufficient flow to meet the city's water needs. So, wells are sunk an average of 400 feet to the aquifer to pull up the bedrock water. The newest well was drilled in 2020-21 and is not yet online. On average, two of the wellhead pumps are replaced each year to keep the water dependably flowing.

It is the responsibility of Klamerus and his staff to keep the water moving through the wells

to reservoirs and towers and, finally, to more than 41,000 customers served by some 600 miles of mains and lines. Department crews keep it all flowing and functioning by performing routine maintenance to valves and wells and periodic repairs to infrastructure.

For such work, the department has a Caterpillar 450F backhoe, a TRUVAC Paradigm hydrovac unit and a couple of dump trucks. Portable booster stations and other specialty machinery also are in the equipment yard. The distribution crew repairs all main breaks and undertakes minor projects. When new construction or major reconstruction is required, the work typically is contracted out.

Project alignment

The department's working relationship with the city's public works department was enhanced three years ago when the water department began an examination of its infrastructure with the aim of more systematically maintaining it. "We wanted to prioritize our water projects," says Luke Payne, the senior civil engineer for water at the utility, "to establish which of our facilities was most likely to fail."

Such review and analysis is not extraordinary. What was notable was the next step taken: meeting with public works managers to coordinate future maintenance and construction work. "We met with people there who were doing similar evaluations on street and sewer infrastructure. Through that we came up with our key projects." That is, where it made sense, the water department and public works department agreed to align their projects.

Previously, the two departments had worked up their schedules with little regard to what the



PROFILE:
Rochester (MN)
Public Utilities

SERVICE AREA:
60 square miles

CUSTOMERS:
41,000 water, 57,000 electric

WATER SOURCE:
32 deep wells pulling from Jordan Aquifer

WATER INFRASTRUCTURE:
613 miles of water mains and lines

WATER STORAGE CAPACITY:
20 facilities with capacity of 16.95 million gallons

EMPLOYEES:
200 (26 in water department including the manager)

WEBSITE:
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“We looked at where our critical customers are and how they are being served by our water system.”

Douglas Klamerus

Rochester Public Utilities water distribution crew members work to replace a gate valve as part of the city’s ongoing water distribution system upgrades. Team members include (from left) Maintenance and Construction Manager Douglas Klamerus and lead water distribution workers Rich Rain, Steve Quandt and Nate Blee. (Photography by Brad Stauffer)

other department planned. “Public works would identify a street that needed resurfacing or a sewer that needed repairing and if our water main in the same area happened to need work, we would replace it at the same time,” Klamerus says.

Such coordination by happenstance was not the best utilization of water department or public works dollars. Payne was instrumental in working up a memorandum of understanding between public works and water works that not only fully coordinates such projects but stipulates shared costs and decision-making responsibilities. An HDR consultant, Kathryn Jones, helped a great

deal by contributing technical analysis of water main breaks, Klamerus says.

This is how it works: A downtown area of the water system that had experienced more infrastructure problems than other areas also was a concern for public works management for other reasons. This confluence of priorities raised the area’s priority ranking at each department. Now, a contract is being bid that will fix both sets of problems. Payne and the water department will lead the project with input from public works. Expenses were identified and a share of the cost was apportioned to each department.



THE VALUE OF EFFICIENCY

A company's core values characterize what it believes is important, what drives its performance and shapes its behavior as a citizen of the business community. Rochester Public Utilities expresses its values in a Minnesota-shaped logo totally populated with nouns and adjectives and phrases that describe who it is.

Some of the words brightly displayed are outward-facing like *courteous* and *compassionate*, *understanding* and *friendly*. Some declare the utility's virtues like *integrity* and *constant*, *knowledgeable* and *ethical*.

One word that is missing in the values logo is efficient.

Nevertheless, the utility's water department is exhibiting that characteristic. The department has reached an agreement with Rochester's public works department to pursue each department's repair and maintenance projects in tandem whenever possible, sharing costs and swapping project leadership.

"The word 'efficient' certainly could be in that core values logo," acknowledges Douglas Klamerus, the utility's manager of maintenance and construction for the water department. "I think the word 'accountability,' which is in the logo, falls on the efficiency side of things."

When version 2.0 of the logo is unveiled sometime in the future, efficiency may be officially recognized as a core value of Rochester Public Utilities. The department's new resolve to coordinate its work with public works certainly is a step in that direction.

"We want to do the best we can for our customers," the manager says, "including maintaining our low rates and providing high-quality service. At RPU, we live and breathe customer service every day."

RPU lead water distribution workers Kris Putzier, Steve Quandt and Nate Bles (from left) expose a buried water line connection with a Truvac Paradigm hydroexcavator.

"It is a shared and fair approach to getting projects done," says Payne of the arrangement. "That particular project wasn't No. 1 on our list of work to do, but after aligning our need with public works' need, it became the key project for us this year." The department now works up its top 25 projects knowing the rankings are subject to change when alignment with public works is factored in.

"It is a mindset change," Klamerus says. "Sometimes in municipal departments, doing what's best for the customer isn't always the mindset. Each department has its own budget and tries to maximize the work without any thought to who pays the bills. This is a real success for us."

Payne says the city now has a more collaborative approach that benefits the residents and helps minimize disruptions. "Efficiency is important," he says.

Likelihood of failure

Identifying potential problems in a water system is a science — mostly a computer science. It wasn't enough for Rochester Public Utilities' water employees to know that it had some infrastructure in the ground dating from 1887. If things were that simple, one would simply replace mains and pipe according to a seniority system — the oldest getting yanked first.

Klamerus and his water department staff incorporated other criteria in their decision-making to determine where to focus maintenance and new construction efforts. "We looked at a lot of components," the manager says. They included, yes, the vintage of pipe, but also the periods when different manufacturing methods were used, different pipe materials, size of pipe and pressures exerted by the system in a particular location.

"We wanted to see if there was any relationship with all those variables and failure rates," he says. Through computer modeling and Excel spreadsheet analysis, the department managers and engineers concluded that pipe installed between 1946 and 1969 was most vulnerable to failure. A thinner wall was used in the cast iron pipe of that era, which ended with the arrival of ductile iron pipe. Corrosion in the thinner pipe wall was a leading harbinger of failure in the mains, which mostly are 8- and 12-inch pipe.

(continued)

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RPU Environmental Regulations Affairs Coordinator Todd Osweiler conducts a fluoride test on a Rochester public water sample in the city's water lab. Behind him is the water department control room.

As it turns out, the Rochester water system is about 75% composed of ductile iron pipe, with the rest being the more problematic cast iron. Klamerus and his analysts and planners are on it.

Another component factored into decisions about pipe replacement had nothing to do with pipe condition, but where a pipe was headed. The analysts examined not only a pipe's likelihood of failure, but the consequences to customers if it failed. "We looked at where our critical customers are and how they are being served by our water system. For example, health care facilities certainly are critical facilities."

Rochester's Mayo Clinic not only serves many people in dire physical condition, it employs a lot of people. Some 36,000 of the 125,000 people in Rochester work at Mayo Clinic. "It is a huge workforce," says Klamerus. "It is our No. 1 customer by virtue of its sheer size."

And it's still growing. Mayo Clinic is part of a Destination Medical Center expansion and has earmarked \$3.5 billion for upgraded patient facilities and new buildings. To the water department, the expanded Mayo facilities in the downtown area meant greater demand for its product. The department's response: A new well was drilled to add capacity and will soon be connected to the system.

Measurable benefits

Yet another criterion that Klamerus and his engineers consider in evaluating maintenance projects is hazards. If a safety issue exists on a section of water main, that can lead to a higher ranking in the fix-it list.

"When you go to repair a broken main that's buried 25 feet in the ground, the safety factor elevates significantly. So, we've given some priority to such areas and will eliminate the main at the depth and run a new one 7 feet deep."

This is Minnesota, after all, albeit southern Minnesota. Average daily temperatures in winter months are way below freezing. Water mains generally are insulated by running about 7 feet below the frozen surface, but service lines are not and frequently freeze. The freeze-thaw cycle produces shifts in supporting earth around mains, however, and springtime can mean spring breaks. "I remember 2018-19 was a bad winter," Klamerus recalls.

Most construction projects end in late October, partly because the local asphalt plant shuts down and resurfacing of dug-up roadways no longer is possible. If waterline work is happening in an unpaved area, the project



Putzier prepares a water line for a new gate valve. Above from left are fellow lead distribution workers Blee, Quandt and Rich Rain.

"Sometimes in municipal departments doing what's best for the customer isn't always the mindset."

Douglas Klamerus

might continue into December before crews call it a season.

Come spring, the coordinated maintenance undertakings of public works and the water department begin again. Klamerus was asked what measurable benefits have accrued from the new working relationship with public works. It stands to reason that savings will result, but it might be reassuring to see the data.

"I don't know that we have done that yet," he says. "We're only about three years into the program. We want to circle back after five years to see the developing trends. But certainly, there are benefits to it. Our customers are the same as public works' customers and anytime we can work together, there should be significant cost savings."

