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ON THE COVER: Lakeland (Florida) Lakes and Stormwater Division Manager Laurie Smith and her team are responsible for protecting the city's 38 named lakes. (Photography by Emily Plank)









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Luke Laggis

EMBRACE THE OPPORTUNITY

Sometimes customers get angry, but that doesn't mean you can't please them

ou no doubt deal regularly with people who think the public works department's primary objective should be to serve them individually. These people think caring for the street and infrastructure in front of their home, nearby park or whatever their interest may be is top priority. You know the type — the people who love to point out that their taxes pay your salary, as if their checking account is electronically debited weekly and the funds wired straight to your pocket. The angrier people are, I've found, the narrower their view of the world.

I've worked with other editors who were so focused on rules that they lost all perspective on the most important thing: serving the reader. I've gotten letters from readers who were outraged by stories that didn't explicitly promote their narrow interests. I've dealt with people who would argue

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at length against fact because acknowledging reality would damage their fragile egos. The thing all these people share in common is a lack of understanding of the big picture.

The companies and municipalities we work for are all bigger than us. We're just a part of it — often a very small part, and some people just need to feel more important than that.

When it comes to customer service, sometimes you need to let those people feel like they're more important. Like you really are there just to serve them. You could put them in their place, but to what end? In most cases it serves no purpose. They'll just go on being angry at the world, worried someone else is getting more than them. And they'll continue to be a thorn in your side.

It certainly won't work in every instance, because some people just don't want to learn, but education about your mission and a tactful explanation of how you're carrying it out is often the key to resolving these issues. Some people simply don't get it, and if you can help them see the light, you'll not only resolve the immediate issue at hand, you'll gain an ally.

You are all public servants, and sometimes servants get treated like just that. It's by no means fair, but it's also an opportunity to share what you do, explain its importance and maybe turn that interaction into something positive.

One of my very favorite things in the greater scope of journalism is when an angry reader calls to question something they read in a story. No, I don't like being yelled at, but I like being engaged and discussing my work. Maybe they have a point, or maybe they just have no understanding of what goes into putting a publication together — where the stories come from, how they're chosen, why certain topics are covered while others aren't, etc.

In my newspaper days, I saved every angry letter and note of criticism I received because I got more out of them than I did the thank-you notes. They made me think, and they either reaffirmed what I was doing or made me reevaluate certain choices. Both are positive. And when I can answer an angry caller, explain myself and completely turn the conversation around by the end, it's pretty rewarding. The caller has been heard, the complaints considered, and everyone feels better.

You won't resolve every issue, and you won't have everyone thanking you by the time the conversation is over, but if you look at those conversations as opportunities, you might just learn something about your utility, your customers and what you're doing right and wrong. That's a good step toward continued improvement.

Enjoy this month's issue. \blacklozenge

Comments on this column or about any article in this publication may be directed to editor Luke Laggis, 800-257-7222; editor@mswmag.com.





In Milwaukee, a massive project to replace lead water pipes poses a huge challenge ...

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TROUBLESHOOTING TIPS Keep Your Hydroexcavator Working

No matter how well a hydroexcavator is engineered and built, the rigors of working under difficult and demanding conditions take their toll. As such, some downtime is inevitable. But savvy operators with the ability to troubleshoot problems can get their machines up and working again without suffering significant losses in job site productivity.

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SAVING THE BUDGET Proactive Pipe Repair

For too long, the City of Lawrence (Massachusetts) Water and Sewer Department took a strictly reactive approach when it came to sanitary sewer infrastructure repairs, only embarking on projects when something completely failed. Since then, the city has benefited in a major way by taking on a proactive and holistic approach to infrastructure repair. mswmag.com/featured

TRAINING EFFECTIVENESS How to Improve Your Team

A utility is only as good as its team. When your customers think of your utility, they think of your employees. If you have a strong team of expert technicians who are giving their best to every customer, you'll position your crew for growth. This online exclusive article explores some of the best ways to cultivate leaders and train your team effectively. mswmag.com/featured



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Lead heavy equipment operator Chris Perlichek changes out a hydraulic plate compactor for a breaker hammer as equipment operator Shane Werre prepares to break sections of a residential street. The two were part of a crew responding to a residential water main break. (Photography by Brad Stauffer)

In-house crews and careful planning lend efficiency to Minnesota utility's main replacement program

By Jim Force

FOCUS: WATER

well-thought-out approach to water main replacement is saving money and minimizing disruption in Moorhead, Minnesota.

ACOORDINATED EFERT

> The Moorhead Public Service utility works closely with the city of Moorhead to plan replacement of the aging cast iron pipes in its 220-mile distribution system, applying a variety of trenchless technologies and doing much of the work itself.

> "We meet every summer with the city to go over its capital improvement program," says Kris Knutson, MPS water division manager. "We focus on the city's

transportation projects and identify roadwork plans in locations where we have old cast iron pipe that needs replacement or where we've experienced main breaks."

Using this coordinated approach, MPS rehabs or replaces 8,000 to 9,000 feet of cast iron pipe in its system each year, using trenchless technologies for about half the work. The trenchless techniques include horizontal directional drilling, pipe bursting and sliplining.

A unique approach to resurfacing entry and exit pits and other opencut areas yields additional savings.

"We are optimistic that we can replace all 30 miles by 2035."

Kris Knutson

Moorhead Public Service, Moorhead, Minnesota

SERVICES: Water and electricity

NUMBER CUSTOMERS SERVED: 46,000 (13,000 connections)

AREA SERVED: City of Moorhead, Oakport Township, city of Dilworth

INFRASTRUCTURE:

Surface water and groundwater treatment plant, upgraded in 1995; 220 miles of water mains; 30 miles of cast iron pipe

STAFF:

PROFILE:

William Schwandt, general manager; Kris Knutson, water division manager; Jake Long, water distribution supervisor

WEBSITE: www.mpsutility.com

"We resurface the bottom 4 inches of the area above our excavations," says Jake Long, water distribution supervisor. "We leave the top 2 inches to the city because they are going to mill and overlay that area anyway."

Managing assets

A consumer-owned electric and water utility, MPS provides drinking water to more than 46,000 customers in Moorhead, Oakport Township and the city of Dilworth — part of the metropolitan



area of Fargo-Moorhead, which has a combined population of approximately 209,000.

The water system has undergone more than \$20 million in improvements since 1986, including the completion of a state-of-the-art water treatment plant in 1995. The plant includes lime water-softening, filtration and ozone for primary disinfection and odor/taste removal. The upgrade has significantly reduced the generation of chlorinated disinfection byproducts. Raw water comes from the Red River of the North, as well as three local aquifers.

The replacement work is performed according to the Watermain Asset Management Plan that MPS started using about five years ago, Knutson says.

The goal of the plan is to provide a safe and reliable water distribution system by strategically replacing cast iron as well as undersized mains to meet flow requirements, through coordination with the city's road construction plans.

"We generally meet with the city during the summer prior to the next round of work," Knut-

son says. "We work cooperatively with the city, using the transportation projects in its capital improvement plan for the coming year."

MPS begins its water main replacement program in April, completing it in early August in time for the city to wrap up its street work before winter.

Long says breaks often indicate areas where work is needed. "We don't use a specific leak detection technology." Rather, the clay soils in the area cause water to bubble to the surface, allowing the MPS team to visually spot main breaks.

GIS data help identify "hot spots" and other areas needing replacement, based on pipe material and pipe conditions, as well as break history.

Since 2013, MPS has replaced an average of approximately 8,500 feet of its 30 miles of cast iron pipe each year. "We are optimistic that we can replace all 30 miles by 2035," Knutson says. Much of the cast iron pipe was installed in the 1950s and '60s, with some dating back to the early 1900s.

Before adoption of the asset plan, the utility was replacing significantly less than 1% of its cast iron a year — a schedule of replacement that



A trench box protects equipment operator Shane Werre while he works on a water main repair with field technician Greg Gilbertson.

exceeded the design life span of most materials. Under the asset plan, the cycle is about every 100 years, more in line with the PVC pipe being used as the replacement.

Knutson estimates a little more than half of the work will be done with trenchless techniques and the rest by opencut excavation. "It depends. If the city is replacing an entire roadway, then we'll use the opencut approach."

If the city is completing a mill and overlay, typically HDD or pipe bursting is used. The choice between HDD and pipe bursting depends on the location of conflicting utilities, Long explains. "If we like the location of the pipe (meaning there are no other utilities interfering), we'll use pipe bursting. If we need to place the water main in a different location to avoid existing utilities, we'll choose HDD." For transmission mains, "where the pipe size can be downsized, we'll use sliplin-



Water Division Manager Kris Knutson oversees a water main repair in one of the city's residential neighborhoods.

ing, but that's more on the transmission side than the residential side because there are not as many individual service lines to reconnect."

In-house replacement

While close coordination with roadway construction is proving to be cost-effective, MPS saves additional money by doing a large por-

tion of the water main replacement with its own crew.

Long estimates that the utility does about 50% of the work, contracting out the other half to local contractors.

"Our crew of six to eight labor/equipment operators is experienced," he says. "Many have a strong background in the construction industry, so they are knowledgeable and familiar with this type of work."

MPS provides training, as well. And Long adds that many of the local organizations offer training and seminars in pipe-laying certification and appropriate safety measures.

"We have a great team that is knowledgeable and works hard. Over the past several years, MPS crews have learned various tactics to become more effective and efficient using trenchless technologies. We continue to learn and improve each year."

"We have a great team that is knowledgeable and works hard."

Jake Long

Sharing success

Several recent projects were featured in a paper MPS, Underground Solutions and Apex Engineering Group staffs presented at the North American Society for Trenchless Technology conference in Chicago in March 2019, and they represent the range of work the utility is undertaking.

One major job involved the pavement mill and overlay of two state

trunk highways and the main street in the middle of town. Trenchless technology was included in the bid package, and the utility was able to use HDD to replace 4,000 feet of cast iron pipe with 8-, 10and 12-inch fusible PVC pipe.

"The fact that the roadwork was mill and overlay versus full-scale reconstruction made trenchless construction of the water main an ideal fit," the authors of the paper report. The approach diminished disruption of traffic in the busy downtown area and allowed MPS to piggyback on the road project, saving on the design, permitting, traffic management and construction administration costs.

In another project, MPS had experienced a number of breaks in a 1,200-foot section of water main along Sixth Street, as well as sloughing of iron deposits. Before the city began a total reconstruction of the street, MPS was able to execute a pipe bursting project, doing 300-foot pulls that took between three and five hours each.

Costs were kept at approximately \$80 per foot since MPS did not have to replace any asphalt at the pipe bursting connection pits because the city fully restored the road surface following pipe replacement. "For a time, the pavement levels are different and we post uneven pavement traffic signs to warn drivers," Long says.

Finally, in a project in a densely populated residential area in the southern part of town, MPS

KEEPING THE PUBLIC INFORMED

In any public works project, utilities are well advised to keep the public fully informed of the work in progress. This is especially true when the project comes down their street or across their property.

Moorhead Public Service pays close attention to the public information component of the water main replacement work it undertakes each summer.

"We take a proactive approach," says Jake Long, water distribution supervisor. "We mail postcards (into the affected neighborhoods) and put up large street signs so drivers are aware of the construction. We also go door to door notifying customers if we need to shut the water off unexpectedly and install temporary waterlines into each property, testing them for pressure and sanitation. We try to minimize the amount of time the customer's water is off."

MPS crews handle four to six projects per year, each involving 1,000-foot sections of service area.



