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May 2015

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# LA STAGES ITS OWN SUCCESS

A carefully coordinated effort  
helps wastewater crews  
manage the largest collections  
system in the country

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**Kent Carlson**  
Los Angeles Collections  
Division Operations Manager  
in Los Angeles

underground  
understood



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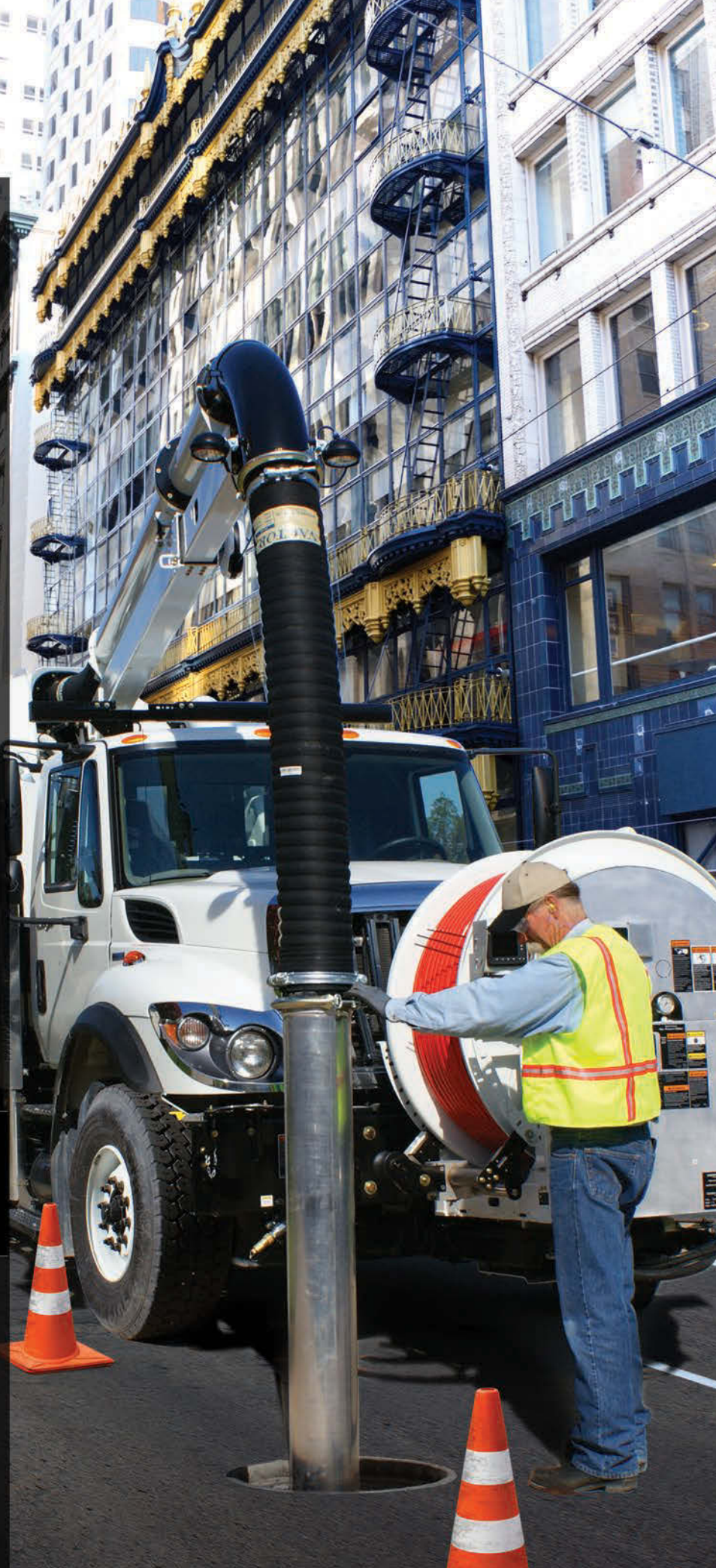
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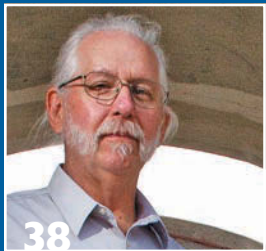


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### ON THE COVER:

Los Angeles Collections Division Operations Manager Kent Carlson stands beside one of the division's new Vector combo trucks at the Reseda yard in the San Fernando Valley just north of Los Angeles. (Photography by Collin Chappelle)



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#### Product Focus: Pumps, Lift Stations and Conveyance

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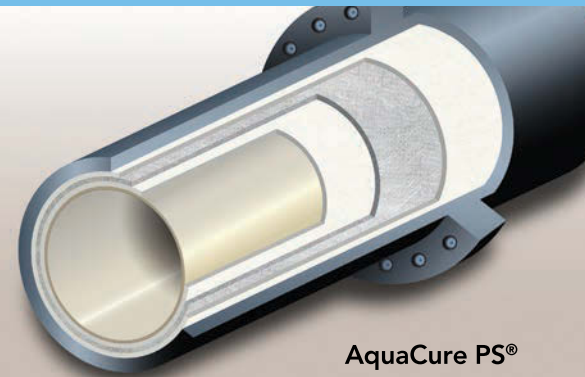


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# THE FIRST LINE OF DEFENSE

Water and wastewater operators play a critical role in maintaining community health and safety



## FROM THE EDITOR

Luke Laggis

Like the notion that people who work with water and wastewater are essentially health care professionals. It frames your work in a context that gives it the importance it deserves.

Dr. Adrianus Vlugman, the senior advisor on water, sanitation and environmental health at the World Health Organization, gave a presentation at the 2015 Water & Wastewater Equipment, Treatment & Transport Show at the Indi-

ana Convention Center in Indianapolis Feb. 26. He spoke to attendees on the transfer of communicable disease in water and wastewater. According to Vlugman, employees who directly handle water and wastewater need to take the same safety precautions as those working in hospitals.

“All people working in water and wastewater sanitation are primary health care workers,” he says. “It’s right in the word itself. ‘Sanitas’ is the Latin word for health.”

tas’ is the Latin word for health.”

I think that’s an important thing for the people of this industry to keep in mind, that you serve a primary role in maintaining the health of your communities and should carry yourselves accordingly.

Everyone in this industry is plenty familiar with the phrase out of sight, out of mind. People don’t think about the infrastructure beneath their feet until there’s a problem. And if they don’t think

harms it carries — in the sewers where it belongs, keeping everything above ground safe for handling.

The Vanguard System connects to a jetting truck’s water tank and a 5-gallon antibacterial cleaning concentrate tank. The system is operated by a control box that combines water from the truck’s tank with the cleaning solution. It also includes a handgun attachment that can be used to disinfect the surrounding area or other equipment that comes

**“All people working in water and wastewater sanitation are primary health care workers. It’s right in the word itself. ‘Sanitas’ is the Latin word for health.”**

– Dr. Adrianus Vlugman

about the infrastructure, they definitely don’t think about the people who maintain it.

You’re not a group of people relegated to working in the filthiest possible environment; you are professionals who understand the importance of maintaining the health of the environment and population. You are constantly putting yourselves in harm’s way — confined spaces, trench work, toxic gases, pathogen-laced materials — so that others can be safe. It’s a role that rivals any in terms of importance.

But what about your health and safety? Who’s looking out for that? Working with wastewater poses legitimate threats, and you need to take steps to protect yourself.

Next month we’ll introduce you to a system for cleaning and disinfecting your cleaning equipment that leaves wastewater — and all the

into contact with sewage.

Independent laboratory testing on the system showed that it reduced bacterial counts by up to 98 percent.

That’s a significant reduction in the chances of you getting sick from your work, which means you’ll be able to continue to do your part in keeping your communities safe and healthy. They might not realize that’s what you’re doing, but that doesn’t make it any less important.

You’re public servants, but more than that, you’re protectors, guardians of a system that provides the foundation for healthy communities. And that should be celebrated.

Enjoy this month’s issue. ♦

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

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## MILESTONE ACHIEVEMENT

### Utility Reflects on 7 Million Hours of Safety

The San Francisco Public Utilities Commission is in the midst of a massive 15-year program to repair one of the nation's largest and most complex water infrastructure systems. Since work started in 2009, more than 11,000 workers have recorded 7.5 million hours without a major injury or lost-time incident, marking a major milestone in the \$4.8 billion Water System Improvement Program. [mswmag.com/featured](http://mswmag.com/featured)

## CSO CONCERNS

### East Coast Sewers Endure Spring Snowmelt

Cities from Boston to Bangor, Maine, are recovering from an unusually harsh winter after the East Coast was hit with record-setting snowfall. As temperatures rose, so did the chances for combined sewer overflows. It challenged the workforce while straining equipment and budgets, but local municipalities managed the risk and averted potential disaster. [mswmag.com/featured](http://mswmag.com/featured)



## OVERHEARD ONLINE

“Toilets are not trash cans, and reducing the amount of inappropriately flushed products will save utilities millions of dollars each year.”

— New 'Flushability' Guidelines In the Works  
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## UNDERWATER REPAIR

### Divers Repair 30-Inch Water Main Under River

Talk about a tough job. The Portland (Oregon) Water Bureau required scuba divers to fix a fractured water main underneath the Willamette River. The river is approximately 60 feet deep where the divers performed the spot repair using a fitted steel plate and a custom-made PVC structural repair system. [mswmag.com/featured](http://mswmag.com/featured)

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# LA STAGES ITS OWN SUCCESS



A carefully coordinated effort helps wastewater crews manage the largest collections system in the country

Wastewater Collections workers Jose Mendez and Elton Howerton, one of the LA City Collections Division's hydro crews, clean a 300-foot section of sewer main in a residential San Fernando Valley neighborhood north of Los Angeles. (Photography by Collin Chappelle)

By Jim Force

The term “Hollywood Hustler” may bring to mind a West Coast shyster intent on stealing your money.

But at the Los Angeles Wastewater Collections Division, the term means something far more beneficial. Hollywood Hustler is the name of a unique tool they’ve developed to facilitate cleaning twisty branch sewer lines in old areas of the city where there is no manhole access.

Part of the city’s sewer system serves an old section of Hollywood Hills, explains Operations Manager Kent Carlson.

“The developer put in a number of branch sewers with sharp bends and angles,” he explains. “The Hustler has a 45-degree angle head that glances around the corners and enables us to get our rodding equipment through bends and turns in the pipe.”

Homemade tools are just one of

the weapons the LA collections team uses to keep the sewer system clean and functional. Some 350 employees use more than 100 major pieces of equipment — including 75 dedicated cleaning units — and a comprehensive set of standard operating procedures to ensure uninterrupted service to the city’s 4 million residents and 27 contracting cities.

“We run around the clock,” Carlson says. “Our sewers never sleep.”

## The LA system

At 6,700 miles, LA’s sewer system is the largest wastewater collections system in the United States. It would stretch across the U.S. and back, and is organized into six separate yards, which are home to 11 divisions. The smallest is a 60-square-mile area in the center of the city, having 300 miles of sewers — about the length of the entire system in many major American cities. Carl-

son says that the district approach organizes the workload and allows the sewer crews to focus on issues particular to specific areas of the city, rather than taking on the entire system all at once. Crew assignments and work order allocations are based on the six yards, Carlson says.

“Each yard has a supervisor and a crew leader on the trucks,” he explains. “But we share the responsibility of getting all the work done. We move crews around from one yard to another. We have no animosities with one yard versus another, and we work as a team.”

The system carries 400-plus mgd of wastewater to the four treatment plants operated by the city. Wastewater flows mostly by gravity, although 48 pumping stations help move wastewater in the beach areas and low-lying sections of the city.

Ninety-five percent of the system is vitrified clay, which despite its age,

is holding up relatively well, Carlson says. Most spills and overflows are caused by tree roots, but through the efforts of Carlson’s crews, spills have been reduced significantly in the past few years. The rigorous cleaning schedule is one reason, but Carlson points out another: “It’s a testament to the tenacity of our guys and gals out in the field, in all kinds of weather and conditions. They’re very detail-oriented and do a bang-up job.”

The sanitary system is completely separate from the storm sewer system, which itself is another 1,200 miles in length.