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PREVENTING ODOR PROBLEMS

Oxygen injection eliminates concerns over stagnant flow in wastewater system

By *Tim Dobbins*

An old golf course went out of business in Granby, Colorado, leaving a large parcel of vacant land that a development company soon acquired. An RV park was built and the remaining land was prepared for a planned neighborhood and modular home construction.

The RV park needed an immediate option to handle waste flow, but at the same time, the system needed to be able to handle the planned neighborhood as occupation grew.

A study was done to see how they could relay wastewater from the new developments to the treatment plant while accounting for expansion and varying flows. Gravity sewer was out of the question, so the developer opted for force main.

A predicted problem with the design was realized right away; the force main was long, and its use was going to be largely seasonal until the housing development was fully occupied. The RV park would create a situation that was busy in the summer and mostly stagnant in the winter.

Roughly 3,500 feet of 4- and 8-inch force main was installed. The 4-inch pipe was installed for the slower months and times with minimal use, and it would switch to the 8-inch during the busy season. But the long retention time of stagnant water in the pipes not being used would create odor issues and action was needed to keep the smell under control.

In situations like this, chemical treatment for odor control is a common practice, but the superintendent of operations for Granby Sanitation District, Andrew Becker, shied away from that method for a few reasons.

“Supply is something I worried about right away,” he says. “Due to the remote nature of our location and the fact that shipments need to get over a mountain pass.” Also, with the harsh winters in the Rocky Mountains area, he had concerns about chemical storage during the long periods of subzero weather.

The most important reason to avoid chemicals in his opinion was that the discharge from the treatment plant goes into the Fraser River, which eventually empties into the headwaters of the Colorado River.

“The Colorado River is in a crisis right now, and with that, the state continues to change regulations to protect the river,” Becker says. “I was really wary of any kind of treatment process that involved chemical addition that could potentially add constituents that would need to be in compliance with my discharge permit.”

Becker had another option in mind that he wanted to investigate further — oxygen injection.

Getting started

Becker consulted with Steve Hanson, president of Ambient H2O. The environmental engineering company was involved with the force main installation, and together they discussed oxygen injection options. Hanson knew about a system from Anue Water Technologies called the FORSe oxygen injection system and contacted the company.

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MANUFACTURER:
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APPLICATION:
Injecting oxygen into the lines

BENEFITS:
Keeping odors under control when wastewater is stagnant

USER:
Granby, Colorado

A new RV park and planned neighborhood in Granby, Colorado, needed a wastewater system that could serve the park's waste and odor-control needs immediately and eventually serve the built-out neighborhood. The FORSe oxygen injection system from Anue Water Technologies met the challenge.





Greg Bock

Anue began working with the team in Granby right away to learn the specifics. “Every application goes through an engineering study by Anue where we collect data upfront, such as the length, diameter, detention time and information on the resident pumps like if they are on/off or variable frequency drive,” says Greg Bock, vice president and general manager of Anue.

Following the gathering of information, in December 2020, Anue technicians set up and ran a pilot at

the location to prove the technology worked and to dial in the engineering further.

Once the engineering was dialed in and the final system arrived in Granby, the Anue technicians took everything off the flatbed, placed it on a concrete pad and had everything up and operational in under 48 hours. “It was very plug-and-play on our end for setup,” Becker says. “It came all set up from Anue and ready for us to use.”

Nuts and bolts

Hanson was familiar with how the FORSe worked, which was a large part of why he felt comfortable trying the system.

“Anue is a pure oxygen injection system whereas other injection systems inject atmospheric air, which

“This system is nice and simple and our guys are able to find relays or basic parts locally.”

Andrew Becker

is almost 80% nitrogen,” Hanson says. “Oxygen, or air, has a fairly low solubility in liquid, so if you’re wasting 80% of it on something that doesn’t improve the process, that’s not efficient.”

The FORSe is designed to increase productivity by eliminating the unnecessary gases. “The Anue system can take ambient air, compress it, store it



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and run it through oxygen generating equipment producing 90-93% pure oxygen,” says Bock. “Then we utilize the pressure of the force main to keep the oxygen solubilized.”

Since it has been up and running, Becker says maintaining the equip-

“So far, zero public complaints, and right there is testament to the effectiveness of the system.”

Andrew Becker

ment has been easy. “There are compressors that we monitor and oil that needs to be changed, but that’s about it,” he says. “We have log sheets we use to record everything from purity

of the oxygen being generated to hours run. It’s really very simple.”

Along with stress-free general maintenance, Becker notes a draw for him is the components used within the technology.

“A lot of the system is built from things I can purchase from any electronic supply warehouse,” Becker says. “We are in the Rockies, if I need a specialized part, I have to question how fast I can get that stuff out here. This system is nice and simple and our guys are able to find relays or basic parts locally.”

Results matter

The system has been functional for almost two years now. Since the development is still not at full capacity, the system hasn’t yet been tested at peak flow, but Bock says the current low capacity is as good a test as any other.

“The largest problem you’re going to have is during the slow times or winter months due to the detention time of the waste sitting in the lift station,” he says. “As it sits, it’s going to go anaerobic and when that happens, it will generate the hydrogen sulfate gas. So right now, when the waste is sitting without high flow is the toughest test for the system. High flow is actually beneficial.”

Testing and monitoring hydrogen sulfide and other gases have been ongoing and so far, the Granby development has had zero odor or hydrogen sulfide issues. Testing will go on as the development continues to fill out.

Most test samples are sent to an outside lab for detailed results, but Becker says one of the more critical tests they have is the least scientific.

“Because of the nature of the system being in the middle of town and surrounded by people, for us the most important test is the ol’ sniff test,” he says. “And so far, zero public complaints, and right there is testament to the effectiveness of the system.”

The success of the technology is critical to Becker and the Granby Sanitation District. “It’s very important that the district is taken care of. My job is to operate a publicly owned facility. I am working for the constituents,” Becker says. “And because of that, I require that I get the best service, the best product and that the people are taken care of for the next however many years. And through this whole process, I got what I wanted.” ♦



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CREATING A CULTURE OF ACCOUNTABILITY

Key ingredients include continuous feedback and explaining the “why” behind expectations.

By Ken Wysocky

We invite readers to offer ideas for this regular column, designed to help municipal and utility managers deal with day-to-day people issues like motivation, team building, recognition and interpersonal relationships. Feel free to share your secrets for building and maintaining a cohesive, productive team. Or ask a question about a specific issue on which you would like advice. Call editor Luke Laggis at 800-257-7222, or email editor@mswmag.com.

Few people will question the importance of accountability in the workplace. Establishing it, however, is an entirely different matter.

But Scott Robley suggests it doesn't have to be that complicated. All organizations have to do is create a culture of multidirectional, continuous feedback that addresses gaps between expectations and employee performance in a meaningful and intentional way.

“Continuous dialogue is the magical part of accountability,” says Robley, the director of professional services as well as a speaker, coach and master trainer at Crucial Learning (www.cruciallearning.com). “My colleague Joseph Grenny (a noted author and keynote speaker) always says you can measure the strength of an organization by the amount of time that a problem exists to the time someone speaks to it.

“If we create a culture of accountability and quickly address performance gaps ... mid- and end-of-year reviews become celebrations instead of just announcements,” he continues. “When you see a gap, you need to close a gap. But the dialogue must be multidirectional so that we're all accountable to each other, peer to peer.”

Moreover, organizations need to create a culture where these gaps can be candidly discussed in a safe way, he says.

Communicate intentions

Providing continuous feedback is more successful when employees know a manager's intentions or motives — what Robley calls “the why.” (One of his favorite books is *Start with Why: How Great Leaders inspire Everyone to Take Action* by Simon Sinek.) For example, if employees know that a manager has high expectations because he or she wants to see them grow and excel — to shine when opportunities arise — feedback becomes much easier to accept.

“Sometimes feedback is hard because you're focusing on what you're going to say and anticipating how the recipient will accept it — will they get defensive about why they think you're saying what you say,” Robley notes. “So you have to make sure you have good

intentions and that they understand those good intentions.

“When those intentions are well-communicated and understood, then feedback becomes natural and easy,” he continues. “Leadership is more than just managing job descriptions, it's about leading people. That's the higher purpose and it should always be your motive.”

How do managers create that kind of environment? By declaring it as a goal and remaining true to it, he says.

“How often do we say we want feedback and then when we get it, we blast it?” Robley asks. “You have to truly want it and declare it, as well as empower people by teaching them how to step up and do it in a safe and non-threatening way.

“Over the years, we've learned that the biggest challenge is that few people know how to properly provide feedback, so they either don't say anything or do it poorly, which makes it even worse,” he adds. “If you're feeling stuck and not getting results you want, it's likely you're either not having those crucial conversations or doing it poorly.”