Moorhead Water Division employees include (from left) water field technician Seth Martinson, equipment operators Nick Duncan and Greg Gilbertson, Water Division Manager Kris Knutson, water distribution supervisor Jake Long, water plant supervisor Marc Pritchard, water treatment plant operator Chris Knutson, administrative assistant Mandy Sauvageau, lead heavy equipment operator Chris Perlichek and equipment operator Shane Werre.

used pipe bursting to replace 3,300 feet of 6-inch cast iron pipe with 8-inch fusible PVC. Because the project was coordinated with an upcoming mill and overlay of the street, MPS achieved significant savings on the cost of patching the many service connections that were required in this densely populated area.

"Contractors were given the choice between opencut excavation and pipe bursting," the NASTT paper reports. Trenchless was chosen due to the high cost of gravel and asphalt needed for roadway repairs with opencut.

Pipe was pulled in three- to five-hour periods during the early morning to allow residents access to their driveways.

Again, coordination between the city and MPS proved cost-effective.

Close coordination

Replacing the aging infrastructure across the nation represents a huge investment of funds that are not always available from government or that require significant water rate increases that must be borne by customers.

At MPS, the use of trenchless technologies and close coordination with the city's road construction projects is turning out to be highly cost-effective.

Knutson estimates that the average cost per foot of replacing water mains is around \$165. By coordinating the replacement with the city's roadway projects and leaving the top 2 inches of the entry and exits pits for the city to resurface, that cost has been reduced to around \$135 per foot. That number can come in even lower when the utility does the replacement work itself.

The utility's Watermain Asset Management Plan is paying dividends. ◆

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PREPARING FOR THE FUTURE

Hands-on classes and internships open students' eyes to water and sewer industry careers

By Ken Wysocky

A little more than a decade ago, two veteran Irving (Texas) Water Utilities employees — David Canady and the late Dennis King — decided to do something about a growing problem: The dearth of younger people interested in working at water and sewer utilities.

In 2008, Canady, the utility's operations manager, and King, then the supervisor of environmental compliance, met with officials at the Irving Independent School District to discuss how to make students aware of careers in the water and sewer industries.

"They get a very well-rounded look at all aspects of water and sewer utility operations."

Barry Allen

The result? A basic water operations course for senior students, based at Barbara Cardwell Career Preparatory Center, a nontraditional high school. Initially taught by Canady and King, the course prepares students to qualify for a Texas Commission on Environmental Quality Class D water operator's license,

says Barry Allen, water pro-

arry Alleli

grams specialist for the utility, which operates water and sewer systems for the city of Irving.

"It's an entry-level position with no experience required," Allen says. "It helps students get their foot in the door at water and sewer utilities."

In 2009, the district added another course aimed at helping students obtain a wastewater collections I license. In all, more than 200 students have taken the courses, which later shifted from Cardwell Prep to Chester W. Nimitz High School.

Furthermore, about 100 of those students have passed the exams for either the water operator's license, the wastewater col-

lections license or both, making them eligible to apply for jobs as licensed water or sewer operators. Five of those students were hired by IWU, and two still work there, says Allen, who helps teach the water operator's course.

Departing baby boomers

Like many water and sewer utilities nationwide, IWU is doing its best to prepare for the so-called silver tsunami — the expected wave of baby boomers who are eligible to retire during the coming decade. The U.S. Bureau of Labor Statistics projects that 8.2% of water operators will leave their jobs between 2016 and 2026, and industry experts estimate that thousands of water utility operators will retire during the coming decade.

"I'm getting ready to retire myself and so is David," Allen says. "I'm in my 35th year in the industry. We have a hard time finding qualified operators at We invite readers to offer ideas for this regular column, designed to help municipal and utility managers deal with day-today 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.





Barry Allen, Irving Water Utilities program specialist

how to replace a main valve assembly on a fire hydrant as part of a water system operator's course they took as seniors at Barbara Cardwell Career Preparatory School in Irving, Texas.

Cristal Velasco (left) and Florentino Rivera learned

the entry level. But if students get a license, they can transition into the industry a lot easier."

At IWU, roughly 31% of the workforce of 168 employees is eligible for retirement within the next decade. And while helping 100 students earn water operator's licenses and then

hiring five of them doesn't by itself serve as a comprehensive succession plan, it's at least alerting students to possible careers that they otherwise might not be aware of, he notes.

"It's 100 more people than we otherwise would've had," Allen says. "The more we can do at a young age, the better off we are as an industry. It's totally a win-win situation."

Allen points out that some students eventually lose interest and don't pursue utility careers. Others move away from Irving for various reasons. And other circumstances also intervene, which makes it difficult for all of those 100 students to possibly become employees.

On the other hand, they also aren't limited just to jobs at municipal utilities in Texas; the license makes them eligible to work at privately owned water systems or at other entities that operate their own water systems, he says.



Internships added

The school district and IWU also created an unpaid summer internship program run by the utility in 2009 and 2010. After that, the internships were folded into the students' high school curriculum, operated by the school district.

About three to five seniors participate in the internship program each year. They must complete one of the classes and pass a licensing exam in order to be eligible. Once selected, they come to the utility for about $2 \ 1/2$ hours a day, Monday through Thursday, for the entire school year, and they receive credits toward graduation as long as they com-

plete the internship.

"Donna Starling, our water programs manager, and I interview students to select the interns," Allen says. "They're selected based on how well they interview and on their aptitude for and interest in a career in the water and sewer industry."

About 20 students have participated in the internship program, which Allen says has been very successful. The internship emphasizes hands-on experience; students spend time in the utility's command center, learn how water is distributed throughout the system, work with environmental-compliance employees and perform industrial pretreatment stormwater sampling, he says.

Hands-on experience is key

The curriculum for the water operator's class is based on a classroom manual developed by the Texas A&M Engineering Extension Service. It includes 20 hours' instruction as part of the school's agricultural sciences curriculum.

Students attend the class for about $1 \frac{1}{2}$ hours for three to four days a week, as opposed to a nonhigh schooler who would get 20 hours' instruction in $2 \frac{1}{2}$ days, Allen says. "That allows us to add supplemental, hands-on components to the instruction that the shorter time frame doesn't allow for. We take field trips and do things that help students to better understand what all goes into operating a water system."

Students get to flush fire hydrants, perform water taps and meter change-outs, experience confinedspace entry, measure chlorine residuals with a colorimeter and tour the city's water and wastewater plants. They also hear managers, engineers and other employees talk about what their jobs entail.

"They get a very well-rounded look at all aspects of water and sewer utility operations," Allen says.

IWU has a built-in advantage that makes it easier to teach the class: Three employees are certified Texas Commission on Environmental Quality instructors. Without certified instructors, a utility or school district would have to hire them from other cities to teach such a class, which isn't always feasible, Allen notes.

In the long run, Allen is proud of what the utility has accomplished and hopes to help other communities start similar high school programs. Moreover, he's not deterred by the low number of students who actually became water operators in Irving, noting that there's intangible value in what hundreds of students have learned.

"Even if they do go elsewhere or do other things, they still have gained a deep understanding of how water utilities work and how important the utilities are to communities," he says. "And they can disseminate that information to others because they're knowledgeable about it." \blacklozenge

Editor's Note:

This is the first in a series of ongoing articles that will examine how water and sewer utilities are confronting the industry's looming labor shortage.



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Georgia utility builds efficiency through system upgrades and customer engagement By Giles Lambertson

t was the presence of a swift-moving stream that led to the founding of Roswell, Georgia, and its earliest infrastructure — a cotton mill. Big Creek, as the stream is known today, is still a critical piece of the city's natural infrastructure.

WATER HAVKS

The Roswell Water Utility is responsible for providing water to 20% of the fast-growing city of 100,000 in the Atlanta metro area. Despite the fact that some of its waterlines date to the 1930s, the utility is regularly singled out by industry peers as a progressive, efficient system. Some credit for this performance surely must be attributed to the water utility manager, Chris Boyd.

Though Boyd has managed the utility for just

four years, he was water distribution superintendent for 10 years before that. On his watch, the utility earned distribution awards in 2006, 2011, 2014, 2018 and 2019, all from the Georgia Section of the American Water Works Association. In 2009, a local and state water partnership named Water-First also cited the utility's excellent stewardship.

"I have a great team," Boyd says about the peer recognition of his department.

Reducing usage

Most Georgia counties were placed under a Level 1 drought declaration in October that persisted into December. Consequently, Roswell is closely monitoring water use to comply with the state's outdoor watering restrictions. It's also offering customers commonsense conservation tips such as putting up a rain gauge to track rainfall before opting to turn on a sprinkler.

However, the utility's conservation program is more than just passively responding to Mother Nature. Its programs anticipate problems and try to preempt them. This includes changing customer billing to monthly from bimonthly. Thirty-day billing gives the utility timelier looks at water usage so it can red-flag higher-than-usual consumption and investigate possible water loss. "With monthly billing, we are able to get to a leak a lot sooner," Boyd says.

"In 2018, we had an outside company survey our entire water system for leaks, and they only found seven leaks on service lines. The system was declared to be 'tight.""

Chris Boyd

That and other proactive programs such as the city's low-flow toilet rebate program have reduced total water usage by 40% over the last dozen years. "In 2006, the gallons per capita per day figure was 122. In 2018, it was 72," Boyd says. "In 2018, we had an outside company survey our entire water system for leaks, and they only found seven leaks on service lines. The system was declared to be 'tight."

When water system failures invariably do occur, the department has promised to respond within two hours. An investigator is sent to a location to determine where a pipe is leaking. If the broken line is on the city side, a crew is immediately sent to repair it. If it's leaking on the customer's property, a plumber is called.

That's all pretty pro forma. The utility's warning system is more innovative. It is called AquaHawk Alerting and lets customers actively monitor water usage. Once customers register for the service, they can go online and track water use. They can also sign up for alerts automatically sent via text, phone call or email. The alerts are triggered whenever an account seems likely to consume more water or to run up a higher bill than stipulated by the customer.

The alerting system is a fruit of the city's decision in 2011 to acquire Sensus FlexNet automated metering infrastructure. "It has been very effective," Boyd says. "We were the second or third water utility in Georgia to implement the customer portal alert system. We are certainly ahead of the national average in the number of customers signing up for the service."

Still, only about one-third of Roswell Water Utility's customers have opted for AquaHawk alerts. The number is increasing, however, partly by word-of-mouth endorsements from satisfied customers. "It's been hard to get people to sign up for it, but those who have, love it. They're advertising AquaHawk to their neighbors."

Meeting demand

Roswell is a suburban bedroom community for Atlanta commuters. Consequently, 83% of the water utility's customers are residential and less than 10% commercial. Five percent of customers buy the water solely for irrigation.

To meet demand, the utility principally draws raw water from Big Creek, which has been a source for 80 years. Fulton County is a backup source with water drawn from the Chattahoochee River. The third Roswell water supply is a deep well drilled in 2012. Water flowing through the utility's lines on any given day is a mix of these sources.

The mix changes most dramatically during dry spells when the flow of Big Creek diminishes to a point below that permitted by the state Environmental Pro-

Profile: Boswall (Georgia)

15 21

Equipment operator Corey Bagby exercises a water valve with a Flowmaster on a Vac-tron LP 873 XDT. The utility tries to exercise all

large valves once a year to ensure there are no issues.

Roswell (Georgia) Water Utility

SERVICE AREA: 7.3 square miles WATER TREATMENT PLANT CAPACITY: 3.3 mgd

WATER INFRASTRUCTURE: 89 miles of distribution line

WATER CUSTOMERS: 5,600

WATER UTILITY EMPLOYEES: 16 WEBSITE:

www.roswellgov.com/ government/departments/ environmental-public-works/water-utility



Casey Schoals uses FieldLogic Tools software to program a SmartPoint 520M meter transmitting unit with a new iPERL ¾-inch Sensus water meter.