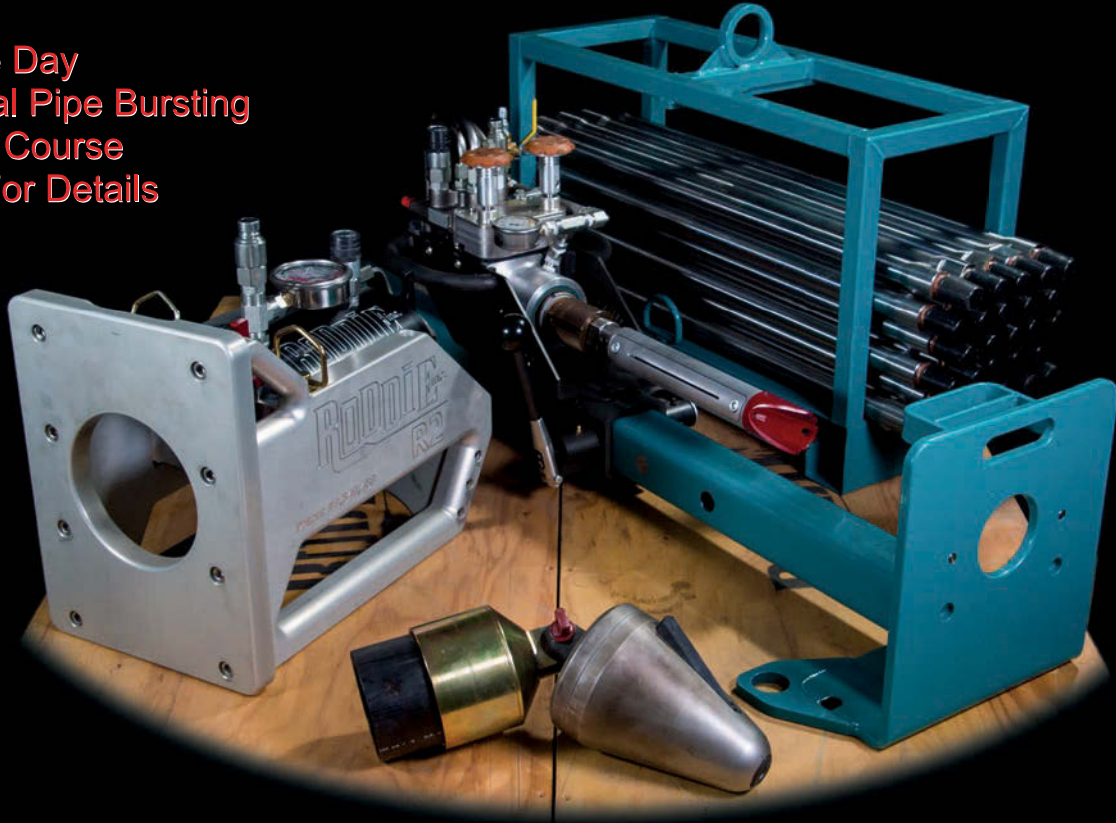
Despite being in a major earthquake zone along the West Coast, Carlson says seismic activity is not a major concern. “The Northridge earthquake in 1994 did a lot of damage, and it took us a long time to assess and fix the damage. But we’ve had no major quakes since then. The ABS [acrylonitrile butadiene sty-

(continued)



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**Wastewater Collections worker Elton Howerton lifts the lid on a manhole to begin cleaning a 300-foot section of sewer in a residential area in the San Fernando Valley.**



**Wastewater Collections worker Jose Mendez uses a mirror to reflect light down a manhole while cleaning a sewer main.**



**PROFILE:**  
Los Angeles,  
California, Wastewater  
Collections Division

**DATE ESTABLISHED:**  
Original sewer lines date to the city's establishment in the late 1700s.

**POPULATION SERVED:**  
Approximately 4 million, plus 27 contracted communities

**AREA SERVED:**  
Los Angeles and surrounding contracting communities

**WATER/WASTEWATER INFRASTRUCTURE:**  
6,700 miles of sewer pipe, ranging in diameter from 6 to 144 inches, 140,000 manholes, 48 pumping stations. Wastewater is treated at four facilities: Hyperion Treatment Plant, Terminal Island Water Reclamation Plant, Donald C. Tillman Water Reclamation Plant, LA-Glendale Water Reclamation Plant.

**EMPLOYEES:**  
350

**ANNUAL OPERATING BUDGET:**  
\$41 million

**WEBSITE:**  
[www.lacitysan.org](http://www.lacitysan.org)

rene] piping and couplings we're using on new hillside lines are quite flexible and aren't affected much by movement."

**Inspection, cleaning and maintenance**

If you suspect that a system this big requires lots of equipment, you're right. Carlson's division operates the largest fleet of Vactor combination jet/vac trucks in the western hemisphere — 75 to be exact. They are among more than 100 pieces of major equipment the city uses, along with Champion rodding machines, Warthog Magnum sewer nozzles (StoneAge), Phantom nozzles from Advanced Infrastructure Technologies, Aries CCTV units, mechanical root saws, hand rodding equipment and more.

The cleaning is scheduled continuously, 24/7, with the objective of regaining at least 95 percent of the original sewer capacity. The division's QA/QC procedure mandates CCTV inspection and cleaning of 10 percent of the entire system each year — about 670 miles.

"In addition to our regular schedule, we inspect and clean some sewers every three to six months, or every one to two years, depending on this history of the pipe and where

it's located," Carlson says. "Some of our lines near restaurants have high grease loads that must be removed."

The city has developed a comprehensive program to reduce fats, oils and grease in the sewer system, and best management practices for both residential and commercial customers are published on the LA sewer website.

All commercial food establishments must control FOG by complying with the city's Industrial Waste Control Ordinance, which calls for adoption of best management practices and the installation of grease traps or interceptors, and limits the use of garbage grinders.

Roots are a special problem, exacerbated by recent drought conditions in Southern California. "Tree roots seek moisture in our sewers and can cause blockages in the lines," Carlson explains. "We have lots of trees of different kinds, depending on the various neighborhoods."

To combat root blockage, Carlson's crew uses both chemical control means — contracted out to a root control service — and aggressive root cutting programs to keep the lines free of clogs.

LA has also increased efforts to control and eliminate sewer odors.

New Air Treatment Facilities are being positioned at odor hot spots around the system. The ATFs use biofilters followed by carbon adsorption to eliminate odors that might otherwise create issues in local neighborhoods.

The topography within the service area is another challenge. Steep grades and hills often require the use of rodding machines — some of them manual — and the variety of special tools the division has built on its own.

**Standard operating procedures**

The division's standard operating procedures provide consistency in operations throughout the sprawling sewer system and army of employees. The printed manual is a living document, constantly being analyzed and updated as equipment and procedures change, not just sitting on a shelf somewhere.

Carlson says the SOPs are organized around three criteria: customer service, system performance and employee performance. Within these topics, SOPs cover everything the LA sewer crews do — from individual roles and responsibilities, to safety, maintenance, recordkeeping and more.

*(continued)*



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# THE HISTORIC ART OF SEWERING

If there were a sewer museum somewhere, Kent Carlson would be the odds-on choice for curator. He loves the old stuff.

He's got photographs of the old-school brick-lined elliptical sewer lines that once served cities like New York and Philadelphia. An old Babbitt book on sewers from 1906 is filled with post-it notes pointing out important developments. Another is the *Glossary of Water and Wastewater Engineering* from the 1960s, which he says "has everything in it that you might hear out in the field."

He hangs onto remnants of old sewer mechanisms. Old blueprints and equipment patents hang on the walls of his office.

The reason? "People need to see how they did business in the old days," he says. "As we instruct the young people coming into the profession, it's important they understand the history of their craft.

"Some of the old stuff is similar to what we have in the older sections of town." He adds that a lot of the older generation of sewers and equipment is still in service and doing a pretty good job. "It helps when you're going into a line to work on it. You have the database — when the line was built, what kind of tools to use."

Plus, he says, his collections division is losing a lot of knowledge as older, experienced employees retire. He says he's trying to keep an appreciation for the older sewers and sewer from fading to black, stressing that it's important that everyone in the profession knows something about what came before them.

"Everybody is covered," Carlson says. "Not just the crews on the street but managers and supervisors, as well. No one is excluded from the SOPs."

SOPs are targeted to all the different types of equipment the LA team uses. "Tools are different," Carlson says. "The SOP lists differ-

ent tools in each truck, how to use them, applications, maintenance. It breaks down what each tool does."

Recordkeeping is critical, Carlson says. "It's very important that we keep track of breaks, spills, cleaning data — whatever we encounter in a system the size of ours."



Despite their completeness, Carlson says the SOPs are only effective if they are applied. Employee buy-in is the key. "Our SOPs are not just drawn up," he says. "Everybody was involved in their formation. Everybody has a say [in what goes into the SOP]."

## Tools of the trade

The Hollywood Hustler is just one of several homemade tools the Los Angeles Wastewater Collections Division has come up with to make their jobs easier and sewers cleaner.

The hydraulic can cutter is another. This water-operated hydraulic unit is designed to cut through protruding laterals. "Our older cutters use a diamond impregnated tip for cutting, and on vitrified clay pipe they work just fine," Carlson says.

"But some of the newer laterals are fiberglass or molded-extruded ABS."

He says the machine his department has invented fits in an 8-inch line and is shaped like a coffee can. It rotates at high speeds and cuts through protruding laterals using a bimetal blade on the leading edge to snip off the ends of laterals protruding into the mainline. The end drops into the sewer line and can be removed with other debris as the line is flushed out.

A third invention is an idea Carlson came up with himself. It's a quick-release mechanism that avoids both the hassle and the safety hazard of unthreading tools on the end of rods and threading on new tools. "New guys always find it difficult to get the angle just right when rethreading," he points out.



Operations Manager Kent Carlson (center, in black) poses with his crew at one of Los Angeles' Collections Division yards in the San Fernando Valley.



«Jeffery Petillo (left) and Mathew Diaz of the Los Angeles Collections Division use a Champion mechanical rodding truck to manually clean sewer lines of roots and debris. »The crews of the Los Angeles Collections Division Reseda yard keep a bag full of interesting debris found while cleaning sewer lines throughout the city.



He says the quick connect takes less than five minutes to change a tool. “We’ve had no injuries with the connection tool. It’s been a godsend for safety.”

The made-in-LA pride is strong, but that doesn’t prevent the Collections Division from pursuing and adopting other sewer line innovations.

“We’re always looking around, trying to use as much new technology as is out there to clean and maintain our sewer lines. We’re always looking forward to innovations and enlarging the scope of knowledge of our staff.”

One breakthrough involves the use of smartphone technology to plot latitude and longitude points for missing manholes, or manholes that are buried in backyards or other hard-to-find places. “Through an app on our phones, we can get the longitude-latitude footprint, and do it without surveying,” Carlson says. “It’s pretty neat.”

In addition, each truck used by collections system crews is equipped with a laptop computer — much like you would find in modern-day police and emergency vehicles. Work orders are sent digitally to crews in the field, eliminating paperwork.

### Training

To staff its crews with knowledgeable, effective people, the LA Collections Division pays special attention to training newcomers to the staff.

“We require Class B licensed operators at a minimum,” Carlson says. “We move new employees around to the different areas, let them get experience on all the different types of equipment we have — cleaners, hydros, rodders.

“Everybody is cross-trained. Like baseball, it’s good to have a deep bench.”

Carlson, an ex-Navy submarine machinist who cut his teeth on trucks and pumping stations, likes the sewer business, even though it’s out of sight and out of mind to most.

“There’s nothing like it,” he says. “We’re not in the limelight like police or fire or water and power. Yet we try to respond to all calls within 30 minutes. The taxpayers expect a high level of service, and we do the best we can with what we have.

“We’re unsung heroes for millions of people,” he adds. “We’re sewer heads.” ♦



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# BUILD A DEEP BENCH

A job-rotation program can help you stay in the game when employees retire, take extended leave or find new jobs

By *Ken Wysocky*

In sports, successful teams benefit from developing a deep bench — a core group of well-qualified backups who can keep a squad competitive in the event of unexpected events, such as player injuries or trades. Ideally, corporations and organizations shouldn't be any different.

So how can your organization make like a first-rate sports team? The answer is both simple and cost-effective: develop a job-rotation program, also known as cross-training.

It makes a lot of sense, especially when you consider that your company is a lot like a sports team. Your employees are effectively free agents, free to leave at any time — and in today's business environment they often do, especially if they're younger millennials who are apt to change jobs more frequently. And just like athletes, your employees could miss time from work because of "injuries," such as prolonged illness. Or an employee may be taken out of the starting rotation, so to speak, due to maternity or family leave.

"Because employee mobility is so much higher these days, you need to have people who can fill in if someone resigns unexpectedly or is out sick or on family leave," says Dr. B. Lynn Ware, the president and chief executive officer of Integral Talent Systems Inc., a talent-management consulting firm based in Mountain View, California ([www.itsinc.net](http://www.itsinc.net)).

"You need bench strength — other people who can step in and do the job, providing customers with continuity of service."

Cross-training used to be considered more of a leadership development tool that could give high-potential managers experience in all areas of a company or organization. But Ware says that over the last several years, she's seen more and more companies interested in implementing cross-training programs for all levels of employees.

"There's so much change going on in organizations these days, with all the technological advancements and [socio-economic] disruptions, that it makes sense to have employees who can do many things as opposed to specializing in just one area," she says.

As further proof of their burgeoning popularity, Ware notes that of the nearly two dozen different topics she covers in webinars, cross-training is one of the two most popular sessions. And when you stop and consider all

the benefits, it's easy to see why.

First of all, cross-training can reduce employee turnover by increasing job satisfaction. Cross-functionally trained employees typically aren't bored silly because their routine and responsibilities can vary. As such, cross-trained employees are also more engaged and productive, Ware says.

"There's a very strong correlation between employees who feel they're getting professional development and higher rates of engagement and lower turnover rates," she explains. "And that, in turn, leads to better customer satisfaction and higher productivity, and all those factors drop to the bottom line. We all know what it takes to do enough to keep our jobs. But motivated employees are more willing to work more hours — go the extra mile."

Cross-training is also gaining traction because more and more employers are hiring greater numbers of millennials, a large generational cohort of 20-somethings that will become a large part of the workforce in the years ahead — particularly in mature industries, Ware points out.

"Millennials are attracted to organizations that focus on skill and employee development, which are top motivators for them," she says. "In fact, those factors are often more important than pay to millennials. They like to take a 'tour' of a company and examine different roles and careers. So companies with job-rotation programs will stand out from the competition and help attract quality employees."