Creating a culture

There are more strategies available to get employees to buy into the feedback/accountability loop. One is to use storytelling to help employees make connections between their jobs and the bigger-picture organizational mission, Robley suggests.

As an example, he cites a documented instance in the early 1960s when former President John F. Kennedy visited NASA's facilities in Cape Canaveral, Florida, for the first time. During his visit, he encountered a janitor carrying a broom down a hallway.

Kennedy stopped his tour to ask the man what he was doing. He replied, “I'm helping put a man on the moon.”

“He didn't say he cleans toilets or mention other things in his job description,” Robley notes. “This shows how storytelling can connect people to an overall mission. And accountability becomes much easier.”

Too often, managers just blurt out data when talking about expectations and accountability, which isn't



“Leadership is more than just managing job descriptions, it's about leading people.”

Scott Robley

a very compelling approach. But storytelling is a powerful way to weave accountability into that data — show employees the meaningful ways their job performance impacts their organization and its goals, he says.

“It taps into their personal motivations,” Robley says.

Aligning expectations

It’s also important to make sure managers’ and employees’ expectations align. If a manager believes there’s a gap between expectations and an employee’s performance, it’s imperative to be sure everyone is on the same page in terms of expectations.

“You first have to engage in dialogue because you may erroneously assume that the gap exists for various reasons,” Robley explains. “You have to make sure you both see the gap the same way because if the employee isn’t clear on expectations, they may not see a gap in the first place.

“The best leaders engage the employee in the process — define the gap and talk about what’s causing it,” he continues. “It’s rarely just one thing. Then you need to collectively find a solution.”

It’s also helpful to mention when employees do good things, too.

“If you find yourself giving people the same feedback over and over again, so they’re feeling barraged, you also need to take time to recognize the good — be positive and acknowledge growth,” he advises. “Sometimes batching or spacing feedback is a good thing. Start with those things that can have the greatest impact on improving an employee’s game.”

Training is crucial

In today’s turbulent workplace, accountability and continuous feedback may be more important to organizations than ever before. For instance, remote and hybrid positions add another layer of complexity to accountability.

“There are so many new dynamics involved,” Robley notes. “Accessibility to remote employees can be more limited. And not only is it more limited, there’s also no casual conversations by the water cooler or in the cafeteria.”

As a result, virtual dialogue via email or texts becomes very formal. That, in turn, makes feedback harder and more intense than it would be if it was cushioned somewhat by normal, day-to-day personal workplace interactions, he posits.

“You can’t just step into someone’s office and have an immediate conversation,” he says. “Connections create safety, but they’re harder to maintain virtually.”

That makes it even more important for organizations to improve employees’ core feedback and dialogue skills — train them to intentionally and purposefully share their perspectives while allowing others to share theirs, too.

“If it isn’t done well, feedback can do a lot of damage,” Robley says. “We refer to it as the ‘hazardous half-minute,’ that first 30 seconds of feedback dialogue.

“Providing feedback takes skill and if you truly want to create a culture of dialogue and accountability, you need to invest in and enable your people with the right skills. It’s not enough to say we want to do this — organizations have to empower employees to do so.

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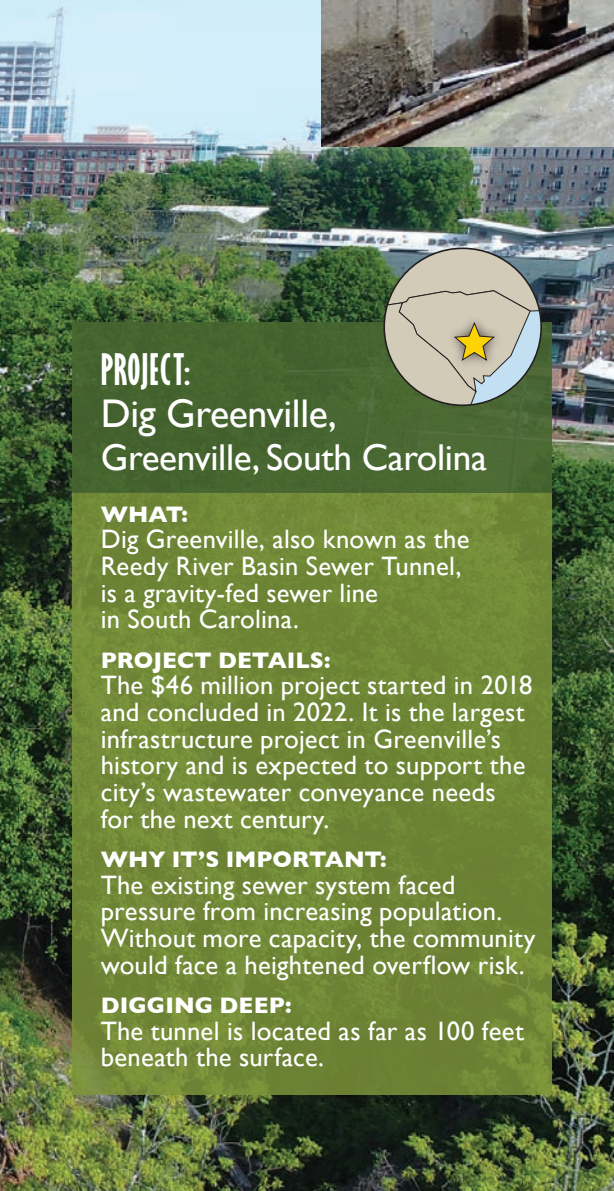
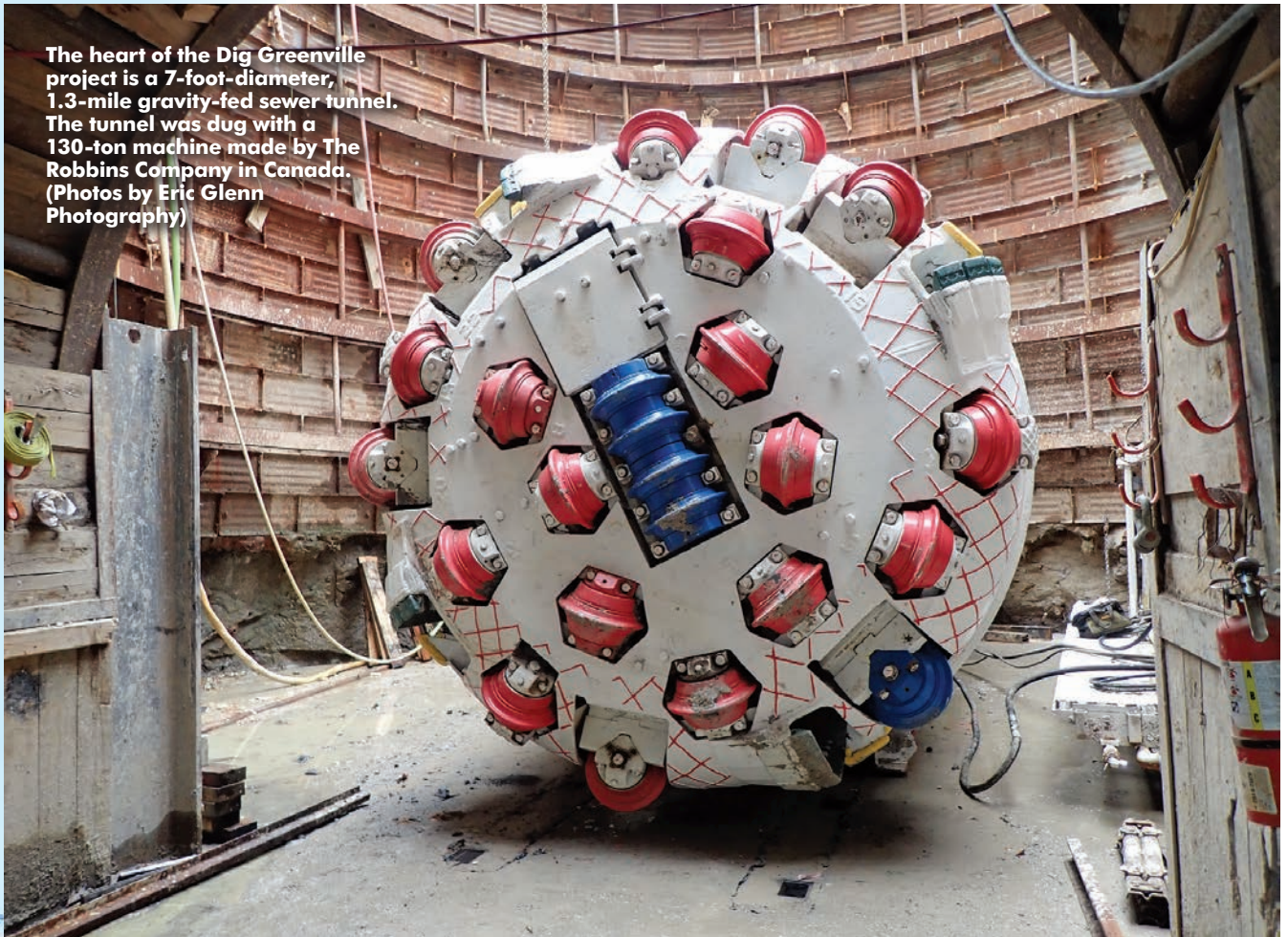
SET UP FOR THE NEXT CENTURY

Massive wastewater conveyance project removes roadblocks to South Carolina community's growth

By Thomas Renner



The heart of the Dig Greenville project is a 7-foot-diameter, 1.3-mile gravity-fed sewer tunnel. The tunnel was dug with a 130-ton machine made by The Robbins Company in Canada. (Photos by Eric Glenn Photography)



PROJECT:
Dig Greenville,
Greenville, South Carolina

WHAT:
Dig Greenville, also known as the Reedy River Basin Sewer Tunnel, is a gravity-fed sewer line in South Carolina.