"It has been very effective. We were the second or third water utility in Georgia to implement the customer portal alert system."

Chris Boyd

tection Division. When that occurs, Roswell Water Utility must supplement its supply from the well. In the event that isn't sufficient, the utility can tap any of its six interconnections with the adjacent Fulton County system.

"It's been awhile since we weren't able to pull water from the creek," says Jessie James Cash, the utility's treatment plant operations manager.

That's good, because whenever the system can't draw from Big Creek, it's costly. According to the utility's master plan, for example, the utility had to buy 20 million gallons from the Fulton County system during a drought in 2016. At that time, treating its own water cost \$1.70 per thousand gallons. Buying it from Fulton County cost \$2.23 per thousand.

Another cost-saving decision: The utility constructed a new water treatment plant in 2016, replacing an 80-year-old facility that could only produce 1.5 mgd, which is about equal to average daily consumption over the course of a year. When the old plant couldn't turn out quite enough water, the utility had to tap the county system.

KEEPING UP WITH INFLATION

Raising water rates is no way for community leadership to win a popularity contest. Attempts to persuade customers that rising rates are good for them usually fail. Nevertheless, proper billing is a part of good utility management.

Roswell (Georgia) Water Utility is a case in point. In July 2019, the utility bumped rates 2.5%. The smallest usage metered customer now pays a \$5.29 base rate and \$4.35 for the first 5,000 gallons.

Over the next five years, however, the rate is scheduled to go up 4% annually. Some perturbed Roswell customers probably remember that in each of the previous five years, the utility raised the rate 1.5%. So over 10 years, the rate is going up significantly.

Chris Boyd, Roswell Water Utility manager, says rates are pretty much in line with neighboring water systems. "We're about in the middle." Some proof of that is the Fulton County water system, which serves 80% of Roswell. The county system is raising its rates 5% per year for the next three years.

The perspective that Roswell customers look for in all this — and some admittedly

never find — is why paying more for an unchanged product is justified. After all, it's not as though the water is going to taste any better at the higher rate. No, but higher water rates usually assure customers that the water will be there when they turn the faucet on. Or flush the toilet. Or turn on the irrigation sprinkler or shower.

In the case of Roswell, Boyd says the additional revenue is mostly about keeping up with inflation and meeting the cost of operating and maintaining the water treatment and distribution system. The water rate is also structured so that a customer pays more as water consumption rises. It's intended to encourage conservation.

Even the fact that bills now arrive monthly, instead of bimonthly, has a purpose: It helps the utility track revenue and forecast water consumption — and find leaks sooner than they did under the every-other-month billing cycle.

It still would be nice to pay a little less, of course, but a dependable water system is pretty nice, too. The state-of-the-art plant, which has won four consecutive American Water Works Association awards for efficiency, can produce 3.3 mgd, a comfortable surplus. As a result, since the new plant came online, less than 2% of water distributed to customers has come from the county. That's a significant savings considering the system pumps out about 500 million gallons a year.

"We have the capacity in our treatment plant to meet demand for the next 20 years," Boyd says, noting that they still need to get more groundwater into the system as part of the drought tolerance plan when the Big Creek flow drops too low. "If we can do that, we can become more self-reliant and have more redundancy, and purchasing water from Fulton County becomes a last resort." A second deep-well site is being scouted.

The system has raw water storage of 10 million gallons. That sounds like a lot but is equivalent to just three to five days of normal customer demand. In addition, the plant has a 375,000-gallon finished water storage facility and three water towers holding more than a million gallons.

Replacing pipes

Getting all that water to homes and businesses is the mission, of course, and maintaining the system's lines poses some challenges. For one thing, some of the pipe has been in the ground for far longer than its normal life expectancy. Half of the distribution pipes are ductile iron, about a third are cast iron, 7% are galvanized steel and less than 3% are asbestos concrete. Getting rid of the latter has been a longtime priority for obvious reasons.

The other main focus of replacement work is the galvanized steel pipe, which has become increasingly problematic, according to Boyd. The 2-inch pipes are mostly in residential cul-de-sacs and tuberculation has begun to restrict flow. Almost as bad, iron oxide is discoloring the water. The pipes will be replaced with HDPE. Another focus of pipe replacement is 8-inch ductile iron pipe, particularly alongside streets being rebuilt.

Boyd doesn't have a so-many-feet-per-year replacement schedule for aging lines. Rather he uses a matrix of considerations about flow, leaks, water quality, economic development and so on to identify priority stretches of pipeline. "I take all these into account and score it and focus on priority areas. How many feet of new pipe we do in a year varies a lot. I don't try to do a certain linear amount every year."

If spending for capital improvements remains where it has been for some time — about \$500,000 a year — the system has a 35-year backlog of replacement work ahead of it. The prospect of replacing so much aging 6- to 16-inch pipe doesn't seem to faze Boyd. "That's the plan," he says. (continued)

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The Roswell Water Utility crew includes (from left) field services representative John Campbell, meter technician Corey Bunkley, equipment operator Corey Bagby, Water Utility Manager Chris Boyd, crew leader Casey Schoals (in track loader), equipment operator Kyle Brookshire and water distribution supervisor Jason Downs.

"For the most part, customers are happy with service. We get compliments based on our service."

Chris Boyd

Pipe replacement is always subcontracted, and it's usually open-trench work. "We haven't used any trenchless technology so far," Boyd says. "We might do some in the future. If we have to lay a lot of pipe in an area where there are a lot of commercial customers, we might use it."

So, the earth-moving machinery in the utility's equipment yard is exclusively for emergency repairs and routine service tasks. Digging equipment includes an 85 hp JCB 350 CX ECO backhoe, a Case TV380 compact track loader and two mini-excavators — a 28 hp Takeuchi and 66 hp Case. A trailered Vac-Tron LPD873 XDT vacuum excavator can be pulled into place for work in sensitive areas.

Moving forward

On a scale of 1 to 10, Boyd rates the system and its administration a 7 or 8 right now. "For the most part, customers are happy with service. We get compliments based on our service."

Still, there's no resting on laurels. The utility is systematically replacing any of its 5,500 water meters that are 15 or more years old, even though testing indicates many of the aging meters are still measuring water flow accurately. Faulty calibration translates into wasted water, so the meter upgrade is about conservation as well as proper billing.

Boyd also wants to move from a single pressure zone system in which the treatment plant pump is providing all the pressure to one with multiple pressure zones. Creating several zones gives system techs the ability to more closely monitor individual stretches of pipe for leaks.

"We're always looking at new and innovative ways to optimize systems and make our operation more efficient," he says. "We're continuously working on that."

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SEWER WATER

2020 SEWER NOZZLES DIRECTORY MANUFACTURERS

MANUFACTURER	NAME OF NOZZLE	APPLICATION	PIPE Diameter	FLOW Rate (GPM)	MAX OPERATINI Pressure (PSI)	G WEIGHT	NUMBER OF Available Front Jets	NUMBER OF Available Rear Jets	HOSE SIZE/ Connecting Thread
Envirosight III Canfield Ave., Unit B3 Randolph, NJ 07869 866-936-8476 973-252-6700 (f) 973-252-1176 www.envirosight.com mail@envirosight.com See ad page 2	Jetscan	Mainline Sewers	6" to 24"		160	2.6 lb		2-6	
	Bulldog Antiblast	Anti-Toilet Blowing in Residentials	8" - 24"	55 to 80	1,500 - 1,800	17 lbs.	6		1" - 11/4 "
	Bulldog	Cleaning grease, roots, deposits, etc.	8" - 24"	50 to 120	2,000 - 2,900	17 lbs.	7	6	1" - 1 1/4 "
Enz USA Inc.	Rotodrill	Cleaning blocked pipes, frozen pipes, heavy debris	2" - 14"	13 to 80	2,000 - 4,000	0.25 lbs. to 1.5 lbs.	1	6	1/2" - 1"
Aurora, IL 60502	Grenade	Flushing heavy debris	6" - 12"	40 to 80	2,000 - 3,600	11 lbs.		10	1"
877-369-8721	Chisel 60.100L	Pentrating clogs, root masses, frozen pipes	6" - 16"	50 to 80	2,000 - 3,600	6 lbs.	4	6	1"
630-692-7880 (f) 630-692-7885	10.125TR Chain Scraper	Root removal, hard grease, hard deposits	5" - 12"	14 to 80	2,000 - 3,600	6 lbs.		6	1"
(I) 050-072-7005 www.enz.com	10.200R Rotating Chain Scraper	Removal of root masses, clogs, hard deposits	8" - 16"	50 to 80	2,000 - 3,600	78 lbs.		6	1"
salesusa@enz.com	10.400R Rotating Chain Scraper	Removal of root masses, clogs, hard deposits Removal of concrete & mineral deposits,	16" - 32"	80 to 120	2,000 - 3,600	105 lbs.		6	l"
See ad page 27	14.200 Milling Cutter	dropped liners	8	80 to 120	2,000 - 2,200	70 IDS.		0	1" - 1 1/4 "
	Bulldozer 50.100G	Flushing debris from large pipe	16" - 40"	40 to 80	2,000 - 3,600	57 lbs.	1	8	1"
	HydroX	Hydroexcavation	Surface	8.4	5,000	0.58 lbs.	1		3/8", 1/2"
General	Chisel Point Nozzle	Penetrating, breaking up debris	4" - 10"	12	2,500	4 oz.	4	6	1/2"
PIPE CLEANERS	Traction Nozzle	Sand and mud removal	4" - 10"	12	2,500	8 oz.	1	6	1/2"
General Pipe Cleaners	Cleaning Nozzle	Maintenance Cleaning	4" - 10"	12	2,500	12 oz.		8	1/2"
McKees Bocks PA 15136	Spring Leader Nozzle	Guiding hose around tight bends	2" - 10"	1.5 to 8	1,500 - 3,000	4 oz.		3 to 4	1/8" - 1/4" - 3/8"
800-245-6200	Downhead Nozzle	Dropping down T's	2" - 4"	1.5 to 4	1,500 - 3,000	2 oz.		3	1/8"
412-771-6300	Chain Saw Nozzle	Cutting roots	4" - 10"	4 to 12	2,500 - 3,000	2 lbs.		2 to 4	3/8" and 1/2"
www.drainbrain.com	Rotary Nozzle	Scour pipe walls clean	2" - 10"	1.5 to 12	1,500 - 3,000	2 oz. to 10 oz.		2 to 4	1/8" - 1/4" - 3/8" - 1/2"
HYDRA-FLEX Hydra-Flex, Inc. 8401 Eagle Creek Pkwy.	Marskman	Cutting through and removing debris at distances of 20-30 ft. Could be used in location like lift stations or manholes. To be used with a gun+Lance. Can up adapted up to a 1" inlet			2,500	1.93 lbs.	1		
Savage, MN 55378 952-808-3640	Reaper 3/8"	Cutting through and removing blockages and flushing debris in sewer lines.	3"- 6"		4,000		1	4	
sales@hydraflexinc.com	Reaper 1/2"	Cutting through and removing blockages and flushing debris in sewer lines.	4" - 8"		4,000	1.54 Lbs.	1	4	
Root Rat PO Box 740 Bolivar, OH 44612 800-288-7873 330-874-4300 (f) 330-874-4448 www.rootrat.net kelly@chempure.com See ad page 46	Root Rat	Root & Encrustations	2" - 30"	4 to 150		0.5 lbs 5 lbs.			
	Mini Missle	General Cleaning	3"-12"	18 to 80	0 - 4,000	5 lbs.	1	3	1/2", 3/4", 1"
Sewer Equipment 1590 Dutch Rd. Dixon, IL 61021	Weisel	General Cleaning	3"-15"	18 to 80	0 - 4,000	2 lbs.		8	1/2" - 3/4" - 1"
	Dual Degree	General Cleaning	4" -18"	18 to 80	0 - 4,000	5 lbs.		8	1/2" - 3/4" - 1"
	Tri-Star	Penetrating	3" -24"	18 to 80	0 - 4,000	3 lbs.	4	6	1/2" - 3/4" - 1"
888-477-7611	Avanti	Pentration - Rotational	3" -24"	18 to 80	0 - 4,000	4 lbs.		6	1/2" - 3/4" - 1"
(†) 815-284-0453	RDS	Heavy Cleaning	3" -28"	18 to 150	0 - 4,000	4 lbs.		6	1/2" - 3/4" - 1"- 1 1/4"
www.sewerequipment.com sales@sewerequipment.com See ad page 3	Mega 5 & 6	Flushing	12" - 120"	18 to 80	0 - 4,000	35 lbs.		11	1/2" - 3/4" - 1" - 1 1/4"
	HW	Flushing	4" -18"	18 to 55	0 - 4,000	3 lbs.		8	1/2" - 3/4" - 1"
	Combi	Cutting	4" - 24"	18 to 80	0 - 4,000	6 lbs.	3	6	1/2" - 3/4" - 1"
	Patriot 1	Root & Grease Cutting	4" - 24"	40 to 80	0 - 3,000	25 lbs.		5	3/4" - 1'