Cross-training is also effective for companies that utilize extremely proprietary processes that require specialized skill sets that most people don't possess. "If you can't find a lot of people off the street who have the skills you need, then job rotations are a great strategy," she adds.

Such programs also give employees a better understanding of how different functions and departments work — how all the pieces that make up organizations fit together. After employees work in other departments and see what those jobs entail, they often have more empathy and appreciation for colleagues in those areas. As a result, they may be less frustrated than before when things go wrong because they realize all the things that go into making things happen in other corners of the company.

"The broader an employee's perspective, the better corporate citizen

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

**“Millennials are attracted to organizations that focus on skill and employee development, which are top motivators for them. In fact, those factors are often more important than pay to millennials. They like to take a ‘tour’ of a company and examine different roles and careers.”**

– Dr. B. Lynn Ware

## Reliable, Cost-Efficient, High Concentration Ozone Generators

they're going to be," Ware notes. "They may even be able to provide new insights and solutions to problems in other departments because they come in with a fresh perspective. Overall, job rotations give organizations lots more internal capabilities."

There are many details to consider when starting a cross-training program from scratch. But in broad brushstrokes, here are some points that require primary consideration:

**1. Back to basics.** Ware suggests that companies begin by following the 80-20 rule, which states that roughly 80 percent of effects stem from 20 percent of the causes. In other words, about 20 percent of an employee's duties are mission critical, while the remaining 80 percent are miscellaneous in nature. As such, cross-training should cover only the most important and most frequently performed core tasks.

**2. Coherent communication.** Make sure the reasons why you're implementing a program are well known and properly communicated internally. If not, you run the risk of employees coming up with reasons on their own, which typically don't mesh well with the organization's goals or strategies.

"Emphasize the team aspect — that this will give employees the ability to fill in for each other and meet goals collectively," Ware advises. "Millennials are especially attuned to working this way — they're used to working in teams. You also need to clearly define the roles and responsibilities of the trainers and trainees."

**3. Fill the gaps.** Figure out ahead of time how you will compensate for the absence of employees who go off for training. Some companies swap two employees from each department; one person from marketing gets cross-training in sales and vice versa, for example.

"Other companies have floating employees who can pitch in," Ware notes. "I've also seen companies hire retirees part time who used to do the job [that's temporarily being vacated]." The average length of a structured cross-training assignment is about nine months, but stints will vary in duration according to how formal/informal the training program is and the complexity of the jobs being learned. Again, focusing on the five or six most critical job skills is paramount, she adds.

**4. Walk before you run.** Before implementing a full-scale, all-encompassing program, develop a short-term prototype program and see how it goes, then adjust things accordingly before rolling out a larger-scale version, Ware suggests.

It's also important to measure whether or not the program is successful. One way is to measure organizational outcomes, such as lost customers or sales figures; if customer loyalty increases or if sales rise after a cross-training program has been around for a while, those metrics indicate the program is working, Ware says.

"You can also measure things like employee retention rates," she adds. "Or do an employee survey and see if people who participate in cross-training programs score higher in engagement and job satisfaction. Use whatever metrics you usually use to measure organizational outcomes and success."

And while you're at it, measure the depth of your bench; you may need a bigger one for all those newly qualified starters-in-waiting. ♦

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# GOING BIG ON BMPs

A wide array of best management practices propels the Columbus water utility's success

By *Jim Force*

It's 4:30 p.m. downtown, rush hour just beginning, wind chill minus 30. The last thing a water utility needs now is a major line break.

Yet that's exactly what happened in January 2014 in Columbus, Ohio. A 24-inch water main popped, flooding about 10 city blocks. Water poured into basements. Worse yet, a nearby hospital faced possible evacuation of patients and staff. "We had a river flowing four ways at once in downtown Columbus," recalls Mike Spriggs, water maintenance coordinator. "The water turned to ice. Locators were freezing up."

But it wasn't the disaster it could have been. By 9 p.m., the Columbus crew had the valves located and

the water shut off. The team stayed with the emergency all night and had the leak repaired and the water turned back on by morning. Most critically, although some elective surgeries were postponed, patient care at the hospital was not affected.

"Our guys didn't hesitate to come in and stay overnight," says Spriggs. "Second shifters were called in to

operate the valves. We had multiple crews who worked through it, even though they were standing in water."

The Water Division of the Columbus Department of Public Utilities is ready for such situations. Emergency response is among a number of best management practices (BMPs) the utility has put in place, and it's just one reason the utility received 2013 Platinum Award recognition from the Association of Metropolitan Water Agencies (AMWA). Other attributes cited by AMWA were strategic planning, asset management, benchmarking, environmental stewardship, employee training, community outreach, customer service and fiscal responsibility.

## Infrastructure innovation

The award was a natural in the eyes of Richard Westerfield, P.E., Ph.D., division administrator: "We won the AMWA gold award some 10 years ago, and we were essentially doing all the BMPs that people were talking about. We were using BMPs to run our system. It wasn't hard to put the application together and submit it."

The Columbus Division of Water serves some 1.1 million people, delivering clean, safe water through a sophisticated system of reservoirs, groundwater wells, treatment plants, and storage and distribution networks. It's a system recognized internationally for innovation and advancement of water treatment science. In 1908,

*(continued)*



**Richard Westerfield, Division of Water administrator for the Columbus Department of Public Utilities, stands near the headquarters' water tower. The Division of Water received the Association of Metropolitan Water Agencies' Platinum Award for Utility Excellence for its innovations in water treatment. (Photography by Amy Voigt)**

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**Columbus Department of Public Utilities' Division of Water crew members (from left) Nick Marsh, Chris Briggs and Matt Bateman set up to repair a broken water service line outside a home on Westwood Road while James Davis looks on from the cab of the excavator.**



in what was known as the Columbus Experiment, water filtration was successfully combined with water softening for the first time.

Today, source water is drawn from three reservoirs on the Scioto River and Big Walnut Creek, as well as from a groundwater aquifer between the two rivers. Three water treatment plants produce a total of 140 mgd of high-quality water. The Hap Cremean Water Plant produces 68.5 mgd, the Dublin Road Water Plant 49 mgd and the Parsons Avenue Water Plant 22.5 mgd.

The treatment process is similar at all three facilities. Water is pumped into the plants through rotating screens, and alum is added to aid in flocculation. After 20 to 40 minutes of flocculation, the water passes to the sedimentation basins, where it is held for two to four hours. Sodium carbonate and hydrated lime are added to remove calcium and magnesium, softening the water.

After additional sedimentation, carbon dioxide lowers the pH to about 7.8. (When groundwater is used, the influent does not need screening or initial sedimentation.)

Media filters – gravel, sand and anthracite coal – polish the product water, which is disinfected with chlorine before passing to the clearwell. Solids collected in treatment are pumped to lagoons for drying.

### Source security

Treatment is only part of the quality equation. Columbus is recognized for its watershed approach to water supply. The department's website states, "The most important part of the water treatment process is protection of our water sources."

Since 1994, the Division of Water has had responsibility not only for managing the water source reservoirs but for land management, boat safety and public education on protection of drinking water sources. In 1996, the Ohio EPA approved the division's wellfield protection plan.

The improvements continue. The Hap Cremean plant is undergoing a \$70 million upgrade to increase capacity to 125 mgd and address disinfection byproducts by adding ozone with biologically active filtration. The ozone generators are from Mitsubishi. Leopold - a Xylem Brand, supplied the underdrain system and the I.M.S. 1000 media retainer. A pressurized solution feed recarbonation system (Tomco2 Systems) is also being installed.

The Dublin Road plant is getting a \$200 million upgrade that includes a capacity boost to 80 mgd, a \$40 million anion exchange system to remove nitrates, a recarbonation basin with pressurized solution feed system (Tomco2), Mitsubishi ozone generators and conversion to biolog-

ically active filtration (AWI Phoenix filter underdrain, WesTech Engineering media retaining troughs).

A \$50 million upgrade at the Parsons Avenue plant includes electrical improvements, a new clearwell, a filter rebuild with the existing Leopold clay tiles and a new recarbonation basin.

The Dublin Road plant was recently converted from chlorine gas to sodium hypochlorite disinfection, and the other two plants will be similarly converted in the next five years. The two surface water plants (Dublin Road and Hap Cremean) will get standby power and UV disinfection as an additional disinfection barrier within the next three years.

### Distribution challenges

The distribution system serves most of Franklin County – 2,700 miles of pipe within the city and 900 miles in neighboring suburbs served by the division. The system includes 20 pump stations and 37 storage tanks with a combined 77 million gallons capacity. The system's countywide footprint raises special challenges, especially in leak repairs: "Some of our piping is over 100 years old," Spriggs says.

While age is one issue, condition is another. "We battle all the elements here, plus traffic issues,"

says Spriggs. The crew fixes at least 1,500 leaks a year and checks out twice that many. "Our group does a great job," Spriggs says. "We try to get to a leak within three to five days, with no leak going over 14 days. We stay pretty even with that."

"When we get a call, we send out our supervisors that day. If it's an owner's leak, we shut off service to that property if it's causing damage or a safety concern. If not, it is left on and the customer has 14 days to repair it. If it's an emergency, like the downtown leak last January, we get out there that day."

The team helps the customer suburbs with leaks, as well. "We have contracts with each of those areas, based on a usage formula," Spriggs says. "If the number of leaks goes beyond the contract,

*(continued)*



## PROFILE: Columbus (Ohio) Department of Public Utilities, Division of Water

**FOUNDED:**  
Late 1800s

**SERVICE AREA:**  
City of Columbus and suburbs

**POPULATION SERVED:**  
1.1 million (300,000 connections)

**SOURCE WATER:**  
Surface water and groundwater

**INFRASTRUCTURE:**  
3,600 miles of pipe,  
3 treatment plants,  
25,000 hydrants, 20 pump  
stations, 37 storage tanks

**TREATMENT PROCESS:**  
Conventional

**TREATMENT CAPACITY:**  
255 mgd

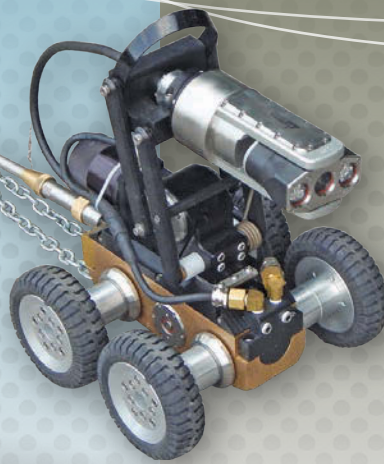
**SYSTEM STORAGE:**  
77 million gallons

**ANNUAL BUDGET:**  
\$190 million operations,  
\$240 million capital

**WEBSITE:**  
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## FLOATING TRIBUTES

The balloons flying over the cubicles in the Columbus Public Utilities call center aren't celebrating employee birthdays. They're acknowledging exceptional service a customer service representative (CSR) has given to one of the thousands of callers who phone each month with questions or complaints.

Cyndi Estep, utility service coordinator, says, "The first thing we train our CSRs to do is to listen. Empathizing with our customers goes a long way. The balloons are our 'attaboys.' We write messages on them thanking our CSRs for a job well done."

The call center has a big job, handling customer contact for the city's water, sewer and electrical divisions, which serve more than a million people. The staff numbers 50 CSRs and five supervisors. Working eight- to 10-hour shifts, team members handle more than 30,000 calls a month relating to water and sewer issues.

Mondays and Tuesdays tend to be the busiest, and the most frequent issue involves people moving in or out of homes. Bill paying is next. Other calls relate to meter replacements, final readings, frozen pipes or meters, and other service issues.

After taking a call, the CSR creates a service order on the spot and transmits it electronically to the field crew. New metering technology promises to enhance response. Debby Murphy, utility service coordinator, says the plan is to transition all customers to automated metering.

Another improvement is a PragmaCAD mobile dispatch system (CGI), launched in May 2014. It replaced thousands of pieces of paper with mobile work orders. "Once the work is complete," Murphy says, "the work order is closed and transmitted instantaneously back to the call center."



**Top: Columbus Division of Water employee Tom Strejcek (in hole) works to fix a broken mainline at a home on Highland Street in Columbus, Ohio. Above: Jeff Boals pulls back a vacuum hose after repairing the broken waterline.**

we just charge them labor and materials. We help each other out. That's the culture we've grown up with here."

Dwayne Maynard, water maintenance coordinator, ticks off improvements made recently in the control center and distribution system: "We're using an Oracle database and asset management system. It creates work orders, tracks all funding and adds preventive maintenance schedules. We have it linked to our storerooms so we can track

stock on hand – certain pumps, valves, parts and equipment."

The hard assets have also been improved. The division has built a number of new storage tanks, essentially doubling the above-ground storage capacity. In addition, standby generators can now provide backup power to the booster stations. "We also inspect tanks for coating, painting, debris removal and rusting, especially in the bowl itself," Maynard says. "We put a lot of extra effort into the tank interiors."

### Going big on BMPs

The key to efficiency at Columbus is continuous improvement based on performance measurement. "Product quality is key, along with customer satisfaction," Westerfield says. On the same level is compliance with regulations: "We actually try to stay ahead of the regs."