PROJECT DETAILS:
The \$46 million project started in 2018 and concluded in 2022. It is the largest infrastructure project in Greenville's history and is expected to support the city's wastewater conveyance needs for the next century.

WHY IT'S IMPORTANT:
The existing sewer system faced pressure from increasing population. Without more capacity, the community would face a heightened overflow risk.

DIGGING DEEP:
The tunnel is located as far as 100 feet beneath the surface.

Very few American communities find themselves with the right infrastructure in place for the century to come. Greenville, South Carolina, may be the exception.

Greenville is in South Carolina's Upstate Region, about halfway between two of the largest cities in the Southern U.S., Charlotte and Atlanta. The community has seen its population grow by 27% since 2000, but a recently completed wastewater conveyance project has ensured that this fast-growing community is poised to accommodate another 100 years of growth.

The Dig Greenville project, also called Reedy River Basin Sewer Tunnel, consisted of a 1.3-mile, gravity-fed sewer line. Work on the \$46 million project started in 2018 and concluded in the spring of 2022.

"It definitely puts not just the downtown, but rather the whole city in a better position for the future," Mayor Knox White said when the project was introduced in 2016.

The underground tunnel is the largest infrastructure project in Greenville's history. Renewable Water Resources, a 97-year-old organization that protects the region's waterways and wastewater infrastructure, spearheaded the effort.

Black & Veatch led the design and provided construction management services.

"Dig Greenville is one of the most important infrastructure investments needed to ensure economic growth in the area," said Graham W. Rich, chief executive officer of ReWa when the project started. "With this investment and hard work, sewer lines and the area along the Reedy River will be at lower risk for sewer overflows, especially when rainfall is high. This

"We put in a good bit of effort to educate the public, get their feedback and learn what they had concerns about."

Joel Jones

investment and work were also required to ensure Greenville's future economic development since, without it, no additional wastewater flows could be added to the existing lines."

Capacity need

The existing sewer line in Greenville followed the Reedy River basin through the city's downtown district. Near capacity, it faced pressure from Greenville's recent and projected population growth. Without more capacity, the com-



While largely hidden from the public, the beginning and end points of the construction are identifiable by BILCO doors that provide access to the 35- and 105-foot-deep access shafts.

line was prohibitive and too disruptive to the city and water basin. ReWa chose to install the new line underground, approximately 100 feet below the heart of the city.

“While it is pricier to build, a deep sewer tunnel powered by gravity will be far less costly over its lifecycle for ReWa while providing the reliable additional capacity Greenville needed as it continues to grow,” says Joel Jones, who took over as ReWa executive director from Rich earlier this year.

Project centerpiece

The tunnel is the project centerpiece. It is 7 feet in diameter and virtually invisible to the public. Entry shafts at each end are the only hint of the massive pipe under the surface. The pipes are encased in granite, lined with fiberglass and grouted. The gravity-fed system requires no mechanical equipment to convey the flow of wastewater.

“The tunnel is bored from one end, resulting in surface impact only at either end of the tunnel, rather than all along the sewer route if conventional construction methods were used,” Jones says.

The initial plan was to drill from the downstream access shaft through the hard rock below with a tunnel boring machine. Before the TBM could be launched, however, a geotechnical investigation found the tunnel zone was comprised of soil and different types of rock in varying conditions.

“The tunnel boring machine can only work through one type of material,” Jones says. “Right when we were getting started, we saw that the granite was not where we thought it was.”

The complication resulted in hand-digging a

starter tunnel. Starter tunnel construction also included drill and blast methods that required 41 blasts over a nine-month period. Each blast was modified to fit the zone’s complex geology. Workers also fabricated and installed a customized steel shield to secure ground support for the 14-foot-round horseshoe-shaped starter tunnel.

“What we found was about 240 feet of clay and rock that we had to dig out,” Jones says.

“It cost us about 10 months of project time. The tunnel boring machine can dig out about 40 to 50 feet per day. We were only digging out about 2 feet per day. It was very time-intensive and labor-intensive just to get started.”

Picking up the pace

A massive tunnel boring machine helped workers pick up the pace after completing the starter tunnel.

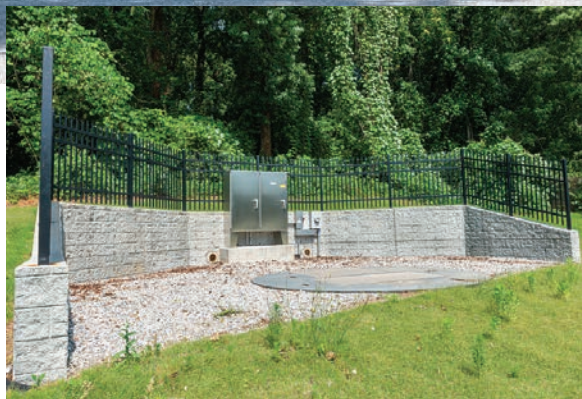
The boring machine, known in the Greenville community as “Drilly,” carved out the majority of the tunnel. The 130-ton machine, made by The Robbins Company in Canada, measures 249 feet and is one of only a handful of similar pieces of equipment in the world. Super Excavators of Wisconsin started digging the tunnel in March 2018 and completed their work in September 2020.

The boring machine was critical to the completion of the project in that it offered a far more efficient drilling method. Boring machines are used as an alternative to drilling, blasting and hand-mining to excavate tunnels with a circular cross-section through layers of soil and rock.

The machines significantly minimize disturbance to the surrounding ground and area. They are frequently used in urban areas and reduce project completion times.

The boring machines consist of a rotating cutting wheel, a main bearing, thrust system and trailing support mechanism. Steel blades chip away at the soil and rock as the head rotates. As the TBM advances, a conveyor belt within the trailing gear transports soil or rock back to a locomotive connected to cars positioned at the end of the trailing gear. The locomotives haul rock back to the shaft for removal from the tunnel.

“Once we got through digging the starter tunnel, we stayed on a fairly good track,” Jones says.



munity would be at risk from increased overflows. That risk posed a direct threat to water quality, the environment and economic development.

“If nothing is done, ReWa’s sewer lines and the area along the Reedy River would be at a higher risk for the environmental impact of sewer overflows,” Rich says. “Furthermore, economic development would be threatened because no additional wastewater flows can be added to the sewer lines. While the project is a long-term fix, Dig Greenville will also meet immediate needs by providing an increased buffer against sewer surcharges due to inflow and infiltration during rain events.”

ReWa considered 18 alternatives before deciding on the gravity sewer tunnel. Rebuilding the sewer

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Out of sight

For a project of this magnitude and duration, workers were surprisingly able to stay out of the public glare. Almost all the construction took place underground, out of sight of city residents.

Teams constructed wooden fencing around the construction to minimize the aesthetic impact of the project. During a two-month winter period, one roadway was closed off to facilitate quicker construction for a sewer crossing of Richland Creek and to accommodate the city's streambank restoration project.

While largely hidden from the public, the beginning and end points of the construction are identifiable by access doors.

The BILCO Company manufactured 13 floor access doors of various sizes for the project. The doors allow access to vertical shafts — one is 35 feet deep, the other is 105 feet deep — in which workers descend or lower equipment into the tunnel.

"We use those types of doors fairly often on our projects, especially at pump stations," Jones says. "We find they have good durability and reliability."

But while most of the work was hidden, ReWa made sure to maintain a dialogue with city residents. The construction sites were near city residences and a local zoo. Residents were understandably concerned about how the project would impact their quality of life.

"It's been a challenging project, but a fun one to be involved with."

Joel Jones

"We put in a good bit of effort to educate the public, get their feedback and learn what they had concerns about," Jones says. "We wanted to gain the trust of the community from the very beginning. We had a series of meetings where we showed the community that we were serious about their concerns and taking them into consideration."

On time, on budget

Large-scale infrastructure projects frequently experience overruns in budget and time. The Dig Greenville project experienced a setback in drilling the starter tunnel but that was the only hiccup in a multiyear project that also included fallout from a global pandemic.