2020 SEWER NOZZLES DIRECTORY_____MANUFACTURERS

MANUFACTURER	NAME OF NOZZLE	APPLICATION	PIPE DIAMETER	FLOW Rate (gpm)	MAX OPERATING Pressure (PSI)	i WEIGHT	NUMBER OF Available Front Jets	NUMBER OF Available Rear Jets	HOSE SIZE/ Connecting Thread
	Viper Chain Cutter	Roots, Grease, Scaling	10" - 48"	40 to 100	2,000 - 4,000	45 to 70 lbs.		8	1" - 1 1/4"
	Power Pull Nozzle	Mud, Sand, Silt	4" - 12"	18 to 80	2,000 - 4,000	1.5 to 9 lbs.		8	1/2" - 1 1/4"
PROSHOP	Spear Nozzle	Penetration of Clogs, Root Masses, Frozen Pipes	8" - 24"	50 to 80	2,000 - 4,000	6.2 lbs.	4	6	
SewerProShop LLC	Emperor Nozzle	Flushing heavy debris from large lines	12" - 32"	80 to 120	2,000 - 2,500	19.8 lbs.		12	
1061 Iriad Ct. Mariotta CA 30062	Penetrator Nozzle	Flushing heavy debris in lines with offsets.	6" - 16"	50 to 80	2,000 - 4,000	15.4 lbs.	1	8	
877-864-9394	Stealth Nozzle	Flushing heavy debris	8" - 24"	60 to 80	2,000 - 4,000	17.6 lbs.		8	
470-592-1717 (f) 770-984-2802	Raptor Nozzle	Penetration of clogs, Root/Grease Masses, Frozen Pipes	4" - 24"		2,000 - 4,000	2.4 to 5.5 lbs.	3	3 (1/2") 6 (1")	
www.sewerproshop.com	Big Foot Nozzle	Flushing debris from the floor of large pipes	16" - 48"	40 to 120	2,000 - 3,600	33 to 56 lbs.		6 - 14	
info@sewerproshop.com	Twister Nozzle	Cleaning grease, roots, mineral deposits, etc.	4" - 24"	18 to 120	2,000 - 4,000	3 to 15.4 lbs.	5	4	
	Milling Cutter	Removal of concrete, tuberculation failed liners	4" - 20"	60 to 120	2,000 - 2,500	18 to 44 lbs.	4	4	1" - 1 1/4"
	Warthog	Roots, Grease	2" - 18"	12 to 35	2,000 - 4,000	1 - 5 lbs.			3/8", 1/2"
	Sandshoe	San, Dirt and Rocks	4" - 18"	12 to 18	2,000 - 4,000	7 lbs			3/8", 1/2"
	Rotating	Scrubbing Pipe Walls	2" - 12"	4 to 18	2,000 - 4,000	1 - 3 lbs			1/4", 3/16", 3/8", 1/2"
	Q Nozzle	Downstream Jetting	4" - 12"	12 to 18	2,000 - 4,000	1 - 2 lbs			3/8", 1/2"
Spartan Tool	Rocket Nozzle	Long Distance Jetting	4" - 12"	12 to 18	2,000 - 4,000	2 lbs			3/8", 1/2"
1618 Terminal Rd.,	Closed Nozzle	Standard Jetting	2" - 12"	4 to 18	2,000 - 4,000	1 lb			3/8", 1/2"
800-435-3866	Open Nozzle	Standard Jetting	2" - 12"	4 to 18	2,000 - 4,000	1 lb			3/8", 1/2"
www.spartantool.com	Brass Ball	Stainless Steel Hose Jetting	2" - 8"	4 to 18	2,000 - 4,000	1 lb			3/16"
sales@spartantool.com	Chain Scraper	Roots, hard grease, scale	2" - 8"	8 to 50	5,075				3/8", 1/2", 3/4"
	Primus 3D	Grease, Crusts, Light Roots	4" - 24"	18 to 120	2000 - 4,000	2.6/7.0/8.3/20.1	1	3/4/5/6	1/2 - 3/4 - 1 - 1 1/4
	Rocket 3D	Sand, Silt, Large Debris	4" - 24"	12 to 120	2,000 - 4,000	.6/2.6/4.85/11.4/44		6/8/10/12	1/2 - 3/4 - 1 - 1 1/4 - 1 1/2
	Pipe Wolf 3D	Total Blockages from Roots, Grease & other Organic Matter	4" - 24"	14 to 120	2,000 - 4,000	2.4/5.7/11.9		6	1/2" - 3/4" - 1" - 1 1/4"
USB-USA LLC	Bagger Max 3D	Sand, Silt, Solids, Sludge & other Heavy Debris	18" - 96"	50 to 120	2,000 - 3,000	33/53/66/114.5	5	6/8/10/12	3/4" - 1" - 1 1/4" - 1 1/2"
7565 OWI Creek Dr. Douglasville, GA 30134 844-285-5770 www.usb-usa.com uchural/c@mail.com	Chisel	Total Blockages from Roots, Grease, etc.	2" - 15"	8 to 120	2,000 - 4,000	.22/.33/.66/1.54	4		1/4" - 3/8" - 1/2" - 3/4" - 1" - 1 1/4"
	FS 3D	Total Blockages from Roots, Grease & other Obstructions	2" - 15"	8 to 80	2,000 - 4,000	.22/.44/.66/1.54/3.7	4	6/5/6/8	1/4" - 3/8" - 1/2" - 3/4" - 1"
See ad page 37	Tri-Jet 3D	Mud, Sand, Silt - Everyday Cleaning	4" - 48"	60 to 120	2,000	4.8/12.1/17.6/23.1/44		12/15	1" - 1 1/4"
ece au page or	FD 2 3D	Half-Open or Complete Open Drains - Mud, Sand, Silt	4" - 12"	14 to 120	2,000 - 4,000	2.6/4/8.3/14.3		6/8	1/2" - 3/4" - 1" - 1 1/4"
	3D Extreme	Mud, Sand, Silt	6" - 15"	40 to 120	2,000 - 3,000	9.4	1	8	3/4" - 1" - 1 1/4"
	3D Cleaning	Everyday Cleaning - Sand, Mud, Silt, Grease	4" - 15"	14 to 80	2,000 - 4,000	.6/12.1/17.6/23.1	1	6/8/10/12	1/2" - 3/4" - 1" - 1 1/4"

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A SOLID FOUNDATION

It's always helpful to revisit the fundamentals that make up a multifaceted safety approach

The idea of "safety"

is largely intangible.

It's a multifaceted

effort that should

constantly evolve on

both the micro and

macro levels.

By Chris Galloway

afety and quality are two of the most inseparable components to success on a job site. You can't have one without the other.

And without a solid foundation of safe practices, you'll suffer from more than a deficit of quality. Safety isn't just a quota — it's the thing that keeps workers safe, happy and productive.

You should have a profound understanding of the tenets of excellent safety. It should be a pillar of your utility's identity. Most of all, you should know that there are always ways to improve upon what you already have. But without the fundamentals, you'll struggle to maintain consistent quality and high productivity.

Trenching and excavation safety from OSHA's perspective

OSHA has already done the hard work to collect, organize and explain the various components to keeping a safe excavation site. For free on its website, OSHA even has a Trenching and Excavation Safety manual for



anyone to download. In this manual, OSHA goes over the fundamentals of excavation and trench safety, such as understanding the various classifications of soil:

Stable Rock — Natural solid mineral matter that can be excavated with vertical sides and remain intact while exposed.

Type A — Cohesive soils with an unconfined compressive strength of 1.5 tons per square foot (tsf) (144 kPa) or greater. Examples include clay, silty clay, sandy clay and clay loam. Certain conditions preclude soil from being classified as Type A. For example, no soil is Type A if it is fissured or has been previously disturbed.

Type B — Includes cohesive soil with an unconfined compressive strength greater than 0.5 tsf (48 kPa) but

less than 1.5 tsf (144 kPa) and granular cohesionless soils (such as angular gravel, similar to crushed rock, silt, silt loam, sandy loam and, in some cases, silty clay loam and sandy clay loam).

Type C — Cohesive soil with an unconfined compressive strength of 0.5 tsf (48 kPa) or less, granular soils (including gravel, sand and loamy sand), submerged soil or soil from which water is freely seeping, submerged rock that is not stable, or material in a sloped, layered system where the layers dip into the excavation or with a slope of four horizontal to one vertical (4H:1V) or steeper.

Keep a site safety checklist

For any excavation job, it's best to create a safety checklist to be completed by a "competent person."

As defined by OSHA: A competent person is an individual, designated by the employer, who is capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous or dangerous to workers, and who is authorized to take prompt corrective measures to eliminate them.

OSHA also lists the types of tasks that a competent person should be performing on a job site:

- ✓ Classifying soil
- ✓ Inspecting protective systems

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Eye protection, both glasses or goggles and a face shield, should always be worn while hydroexcavating.

- ✓ Designing structural ramps
- ✔ Monitoring water removal equipment
- Conducting site inspections

It's best to create a custom checklist based on your specific requirements and even tailor individual checklists to your various job sites.

Use proper PPE safety

PPE — personal protective equipment — is a term used for any protective equipment worn by a person for hazard protection. PPE can include helmets, goggles, clothing, gloves and anything else that is worn to keep you safe at your prospective site.

OSHA outlines the "general PPE" required for most excavation, but the more protected your crew is, the safer and more productive you'll be. OSHA's trenching and excavation worksheet outlines the following PPE:

- ✓ Hard hat for overhead impact or electrical hazards
- ✓ Eye protection with side shields
- ✓ Gloves chosen for expected job hazards (e.g., heavy-duty leather work gloves for handling debris with sharp edges and/or chemical protective gloves appropriate for chemicals potentially contacted)
- ✔ ANSI-approved protective footwear



Respiratory protection is important for nuisance dusts, mold and odors.

✓ Respiratory protection as necessary — N, R or P95, filtering facepieces may be used for nuisance dusts (e.g., dried mud, dirt and silt) and mold (except mold remediation); filters with a charcoal layer may be used for odors

Two popular sources for hardy, cost-effective PPE are www.uline.com and www.grainger.com.