Financial viability is right up there, too. Columbus is one of few cities its size to have an AAA bond rating, which holds financing costs down. Here are some specific tools Columbus employs to maintain its award-winning efficiency:

#### *Asset management*

"This was new to us until about five years ago," says Westerfield. "We use it to measure risk. When deciding whether to move ahead with a capital project, we look at the risk. What are the options? We take a triple-bottom-line approach – the financial risk as well as the social and environmental risk." That's

especially important as the division looks at replacing and repairing its vast piping system: "We're able to prioritize our water system and all the pipes and plan for replacement of those that will eventually fail."

#### *Environmental management system*

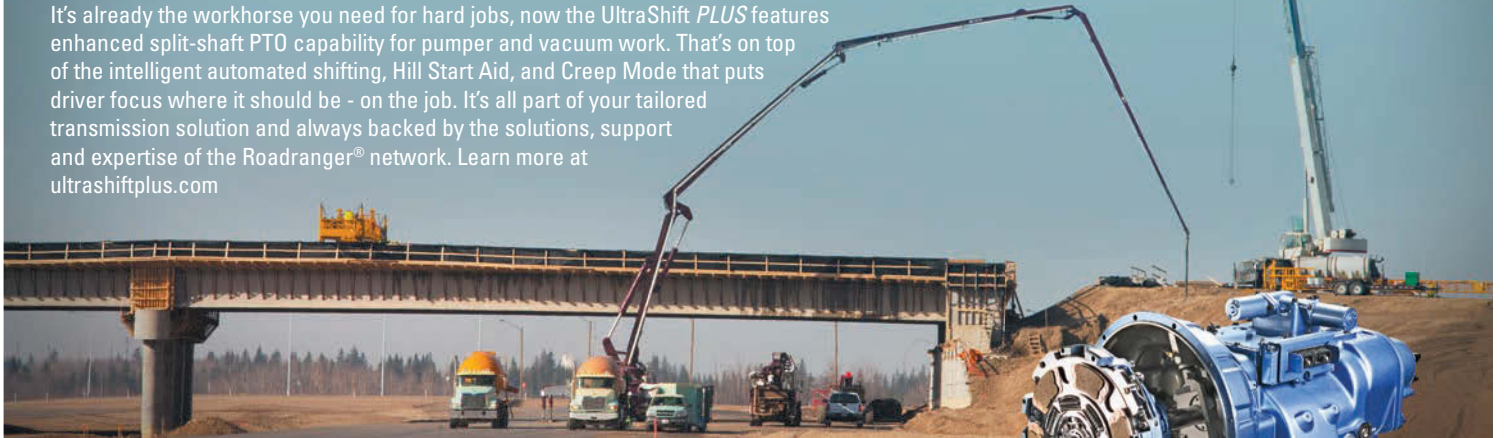
"We have a group in the department that focuses on environmental management," Westerfield says. "They are concerned with anything that will have an environmental impact. In fact, now the whole department is trained in environmental management." The program deals with matters such as spill control, emergency response, protecting the stormwater system from mud in the streets, and proper handling of material excavated from main breaks. The city recently upgraded its water emergency plan and hired an emergency planning section chief. The Water Division also works with other emergency response organizations in the community.



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## Sustainability

Since a serious drought in central Ohio in 1987, the division has had an extensive plan for drought conditions. That includes additional storage capacity: A \$120 million upground reservoir completed in November 2013 added 25 million gallons for Columbus and 4 million gallons for a partner utility (Del-Co Water Company).

The 850-acre reservoir is one of the nation's largest lined drinking water reservoirs (liner from the Rufco Division of Raven Industries). As part of the reservoir, a pump station and inflatable weir (Obermeyer Hydro) were built on the Scioto River to allow pumping during high flows.

Sustainability is also supported through a GreenSpot community conservation program that encourages conservation through the use of water-saving showerheads and fixtures and efficient lawn and garden watering.

## Community relations

Extensive community involvement in the division's planning and operation is also high on the list. The water department holds regular and frequent meetings with stakeholder groups like the Sierra Club and neighborhood organizations. "We talk about things that need to be done to protect the watershed - stormwater management, creek cleanups, projects affecting neighborhoods," says Westerfield.

## Fiscal responsibility

"Our success hinges on our ability to finance these programs and projects," Westerfield says. "Our rates are in a good place - about in the middle of other large cities in the United States."

The city council and the community have supported rates over the years, recognizing the need for water infrastructure improvements.

## Ready to grow

Of course, the best of BMPs is to be ready for the future. Westerfield focuses on being prepared and merging water utility plans with community needs. The recently built earthen-dike upground

reservoir is an example. "We knew it wouldn't be easy or acceptable to the community to build another dam," he says. "So we constructed a pump station along one of the rivers and used an inflatable rubber dam to divert water and fill the reservoir."

He knows the utility needs to be ready for growth by maintaining a reliable and redundant system for customers. And he adds that a fourth water treatment plant is already in the discussion stages. There's nothing quite like being ready for anything. ♦

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Workers hydroexcavate to reach a waterline serving a fire hydrant.

# SUCK IT UP

Increase the effectiveness, efficiency and safety of your vacuum excavation operations

*By Jeff Wage*

**F**or a public works crew working on a congested city block, locating an existing utility is only half the battle. Locators can provide a precise target, but owners and engineering specifications will often demand visual inspection to help verify these findings. Methods such as potholing then come into play, but that still leaves the issue of dealing with the residual material after it's removed.

More and more, municipalities are turning to vacuum excavators to clean and remove debris created from boring projects and locating utilities. However, with the diversity in size and capability of vacuum excavators, municipalities need to know how to right-size a vacuum excavator and follow best practices to increase productivity.

**The primary obligation of any vacuum excavator operator is to avoid damaging utilities. Constant attention and adherence to training are necessary for safe and effective operation.**

## Excavator selection

Municipalities are finding new time- and labor-saving uses for vacuum excavators every day. A wide array of attachments can expand their applications. Different size-reduction tools allow cleaning of smaller water valve boxes and catch basins. A valve exerciser attachment, which mounts to the vacuum trailer, can save crews countless hours of exercising valves from one stationary location, eliminating the old-fashioned hand cranking method.

In today's vacuum excavator market, there are two predominant methods. Hydroexcavation uses water to excavate the hole and is particularly useful in fragmented soils or heavy clay conditions. It is very useful in congested or urban areas, as it limits the amount of particulate material in the air.

Even with the numerous proven benefits of hydroexcavation, many municipalities are trending toward using air for excavation. Air excavation is typically more successful in sandy, dry or granular soils.

One of the advantages of air excavation is being able to put the soil back in the hole. If you are using air, you don't get the soil wet and you can put the dry material back in and don't have to haul material in and out.

Determining the correct size of a vacuum excavator is just as important

*(continued)*



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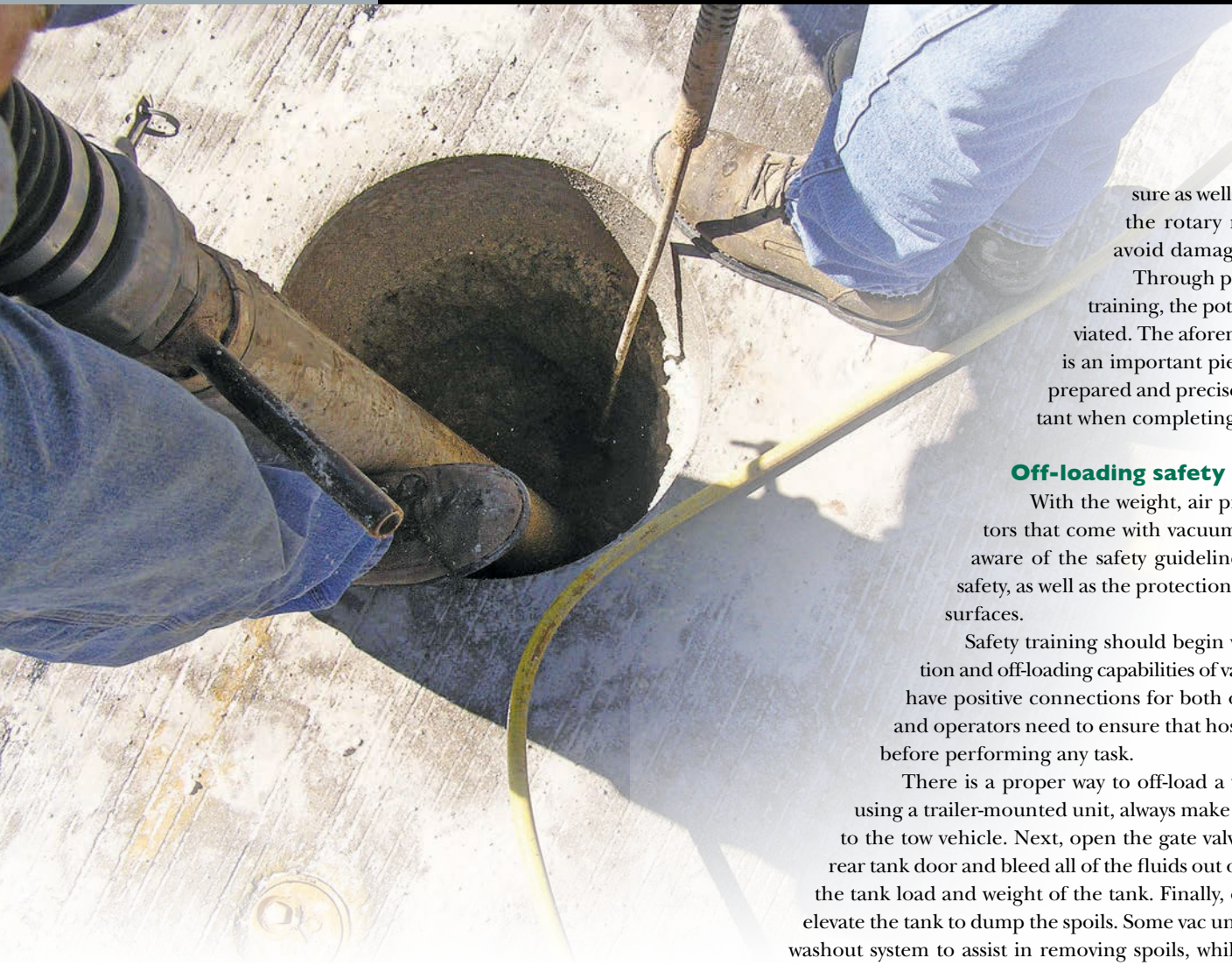


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as the excavation method. Trailer mounted vacuum excavator selection can often be predicated on tank and blower capacity, which frequently determines hose size and overall machine productivity. Most vacuum excavators tend to feature tanks between 500 and 800 gallons; however, municipalities engaged in sewer cleaning will use truck rigs up to a 2,200-gallon capacity. For municipalities that typically work on smaller projects, smaller excavators are available with only 100- to 250-gallon capacities.

### Operator best practices

The primary obligation of any vacuum excavator operator is to avoid damaging utilities. Constant attention and adherence to training are necessary for safe and effective operation.

Most manufacturers will set the water pumps on hydroexcavators below 3,000 psi, with 2,200 to 2,800 being the most popular range. Many of these machines have pumps capable of achieving pressures up to 4,000 psi, but it is this high pressure that can lead to issues if the operator is not careful.

When working around sensitive utilities such as an aged cast iron gas line, experienced operators pay close attention to their water pres-

sure as well as the distance between the rotary nozzle and the line to avoid damage.

Through proper maintenance and training, the potential for damage is alleviated. The aforementioned rotary nozzle is an important piece to this puzzle; being prepared and precise are also equally important when completing an excavation project.

### Off-loading safety

With the weight, air pressure and suction factors that come with vacuum excavator units, being aware of the safety guidelines is critical for worker safety, as well as the protection of equipment and road surfaces.

Safety training should begin with a focus on the suction and off-loading capabilities of vacuum excavators. Hoses have positive connections for both off-loading and suction, and operators need to ensure that hoses are secured properly before performing any task.

There is a proper way to off-load a vac unit. First, if you're using a trailer-mounted unit, always make sure to keep it attached to the tow vehicle. Next, open the gate valve on the bottom of the rear tank door and bleed all of the fluids out of the unit so you reduce the tank load and weight of the tank. Finally, open the rear door and elevate the tank to dump the spoils. Some vac units come with an in-tank washout system to assist in removing spoils, while others may include a liner to assist in releasing spoils.

Many of today's vacuum units have the ability to put a small amount of pressure inside the vacuum tank to help off-load the fluids without ever having to open the rear door. In these situations, a strong banded coupler is needed to help create a positive connection to the hose. Substitutions like duct tape are never recommended in place of a quality, approved coupler.

Pressure can also help push rocks and other obstructions from the hose, but a good positive hose connection and integrity throughout the hose length is critical for this. If you're using any kind of segmented hose, a positive cam lock style coupler is important. These couplers are ideal for positive connections when an operator is pressure off-loading or using reverse pressure in the tank to remove clogs.

### Wear and tear

The rotary nozzle is the No. 1 wear item on hydroexcavators and is important to monitor for safe operation. It is constantly working in an abusive environment and too often becomes the digging tool itself. If the nozzle becomes damaged or inoperable — losing its rotary dispersion — the high water pressure can create risk of damaging a utility.