"We had to add about 10 months due to the schedule, but we were able to keep it within the original project budget," Jones says. "We were able to find some cost savings in some other areas and we had some good bids when we started."

The most important objective, however, was giving Greenville the wastewater conveyance infrastructure to help the community build for the next century.



Despite an early setback with the starter tunnel and adding 10 months to the multiyear project's schedule, it was completed within the original budget.

"It's been a challenging project, but a fun one to be involved with," Jones says. "It's a good feeling to know that we're contributing to the long-term viability of the community. It took a lot of work to make it a success, and it came about through the efforts of a large group of people." ♦

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ESTABLISHING SITUATIONAL AWARENESS

We should all take on the responsibility for our co-workers' safety and wellbeing

By *Ronnie Freeman*



Maybe you have heard of the phrase “situational awareness” recently. It has been used here and there in different settings and maybe you understand what it refers to, but do you know what it means?

Situational awareness can be useful in many areas of our lives. From going out shopping, being on vacation, being at the airport, driving our cars, walking in our neighborhoods, going to the park, and answering an unexpected knock at the door. We can get complacent when nothing in our lives ever seems to be out of place. This is where employing situational awareness can be a great benefit in preventing incidents from happening whether at work or in our daily lives.

Situational awareness has three parts to its definition: (1) perception of the elements in the environment, (2) comprehension of the situation and (3) projection of future status.

Perception – What information do I need?

Comprehension – What does this information mean to me?

Projection – What do I think could happen next?

Situational awareness has been recognized as a critical yet often elusive foundation for successful decision-making across a broad range of situations, many of which involve the protection of life and property. In the workplace, situational awareness is a great tool in injury prevention.

Simply put, situational awareness is knowing what is going on around us. What are the hazards? Understanding the consequences of our actions. Knowing how to respond should a critical situation arise. Knowing how to work safely in the environment we find ourselves in each day, whether it be in the office, a wastewater plant or in the field excavating a trench.

Simplifying the term situational awareness a little further, the following color chart gives us a guideline so we know what state of situational awareness we might be in.

White	The lowest level. You are basically unaware of what is going on around you and you are not ready for anything to happen. Reasons affecting your status could be fatigue, stress, distractions or apathy.
Yellow	You are alert and aware yet relaxed. You are familiar with your surroundings and the employees and visitors who are in your area. You know where the emergency response equipment is located just in case, and you are prepared if needed to respond.
Orange	You are in a state of heightened awareness. You sense something is not right. This is the time to make important decisions in case something must be done. This is also the time to mitigate the situation if needed.
Red	Something has happened! You are taking decisive and immediate action. You recognize a threat is ongoing and you are responding to limit the damage done and promote recovery.
Black	Something is happening and you are now in panic mode because you are unprepared and do not know how to respond. There is a breakdown of mental and physical performance.

Sadly, too many of us may live in the “white” status far too often. We have become so comfortable in our everyday lives that we tend to go through the motions of daily living whether it is at work or at home or in our communities. Therefore, when hazardous situations arise, we are “shocked” and either do not know what to do or we panic and do nothing at all.

Situational awareness should be important to all of us, and it is important that we are aware of the potential hazards in our work environment. We all should take on the responsibility for each other’s safety and wellbeing while at work and when we are out in public and at home as well.



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Situational awareness has been recognized as a critical yet often elusive foundation for successful decision-making across a broad range of situations.

Ways to Improve Situational Awareness

1. Do not allow yourself to be distracted. When you allow yourself to become distracted you take away any chance at a proper response. Any response is then delayed and, in some cases, too late. Keep your phone someplace where it is not a distraction or temptation to constantly look at.

2. Have a plan, just in case. Always ask the “What if?” questions regarding your work situation and tasks at hand. What if the trench collapses? What if another employee passes out in a confined space? Have you been trained in the proper response to these major incidents?

3. Scan your area. Be alert and stay alert to what could potentially be a hazardous situation. Look for things that are out of the ordinary or just not right. An unusual loud noise in your equipment could be an early warning sign that failure is about to occur.

4. Have a designated escape route. If there is the potential for a situation to go bad, always have a plan of escape to minimize the danger and/or damage.

5. Train and practice being situationally aware. Safety training does not do anyone any good if it is ignored or just so routine employees doze off during the training and do not hear important information. Practice helps employees retain the training. ♦



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Sheila Joy is executive director of NASSCO. She can be reached at director@nassco.org.

TRENCHLESS VIDEO SERIES EXPANDS

A rising tide of technology awareness will lift all manufacturers, suppliers and contractors

By Sheila Joy

NASSCO's mission is to set standards for the assessment, maintenance and rehabilitation of underground infrastructure. It also assures the continued acceptance and growth of all trenchless technologies.

Those of us who have been in the industry for many years should remember that new professionals are continually becoming part of the underground infrastructure world. It is our responsibility to welcome, educate and integrate these new professionals with resources that help them quickly learn and grow within our industry.

One thing that I am very aware of is that acronyms like PACP, ITCP, CIPP, FFRP, FRP, SAPL, SIPP and others are used freely in presentations, articles and basic conversation by those of us who have been around for a while. While they might be second nature to us, those new to our industry may have no idea what we are talking about, and we should always remember our audience as we discuss specific technologies. In fact, we should never make assumptions about an individual's knowledge. For example, an industry professional may have been around for many years without any exposure to a specific trenchless technology.

To take things down a notch and share the basics of trenchless technologies, NASSCO has been gradually building a library of short, easy-to-understand technical videos on a variety of topics. These videos are developed with the help of NASSCO technical committees and are intended to share a basic overview of specific trenchless technologies, along with the problems they solve and the unique benefits and features of each. The goal of the videos is to open the door of knowledge for people unfamiliar with trenchless technologies and invite viewers to learn more through NASSCO's other technical resources including specification guidelines, technical manuals, webinars and other materials.

To date, NASSCO has developed introductory technical videos on the

These videos are developed with the help of NASSCO technical committees and are intended to share a basic overview of specific trenchless technologies.

topics of pipe bursting, cured-in-place pipe, grouting, spiral-wound pipe and manhole rehabilitation. In 2022, NASSCO committees will produce three new videos for this growing library including lateral and building pipe rehabilitation, spray-applied pipe lining and force main rehabilitation. In addition to these trenchless technology videos, NASSCO's Health and Safety Committee will also produce videos on styrene monitoring equipment and confined-space entry.

While NASSCO technical videos are made possible by NASSCO member sponsors, the content is objective and never names manufacturers or other proprietary information specifically. The hope is that better awareness of technologies will lift the tide for all suppliers and manufacturers who provide the equipment, materials and services, and for the contractors who do the work. In short, to help NASSCO achieve its mission to assure the continued acceptance and growth of all trenchless technologies.

The videos are available for free download on the NASSCO channel at www.vimeo.com. This means they can be used by the entire industry — whether you are a NASSCO member or not — to include on your website, presentations or training materials to inform and educate on various trenchless technologies.

To learn more about NASSCO's growing library of technical resources, please visit www.nassco.org. ♦

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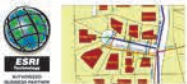
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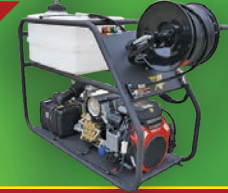


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ELECTRIC VS. PNEUMATIC ACTUATORS

Each has benefits and limitations, so it's important to consider the application, location and intended functionality

By *Laura Jensen*

A valve actuator is a mechanism that opens and closes a valve. By definition it seems simple but in reality there is nothing simple about it. There are two basic valve operating designs: linear and rotary. Therefore, basic actuator designs are linear, rotary and sometimes rotary linear. Typically, rotary-operated valves provide the best overall value in valve automation.

Valves that need to be opened, closed or throttled frequently are popular candidates for pairing with an actuator. Actuators are attached or built into a valve body to automatically adjust the flow of fluids, gases, steam, solids or slurries through a valve. If you're in the market for an actuated valve, there are many things to consider. First, there are several types of actuators: pneumatic, electric, water hydraulic, oil hydraulic and self-contained electro-hydraulic (oil). The two most common types are pneumatic and electric. These technologies are very different and understanding the benefits and limitations of each one is very critical. In general, it's important to consider the application, location and intended functionality.

Pneumatic

Pneumatic actuators typically provide high force and speed in a smaller footprint than electric actuators depending on available air pressure supply. The force and speed of these actuators are semi-independent from each other, the greater the force required, the larger the actuator size and therefore, slower operating speed ranges. These ranges are adjustable with air throttling mechanisms to accommodate different speed requirements.

There are several different pneumatic actuator designs,

The accuracy comes from the high quality components.

including diaphragm and piston-cylinder types for both linear and rotary valve operating designs. Rotary actuators provide the most variety in design. Piston-cylinder designs include scotch yoke, rack and pinion, and modified scotch yoke. Secondly, there are also vane and diaphragm-type rotary designs. All of these provide air to open and close the valve. With the addition of a spring or springs, a fail position on the loss of air supply can be provided. An electric solenoid valve is usually required to allow the actuator to shift air supply from open to closed and vice versa.