Choose the safest tools for the job

Not every power tool is created equal. There are easy ways to increase your safety by being more mindful of the tools your crew uses.

For example, one easy way to reduce air compressor noise and the various other hazards that come with a compressor is to switch to a more portable gas-powered jackhammer. They're more efficient than the standard pneumatic variety of jackhammer and produce less noise, dust and vibration. With less equipment needed and less to haul to and from a site, making use of power tools with more portability will have a positive effect on the overall site safety.

Safety is multifaceted

The idea of "safety" is largely intangible. It's a multifaceted effort that should constantly evolve on both the micro and macro levels.

As your business matures, so too should its understanding of safety. Day-to-day safety on a job site should evolve as well to accommodate the changing landscape, the different weather and the stage of construction. If you follow these basic tenets, you'll be well on your way to a safer job site. \blacklozenge

About the Author

Chris Galloway is the owner of US Hammer Jackhammers and Post Drivers. A lifelong contractor, he runs US Hammer and Pioneer Machinery, his rental equipment company, from Woodland, California.



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CLEAN SWEEP

Tourists, snowbirds and residents all love the lakes in Lakeland, Florida. They marvel at the swans, the boating,

the water skiing and kayaking, trails, picnicking and wildlife viewing available on and around the city's 38 named lakes.

"Our lakes contribute significantly to our community through increased land values, recreational activities and tourism," says Laurie Smith, manager of the city's Lakes and Stormwater Division.

The division, which was created in 1999, is tasked with protecting the quality of these lakes. Smith's team includes Jennifer Schilling, senior environmental specialist, and staff members Sandra Pope, Cole Edwards, Cody O'Gorman and Elias Sierra.

"Our priority is to preserve and enhance the city's stormwater systems, surface waters and natural resources. These objectives benefit the city's citizens and community as a whole."

Lakeland

Northerners may know Lakeland primarily as the winter home of the Detroit Tigers baseball

Florida community takes a multifaceted approach to ensuring the health of its lakes

By Jim Force

team, but the community is much more. Located about 40 miles east of Tampa on Interstate 4, the city is home to more than 106,000 people, a historic downtown, several colleges and universities, and the lakes.

Nearly 10% of the city's 67-square-mile area is made up of surface waters, ranging from Lake Parker at 2,550 acres to many smaller bodies of water, some of which are old phosphate mine pits that have filled with water. Other major lakes include Hollingsworth, Morton, Mirror and Gibson. Altogether, the lakes comprise three different watersheds.

The Lakeland Lakes and Stormwater Division, winner of an excellence award in 2018 from the Florida Stormwater Association, has an annual budget of \$6 million, supported entirely from a stormwater utility fee of \$8 per equivalent residential unit. The division also responds to complaints and enforces stormwater discharge regulations.

The program is active and holistic, Smith says, and is focused on maintaining and improving stormwater systems, reducing stormwater pollution and restoring the surface waters and natural resources of the city. The division is responsible for implementing the city's NPDES permit to discharge stormwater to the municipal stormwater system.

Specific elements of the program include street sweeping; drainage system construction, maintenance and repair; water quality, bioassessment and lake level monitoring; flood plain and aquatic vegetation management; stormwater pollution prevention and treatment; and watershed planning and compliance.

To support the effort, Lakeland conducts a vibrant public outreach and education program to inform citizens of the sources of stormwater pollution and how to prevent it.

Clean sweep

While nearly every municipality in the country sweeps its streets, few are as aggressive as Lakeland. "It's a robust program that ensures every curbmile of street is swept every two weeks,"

Lakes and Stormwater Division staff includes (from left on airboat) environmental tech Amy Harrison, senior environmental specialist Jennifer Schilling, support specialist Christina Harvey, environmental tech II Elias Sierra and maintenance foreman Cody O'Gorman; on shore from left: Manager Laurie Smith, environmental tech Alton Johnson, maintenance specialist Ryan Pementil, environmental specialist Sandra Pope and engineer Cole Edwards. (Photography by Emily Plank)

Equipment operators Joey Johnson and Stan Woolley do maintenance work on a pollution control device near Lake Hollingsworth.

"It's made a huge difference. We have clean streets, and we sweep and collect over 2,500 tons of trash a year."

Laurie Smith

Smith says. In addition to designated routes throughout the city, the streets around the city's lakes are swept weekly. The downtown area is swept nightly.

One sweeper route is dedicated solely to the lake basins to reduce potential pollutants.

Lakeland uses a fleet of Elgin vacuum sweepers and one Elgin mechanical sweeper.

"It's made a huge difference," Smith says. "We have clean streets, and we sweep and collect over 2,500 tons of trash a year."

That trash contains nutrients, debris and sediment that otherwise would get into the city's storm drain system, and eventually the lakes.

In 2016, the city conducted a study aimed at identifying time, location and frequency adjustments that could improve the effectiveness of street sweeping. One important finding was that significant reductions in phosphorus, nitrogen and suspended solids from the tree canopy were realized when these areas were swept more frequently.

Better drainage

To keep its storm drain system operating efficiently, Lakeland employs a thorough program to inspect, maintain and repair its drainage and conveyance system. It does nearly all the work itself through an in-house drainage team.

"We have all the equipment and tools we need," Smith says. "We video (CUES video inspection system) portions of our storm system every day, evaluating the integrity of the pipes and identifying areas in need of repair or replacement." The focus is on prevention rather than costly response to emergencies.

The system includes 22 pollution control devices at the end of pipes. These are underground vaults equipped with baffles, and they



One of Lakeland's street sweepers, wrapped with educational graphics, sweeps Lake Morton Drive.

need regular cleaning. The Lakeland team uses Vactor trucks to vacuum each pollution control device once a month.

Currently, Lakeland is constructing a new stormwater detention pond, using an outside contractor for the work. Smith notes that the pollution control

devices associated with the pond will have clear plexiglass tops — or roofs — allowing the public to observe what goes on inside the structures, furthering their understanding of the city's pollution control effort.

A flood plain manager ensures that FEMA flood control guidelines and requirements are incorporated into development plans for new construction or property retrofits.

Lake levels and quality

The objective of the Lakeland stormwater control program of course is to maintain the water quality of the lakes, making sure they are healthy for public use and enjoyment.

Smith's team maintains a meticulous lake level monitoring program, headed by O'Gorman. Flood control gates are situated at 10 locations throughout the system, and they are raised or lowered manually to manage the level of the water in the lakes. Most of the lakes are connected, so it's important they drain properly from one to another and ultimately to the system outfall.

"We try to keep the levels high in summer to accommodate boating, water skiing and other

PROFILE: Lakeland (Florida) Lakes and Stormwater Division

FOUNDED: 1999

AREA SERVED: City of Lakeland

CUSTOMERS SERVED: 106,000

MISSION:

Preserve and enhance the stormwater systems, surface waters and natural resources, and protect the city's 38 named lakes

STAFF:

Laurie Smith, manager; Jennifer Schilling, senior environmental specialist; Sandra Pope, Cole Edwards, Cody O'Gorman and Elias Sierra, staff members

ANNUAL OPERATIONS BUDGET: \$6 million

WEBSITE: www.lakelandgov.net



activities," Smith says. "On the other hand, during rainy seasons, lake levels are managed such that there is 'enough room' in the lakes for the precipitation to run off and avoid flooding.

"In summer, we're constantly opening and closing the gates," he adds. "It's a full-time job, with backup help on weekends."



Maintenance foreman Mike Slaton and Lakes and Stormwater Division Manager Laurie Smith discuss water samples collected from a pollution control device near the edge of Lake Hollingsworth.

"We're really careful managing our lake levels. Our field people have access to data via their hand-held tablets. They need to fully understand how the water is moving. It's really an art."

Laurie Smith

Smith says last summer was particularly critical because of heavy rainfall that totaled more than 60 inches.

"We're really careful managing our lake levels," she says. "Our field people have access to data via their hand-held tablets. They need to fully under-

A HELPFUL CAST OF CHARACTERS

You're sitting in a movie theater in Lakeland, Florida, and suddenly Toby the Turtle, Ollie the Otter and Finn the Fish come cavorting across the screen, explaining how trash in the street fouls the city's stormwater system and gets into the lakes.

They're part of Toby's Water Warriors — a group of cartoon characters developed by Lakeland's Lakes and Stormwater Division to educate the public about stormwater control and pollution prevention.

"Our lakes are important," says Laurie Smith, division manager. "Everyone has a responsibility to keep trash out of our lakes and keep stormwater clean."

She says Toby's Water Warriors — seen in television public service announcements, in decals on city trucks, and at numerous city events and festivals — appeal mainly to young people. "But at the same time, it's a way to keep the parents accountable, too," she adds.

Each character has a specific message. Toby promotes the lakes, Finn is for fishing and reduced use of fertilizers, Ollie encourages boating and swimming and having fun. A fourth character — Hope the Heron — is joining the gang soon as an advocate for keeping plastics out of the water.

All appear at an annual Water, Wings and Wild Things event that brings in every second grader in the county to have fun and learn about environmental awareness.

"When I was young, I saw the Keep America Beautiful campaign on TV, and the Native American canoeing up a polluted river with a tear in his eye.

"That's how I got started in this field. I wanted to make a difference."

stand how the water is moving. It's really an art."

Water quality is just as important as lake levels. In conjunction with Polk County and the city of Lakeland, the stormwater team monitors surface water quality in both the natural lakes and those formed in the old mining pits. The quarterly sampling program produces data that guides surface water quality assessment and restoration plans. The city has prioritized several lakes with total maximum daily load requirements for restoration

"We analyze for trends and to identify issues," Smith says. Nutrients — especially phosphorus — are the primary concern, and she's pleased with the progress. "In the last few years, we've witnessed increasing surface water quality improvements. It's nice to see."

Weeds be gone

As picturesque and protected as they are, the city's lakes haven't escaped the frustrating problem facing lakes around the country aquatic vegetation. The stormwater division is attacking this problem with chemical, mechanical and biological approaches.

"We have invasive species in the lakes," Smith explains. "There are three main types: hydrilla, water lettuce and hyacinths. The latter two are floating plants. Hydrilla, a rooted plant that grows in water and chokes out other vegetation, is one of the most invasive aquatic species in Florida and the Southern U.S.

"All three outcompete our native species and can overtake the environment if we don't take action."

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Lakeland has 22 pollution control devices — underground vaults equipped with baffles — at the end of key stormwater lines that require regular cleaning.

She says herbicides are used only where appropriate. The division has also recently purchased a harvesting boat from Inland Lake Harvesters for mechanical removal of the plants, enabling Lakeland to reduce its dependence on herbicide spraying.

And, she adds, the division has had good luck

"We analyze for trends and to identify issues. In the last few years, we've witnessed increasing surface water quality improvements. It's nice to see."

Laurie Smith

with grass carp, which she says "go to town" eating the hydrilla.

"We've released a sterilized species of the carp so they can't reproduce (and impact the local fish population), and we introduced them in lakes to get rid of the hydrilla."

The stormwater division also promotes propagation of native plants like eelgrass.

Looking ahead

'ground The Lakeland Lakes and Stormwater Division recently completed a comprehensive lake management plan that provides a pathway for assessment, restoration and maintaining priority lakes in the city in the years ahead.

"Our lakes are not necessarily natural any longer," Smith says. "They are urban."

The city of Lakeland was settled in 1875, she notes, and saw significant growth during the early and mid part of the last century, at a time prior to the initiation of stormwater regulations.

"As a result, some of the stormwater systems are in need of repair and replacement as it reaches the end of its life expectancy. In other areas of the city, development occurred rapidly and prior to stormwater regulations so the existing systems may not be adequate to handle runoff from larger storms."