The suction hose is next in line. The hose can get worn down over time and often sees more rapid wear than other components. Daily job site checks  
*(continued)*



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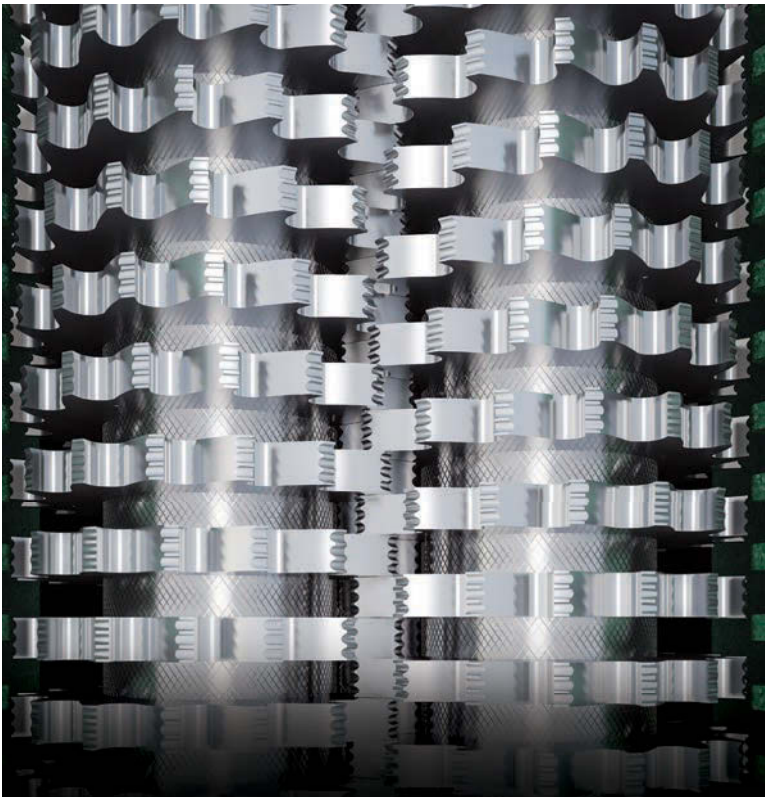
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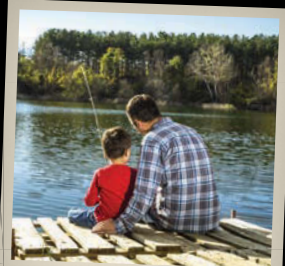




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should also be done on the air filter between the tank and blower. The filter should be free-flowing and free of dust.

Cleaning the tank, vacuum float ball and full-tank shut-off mechanisms should also be included in the maintenance schedule. Full-tank shut-off mechanisms reduce the risk of overfilling the tank and passing material to the final filter and blower. Finally, dumping the tank at the end of the day limits the chance of dirt and dust drying and solidifying inside.

### Weight considerations

With trailer vacs that can weigh up to 24,000 pounds, it is also important to perform routine maintenance on the towing and transportation equipment. Regular inspection of the brakes on a trailer hauling the excavation unit is important for both safety and fleet maintenance.

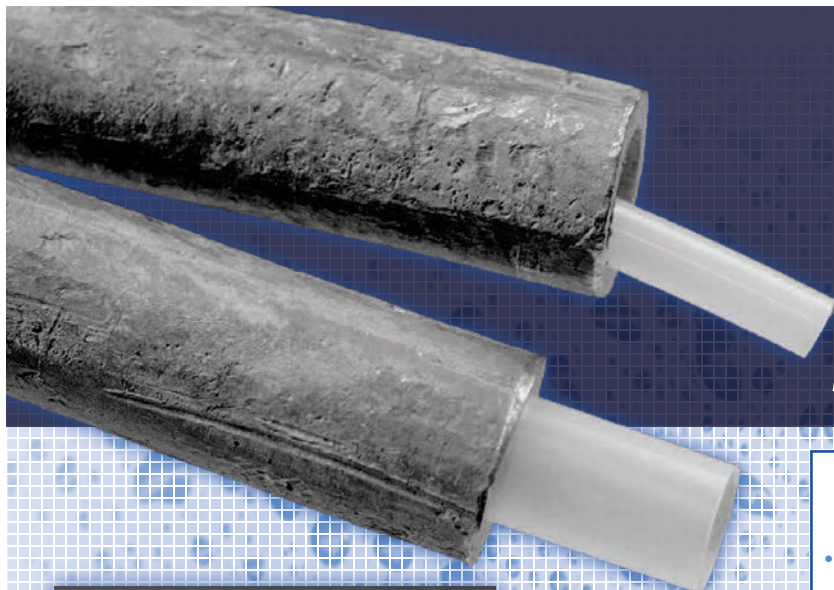
Weight distribution is also crucial when towing vacuum excavation trailers. Having axles equally loaded and at proper hitch height is critical to the longevity of tires and axles, as well as the trailers themselves. If the hitch is too high you will put that entire load on the rear axle. If it is too low, the opposite will happen and the whole load will shift to the front. Either imbalance can lead to excessive tire wear or damage to either the front or back axle of a trailer.

### Excavator importance

Vacuum excavating is growing in popularity not only out of necessity, but also viability. The ability to quickly and effectively remove dirt and debris from an urban area has enhanced the demand and role of vacuum excavators. Before setting out into the streets, however, a municipality should compare the selection, safety and maintenance of each excavator to achieve the best possible results. ♦

### About the Author

*Jeff Wage is vice president of McLaughlin Group.*



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| MANUFACTURER  | NAME OF NOZZLE                  | APPLICATION   | PIPE DIAMETER | FLOW RATE (GPM) | MAX OPERATING PRESSURE (PSI) | WEIGHT                | NUMBER OF AVAILABLE FRONT JETS | NUMBER OF AVAILABLE REAR JETS | HOSE SIZE / CONNECTING THREAD                 |
|---|---------------------------------|---|---------------|-----------------|------------------------------|-----------------------|--------------------------------|-------------------------------|---|
|  <p><b>ARTHUR PRODUCTS CO.</b><br/>an LSC Mfg Company</p> <p><b>Arthur Products Co.</b><br/>1140 Industrial Pky.,<br/>Medina, OH 44256<br/>800-322-0510<br/>330-725-4905<br/>(f) 330-722-2698<br/>www.arthurproducts.com<br/>apc@apclsq.com<br/><b>See ad page 55</b></p> | Cnt-r-KUT™ Elite Kit            | Roots and Other Blockages   | 2" - 12"      | 4 to 80         | 2,000 - 10,000               | varies per NPT size   | Customer Spec                  | Customer Spec                 | 3/8" - 1/2" - 1"                              |
|   | Cnt-r-KUT™ Basic Kit            | Deicing/Degreasing, Penetration, Flushing                           | 2" - 12"      | 2.5 to 80       | 2,000 - 10,000               | varies per NPT size   | Customer Spec                  | Customer Spec                 | 3/8" - 1/2" - 1"                              |
|   | Egg-a Nator                     | Heavy Duty Nozzle - Heavy Duty Sediment Jobs                        | 4" - 12"      | 4 to 80         | 10,000                       | varies per NPT size   | Customer Spec                  | Customer Spec                 | 3/8" - 1/2"                                   |
|   | Hard Hitter EPN                 | Surface Cleaning  | N/A           | N/A             | 10,000                       | 1.6 lbs.              | 1                              |                               | 3/4"  |
|   | Line Noles                      | Nozzle with replaceable inserts for all types of cleaning           | 4" - 12"      | 4 to 80         | 10,000                       | varies per NPT size   | Customer Spec                  | Customer Spec                 | 3/8" - 1/2" - 3/4"                            |
|   | Penetrator Hex                  | Penetration or Flushing   | 1" - 24"      | 1.7 to 80       | 1,200 - 15,000               | varies per NPT size   | Customer Spec                  | Customer Spec                 | 1/8" - 1/4" - 3/8" - 1/2" - 3/4" - 1"         |
|   | PX Revolver G3                  | Full 360° rotation for cleaning & polishing; designed for long runs | 1" - 24"      | 1.7 to 80       | 1,200 - 10,000               | varies per NPT size   | Customer Option                | Customer Spec                 | 1/4" - 3/8" - 1/2" - 1"                       |
|   | Round Nose (Button)             | General Cleaning/Cornering  | 1" - 24"      | 1.7 to 80       | 1,200 - 15,000               | varies per NPT size   | Customer Spec                  | Customer Spec                 | 1/16" - 1/8" - 1/4" - 3/8" - 1/2" - 3/4" - 1" |
|   | Round Nose Hex                  | Penetration or Flushing   | 1" - 24"      | 1.7 to 80       | 1,200 - 15,000               | varies per NPT size   | Customer Spec                  | Customer Spec                 | 1/8" - 1/4" - 3/8" - 1/2" - 3/4" - 1"         |
| Washdown  | Surface Cleaning                | N/A   | 50 to 100     | 2,000           | 4.4 lbs.                     | N/A                   | N/A                            | 2.5" NPT male                 |   |
| <p><b>Cloverleaf Tool Co.</b><br/>PO Box 1338,<br/>Tallest, FL 34270<br/>800-365-6583<br/>941-739-0707<br/>(f) 941-739-0001<br/>www.cloverleaftool.com<br/>sales@cloverleaftool.com<br/><b>See ad page 51</b></p>   | Ultimate Penetrator             | Sewer/Storm Pipe Cleaning   | 12" - 24"     | 60 to 80        |                              | 10 lbs.               | 1                              | 5                             | 3/4" - 1 1/4"                                 |
|   | Big Shark/Small Shark           | Sewer/Storm Pipe Cleaning   | 12" - 60"     | 60 to 80        | 1,800 - 2,500                | 30 lbs./14 lbs.       | 1                              | 12                            | 3/4" - 1 1/4"                                 |
|   | Aluminum Grease                 | Sewer Pipe Cleaning   | 6" - 12"      | 40 to 80        | 1,800 - 2,500                | 2 lbs.                | 1                              | 6                             | 3/4" - 1"                                     |
|   | Bomb                            | Sewer Pipe Cleaning   | 6" - 15"      | 60 to 80        | 1,800 - 2,500                | 3 lbs.                | 1                              | 5                             | 1"  |
|   | Chisel                          | Sewer Pipe Cleaning   | 6" - 15"      | 60 to 80        | 1,800 - 2,500                | 2 lbs.                | 1                              | 6                             | 3/4" - 1"                                     |
|   | Truder                          | Sewer/Storm Pipe Cleaning   | 12" - 24"     | 60 to 80        | 1,800 - 2,500                | 16 lbs.               | 1                              | 3                             | 1"  |
|   | Floor Cleaner                   | Sewer/Storm Pipe Cleaning   | 10" - 48"     | 60 to 120       | 1,800 - 3,000                | 50 lbs.               |                                | 8                             | 3/4" - 1 1/4"                                 |
|   | Floor Cleaner                   | Sewer Pipe Cleaning   | 6" - 12"      | 16 to 25        | 2,500 - 5,000                | 8 lbs.                |                                | 10                            | 1/2"  |
|   | Traction                        | Sewer Cleaning  | 4" - 12"      | 16 to 25        | 3,000 - 5,000                | 1 lb.                 | 1                              | 12                            | 1/2"  |
| Bomb  | Sewer Cleaning                  | 4" - 12"  | 16 to 25      | 3,000 - 5,000   | 2 lbs.                       | 1                     | 14                             | 1/2"                          |   |
| <p><b>Envirosight</b><br/>111 Canfield Ave., Unit B3<br/>Randolph, NJ 07869<br/>866-936-8476<br/>973-252-6700<br/>(f) 973-252-1176<br/>www.envirosight.com<br/>office@envirosight.com<br/><b>See ad page 2</b></p>  | Jetscan                         | Video   | 6" - 24"      | 40 to 80        | 1,500 - 2,500                | 16.3 lbs.             |                                | 6                             | 1" NPTF                                       |
| <p><b>enz usa inc.</b><br/><b>Enz USA Inc.</b><br/>1585 Beverly Ct., Unit 115,<br/>Aurora, IL 60502<br/>877-369-8721<br/>630-692-7880<br/>(f) 630-692-7885<br/>www.enzusainc.com<br/>sales@enzusainc.com<br/><b>See ad page 39</b></p>  | Bulldog Antiblast               | Anti-Toilet Blowing in Residential                                  | 8" - 24"      | 55 to 80        | 1,500 - 1,800                | 17 lbs.               | 6                              |                               | 1" - 1 1/4"                                   |
|   | Bulldog                         | Cleaning grease, roots, deposits, etc.                              | 8" - 24"      | 50 to 120       | 2,000 - 2,900                | 17 lbs.               | 7                              | 6                             | 1" - 1 1/4"                                   |
|   | 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"                                     |
|   | Grenade                         | Flushing heavy debris   | 6" - 12"      | 40 to 80        | 2,000 - 3,600                | 11 lbs.               |                                | 10                            | 1"  |
|   | Chisel 60.100L                  | Penetrating clogs, root masses, frozen pipes                        | 6" - 16"      | 50 to 80        | 2,000 - 3,600                | 6 lbs.                | 4                              | 6                             | 1"  |
|   | 10.125TR Chain Scraper          | Root removal, hard grease, hard deposits                            | 5" - 12"      | 14 to 80        | 2,000 - 3,600                | 6 lbs.                |                                | 6                             | 1"  |
|   | 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"  |
|   | 10.400R Rotating Chain Scraper  | Removal of root masses, clogs, hard deposits                        | 16" - 32"     | 80 to 120       | 2,000 - 3,600                | 105 lbs.              |                                | 6                             | 1"  |
|   | 14.300 Milling Cutter           | Removal of concrete & mineral deposits                              | 12"           | 80 to 120       | 2,000 - 2,200                | 178 lbs.              |                                | 6                             | 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"                            |   |
| <p><b>General PIPE CLEANERS</b><br/><b>General Pipe Cleaners</b><br/>1101 Thompson Ave.,<br/>McKees Rocks, PA 15136<br/>800-245-6200<br/>412-771-6300<br/>www.drainbrain.com<br/>info@drainbrain.com</p>  | Chisel Point Nozzle             | Penetrating, breaking up debris                                     | 4" - 10"      | 12              | 2,500                        | 4 oz.                 | 4                              | 6                             | 1/2"  |
|   | Traction Nozzle                 | Sand and mud removal  | 4" - 10"      | 12              | 2,500                        | 8 oz.                 | 1                              | 6                             | 1/2"  |
|   | Cleaning Nozzle                 | Maintenance Cleaning  | 4" - 10"      | 12              | 2,500                        | 12 oz.                |                                | 8                             | 1/2"  |
|   | 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"                            |
|   | Downhead Nozzle                 | Dropping down T's   | 2" - 4"       | 1.5 to 4        | 1,500 - 3,000                | 2 oz.                 |                                | 3                             | 1/8"  |
|   | Chain Saw Nozzle                | Cutting roots   | 4" - 10"      | 4 to 12         | 2,500 - 3,000                | 2 lbs.                |                                | 2 to 4                        | 3/8" - 1/2"                                   |
|   | 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"                     |