An important factor when determining price is the added cost of a compressor and air tubing to each actuator. While pneumatic actuators are significantly less expensive in terms of upfront costs, they are most economical when appropriately matched with compressor size. Small compressors are economical only when they are used to power a small number of actuators. The same is true with larger compressors. Unused compressor capacity can be a waste of money; therefore it's best to only use a larger compressor when there is a need to power many pneumatic actuators.

Although initial pneumatic unit actuator price is considerably lower, compressor costs, tubing and solenoid wiring costs, and maintenance and operating costs can be higher overall. These costs include replacing components that commonly wear out over time, like actuator cylinders, and paying for the electricity it takes to power compressors, which eventually adds up higher than most would expect. If there



When calculating cost versus benefit between pneumatic and electric, look past initial cost and remember to factor in operating time and costs.



is already a compressor with extra capacity at your facility, a pneumatic actuator can be the best value.

Electric

Electric actuators, also known as electric motor operators, are known for their precise control and positioning capabilities. Typically, they can be heavier but because of what it takes to achieve that precision, they can be substantial in cost. The accuracy comes from the high quality components. High precision screws and anti-backlash mechanisms can create positioning accuracy to ten-thousandths of an inch and even standard components can generate exactness to a few hundredths or thousandths of an inch.

Electric actuators tend to not have the speed and thrust associated with pneumatic due to the nature of electric motors. Thrust must be sacrificed to achieve high speeds and vice versa. For any electric actuator, more thrust is available at low speeds. Because of this, initial sizing of electric actuators is extremely important. If a thrust or speed increase is needed after installation, it will require a larger and more powerful actuator.

If you decide to go electric, make sure you understand its application in real conditions under load. With electric actuators, the cost between different sizes increases exponentially, so understanding specifications of your system will help in choosing the right actuator while minimizing cost. One area operators see lower costs with electric actuators is in operating expenses. Operating costs for these units come mostly from the power draw of the motors. When calculating cost versus benefit between pneumatic and electric, look past initial cost and remember to factor in operating time and costs.

Other considerations

It's important to keep in mind that environmental regulations are getting tighter each year and strict emission laws are frequently being put in place. Electric actuators are currently gaining popularity because they do not require the use of supply gas and do not create emissions. Installing a vapor recovery unit or using compressed air can help cut down on emissions associated with pneumatic actuators.

Another case for electric actuators is automation. A significant benefit with electric actuators is they can control your valves from an offsite location. Automation is also possible with pneumatic but only through an I/P valve controller that converts an electric signal to pneumatic, ultimately adding another component to buy and maintain.

If it's time to replace actuators or if you're pur-

chasing them for the first time, take some time to consider your system and the exact role the actuators will serve. Consider future expansion and your overall budget and always ask reputable experts for recommendations. ♦

Laura Jensen is the marketing and communications specialist at Flomatic Valves. She holds a Master of Arts in integrated marketing communication from Marist College.



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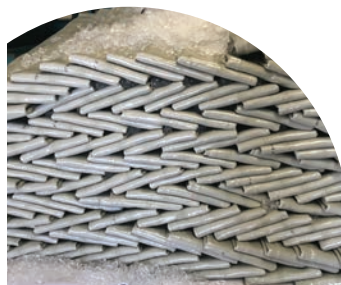
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FLOW CONTROL AND MONITORING

By Craig Mandli



DATA LOGGERS AND MANAGEMENT

1. Hermann Sewerin GmbH SePem 155

SePem 155 data loggers from **Hermann Sewerin GmbH** are suitable for mobile use and can also be used for the stationary monitoring of water supply networks. The SePem 01 Master, with its simple and intuitive menu navigation, provides fast and reliable results and can also be reliably operated by less experienced users. The measuring times and periods of radio activity are freely programmable. In a pipe network, water loss caused by a number of smaller leaks added together is likely to be considerably higher than the loss caused by a few spectacular pipe bursts visible on the surface. Noise loggers are capable of reliably detecting both types of leak site — slowly growing and spontaneously occurring. **888-592-9916; www.sewerin.com**

FLOW CONTROL/MONITORING EQUIPMENT

2. Badger Meter ModMAG M2000

Water treatment and distribution applications can be complex and result in limited pipe runs to install flowmeters. When space runs out, the **ModMAG M2000** electromagnetic flowmeter from **Badger Meter** is a solution, delivering accuracies of $\pm 1\%$ with zero straight run required or $\pm 0.2\%$ with appropriate straight run. It effectively measures water, wastewater, water-based fluids and other liquids that meet minimum electrical conductivity. It has a full-bore design, which means there is no size reduction resulting in undesirable pressure drops. **877-243-1010; www.badgermeter.com**

3. Blue-White Industries BW DIGIMETER F-2000 Series

BW DIGIMETER F-2000 Series electronic insertion style flowmeters from **Blue-White Industries** are quickly installed on IPS (ASTM-D-1785) pipe sizes from 1 1/2 through 12 inches. The electronic display and communication enclosure can be mounted directly to the sensor, or remotely mounted to a pipe or panel. Standard models display flow rate and accumulated total flow, and they include an NPN open collector output for communication with data loggers, SCADA systems and other external devices. Optional 4-20mA / 0-10 volts DC plug-in circuitry can be added for additional communication requirements. Optional batch processing plug-in circuitry includes an 8-amp relay board that adds manual or automatic batch processing capability, or a high/low flow rate alarm output. The electronics can be battery operated using

four standard AA-size batteries, or AC powered using a 15-24-volt DC plug-in transformer. A battery backup option is also available. Battery life in standard mode is a minimum of one year. **714-893-8529; www.blue-white.com**

4. Franklin Electric Cerus X-Drive

Designed for variable torque applications up to 600 hp, the **Cerus X-Drive** is **Franklin Electric's** all-inclusive drive solution for a variety of markets. Available as a standalone drive and in multiple enclosed configurations, these panels are built to last, according to the maker, with every detail and component centered around the application's specific requirements. It can be paired with a choice of motors and pumps to maximize the performance of the application. **866-271-2859; www.franklinengineered.com**

5. Mueller Water Products Cellular Node

The **Mueller Water Products Cellular Node** is designed for water network agility, enabling utilities to connect meters to their AMI network in areas or across the entire distribution system by leveraging existing cellular infrastructure, eliminating the need for maintenance. The node is a Network-as-a-Service endpoint solution that communicates with encoded water meters, including meters that are already in operation. Like other Mueller nodes, it feeds consumption data directly to the Sentryx Water Intelligence Platform, which provides utilities with a holistic view and insights into the health of their distribution systems such as water pressure, meter management and operation service, and leak detection. On this secure platform, utilities can easily add more water meter data points to the metering module without having to reconfigure the entire platform architecture, providing a true network-in-a-box solution for water systems of any size. **800-423-1323; www.muellerwaterproducts.com**

6. Orenco Controls OLS Control Panels

OLS Control Panels from **Orenco Controls** come with the choice of either integrated starters or variable-frequency drives that optimize system operation. These panels are suitable for a variety of pumping applications such as lift stations, stormwater pump stations, water boosting, dewatering or sludge pumping. They can also be used as a SCADA patch, connecting peripheral equipment to future or existing SCADA systems. Parameters can be configured via a human-machine interface and include a user-friendly startup wizard. Engineers can preprogram user interfaces to the site-specific needs of an installation, making the panel virtually plug-and-play. Maintenance staff



can easily adjust settings and monitor the system remotely. These weather-proof control panels are UL 508A listed and include service-rated circuit protection, phase and voltage protection, and level controls. **877-257-8712; www.orenco.com**

7. PRIMEX Eco Smart Station

The **Eco Smart Station** control system from **PRIMEX** provides a safe, energy-efficient solution for optimum pump control in municipal lift station applications. It uses the latest technology in VFD, microprocessor-based controller, data storage and communication capabilities available. It achieves up to 30% energy savings using an efficiency auto-tune algorithm that searches for the pump speed that will consume the least amount of energy per gallons of liquid pumped. It is housed in a multiple-compartment Arc Armor Enclosure, reducing the risk of injury resulting from electric shock and exposure to arc flash. It features the Energy View controller powered by kW Logix software, an energy-efficient solution. The color touch-screen HMI provides level control, pump alternation, flow monitoring, data logging, alarm logging and historical trending, and comes equipped with a SD memory card for data storage and download. It is available in 29 models, from 10 to 100 hp. **844-477-4639; www.primexcontrols.com**

SENSORS

8. ABB KPM KC7

ABB has updated its **KPM KC7** microwave consistency transmitter portfolio with a larger flow-through sensor to fit process pipes with a diameter of up to 16 inches, giving the choice to measure the total consistency of mixed pulps with a flow-through sensor. The enlarged flow-through model, extending from a previous maximum of 12 inches, expands **ABB's** market reach to those with wider diameter pipes that previously could only use insertion types, but now can consider both. The larger size, capturing the whole pipe diameter, provides precise, reliable measurements of total consistency regardless of flow rate for superior process control. **800-435-7365; www.abb.com**