At the same time, she says, people want to be able to use the lakes for recreation and enjoyment.

"It's a huge challenge to create a system that meets everyone's needs. We need to restore our lakes to a more naturalized system while in a growing urban environment." \blacklozenge

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TECH TALK

QUICK FIELD FIXES

Use these troubleshooting tips to keep your hydroexcavator out of the shop and on the job

By Ken Wysocky

o matter how well a hydroexcavator is engineered and built, the rigors of working under difficult and demanding conditions take their toll. As such, some downtime is inevitable.

But savvy operators with the ability to troubleshoot problems can get their machines up and working again, without suffering significant losses in revenue and job site productivity.

"You have to remember that material is running through the hose at 150 to 200 mph, and sands and rocks can eventually <u>abrade a hose."</u>

Mike Selby

Loss of vacuum

With that in mind, here are some common problems operators encounter while running hydroexcavators and what can be done to solve them and keep the productivity train rolling.

Mike Selby, southeastern regional sales manager for Vac-Con, and Dave Barr, sales manager at Presvac Systems, who have a combined 60 years' experience in the industry, share their best tips for troubleshooting in the field.

This is typically caused by debris clogging a hose, a tear in a hose or dirty filters. "Most machines have a vacuum gauge," Selby explains. "If it shows elevated vacuum while it's not working, you have a hose restriction. If you have low pressure while working, you usually have some kind of tear or hole in the hose. Or the suction filters that protect the blower from carryover contamination are clogged."

To fix clogged hoses, booms or turrets, shut down the machine and check out each one. "Blockages are most likely to occur where the hose has vertical to horizontal to vertical transitions," Barr says. "Prioritize the most likely location of the problem and move down to the least likely location. When you find the clog, move the hose out and give it a shake to loosen the debris."

To help prevent clogged hoses, Barr suggests using the following rule of thumb regarding hose diameter: The hose should be three times the size of the material being vacuumed. If it's 2-inch-diameter gravel, for instance, use a 6-inch-diameter hose.

If the hose, boom and turret are clear, then examine the cyclone separators. If they're clogged, lighter materials remain in the airstream longer and carry over into the filter, which is final protection for the blower. The remedy for this is to clean or replace the cyclones and/or filter, Barr says.



Selby recommends having several extra separators on hand. While one is getting cleaned and washed, another can replace it and the truck can keep working. "If the cyclonic separators get full, material can't settle out," he explains. "So you need to keep the separators clean. Some have a removable receptacle at the bottom that can be pulled out and dumped."

Operators should also carry extra filters to replace clogged filters. To minimize downtime, consider cleaning filters in between dump cycles, Selby advises.

If a hose is torn, use duct tape to stop air leakage. "You have to remember that material is running through the hose at 150 to 200 mph, and sands and rocks can eventually abrade a hose," Selby says. "Wrapping a hole with duct tape is a quick field fix that'll at least get you through the day until you have time to replace the entire hose. Trying to keep working with just a duct-tape patch only delays the inevitable total-hose failure."

No water flow

Presvac hydroexcavators are equipped with triplex plunger water pumps, in which water first passes through a strainer. A clogged strainer will stop water flow, which results in a hammering or banging noise, Barr says.

"The solution is to shut down the system, then check the water-supply line and the strainer to make sure they're clear. When you start up again, be sure to open the drain valve to make sure everything flows properly and that there's no air in the water-supply line."

Selby also points out that some nozzles are more fragile than others. As a result, they're more prone to clogging with whatever material is being excavated.

TECH TALK



Fixing that requires taking apart the nozzle, which isn't always feasible out in the field. "So carry extra nozzles," he suggests. "If something fails on a nozzle and you don't have a replacement, then you're done — dead in the water."

Loss of pressure

Several things typically cause loss of water pressure, including a worn or improperly sized nozzle tip or an unloader that's stuck open or set improperly, Barr says.

Resolve the first two issues by replacing the nozzle tips. As for the unloader, which regulates water pressure, it needs to be disassembled and cleaned. "Usually there's sand or particulate stuck inside the seats of the valve," Barr says. "Because it's a high-wear item, it's designed to be maintained in the field."

Furthermore, operators need to ensure the water pressure is set properly for the type of nozzle being used. "You have to size the nozzle according to the pressure. We have an adjustable unloader you can set from 1,200 to 3,500 psi."

Broken blowers

There's not much anyone can do in the field to repair a blower. But Barr points out that operators can minimize blower issues by not running the hydroexcavator at high vacuum while the engine is running at low revolutions per minute. This can occur when a hose gets clogged while cycleloading heavy materials, such as sludge.

"As you create vacuum, the horsepower draw increases," he explains. "But if you have high vacuum and low revolutions per minute, the torque goes up ... and the drive shaft can only handle so much torque."

To avoid this, Presvac hydroexcavators feature a velocity-control valve that allows the operator to reduce load velocities as needed, he says.

If the blower isn't working because carry-over debris has locked it up, an operator can try to physically turn the blower backward to work the material out. To do this, turn off the machine, then manually turn the blower in the opposite direction than it normally rotates, Selby says. "As you create vacuum, the horsepower draw increases. But if you have high vacuum and low revolutions per minute, the torque goes up ... and the drive shaft can only handle <u>so much torque."</u>

Dave Barr

"You need to put a big pipe

wrench on the drive shaft in order to get it to spin backward. The drive shaft is easily accessible."

Maintenance matters

Performing routine maintenance and listening for unusual noises can go a long way toward minimizing repairs and keeping small issues from becoming bigger issues.

"An ounce of prevention is worth a pound of cure," Selby says. "If you do periodic maintenance as recommended by the manufacturer, the machine should at least last through its expected life cycle of roughly 10 years." \blacklozenge

NASSCO CORNER

THE IMPORTANCE OF A WORD

NASSCO's certification program ensures PACP software meets performance standards

By Sheila Joy

hen it comes to NASSCO's Pipeline Assessment and Certification Program, maintaining integrity in certified software is paramount to achieving our mission to set standards for the assessment, maintenance and rehabilitation of underground infrastructure and to ensure the continued acceptance and growth of trenchless technologies.

It's easy to determine if software has been certified by NASSCO for use with PACP (as well as the manhole and lateral assessment programs) because all certified software is listed at www.nassco.org/certified-software. All data collection software vendors listed on NASSCO's website have proven their ability to both import and export the standard NASSCO transfer file (version 6.0 or 7.0), and NASSCO has successfully tested each company's product.

Do not be fooled by software vendors that use terms such as "compliant" or "compatible" when describing their software product's ability to work with NASSCO's PACP, as these terms are misleading, and the software has most likely not been certified by NASSCO.

Software programs that are certified by NASSCO provide a wide variety of features to allow utility owners to evaluate assets, assist with determining corrective measures and help prioritize rehabilitation work. NASSCO PACP certification means that bidders are able to use any of the certified data collection software packages listed on the NASSCO website. Each software vendor has developed valuable tools to facilitate the management and utilization of data collected in the field to include automatic validation of PACP data, the creation of different reports, the ability to manipulate and query data to support rehabilitation recommendations, and product support.

One of the best ways to ensure NASSCO's PACP-certified software is used to maximize inspection results is through education. System owners may issue a bid for a PACP product but might also require a specific software. This eliminates one of the best financial benefits of using PACP, which is that any contractor using any NASSCO PACP-certified software can provide you with a deliverable you can use.

Municipalities that specify a specific software are paying contractors to purchase and learn a new software package, rather than bid using the software they have. Allowing contractors to use their own NASSCO PACP-certified software increases competitive bidding and saves the owner money.

Since using PACP-certified software can also mean a significant learning curve for employees not used to importing from the PACP transfer file into computerized maintenance management systems, into work order programs or even into other PACP-certified software, our job is also to work with vendors to make that process less painful.

In general, some municipalities may not understand the structure of PACP and its databases or realize that once a field is added or a code is changed, it is no longer PACP. This is true, in part, because they don't use the software every day. Therefore, it is our job to provide cities with the education they need in order to receive and appreciate the many benefits of PACP, including the use of NASSCO PACP-certified software.

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OTHER CLASSES FORMING Contact one of the trainers listed above if you are

interested in having a class at your facility or in your area.

NASSCO (National Association of Sewer Service Companies) is located at 2470 Longstone Lane,

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

Suite M, Marriottsville, MD 21104;

410-442-7473; www.nassco.org





















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PRODUCT FOCUS

HYDROEXCAVATION AND INDUSTRIAL JET/VAC SERVICES

By Craig Mandli

HYDROEXCAVATION EQUIPMENT AND SUPPLIES

Comet Industrial Pumps EF and EFR 75/88



EF and **EFR 75/88** high-pressure plunger pumps from **Comet Industrial Pumps (A Division of Valley Industries)** easily handle up to 23 gpm, 4,060 psi and 43 hp. Flexible setup allows for multiple gearbox mounting positions, and a symmetric crankcase allows for simple right-to-left shaft

conversion. They are designed with stainless steel and aluminum alloy to provide increased durability. They come standard with heavy-duty seals that have low-pressure lubrication and a circulation chamber. They include oversized tapered roller bearings, solid ceramic plungers, stainless steel piston guides and connecting rods with thin-shell bearings. They come standard with a flange for a direct-drive mount, but they can be adapted for a hydraulic motor, a PTO connection or set up with an input pulley and clutch. **800-864-1649; www.cometpump.com.**



Dynablast HV420F-12VRED

The **Dynablast HV420F-12VRED** hydrovac water heater produces 420,000 Btu with an output temperature of 175 degrees F at 5 gpm, making it suitable for colder climates and improved digging in clay-filled areas. All models come with ETL certification for safety, which also includes certification on the coil for higher efficiency and heat transfer, a stainless steel target plate for increased coil life and a design with serviceability in mind with momentary override control. A 19-by-19-inch footprint makes it suitable for compact installations. **905-867-4642; www.dynablast.ca.**

Enz USA HydroX nozzle



The HydroX nozzle from Enz USA

is available in 3/8-inch NPT or 1/2-inch

nance, a repair kit is available. Due to the nozzle's simplicity, repairs can be made quickly and efficiently in the field with little downtime. For the operator's safety, a plastic cover provides protection against harsh and sensitive environments. **888-369-8721; www.enz.com.**

Hydra-Flex Reaper rotating jetting nozzle



The **Reaper** rotating jetting nozzle from **Hydra-Flex** has a rotating front jet that provides a 0-degree, straight water stream that blasts at up to 4,000 psi while rotating. Optimized stream quality results in greater impingement, allowing the technician to use one tool for various applications, including cutting, cleaning and removal. Its four rear jets create a 20-degree angle for maximum thrusting and pulling power. This heavy-duty, high-

impact nozzle is constructed with a stainless steel housing and tungsten carbide wear surfaces to withstand harsh environments and provide long life. **952-808-3640; www.hydraflexinc.com.**

NozzTeq MONRO-JET



The **MONRO-JET** hydroexcavation nozzle from **NozzTeq** combines the power of a solid-stream pencil jet with the large coverage of a fan jet. An orbital design increases performance at a lower gallonsper-minute rate and pressures as high as 36,250 psi, allowing the operator to move faster when hydroexcavating and cleaning surfaces or sewer lines. It can be used for other types of surface cleaning such

as concrete, steel, castings and large surface areas including line removal from runways. It can be modified for internal cleaning of sewers and pipes of all types. **866-620-5915; www.nozzteq.com**.