# NOZZLE COMPANY DIRECTORY 2015

# MANUFACTURERS

| MANUFACTURER  | NAME OF NOZZLE   | APPLICATION   | PIPE DIAMETER | FLOW RATE (GPM) | MAX OPERATING PRESSURE (PSI) | WEIGHT            | NUMBER OF AVAILABLE FRONT JETS | NUMBER OF AVAILABLE REAR JETS | HOSE SIZE / CONNECTING THREAD             |
|---|--|---|---------------|-----------------|------------------------------|-------------------|--------------------------------|-------------------------------|---|
|  <p><b>Jetstream of Houston</b><br/>5905 Thomas Rd.,<br/>Houston, TX 77041<br/>800-231-8192<br/>832-590-1300 (f)<br/>832-590-1304<br/>www.waterblast.com<br/>sales@waterblast.com</p>   | 15K Orbi-Jet   | Surface Cleaning  | N/A           | 25              | 15,000                       | N/A               | 4                              |                               | 1/2" NPT Female                           |
|   | 15K Straight Tip   | Surface Cleaning  | N/A           | 51.7            | 15,000                       | N/A               | 1                              |                               | 1/4" NPT Male                             |
|   | 15K Fan Tip  | Surface Cleaning  | N/A           | 51.7            | 15,000                       | N/A               | 1                              |                               | 1/4" NPT Male                             |
|   | 15K Rotomag  | Pipe Cleaning   | >3"           | 50              | 15,000                       | N/A               | 2                              | 2                             | 3/4" NPT Male                             |
|   | 15K Tube Spinner w/Nozzle                                | Tube Cleaning   | >5"           | 50              | 15,000                       | N/A               | Various                        | Various                       | Various                                   |
|   | 15K Compact Nozzle                                       | Tube Cleaning   | >5"           | 36.2            | 15,000                       | N/A               | Various                        | Various                       | Various                                   |
|   | 15K Evaporator Nozzle                                    | Tube Cleaning   | >5"           | 36.2            | 15,000                       | N/A               | Various                        | Various                       | Various                                   |
|   | 15K Abrasive Nozzle                                      | Surface Cleaning  | N/A           | 8               | 15,000                       | N/A               | Various                        | Various                       | 3/8" NPT Female                           |
|   | 20K Orbi-Jet   | Surface Cleaning  | N/A           | 7.5             | 20,000                       | N/A               | 4                              |                               | 9/16" MP Female                           |
|   | 20K Straight Tip   | Surface Cleaning  | N/A           | 20.7            | 20,000                       | N/A               | 1                              |                               | Gun Nozzle Holder                         |
|   | 20K Fan Tip  | Surface Cleaning  | N/A           | 20.7            | 20,000                       | N/A               | 1                              |                               | Gun Nozzle Holder                         |
|   | 20K Rotomag  | Pipe Cleaning   | >3"           | 55.3            | 20,000                       | N/A               | 2                              | 2                             | 3/4" MP Female                            |
|   | 20K Pineapple  | Pipe Cleaning   | >3"           | 7.6             | 20,000                       | N/A               | 4                              | 6                             | 3/4" MP Female                            |
|   | 20K Tube Spinner w/Nozzle                                | Tube Cleaning   | >5"           | 14.6            | 20,000                       | N/A               | 2                              | 2                             | Various                                   |
|   | 20K Compact Nozzle                                       | Tube Cleaning   | >5"           | 41.8            | 20,000                       | N/A               | Various                        | Various                       | Various                                   |
|   | 20K Evaporator Nozzle                                    | Tube Cleaning   | >5"           | 41.8            | 20,000                       | N/A               | Various                        | Various                       | Various                                   |
| 20K Abrasive Nozzle   | Surface Cleaning   | N/A   | 4.8           | 20,000          | N/A                          | Various           | Various                        | 9/16" MP Female               |   |
| 40K Tornado Nozzle  | Surface Cleaning   | N/A   | 8.2           | 40,000          | N/A                          | 3 to 4            |                                | 9/16" Button Seal             |   |
| 40K UHPE Nozzles  | Tube Cleaning  | >5"   | 7.8           | 40,000          | N/A                          | Various           | Various                        | Various                       |   |
|  <p><b>NozzTek Inc.</b><br/>1949 Calumet St.<br/>Clearwater, FL 33765<br/>866-620-5915<br/>603-413-6583<br/>(f) 603-413-6744<br/>www.nozztek.com<br/>info@nozztek.com<br/><b>See ad page 49</b></p>                                   | BL Swiper™ (Med)   | Reduce blown toilets and safe in lined pipes  | 8" - 18"      | 15 to 250       | 400 - 4,000                  | 3 lbs.            |                                | 4                             | 1/2" - 3/4" - 1" - 1 1/4"                 |
|   | HAMMERHEAD™  | High performance sewer cleaning or storm water cleaning                             | 6" - 12"      | 5 to 80         | 400 - 4,000                  | 4 lbs.            |                                | 4                             | 1/2" - 3/4" - 1"                          |
|   | Multi-Global Nozzle™                                     | Sewer and pipe cleaning for penetration   | 2" and Up     | 4 to 170        | 400 - 4,000                  | 2 lbs.            | 4                              | 6                             | 1/2" - 3/4" - 1" - 1 1/4"                 |
|   | JAWS®  | High performance sewer and pipe cleaning heavy debris                               | 6" - 30"      | 30 to 265       | 400 - 4,000                  | 7 lbs.            |                                | 5                             | 1/2" - 3/4" - 1" - 1 1/4"                 |
|   | IceBear Penetrating Nozzle™                              | Sewer and pipe cleaning penetrating nozzle  | 1" and Up     | 4 to 170        | 400 - 4,000                  | 1 - 3 lbs.        | 3                              |                               | 1/4" - 1/2" - 3/4" - 1" - 1 1/4" - 1 1/2" |
|   | C-RAY 200™   | Bottom cleaning for sewer and pipe  | 12" - 36"     | 30 to 265       | 400 - 4,000                  | 22 lbs.           | 1                              | 6                             | 1/2"                                      |
|   | C-RAY 400™   | Bottom cleaning for sewer and pipe  | 15" and Up    | 40 to 350       | 400 - 4,000                  | 42 lbs.           | 1                              | 8                             | 3/4" - 1" - 1 1/4" - 1 1/2"               |
|   | BL Swiper™ (large)                                       | Ventura effect type nozzle to clean with water in the line and sucks the water down | 15" and Up    | 40 to 265       | 400 - 4,000                  | 13 lbs.           |                                | 39                            |   |
|   | Spinner Nozzles (No rebuilds)                            | Grease and other obstructions   | 4" and Up     | 14 to 350       | 400 - 4,000                  | 3 - 15 lbs.       | 2                              |                               | 1/2" - 3/4" - 1" - 1 1/4" - 1 1/2"        |
|   | Goblin Grease Eater™                                     | Grease nozzle sewer lines or storm lines  | 6" and Up     | 40 to 350       | 400 - 4,000                  | 12 lbs.           | 1                              | 10                            | 3/4" - 1" - 1 1/4" - 1 1/2"               |
|   | NATAB  | Penetration with sewer and pipe cleaning  | 4" - 12"      | 5 to 50         | 400 - 4,000                  | 3 lbs.            | 1                              | 4                             | 1/2" - 3/4"                               |
|   | BL Swiper™ (Small)                                       | Helps reduce blown toilets with 1/2" and 3/4" units                                 | 4" - 12"      | 10 to 80        | 400 - 4,000                  | 2 lbs.            |                                | 4                             | 1/2" - 3/4"                               |
|   | MONRO-JET®   | Hydro-Excavation  | 2" - 8"       | 3 to 20         | 2,000 - 36,000               | 2 lbs.            | 1                              |                               | 1/2"                                      |
|   | ORCA™  | Two truck operation at either end of the pipe                                       | 15" - 60"     | 40 to 350       | 400 - 4,000                  | 15 lbs.           |                                | 8                             | 3/4" - 1" - 1 1/4" - 1 1/2"               |
| Missile Nozzle  | Heavy duty cleaning with optional front jet              | 6" - 36"  | 40 to 265     | 400 - 4,000     | 10 lbs.                      | 4                 | 6                              | 3/4" - 1" - 1 1/4" - 1 1/2"   |   |
| Golden Nozzle   | Recycled water use with our same tube system technology  | 6" - 36"  | 40 to 265     | 400 - 4,000     | 6 lbs.                       | 1                 | 6                              | 3/4" - 1" - 1 1/4" - 1 1/2"   |   |
| C-RAY 800™  | Dual truck operation for double the flow for large pipes | 36" - 96"   | 120 to 350    | 400 - 4,000     | 50 lbs.                      |                   | 8                              | 3/4" - 1" - 1 1/4" - 1 1/2"   |   |
|  <p><b>USB - SEC Equipment Corporation</b><br/>1700 Enterprise Way,<br/>Ste. 116,<br/>Marietta, GA 30067<br/>866-408-2814<br/>770-984-8880<br/>(f) 770-984-2802<br/>www.usbsec.com<br/>dlong@usbsec.com<br/><b>See ad page 53</b></p> | Flying Nozzle - 3D                                       | Hilly difficult terrain, silt, sand & large debris removal                          | 4" - 24"      | 13 to 120       | 2,000 - 4,000                | 1/2/5/12 lbs.     |                                | 6/8                           | 1/2" - 3/4" - 1" - 1 1/4"                 |
|   | Cleaning Nozzle - 3D                                     | General Cleaning of Sand, Silt, Mud & Grease  | 4" - 15"      | 13 to 80        | 2,000 - 4,000                | 1/2/5/7.5 lbs.    | 1                              | 7/9/9/11                      | 1/2" - 3/4" - 1"                          |
|   | Pipe Wolf  | Total obstructions & Blockages caused by Roots, Grease & Organic Solid Material     | 4" - 24"      | 15 to 120       | 2,000 - 4,000                | 2.2/5.8/12.8 lbs. | 3                              | 6                             | 1/2" - 3/4" - 1" - 1 1/4"                 |
|   | Primus Nozzle  | Grease, Scale, Crusts & Roots   | 4" - 24"      | 15 to 120       | 2,000 - 4,000                | 2.5/7.8/19.4 lbs. | 5/6                            | 3/4/06                        | 1/2" - 3/4" - 1" - 1 1/4"                 |
|   | Superior Penetrator Nozzle - 3D                          | Pipe lines w/off-sets, drop joints, voids, etc.                                     | 6" - 15"      | 30 to 120       | 2,000 - 3,000                | 9.8 lbs.          | 1                              | 8                             | 3/4" - 1" - 1 1/4"                        |
|   | Dredger Nozzle   | Removal of heavy solids, silt, sand & sludge at the bottom of pipe                  | 8" - 96"      | 40 to 120       | 2,000 - 3,000                | 22/40/56/59 lbs.  |                                | 6/8/10/14                     | 3/4" - 1" - 1 1/4"                        |
|   | Antiblaster Nozzle - 3D                                  | Shallow sewer lines, Sewer lines close to homes                                     | 6" - 12"      | 30 to 80        | 2,000 - 3,000                | 4 lbs.            | 1                              | 8                             | 3/4" - 1"                                 |
|   | Ultimate Chisel Nozzle                                   | Total obstructions, blockages & pipe deformations                                   | 6" - 24"      | 50 to 120       | 2,000 - 3,000                | 5.2 lbs.          | 4                              | 6                             | 1/2" - 3/4" - 1" - 1 1/4"                 |
|   | Grand Slam - 3D  | General Sewer Cleaning  | 6" - 15"      | 50 to 120       | 2,000 - 3,000                | 12 lbs.           |                                | 8                             | 3/4" - 1" - 1 1/4"                        |
| Super Slam - 3D   | General Cleaning in large sewer/storm lines              | 10" - 40"   | 50 to 120     | 2,000 - 3,000   | 15 lbs.                      |                   | 12                             | 3/4" - 1" - 1 1/4"            |   |