9. Eastech Flow Controls iTracker Sensors

Eastech Flow Controls' iTracker Sensors can pinpoint I&I problems down to adjacent manholes and generate data-rich analytics, alerts and sophisticated reports for municipal wastewater engineers. These devices install easily under manholes and have quickly located blockages in municipal wastewater systems that engineers previously spent years trying to find. They allow municipalities to become proactive and alert municipal wastewater engineers at the beginning of a storm or rain event as to where I&I issues will occur so that they can avoid what historically has resulted in very costly environmental problems. **800-226-3569; www.smartwastewater.com**



10. Electro Scan ES-620 Sewer Probe

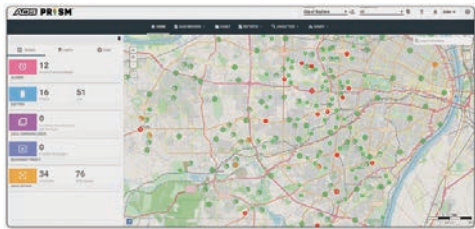
Electro Scan's ES-620 Sewer Probe uses Focused Electrode Leak Location to unambiguously locate and measure all potential leaks in gpm. These include bad joints, cracks, holes, fractures, bad service reconnections and poorly cured liners. **FELL** uses a high-frequency low-voltage electrical signal to inspect the entirety of the pipe wall. A watertight pipe does not allow electricity to escape or "leak" from a piping system unless there is an opening in the pipe wall. The larger the opening, the greater the electric current, meaning a larger water leak, as described in ASTM F2550. The system provides reports and data within minutes of scan completion and is available as a stand-alone system or as an addition to an existing CCTV system, for pipes 6 inches and above. **916-779-0660; www.electroscan.com**

11. Hawk Measurement CGR PoE Level Transmitter

The **CGR PoE Level Transmitter** from **Hawk Measurement** is a guided Radar Power over Ethernet product that provides secure in-plant and remote monitoring, as well as remote sensor setup, diagnostics and troubleshooting abilities. If any troubleshooting is required, it will communicate to remote service technicians for offsite diagnostics, sensor health and reconfiguration, without the need to climb a tank or enter the facility. It can connect to an online portal, the HawkEye365, which can monitor multiple tanks worldwide in real time. This monitoring portal provides accessibility to critical data such as the ability to view volume, space, material height, historical trending, alarms and alerts, sensor setup and diagnostics. Plant level operator screens are customized to the company's specifications to include control room level and operations level interface screens. The graphical user interface is common throughout and permissions can be set for different tiers such as plant level, finance, or executive level. **888-429-5538; www.hawkmeasurement.com**

12. Pulsar Measurement dBi-Modbus

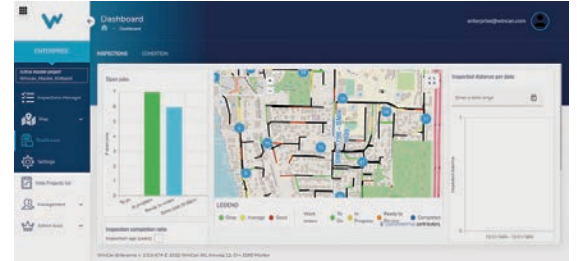
Pulsar Measurement's dBi-Modbus intelligent ultrasonic level sensors are suitable for remote installations. These transducers include **DATeM** (Digital



13.



14.



15.

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13. ADS Environmental Services PRISM 3.0

The **PRISM 3.0** solution platform from ADS **Environmental Services** equips users with the necessary tools to capture, analyze, store, report and visualize actionable answers to the industry’s most critical collections system problems — prioritizing sewer cleaning and preventing SSOs, assessing RDII and measuring and managing CSOs. Updates include a home screen map with updated notification tiles and GIS mapping; a notification dashboard with customer level controls for setting alarms, tiered alarm escalation and contextual alarms using ANSR entities; and the ability to save configuration settings for the location dashboard. **800-633-7246; www.adsenv.com**

14. Endress+Hauser Netilion Water Networks Insights

Netilion Water Network Insights from **Endress+Hauser** enables full transparency for water networks around the clock by providing reliable monitoring of flow, pressure, temperature, level, water quality and other measurements. The technology connects multiple sources in a single interface, including field devices, industrial controllers, data transfer components, data recording and archiving devices, analysis and forecasting tools, and others. The web-based interface provides users with complete system monitoring, and when limit values are exceeded, or in the event of failure, it delivers alarms to users via email, SMS or push notifications. All communication is encrypted and secure, even in remote regions with a self-sufficient power supply, providing data reliability and integrity. **888-363-7377; www.endress.com**

15. WinCan Web

WinCan Web delivers a series of enterprise maps that give leadership a sky-high view of a city’s sewer system, and where inspections are taking place throughout the day. Designed for fast, easy project editing and defect coding, it provides avenues for processing and reviewing any type of data. Collect inspection data, then visualize results from anywhere with seamless integration with Esri’s ArcGIS online or on the WinCan Maps native mapping software. The program’s enterprise-tier inspection manager helps wastewater and sewer managers track maintenance and inspection work orders and determine the progress of each. This not only increases productivity for office teams creating and monitoring work orders, but allows tracking the progress of individual crews throughout the day, providing an enhanced layer of accountability and team management. **877-626-8386; www.wincan.com** ♦

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Product Spotlight

Trenchless alternative available to address lead pipe water service crisis

By Craig Mandli

As many as 10 million U.S. households, schools and care facilities get their drinking water through lead pipes, and each pipe can cost thousands of dollars to replace. Despite those challenges, the U.S. goal is to replace all lead service laterals in the next 10 years. HammerHead Trenchless designed the HydraSlitter system to help.

The kits provide a minimally invasive alternative to open-cut replacement of lead potable water pipe 1/2 to 1 inch in diameter. Kits arrive within a few days containing all tooling and accessories needed for that specific job, including the appropriate slitter, blades, expanders, cable, duct-rodder and cable grip for the excavator, as well as a tooling assembly selection chart and instructions.

“Federal guidelines and specifications sanctioned the manufacture and use of lead pipes for potable water into the 1950s,” says Josh Hood, senior manager of product management and support at HammerHead Trenchless. “And national plumbing codes permitted the use of lead water pipes into the 1970s and ’80s. It was not until 1986 that congress finally banned lead for use in new installation/construction.”

Hood says HydraSlitter kits are specifically designed to give pipe replacement professionals a safe, quick and reliable means of taking lead lateral



lines out of service. “The system is simple, it is easy to learn and easy to use,” he says. “Plus, investment cost is super low, since you’re only buying tooling, not a machine.”

A trenchless pipe-slitting operation using HydraSlitter tooling provides a significantly less invasive process for lead pipe replacement. Drawn by a cable attached to a mini excavator with the cable grip provided in the kit, HydraSlitter tooling slits the lead pipe while simultaneously installing new pipe into place as it progresses. Since the replacement pipe follows in the same path as the existing pipe, a trenchless replacement process greatly reduces disruption to daily routines, traffic or commerce. It reduces project time and cost by minimizing excavation, demolition and restoration requirements. It has no impact on tree root systems and significantly mitigates the risk of interfering with other utilities in shared easements.

In most cases, the machine used to pull the tooling can be the same mini excavator that was used to dig the pit depending on ground conditions and length of run.

“Runs will generally be 40 to 50 feet, but 120 feet is the maximum length right now.” **800-331-6653; www.hammerheadtrenchless.com**

SPECIAL REPORT

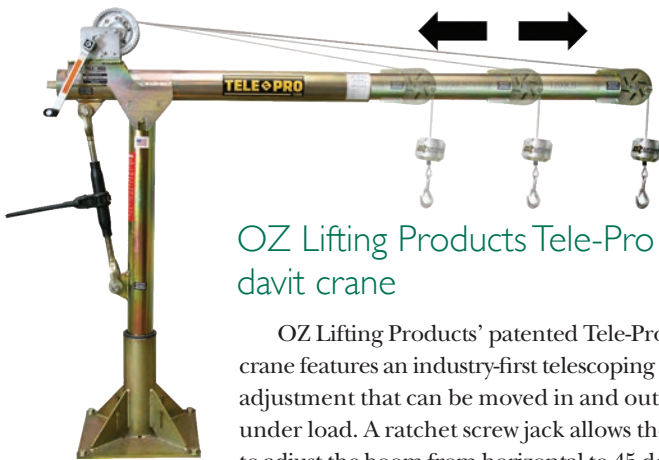


Patterson Manufacturing Davit Cranes

Give your operations a lift with Patterson Davit Cranes, available in 1/2-ton and 1-ton capacities. The low maintenance, easy-to-assemble design offers adequate reach to accommodate lifting large loads within tight spaces, and a boom that can be adjusted to nearly 45 degrees to allow for clearance over obstructions such as handrails. Built for durability, it comes standard with a hot-dipped galvanized finish and stainless steel hardware to prevent rust and corrosion in wet work environments. Following Patterson’s tradi-

tion of safety-focused innovation, the davit features a reliable brake to keep loads in position without creeping. For over 160 years Patterson has been a trusted supplier of winches, rigging, fittings and custom products for lifting applications. Patterson Davit Cranes are made in the U.S.A. and deliver on the company’s promise of helping businesses run safer, easier and faster. Find out how Patterson can improve employee safety and positively impact your bottom line. **800-322-2018 www.pattersonmfg.com/davit-cranes**