Soil Surgeon hydroexcavating tool

The **Soil Surgeon** hydroexcavating tool fits any sewer combination truck equipped with a telescoping 6- or 8-inch boom. The tool has a 1-inch water connection. The operator controls water pressure and power through truck controls. It has a 6-foot Tuff Tube with handles to guide the unit down for potholing or side to side for trenching. Six jets boring inward cut the soil, while six boring outward bring the tube down. **949-363-1401; www.soilsurgeoninc.com.**

Vanguard Pathogen Defense Systems

Vanguard Pathogen Defense Systems are designed to minimize worker contact with raw sewage. By reducing exposure levels to pathogens on equipment workers come in direct contact with, as well as routine splashes onto skin and clothing, it helps reduce the possibility of sickness for workers. It is constructed from high-quality electronic

PRODUCT FOCUS

components, aircraft aluminum and stainless steel. It is designed to eliminate up to 98% of bacteria and other pathogens commonly found and encountered by wastewater maintenance personnel. The system's modular design and light weight make it simple to install and use on any combination, jet or CCTV truck. **800-781-3164; www.vanguard-systems.us.**

Hydroexcavation Trucks/Trailers

Ditch Witch HX30G



The **HX30G** vacuum excavator from **Ditch Witch** boasts highprofile power in a low-profile design that eases navigation in congested and height-restricted areas. It is powered by a 31 hp Vanguard gas engine for optimal suction power and water pressure. To boost efficiency on

any job, it comes with a powerful 542 cfm blower, 3,000 psi water pressure and 4.2 gpm water flow. It is offered with the choice of a 500- or 800-gallon tank for a variety of job requirements. The machine is available in a variety of trailer configurations, including the VT9 trailer that, when equipped with the 500-gallon tank, does not require a CDL to transport. **800-654-6481;** www.ditchwitch.com.

GapVax HV33



Designed to safely transport water and debris in urban areas, the **GapVax HV33** is shorter, smaller and more compact than its predecessor. It is 30 feet long overall on a medium-duty chassis and includes a 600-gallon water tank, 6-cubic-yard debris

body, 6- or 8-inch top-mounted telescoping boom with a 14- to 17.5-foot reach, 4,000 cfm power and an inverted, full-opening tailgate. **888-442-7829;** www.gapvax.com.

Kaiser Premier CV Series



CV Series hydrovacs from **Kaiser Premier** are purpose-built to handle tough applications in harsh climates. At the center of the unit is a Robuschi DV145 27-inch Hg, 6,600 cfm positive displacement blower that allows operators the power to pull long distances, reach great depths and

handle heavy sludges. Optional air excavation capabilities let operators use air or water excavation depending on the demands or requirements of a specific job. They come ready to dig with a top gun boom that allows 342-degree rotation and 26 feet of reach. The boom is also capable of digging 20 feet down without clamping on extension pipes, saving valuable time in the setup, teardown and cleaning processes. **970-542-1975; www.kaiserpremier.com**.

Rival Hydrovac T7 Tandem

The **T7 Tandem** hydrovac from **Rival Hydrovac** was designed primarily to be loaded with debris and driven within legislated road limits with most types of debris on board. The unit comes standard with a scale that reads



real-time weights both in the cab and on the wireless remote to confirm weights prior to travel. It is operatorfriendly, and the operating system is engaged through one PTO

switch. The remainder of the operation occurs from the rear panel or the wireless remote. The components are high performance, and the unit will dig at levels competitive to large units, according to the maker. **403-550-7997**; www.rivalhydrovac.com.

Tornado Global Hydrovacs F4 ECOLITE



The **F4 ECOLITE** from **Tornado Global Hydrovacs** has a 12-cubic-yard mud tank and holds 1,550 gallons of freshwater. The unit is more than 7,000 pounds lighter than the company's older models and offers more than double the payload. The boom has a 342-degree

rotation and a 26-foot reach. The smaller F3 ECOLITE is a 10-cubic-yard, 1,250-gallon tandem-axle unit that more than doubles older payload capacities. It features an 8-inch boom and 3,800 cfm blower. **877-340-8141;** www.tornadotrucks.com.

TRUVAC by Vactor Paradigm



Designed for utility, municipal and contractor customers involved in the installation, maintenance and repair of underground water, sewer, gas, electric and telecommunications lines, the **Paradigm** subcompact vacuum excavator from **TRUVAC by Vactor** can dig holes with water or air; vacuum, contain and dispose of drill mud; power

pneumatic, hydraulic or electrical tools; and provide transport and storage of replacement parts, equipment and tools. The truck's Park-n-Dig design minimizes time between job site arrival and excavation, including the ability to dig up to 6 feet without additional pipe and hose. The air compressor powers utility tools such as jackhammers and tampers. The truck offers tool storage space, including a long-handle toolbox. The truck can tow up to 20,000 pounds. **800-627-3171; www.truvac.com.**

Vac-Con X-Cavator



need for PTO, clutch and gearbox operation. It is available with water systems up to 4,000 psi and a mobile, wireless remotecontrol system for chassis engine revolutions per minute, boom, automatic vacuum breaker, dump controls and hydraulic door locks from up to a halfmile away. The boom rotates 270 degrees. **904-284-4200; www.vac-con.com**.

The X-Cavator from Vac-Con is designed to be powerful, durable, efficient and easy to operate. It features a hydrostatic drive using the chassis engine for vacuum, eliminating the need for PTO, clutch and gearbox operation. It is

Westech Vac Systems Wolf



The Wolf noncode hydrovac truck from Westech Vac Systems is suitable for work in extreme conditions. The debris body is positioned on the optimal chassis location to ensure the payload is proportionately distributed across all axles, maximizing legal

payload for customers and improving operational efficiency. The sidemounted water tanks reduce the weight by more than 40%, lowering the overall cost of the truck. The 1,500-gallon capacity ensures ample water for large or remote jobs. A top-mounted, no-touch water fill system is easily accessible from the passenger side of the vehicle. The debris body is lifted using a telescoping, dual-acting hydraulic cylinder capable of 36,000 pounds of force. When fully extended, the debris body exceeds a 45-degree dump angle for fast and efficient off-loading. To help the off-loading process, a heavy-duty, hydraulically powered tank vibrator is mounted to the belly of the debris body. **780-955-3030; www.westechvac.com.**

INDUSTRIAL VACUUM TRUCK

Guzzler CL



The **CL** (**Classic**) industrial vacuum loader from **Guzzler** is designed to recover, contain and carry solids, dry bulk powders, liquids, slurries and thick sludge from hard-to-reach areas. The truck offers upgraded operator ergonomics; improved air routing, filtration and maintenance; a longer body for improved material separation; an enlarged baghouse; and cyclone clean-out access doors for easier access. Its modular design allows for

a wide selection of off-loading configurations, including a rear door-mounted sludge pump for unloading sludges from the debris body, an XCR system with a swing-out cyclone that allows material discharge into collection vessels while vacuuming, and a high-rail system (available in three configurations) with a loading boom, hydraulic creep drive and rear-mounted operator chair. Options include a telescoping boom, vane pressure off-load system (high pressure, low airflow) for liquids and slurries, and a full-opening rear door for improved dumping. **800-627-3171; www.guzzler.com.**

JET/VAC COMBINATION TRUCKS/TRAILERS

Hi-Vac Aquatech Guardian



The **Aquatech Guardian** from **Hi-Vac** has a large vacuum system offering 5,800 cfm and 27 inches Hg, allowing operators to keep up with heavy-flow, large-diameter sewers. The large-capacity vacuum system allows for fast, efficient loading in any application. A noise-deadening, climatecontrolled enclosure prevents freezing, reduces noise and secures tools. Its rear hose reel design protects the operator from noisy and hot chassis engines with an operating noise level typically less than 81 dBA. The toploading, 360-degree boom offers efficiency and unlimited work zones for fast and easy setups. A rear-mounted hose reel with 180-degree hydraulic articulation can extend the reel reach beyond the truck's width. **800-752-2400**; www.aquatechinc.com.

HotJet USA Vac 'n Jet Series



The HotJet USA Vac 'n Jet Series of vacuum trailer jetters are rugged and compact; are engineered to haul

equipment and spoils loads; can clean valve boxes and storm drains; and can hydroexcavate and/or clean drainlines and sewer lines. They offer hotand cold-water operation with a choice of engine options ranging from 13 to 66 hp and gas or diesel operation. They are equipped with premium triplex pumps, a 500-gallon spoils tank, 200-gallon water tank, Gardner Denver vac/blowers, 4-ton hydraulic dump and centri-clean filter system. They can also be custom-engineered and designed to meet specifications. **800-624-8186; www.hotjetusa.com.**

Sewer Equipment Model 900 ECO



The **Model 900 ECO** from **Sewer Equipment** is available in 6-, 9-, 12- or 15-yard debris capacities, equipped with Duraprolene water tanks carrying 900 to 2,000 gallons of onboard water. Its Hydro

Drive powertrain system eliminates the need for a transfer case. Both single-piston and triplex pump options are available at 55 to 80 gpm at 2,000 to 3,000 psi with a 4,400 cfm blower and 18 inches Hg, built on an eco-friendly platform that provides greater fuel efficiency and offers noise reduction. **888-477-7611; www.sewerequipment.com.**

Super Products Camel Max Series



The **Camel Max Series** combination sewer cleaner from **Super Products** is available in a variety of configurations such as 9- or 12-yard debris capacity, dump or tilt ejection unloading, wastewater recycling option and hydroexcavation package. Dump-

body unloading uses a telescopic hydraulic cylinder to raise the body up to a 50-degree angle for quick unloading. Tilt ejection unloading provides safe and thorough debris removal for more efficient tank washdowns and cleanups, as the collector body raises to a 19-degree angle while the ejector plate pushes out debris. The wastewater recycling feature allows an operator to clean nearly 2,500 feet of sewer pipe per day without the use of freshwater, saving time and promoting sustainability. With the excavation package, operators can vacuum, jet and excavate continuously all day long. **800-837-9711; www.superproductsllc.com. ◆**

Wastequip names Bryant chairman of the board

Wastequip has appointed Marty Bryant as chairman of its board of directors. Bryant has served as the company's CEO since 2012 and has been a member of its board since that time. His career spans all facets of industrial and automotive manufacturing, from design and development to executive management and successful distressed business turnarounds. Prior to joining Wastequip, he held positions as senior adviser at Centerbridge Partners, president of light-vehicle products at Dana, vice president of



Marty Bryant

operations at Webasto Roof Systems and engineering manager at Toyota.

Halbardier joins Vacuum Truck Rentals

Vacuum Truck Rentals announced Mitch Halbardier as the newest member of its sales team. He will serve the Deer Park, Texas, region and brings more than 18 years' experience in the vacuum truck and heavy-equipment industry. Halbardier holds certifications in several Vactor training programs, as well as Vactor 2100 mechanics training and Vactor HXX products/mechanics training. He



also holds training certifications with IBAK camera sys- Mitch Halbardier tems and PipeLogix, and he has worked with many other manufacturers and equipment including Keith Huber, Galbreath, Presvac Systems, Global Vacuum Systems and GapVax.

Kaiser Premier announces management appointments







Kofi Barkoh

Lindsey Escalante Brandon Buchleiter Marcus Thomas

Dan Weber, president and CEO of Kaiser Premier, announced the promotion of several key employees to its executive management team. The promotions include Kofi Barkoh, executive vice president, general manager, Gulf Coast region. He joined the company in 2019 and was instrumental in launching the new Gulf Coast service center in Pasadena, Texas. Lindsey Escalante, vice president, supply chain and quality operating systems, has been with the company since 2005. In addition to her experience in administrative and financial roles, Escalante has 12 years' experience in supply chain management. Brandon Buchleiter, now the vice president of operations, started with the company in 2000. He has served as operations manager for the company since 2017. And Marcus Thomas, vice president of engineering, joined the company in 2006. He has held various positions in maintenance, product support and production management.