# NOZZLE COMPANY DIRECTORY 2015

# MANUFACTURERS

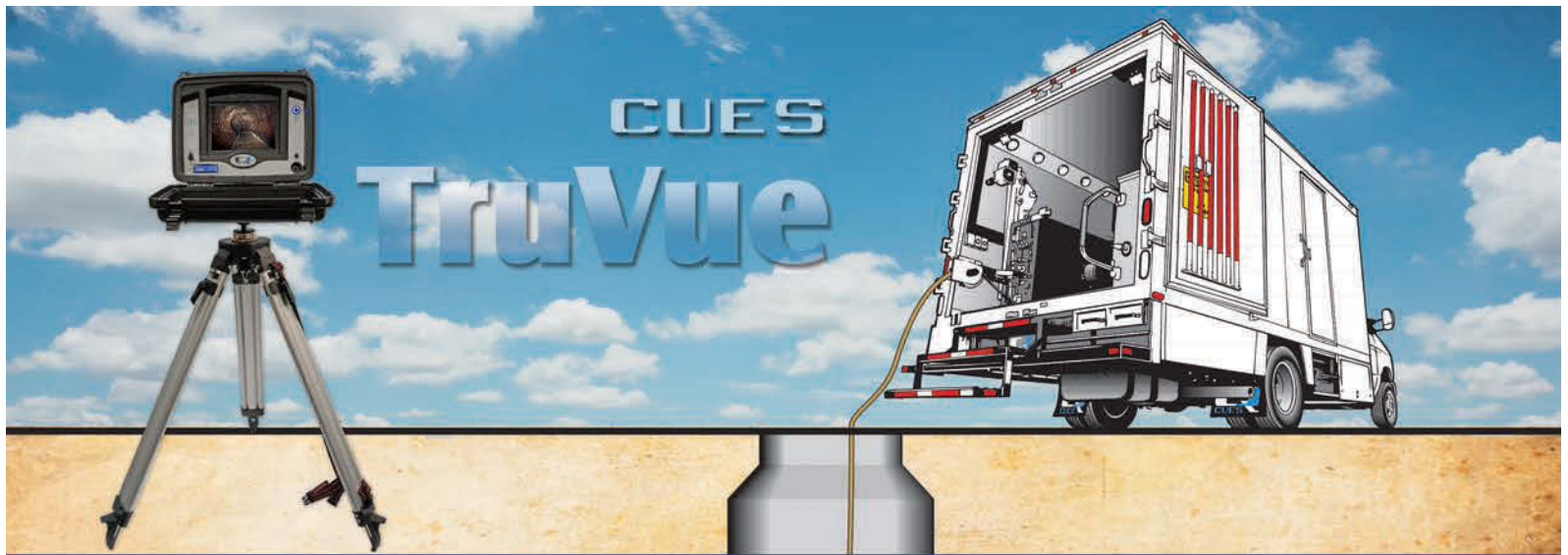
| MANUFACTURER  | NAME OF NOZZLE             | APPLICATION  | PIPE DIAMETER | FLOW RATE (GPM) | MAX OPERATING PRESSURE (PSI) | WEIGHT              | NUMBER OF AVAILABLE FRONT JETS | NUMBER OF AVAILABLE REAR JETS | HOSE SIZE / CONNECTING THREAD |
|---|----------------------------|--|---------------|-----------------|------------------------------|---------------------|--------------------------------|-------------------------------|-------------------------------|
| <br><b>VARCO</b><br>LANDSCAPER CONTRACTOR HOSE ACCESSORIES<br>7489 Mason King Ct.,<br>Manassas, VA 20109<br>866-872-1224<br>703-334-5980<br>(f) 703-334-5979<br>www.varcopumper.com<br>ron@varcopumper.com<br>See ad page 41 | Super Sewer Squad Kit      | Penetration, Flushing, Deicing, Degreaser, Polishing | 1" - 24"      | 17 to 80        | 1,200 - 10,000               | varies per NPT size | Customer Spec                  | Customer Spec                 | 1/8" - 1"                     |
|   | Elite 6 Pack Nozzle Kit    | Penetration, Flushing, Deicing, Degreaser, Polishing | 1" - 24"      | 17 to 80        | 1,200 - 10,000               | varies per NPT size | Customer Spec                  | Customer Spec                 | 1/8" - 1"                     |
|   | Evaporator (EV)            | Deicer, degreaser                                    | 1" - 24"      | 17 to 80        | 1,200 - 10,000               | varies per NPT size | Customer Spec                  | Customer Spec                 | 1/8" - 1"                     |
|   | Impactor (LT)              | Heavily fouled pipes                                 | 1" - 24"      | 17 to 80        | 1,200 - 10,000               | varies per NPT size | Customer Spec                  | Customer Spec                 | 1/8" - 3/4"                   |
|   | PX Revolver                | Full 360° rotation for cleaning & polishing          | 1" - 24"      | 17 to 80        | 1,200 - 10,000               | varies per NPT size | Optional                       | Customer Spec                 | 1/8" - 3/4"                   |
|   | Round Nose (Button)        | General Cleaning/Cornering                           | 1" - 24"      | 17 to 80        | 1,200 - 10,000               | varies per NPT size | Customer Spec                  | Customer Spec                 | 1/16" - 1"                    |
|   | Round Nose Hex             | Penetration or Flushing                              | 1" - 24"      | 17 to 80        | 1,200 - 10,000               | varies per NPT size | Customer Spec                  | Customer Spec                 | 1/8" - 1"                     |
|   | B Style                    | Penetration or Deicing, Degreaser                    | 1" - 24"      | 17 to 80        | 1,200 - 10,000               | varies per NPT size | Customer Spec                  | Customer Spec                 | 1/8" - 3/4"                   |
| <b>Water Cannon Inc.</b><br>4300 W Lake Mary Blvd.,<br>Units 104-424,<br>Lake Mary, FL 32746<br>800-333-9274<br>(f) 888-928-9274<br>www.watercannon.com<br>sales@watercannon.com<br>See ad page 9   | AquaNoz De-Icer/De-Greaser | Degreasing drainlines or deicing waterlines          | 1 1/4" - 12"  | 2 to 20         | 1,000 - 7,000                | .25 lbs.            | 3                              | 6                             | 1/4" - 3/8" - 1/2" FPT        |
|   | Ruat Chisel Point Nozzle   | Front Impact - Difficult cleaning applications       | 1 1/4" - 12"  | 8 to 30         | 2,000 - 6,000                |                     | 4                              | 4                             | 1/4" - 1/2" - 3/4" - 1" FPT   |



# NOZZLE COMPANY DIRECTORY 2015

# DEALERS/DISTRIBUTORS

| DEALER/DISTRIBUTOR  | NOZZLE LINES  |
|---|---|
| <br><b>Jetstream of Houston</b><br>5905 Thomas Rd., Houston, TX 77041<br>800-231-8192 • 832-590-1300<br>(f) 832-590-1304<br>www.waterblast.com • sales@waterblast.com        | StoneAge  |
| <b>MTech</b><br>7401 First Pl., Cleveland, OH 44146<br>800-362-0240/440-646-0996<br>(f) 440-646-9953<br>www.mtechcompany.com • sales@mtechcompany.com   | Warthog, Phantom Grenade, Advanced Workhorse, StoneAge, UEMSI, Spider Root Cutter                       |
| <br><b>Water Cannon Inc.</b><br>4300 W Lake Mary Blvd., Units 104-424, Lake Mary, FL 32746<br>800-333-9274 • (f) 888-928-9274<br>www.watercannon.com • sales@watercannon.com | AquaNoz, Arizino, Avain, Canin, Carnia and Friuli, Fara, Isonzo, Natisone, Paive, Raut, Suttner, Tremol |



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- Supplied with mounting tripod and battery charger



## FOREMOST TAKING ON US MARKET

Partnership enables Canadian cold-weather hydroexcavator manufacturer to gain a foothold in the states

By Craig Mandli



Tim Dell, left, vacuum systems sales manager for Foremost, points out the heated and insulated doghouse and heated valves on the 1600 Hydrovac. The unit is designed to operate effectively in temperatures as low as -40 degrees. (Photo by Craig Mandli)

Foremost has long been known in Canada for durable, cold-weather-ready hydroexcavation systems. Now, thanks to a partnership with Colorado-based heavy truck distributor Transwest, the units are easier to find in the U.S.

The Foremost 1600 Hydrovac, with its distinctive doghouse, drew plenty of onlookers at the 2015 Water & Wastewater Equipment, Treatment & Transport (WWETT) Show.

“The 1600 is designed to work effectively in temperatures down to -40 degrees,” says Tim Dell, vacuum systems sales manager for Foremost. “Not only is the doghouse insulated and heated, all external valves are, too. The heating options are a must in most Canadian climates, and we think this unit is going to be a good fit for the northern states in the U.S. as well.”

The 1600 allows for water capacities of 1,600 gallons and a 13-yard debris body. Vacuum power is sup-

plied by the Robuschi RBDV125 blower. The Cat 3560 wash pump and 740,000 Btu boiler are also used on this model. The boom is rear-mounted, 8 inches in diameter, fully rotational and controlled by an Omnex wireless controller, which

also controls the vehicle rpm, wash and vacuum functions. All off-loading functions can also be performed via remote.

“The remote functionality enables one person to operate this unit if needed,” Dell says. “That saves on manpower costs, making the unit more appealing to municipalities and private contractors.”

Off-loading is performed via a sloped debris floor design and wash-out system. The dump door is 48 by 58 inches, providing easy access for

tank cleaning. Optional 4-inch Hydratech off-loading pump systems are available, which allow for pumping off in a contained manner when discharging liquid loads.

Dell recommends the 1600 for municipal and industrial settings.

**“Partnering with a company like Transwest that understands the U.S. market is big for us.”**

– Tim Dell

While its smaller van body sacrifices some heated storage, its smaller footprint means a more maneuverable, versatile unit.

“It’s definitely going to appeal to the subcontractor who performs municipal work every day,” Dell says. “It is designed as a workhorse, and can fit the industrial oil and gas and utility markets as well.”

Foremost’s partnership with Transwest allows the heavy truck distributor to leverage its marketing and sales expertise to sell Foremost

hydrovacs to U.S. customers. According to Dell, the 1600 is the focus of the initial marketing campaign, with more to come in the future.

“Partnering with a company like Transwest that understands the U.S. market is big for us,” he says. “Canada has a more mature hydroexcavation market than what you see in the states. We are already seeing increased interest, and that’s causing us to take a look at what we’re offering in the U.S.”

Next year, Dell says he hopes to bring several of Foremost’s hydrovac options to the WWETT Show, including a model with fewer heating options designed for the southern states, and a miniature “urban” model offering even more maneuverability.

“Judging by the response I’ve seen at the 2015 show, we’re definitely coming back bigger and better,” Dell says. “Hydroexcavation is really starting to take off in the U.S., and we’re going to be involved.” 855/742-9990; [www.foremost.ca/vactrucks/](http://www.foremost.ca/vactrucks/). ♦



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# WELCOMED DELAYS

Effective conservation work lessens the immediate need for a new supply line in the Tarrant Regional Water District

By Erik Gunn

The Tarrant Regional Water District is building a massive new 150-mile-long water supply pipeline in north Texas that will double the district's transmission capacity, but delays have already pushed the project's targeted completion date back 12 years.

The \$2.3 billion project was originally slated for completion by 2018, but the target date keeps receding. Now it's about 2030, and it could wind up taking longer. That's no reason to complain, however; it's actually an accomplishment.

That's because construction hang-ups haven't delayed the project. Instead, conservation has, says David Marshall, director of Engineering and Operations Coordination for the water district. And regionwide teamwork involving the water district and municipalities in the greater Dallas-Fort Worth metro area — where most of the people served by TRWD live and work — has made that conservation ethic far more effective than it might have been otherwise.

Along the way, the water district has been undergoing steady infrastructure improvement and now has begun to develop a systematic asset management program so that it can move beyond reactive maintenance, says Marshall.

The water district serves an 11-county slice of north Texas centered on the Fort Worth-Arlington area. Established as Tarrant County Water Improvement District No. 1 by the state Legislature in 1924, the water district was

**“Our demand reductions have just been far greater than I anticipated. We’re estimating our demand is down at least 30 percent based on the conservation program.”**

— David Marshall

Initially the district took raw water from two reservoirs upstream on the West Fork River. In the decades since, the region has grown and the water district with it. The Dallas-Fort Worth metro area “has grown dramatically,” Marshall says — on the order of 1.5 to 2 percent a year over the last 40 years.

While flood control remains a significant responsibility for the district, supplying water has become the largest component of its mission: “Our water supplier enterprise fund is four times the budget of our flood control operation,” notes Marshall.