SPECIAL REPORT



OZ Lifting Products Tele-Pro davit crane

OZ Lifting Products' patented Tele-Pro davit crane features an industry-first telescoping boom adjustment that can be moved in and out while under load. A ratchet screw jack allows the user to adjust the boom from horizontal to 45 degrees while under load and the 360-degree rotation

of the crane allows a full range of motion. Smart latch technology at the boom/mast means no tools are required for assembly. A zinc-plated finish provides added corrosion protection. The Tele-Pro is available in 500-, 1,200- and 2,500-pound capacities. AC and DC electric winches are optional on the 500- and 1,200-pound models, or manual winch with drill drive adapter is available for all three models. The cranes are made in the U.S. and each one is individually tested and certified at 125%. **800-749-1064; www.ozliftingproducts.com**

Reed Mfg. Guillotine pipe cutters



Joining the slimmed-down line of Reed Mfg. Guillotine pipe cutters is the updated HPC4+ model. Weighing in at a trim 11 pounds, the tool cuts square on medium and high-density PE pipe used by water and gas utilities. Accurate cuts mean no facing is needed for electrofusion and only minimal facing for butt fusion joints. All aluminum construction results in lighter tool weight and greater rigidity. HPC4+ cuts through 1 1/2- through 4-inch HDPE, both DIPS and IPS. Aluminum rails and crosshead with hard anodized finish reduce wear on sliding surfaces. A durable, coated blade produces square cuts with no chips to clog valves and small openings. A slight taper on blade allows an unchallenging start to the cut and holds form

for an impressive, straight cut. Blades are straightforward to sharpen or replace. **800-666-3691; www.reedmfco.com**

In-Situ TurbiTechw² suspended solids sensor



The TurbiTechw² suspended solids sensor from In-Situ includes a large optical surface and self-cleaning mechanism designed to deliver reliable data. The TurbiTechw² can also be used to measure returned activated sludge, surplus activated sludge and suspended solids or turbidity. The sensors use a solid state

infrared light source for stable measurements. The automatic cleaning process takes only 90 seconds, which means the sensor is available for readings 99.5% of the time. **800-446-7488; www.in-situ.com** ♦

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CUES announces New Jersey sales partnership

CUES announced a new sales partnership with W.E. Timmerman Co. in New Jersey. Since 1938, Timmerman Equipment has been providing New Jersey and southeastern New York customers with quality environmental equipment. They are a locally owned dealer with a variety of equipment available in the public works and environmental industry.

Aries Industries expands in multiple states with new dealers

Aries Industries has added to its U.S. market reach with the addition of dealers in Ohio and Virginia. C&S Solutions, based in Harrison, Ohio, and MT Electronics, headquartered in Boones Mill, Virginia, are well-established dealerships offering sales, service and training to broad customer bases. The additions further the rapid growth of the Aries Industries dealer network, which has added seven U.S. dealers coast to coast, and three in Canada, in less than three years.

CGLR and TWC create partnership

The Council of the Great Lakes Region and The Water Council announced a partnership to deepen ties and accelerate water innovation and stewardship in the binational Great Lakes region, the largest freshwater system in the world. As part of the collaboration, CGLR will help TWC grow its WAVE: Water Stewardship Verified program, an initiative that helps companies follow a strategic process to understand their water uses and impacts, assess associated risks across the enterprise and prioritize the highest risks.

NYC delivers two miles of new sewers and water mains in Queens

The New York City Department of Environmental Protection and NYC Depart-

ment of Design and Construction announced the completion of a \$24 million project to improve street conditions, alleviate flooding and upgrade infrastructure in the South Jamaica and St. Albans neighborhoods of Queens. The project, which was completed one year ahead of schedule, was funded by DEP and was managed by DDC. The project is part of a \$2.5 billion investment made by the city to improve neighborhoods throughout southeast Queens. The program consists of 44 projects overall, including 18 that are substantially completed and three that are in active construction.

Tnemec announces new sales director

Tnemec welcomed Brian Cheshire as its new sales director of water and wastewater. Cheshire, a 20-year veteran in the coatings industry, will focus on the overall market strategy and sales activity for this market. Cheshire's hire comes after the former sales director, Vaughn O'Dea, was promoted to director of Epoxytec, a subsidiary of Tnemec.



Brian Cheshire

Sam Hall announced as VP of Common Ground Alliance's DPI

Common Ground Alliance, a national nonprofit trade association dedicated to protecting underground utility lines, people who dig near them and their communities, announced that Sam Hall will join the organization as the vice president of the Damage Prevention Institute. The newly created DPI will utilize data and statistics to generate powerful insights and efficiencies that will reduce the rate of damages to buried infrastructure.

Electro Scan awarded condition assessment contract in Florida

Electro Scan was awarded the contract by Polk County, Florida, to conduct an inspection survey of the county's 20-inch-diameter wastewater force main. The force main is critical to the county's wastewater collections system representing its main artery line. Electro Scan will be providing an assessment of the existing coating and corrosion levels in the force main and survey about 3,300 linear feet of pipe.

Anaheim City Council appoints new director to board

Gloria Ma'ae was recently appointed to the Orange County Water District board of directors by the Anaheim City Council to represent Division 9, the city of Anaheim. Ma'ae is a 42-year resident of west Anaheim, where she has a long history of community involvement. She has served on the Anaheim Community Services Board, North Anaheim Neighborhood Council, Anaheim Charter Review Commission, Anaheim Citizens Advisory Committee on Elections, and has participated in the Anaheim Police Department's PACE program. Director Ma'ae is part of a 10-member board of directors at OCWD. Seven are elected from divisions that consist of cities throughout north and central Orange County, and three are appointed to represent the cities of Anaheim, Fullerton and Santa Ana.

WJTA's 2022 Conference and Expo Nov. 1-3 in New Orleans

The WaterJet Technology Association's annual Conference and Expo will be held Nov. 1-3 in New Orleans. Equipment displays and live demonstrations will offer attendees a firsthand look at waterjetting tools, high-pressure pump technology, automation controls and robotics, as well as advanced vacuum trucks and related equipment. Contractor and OEM experts will provide insight on applications and equipment selection. Education opportunities include several session tracks for asset owners, contractors, and research and development. A panel discussion with industry leaders will discuss issues from workforce to supply chains and will be moderated by Kerry Siggins from StoneAge. And a new vacuum technology short course will provide practical and theoretical knowledge and coincides with the newly launched WJTA training and certification program for vacuum operators. To register, visit www.wjtaexpo.com ♦



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WORTH NOTING

PEOPLE/AWARDS

The village of Montour Falls (New York) received \$571,000 from the Federal Highway Administration to construct stormwater improvements.

The township of Cranford received \$1.8 million from the state of New Jersey for the Southside Stormwater Improvement Project, which encompasses a 50-acre area near South Avenue.

A board game developed by the city utilities team in Fort Wayne (Indiana) won the International Serious Play Silver Medal. The game helps players learn how stormwater runoff carries pollutants to rivers.

The city of New Bloomfield received a \$50,000 Clean Water Engineering Report Grant from the Missouri Department of Natural Resources. The funds will be used, in part, to help stop stormwater infiltration into sewer collection pipes. ♦

CALENDAR

Oct. 5-7

Southeast Stormwater Association Annual Conference, Hilton Head Marriott Hotel, Hilton Head, South Carolina. Visit www.seswa.org.

Oct. 8-12

Water Environment Federation Technical Exhibition and Conference, Morial Convention Center, New Orleans. Visit www.weftec.org.

Oct. 18-20

Tennessee Stormwater Association Annual Conference, The Lodge at Montgomery Bell State Park, Burns, Tennessee. Visit www.tnstormwater.org.

Oct. 19-20

Wisconsin Association for Floodplain, Stormwater and Coastal Management Annual Conference, Kalahari Resort, Wisconsin Dells. Visit www.wafscm.org.

Oct. 24-26

California Stormwater Quality Association Annual Conference, Palm Springs Convention Center, Palm Springs, California. Visit www.casqa.org.

Nov. 7-9

American Water Resources Association Annual Conference, Hyatt Regency Lake Washington, Seattle. Visit www.awra.org.

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