GPS Insight acquires ServiceBridge

GPS Insight announced the acquisition of Chicago-based ServiceBridge, a leading field service management software company for small businesses and franchises with tools that empower field service teams. Founded in 2010, ServiceBridge offers software solutions that enable field service teams to dispatch technicians, manage customer data, streamline workflow management and franchise operations, and analyze results.

Mueller Water Products building brass foundry facility

Mueller Water Products is building a new finished goods brass foundry in Decatur, Illinois. The facility is expected to employ 250 workers to help increase production capacity and meet growing demand within the water infrastructure industry. Mueller was founded in Decatur in 1857 by German immigrant Hieronymus Mueller.

Fink named president of Plastics Pipe Institute

The Plastics Pipe Institute named David Fink as its new president and executive director. Fink, a veteran of the plastics pipe industry, previously served as the chairman of the PPI board of directors from 2017 to 2019 and has held a number of other leadership positions within the organization. Fink earned his Bachelor of Science degree in chemical engineering from the University of Pittsburgh and his Bachelor of Science degree in chemistry from Gannon University in Erie, Pennsylvania.



David Fink

Vacuworx promotes Raines to regional service manager

Vacuworx announced an increased presence in the Gulf Coast area with the promotion of Paul Raines to regional service manager. Factory trained and certified to inspect, service and repair all makes and models of Vacuworx lifting equipment, he has been deployed north of San Antonio, as Vacuworx anticipates current and future needs tied to growth potential in South and West Texas and throughout the Gulf Coast region.



Paul Raines

Vermeer enters distribution agreement with MultiOne

Vermeer announced it has entered into a distribution agreement with MultiOne, a manufacturer of compact articulated loaders. Through the agreement, MultiOne will supply Vermeer-branded loader models to be sold, serviced and supported exclusively through Vermeer dealers across North America and the Caribbean.

O.J. Watson Equipment joins Vac-Con distribution network

Vac-Con announced that O.J. Watson Equipment joined its distribution network providing coverage in Colorado and specific counties in Wyoming. Family-owned and -operated since 1988, O.J. Watson traces its roots back more than 100 years, building custom trucks from pickups to large workhorses since 1912. Headquartered in Denver, the company also operates a full-service facility in Greeley, Colorado. **♦**

APRIL 2020

Product Spotlight

Multifunction Power System designed to keep techs on the job

By Craig Mandli

PRODUCT NEWS

ater and sewer technicians require equipment that is versatile enough to work in nearly any climate and environment. Time is often of the essence, so they can't allow anything to stop them on the job site. With everything needed built into a single compact system, the VMAC 6-in-1 Multifunction Power System is designed to make those technicians ready for anything. This self-contained system can be fully integrated into any diesel work truck fuel system or skid-mounted for stand-alone applications with an optional external fuel tank.

The newest version of the VMAC Multifunction comes with a Caterpillar engine and is available to CAT dealers and other customers across North America. The unit includes a rotary screw air compressor, generator, welder, battery booster/charger, PTO with optional hydraulic pump, and integrated cold-climate kit. The CAT variation of VMAC's Multifunction System was engineered by VMAC especially for CAT mechanics, after receiving a request from Finning, the world's largest CAT equipment dealer. According to the company, Finning's global sustainability policy demonstrates their commitment to people, safety, environment, product stewardship, communities and ethics and governance.

"Finning approached our team to help them accomplish their sus-



tainability goals and asked us to create a variation of our Multifunction Power System that used a Caterpillar engine," says Gord Duval, vice president of marketing and sales at VMAC. "We have worked with Finning for more than 20 years and are always happy to collaborate on innovative new products."

This latest VMAC Multifunction has a C1.1 industrial diesel engine, which provides additional benefits beyond the typical multipower system. The C1.1 offers lower engine speeds, which reduces noise, and is easy to maintain due to single-side servicing. The C1.1 also requires less maintenance and only needs to be serviced every 500 hours. This lengthy service interval is notable when compared to the 100- to 200hour service intervals that are typical with other small industrial engines. In addition to hydroexcavation and industrial vacuum trucks, applications include mobile heavy-duty mechanics, heavy-equipment repair technicians, and remote access jobs in mining, logging, and oil and gas.

"The new Multifunction with CAT power is the perfect example of how our partnership can lead to fantastic new products," Duval says. "You don't need to be affiliated with Caterpillar to appreciate and enjoy the benefits of this system." **800-738-8622; www.vmacair.com.**

Sewer Equipment Tempest industrial air mover

The RAMVAC Tempest industrial air mover from Sewer Equipment has an 18-cubic-yard debris box and a 28-inch Hg cfm positive displacement blower through an 8-inch system. The self-



discharging filter system provides automatic interval cleaning of the filter house during operation, reducing downtime. The articulating, extendable knuckleboom provides 4.5 feet of extension, with a total working length of 16 feet and 270-degree range of motion. Standard with a fully opening rear door, the Tempest requires only one dump to eliminate all debris within the box. Also standard is a 50-degree dump angle and 50-inch clearance from splash plate to the ground, allowing for easy off-loading of material into roll-off containers. **800-323-1604; www.sewerequipment.com.**

Zurn Industries 20XL pressure reducing valve

The 20XL pressure reducing valve from Zurn Industries is designed to reduce high-inlet pressure on potable waterlines. Its short lay length and compact design ensure ease of installation in residential or commercial applications from new construction to replacement. The balanced stem design enables the valve to react in a smooth and responsive manner when changes to system flow occur. The composite cartridge and bellhousing deliver superior strength and corrosion resistance. The stainless steel strainer screen catches debris, while the cartridge ensures easy repairs. The 20XL is available in 3/4- and 1-inch sizes with versatile connection options. **814-875-1252;**

PRODUCT NEWS

ADS Environmental Services ECHO ultrasonic monitors

The ECHO from ADS Environmental Services has a 20-foot dynamic measurement range in an 8-inch pipe. It provides for total manhole visibility and introduces stabilized, near-top-side mounting. It is located just under the manhole cover, making installation easy with no manned entry. For reliable connectivity, the ECHO now features



communication via the LTE-M network, which is designed and optimized for the Industrial Internet of Things. Its cloud-based software and advanced analytics platform provide fast, easy access and insights into the collections system's behavior. **800-633-7246; www.adsenv.com.**

Vacall AllExcavate hydroexcavator

The Vacall AllExcavate hydroexcavator is ideal for excavating soil, rocks and clay around utility lines and foundations. It uses highpressure jetting action up to 24.5 gpm with up to 3,000 psi to loosen material. A 27-inch Hg and 5,800 cfm vacuum suctions the material and water slurry into the debris tank. The multistage vacuum fil-



tration system has a simplified design to reduce maintenance, extend performance and increase working life. As material is deposited into the debris body, air continues to move through a dual cyclone separator where more material particles and moisture are removed. The filtered air then passes through the blower, silencer and exhaust. All of the AllExcavate models are available with three different vacuum boom tube and hose designs to accommodate customer preference. **800-382-8302; www.vacall.com.**

FEBCO ArmorTek advanced coating system

ArmorTek advanced coating system from FEBCO, a Watts Water Technologies brand, adds a layer of protection to its ductile iron backflow preventer valves. Three layers of protection create an effective barrier, increasing resistance to corrosion. First, an anti-corrosion



primer slows the spread of corrosion should the metal substrate become exposed from wear or impact. Secondly, ArmorTek's formulation inhibits the growth of bacteria that causes microbial-induced corrosion, limiting the growth of tubercles that can clog or foul downstream equipment. And lastly, the robust topcoat is designed to bond to the primer below, providing a high-strength barrier between the iron substrate and water. **800-767-1234;** www.febcoonline.com.



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WORTH NOTING

PEOPLE/AWARDS

The American Council of Engineering Companies of New York presented the 2020 Platinum Award for Engineering Excellence to the **Stormwater Consortium of Rockland County, Cornell Cooperative Extension of Rockland County,** and **H2M architects + engineers** for a stormwater mapping project. Funded by the New York State Department of Environmental Conservation, the purpose of the mapping project is to geolocate stormwater infrastructure including catch basins and outfalls and identify stormwater management practices.

Diane Beyer was hired as the director of Public Works for the city of Fredericksburg (Virginia). She replaces **Dave King**, who retired. In addition, the city hired **Tyler Gelles** as stormwater manager and **Chantz Ballard** as stormwater administrator.

The National Association of Clean Water Agencies presented **Lakewood** (Ohio) Mayor Mike Summers with a 2020 National Environmental Achievement Award for Local Public Service. The honor recognized Lakewood's 220-page Clean Water Act Compliance Report to the Environmental Protection Agency outlining the city's 15-year, \$75 million plan to address water polluting the watershed during major storm events when its infrastructure is overwhelmed.

The **city of Kingston**, New York, received \$2.5 million for improvements at Dietz Stadium, with funds coming from the state Environmental Facilities Corp.'s Green Innovation program and the state Department of Environmental Conservation's Climate Smart Communities program. The project includes repaying and redesigning the parking lot at the stadium using environmentally friendly techniques to minimize stormwater runoff.

Christopher B. Burke Engineering promoted **Darren Olson** to vice president of the Illinois-based consulting, engineering and surveying firm. His duties, in part, include working on urban drainage projects, watershed studies, stormwater management plans and flood control project designs.

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CALENDAR

March 29-April I

American Water Works Association Sustainable Water Management Conference, Hyatt Regency, Minneapolis.Visit www.awwa.org.

April 14-17

Center for Watershed Protection National Watershed and Stormwater Conference, Renaissance Austin Hotel, Austin, Texas. Visit www.cwp.org.

April 19-22

American Public Works Association North American Snow Conference, Cleveland. Visit www.apwa.net.

May 17-21

World Environmental & Water Resources Congress, presented by the Environmental & Water Resources Institute of the American Society of Civil Engineers, Green Valley Ranch Resort, Spa and Casino hotel, Henderson, Nevada. Visit www.ewricongress.org.

May 20-21

American Society of Civil Engineers Watershed Management Conference, Green Valley Ranch Resort, Spa and Casino Hotel, Henderson, Nevada.Visit www.asce.org.

June 14-17

American Water Works Association Annual Conference & Exposition (ACE), Orange County Convention Center, Orlando, Florida. Visit www.awwa.org.

July 12-15

American Society of Agricultural and Biological Engineers Annual International Meeting, CHI Health Center, Omaha, Nebraska.Visit www.asabe.org.

Aug. 9-12

American Society of Civil Engineers Pipelines Conference, San Antonio Marriott Rivercenter, San Antonio.Visit www.asce.org.

Aug. 10-13

National Association of Flood and Stormwater Management Agencies Annual Meeting, Stein Eriksen Lodge Deer Valley, Park City, Utah. Visit www.nafsma.org.

Aug. 17-19

StormCon, Washington State Convention Center, Seattle. Visit www.stormcon.com.

Aug. 30-Sept. 2

American Public Works Association Public Works Expo (PWX 2020), Ernest N. Morial Convention Center, New Orleans, Visit www.apwa.net.

Sept. 14-16

National Rural Water Association WaterPro Conference, Phoenix (site TBA). Visit www.nrwa.org.

Oct. 28-31

American Society of Civil Engineers Annual Convention, Disneyland Hotel, Anaheim, California.Visit www.asce.org.

Nov. 9-12

American Water Resources Association Annual Conference, Embassy Suites by Hilton Orlando Lake Buena Vista South, Kissimmee, Florida. Visit www.awra.org.

Municipal Sewer & Water invites your national, state or local association to post notices and news items in this column. Send contributions to editor@mswmag.com.







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