About 1.9 million people rely on TRWD water to drink, bathe, water their gardens and more, but the district's direct customers are more than

Tarrant Regional Water District crew members work inside a new section of 108-inch-diameter pipe being installed to augment the district's water supply. PHOTOS CONTRIBUTED BY TARRANT REGIONAL WATER DISTRICT



(continued)

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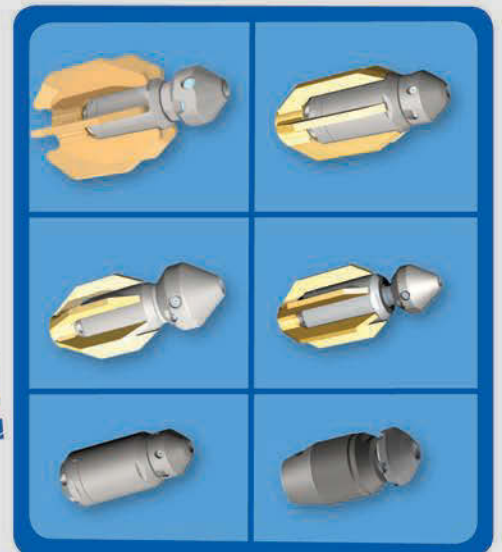
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**Clockwise: A crew from the Tarrant Regional Water District works inside a shoring box on a section of the 150-mile-long water supply pipeline currently under construction; crews use large excavators to lower a section of the new water supply pipeline into the trench; crews move a section of the new line into place for connection.**

30 municipalities and similar entities. The lion's share of its water — 92 percent — is used in Tarrant County, with about two-thirds of that going to Fort Worth.

Over the years, the district has tapped into several new reservoirs; today, its first two, Eagle Mountain Lake and Bridgeport Lake, supply only about 15 percent of the water the district transmits, Marshall says.

### Wet and dry

Disastrous flooding in the 1920s helped spark creation of the water district, and flood prevention remains an important part of its job. But in recent decades it's faced challenges from the opposite side of the coin: drought.

Severe drought conditions have

made keeping the TRWD's reservoir water supplies reliably available a continuing critical task. And because it depends so heavily on those reservoirs, the district has been required to make sure it can rely on the transmission infrastructure, too.

Of the existing 180 miles of pipeline, about 150 miles are constructed with prestressed cast concrete pipe. Back in the late 1980s and early '90s, the district, like many other water utilities, encountered problems with prestressed concrete breaking down too soon.

A users group of water utilities convened with the industry's manufacturers and over time got to the bottom of the problem: Transient water hammer pressure would crack the pipeline's outer mortar coating, exposing reinforcing wire in the pipe's structure. The wire tended to go brittle with exposure to certain naturally occurring chemicals.

TRWD was especially vulnerable to the corrosion that was responsi-

ble. "Texas soils are very aggressive," Marshall says.

### Systematic replacement

Since coming to understand that problem in detail, TRWD has been systematically replacing problem segments of pipe in its system with newer varieties of the prestressed cast concrete redesigned to reduce or eliminate the sources of decay.

"We replace anywhere from 10 to 15 segments of pipe a year," Marshall says, noting they did much more in the earlier years after the concrete pipe specs were rewritten. These days the focus is on the pipes that pose the biggest risk over the next five to 10 years.

TRWD maintenance programs focus on additional priorities as well, such as ensuring air vacuum valves are "100 percent reliable," says Marshall. "We also monitor pump efficiencies — once our pumps drop about 5 percent, we rebuild them."

The reason is pretty straight-

forward: Less efficient pumps use more energy — and the energy demand TRWD makes on the grid so it can move water

*(continued)*



## PROFILE: Tarrant (Texas) Regional Water District

**POPULATION SERVED:**  
About 1.7 million

**SERVICE AREA:**  
11 counties of north Texas: all of Ellis, Navarro, Tarrant and Wise counties; portions of Jack, Denton, Parker, Johnson, Kaufman, Henderson and Freestone counties.

**WATER VOLUME:**  
323 mgd supplied to 30 wholesale customers (primarily municipalities)

**INFRASTRUCTURE:**  
More than 150 miles of water transport lines

**ANNUAL OPERATING BUDGET:**  
\$136,125,418 (2015)

**WEBSITE:**  
[www.trwd.com](http://www.trwd.com)



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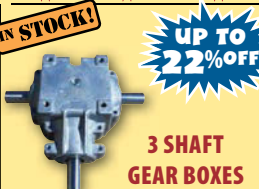
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**Left: When complete, the Tarrant Regional Water District's new water supply line will stretch across 150 miles of Texas countryside and connect the utility to four additional water sources. Above: A Tarrant Regional Water District construction crew member walks through the framework of a section of the new pipeline.**

## TEAMWORK TAKES MANY FORMS

North Texas may be famous for “America’s Team,” but for the Tarrant Regional Water District, teamwork is a lot closer to home than AT&T Stadium.

Partnering with the City of Dallas to build a new 150-mile Integrated Pipeline is only one example of the way the water district’s dedication to teamwork plays out, says David Marshall, director of Engineering and Operations Coordination for the water district.

For example, Marshall sits on a research group working with the Botanic Research Institute of Texas that is examining water use in the DFW metro area over the next half century. The Botanic Institute is also evaluating what kind of native vegetation would be best for the water district to use near flood-prone areas — behind levees, for instance — so that it would be easier to maintain as an urban ecosystem.

Water conservation itself has been a focus of the district’s cooperation with the municipalities it serves and those nearby.

First came a ban on lawn watering from 10 a.m. to 6 p.m. in most of the region; those are the hours when the water’s impact on the soil is least effective because the heat typically evaporates it too quickly to be able to sink into the earth.

Now Dallas has begun limiting lawn watering to twice a week. “Fort Worth has done that as well, and we’d like our other customers to make that mandatory year-round,” Marshall says.

To help sell property owners on the new rule, Dallas and TRWD teamed up on a public education campaign nicknamed “The Lawn Whisperer.” With public service ads and a social media presence on Facebook, the campaign has been effective, Marshall says.

“It really got people in tune with what they needed to do with their yards,” he says. “We’ve been able to reduce outdoor watering.”

through the DFW metro area puts it among the top 1,000 energy users in the Lone Star State. “Last year we spent about \$26 million on energy,” he says.

The district is also beginning to develop a stronger system of asset management that seeks to bring a sharper analysis to estimating when repairs or replacement of infrastructure is called for. That’s still in the early stages, Marshall says.

### **Doubling capacity**

Reliability remains a continuing objective, and that’s why TRWD is now working to nearly double its transmission capacity with new lines and additional water sources.

When complete, the \$2.3 billion Integrated Pipeline project will give the system another 150 miles of transmission line, connecting to Cedar Creek and Richland-Chambers reservoirs as well as Lake Palestine and Lake Benbrook. The additional 350 mgd of water will more than double the water available to the region where the district is located.

The project is being undertaken

as a partnership between TRWD and the City of Dallas, which is outside the water district’s own territory. The line is to include 95 miles of 108-inch-diameter pipe, and 55 miles of 84-inch pipe.

By sharing resources, Marshall says, the two entities estimate they’ve cut about a half billion dollars in capital costs and more than \$1 billion in energy costs over the life of the pipeline.

To date, 15 miles of pipe have been completed so far and the first round of bidding covered 25 miles. One surprise, Marshall says, has been that steel pipe is becoming more competitive, so the initial portions of the line are being built with steel instead of the prestressed concrete that has until now been the old standby for the utility.

The first operational use of the line is expected to begin in 2017 with connection to the Richland-Chambers reservoir.

### **Conserving water**

Even as TRWD and its partner, Dallas, have been planning and



That's been especially important because of the drought the region has endured for several years now.

The district has been working with landscapers, plant suppliers, irrigators and homeowners to encourage a transition away from lush "English manor" style yards to a lawn aesthetic appropriate for the dryer climate of the area. "This is the grand prairie, and our yards should reflect that," Marshall says.

Other measures have helped increase water reuse — essentially, relying on treated wastewater returned to the Trinity River. A wetland 100 miles downstream from the metro area, under the TRWD's oversight, has helped retain the treated effluent for at least seven days before it is discharged into a reservoir, where it remains for at least six months.

"Then it just becomes reservoir water," says Marshall. "Anything left becomes biologically mitigated, so it becomes raw water for our customers."

As a result, at least 15 percent of the district's water supply is from reuse, and in 2014, the actual reused water was closer to 20 percent, he says.

The district has seen its demand curve take a much flatter path than the area's growth — another

sign that its conservation strategies are working. "We're adding over 100 people a day to our system — 40,000 people a year," Marshall says.

For instance, in the last decade, Fort Worth has grown by around 40 percent. In the process, the city developed a denser, more urban feel that has been an asset, with high-rises and condominiums as well as a thriving night life that have made the area more attractive.

"But their water demands have only grown by 6 percent," he says. "Our demand reductions have just been far greater than I anticipated. We're estimating our demand is down at least 30 percent based on the conservation program."

The lower demand has thus slowed down the Integrated Pipeline project so that it keeps pace more closely with the actual increase in demand.

Through it all, the district has sought to keep its eye on the big picture. As examples, he points to projects such as a linear park that makes an amenity out of levee areas in the Fort Worth floodway and another 400-acre park at the district's Eagle Mountain reservoir.

"We're not just bringing water here reliably, but also trying to enhance the quality of life with the projects we do." ♦

beginning construction on the new pipeline, the two entities, along with TRWD's customer municipalities, have been working together to actually reduce the need for the line's added capacity.

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# GET YOUR HANDS DIRTY

NASSCO's Operations and Maintenance Committee provides a new opportunity to get involved

By *Ted DeBoda, P.E.*

**H**ere at NASSCO we have a saying: When you become a member, be prepared to get your hands dirty. The opportunities for you to roll up your sleeves, have a voice and make a difference for the industry are immense.

One of the most important ways members can get involved is through participation in our various committees. This past winter we introduced the Operations and Maintenance Committee to a list of influential committees that already includes Infrastructure Condition Assessment, Industry Standards, Laterals, CIPP, Manhole Rehabilitation, Software Vendors, Asset Management and Pressure Pipe. With an objective to promote safety and knowledge by education of processes, equipment and tools for industry-specific tasks, the first O&M Committee meeting, chaired by Joe Schotthoefer of Doetsch Environmental, was held at NASSCO's 2015 Annual Conference in Savannah, Georgia, this past February.

The high level of interest in this new committee was evidenced by the attendance of 27 industry professionals — including municipalities, engineers, contractors and manufacturers — who came together to lend their expertise and knowledge in educating and promoting safety in the workplace.

O&M Committee members shared their personal reasons for their involvement in the committee, and some of the common responses included:

- Preserving a legacy — currently the older, more experienced operators are passing along their knowledge to younger operators, but a more formal level of training is needed to perpetuate work done right.
- Filling the void for manufacturers who sometimes don't provide the level of training necessary. Operators and owners look to NASSCO for information

on operations and maintenance and we need to help set those standards.

- Providing repeatable training resources to educate new employees and refresh more experienced employees. Verbal instructions aren't enough.
- Providing educational guides for industry personnel to help achieve peak job performance.
- Updating NASSCO's existing Jetter Code of Practice manual and video.
- Developing a specification guideline for cleaning and inspecting large-diameter pipe.
- Protecting operators, minimizing accidents and keeping people safe.
- Extending the learning curve. For example, within two weeks of training, new operators are not likely to encounter everything they learned in a training session. Operators must have a reference document to go to as situations occur.
- Providing a basic explanation of the need for training in simple layman's terms to be shared with city councils, residents, etc.
- Setting standards that are consistent among states and contractors. Educate both owners and operators.

The committee's next steps are to update NASSCO's Jetter Code of Practice, edit/modify the current jetter video with specific training modules, develop a specification guideline for large-diameter pipe cleaning and inspection, and focus on education and safety.

Obviously there is much work to be done. If you are interested in joining NASSCO, want to be involved in one or more of our influential committees, and are ready to get your hands dirty, contact us today at [nassco.org](http://nassco.org) or 410/442-7473. ♦

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Trainer: Brandon Conley

Contact the Camera Department for more information or to register:

248-349-0904 or email [pacp@dohenycompanies.com](mailto:pacp@dohenycompanies.com)

#### May 20-22

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Trainer: John Jones

Contact John Jones for more information or to register: 404-431-5584 or email [plumblineconsultant@gmail.com](mailto:plumblineconsultant@gmail.com)

#### June 8-10

#### Marriottsville, Maryland

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Trainer: Ted DeBoda

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#### June 23

#### Marriottsville, Maryland

PACP User Recertification

Trainer: Ted DeBoda

Contact Dawn Jaworski for more information or to register: 410-442-7473 or email [dawn@nassco.org](mailto:dawn@nassco.org)

#### June 23-25

#### Northville, Michigan

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Trainer: Brandon Conley

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### ITCP TRAINING (CIPP and Manhole)

#### May 7-8

#### Minneapolis, Minnesota

Manhole Rehabilitation

8:00 am – 5:00 pm Day 1 • 8:00 am – 1:00 pm Day 2

Trainer: Tim Back

Contact Tim Back for more information:

513-253-8461 or email [tback@cinci.rr.com](mailto:tback@cinci.rr.com)

#### May 18-19

#### Cleveland, Ohio

Manhole Rehabilitation

8:00 am – 5:00 pm Day 1 • 8:00 am – 1:00 pm Day 2

Trainer: Tim Back

Contact Tim Back for more information:

513-253-8461 or email [tback@cinci.rr.com](mailto:tback@cinci.rr.com)

#### May 28-29

#### Detroit, Michigan

Manhole Rehabilitation

8:00 am – 5:00 pm Day 1 • 8:00 am – 1:00 pm Day 2

Trainer: Tim Back

Contact Tim Back for more information:

513-253-8461 or email [tback@cinci.rr.com](mailto:tback@cinci.rr.com)

#### June 25-26

#### Des Moines, Iowa

Manhole Rehabilitation

8:00 am – 5:00 pm Day 1 • 8:00 am – 1:00 pm Day 2

Trainer: Tim Back

Contact Tim Back for more information:

513-253-8461 or email [tback@cinci.rr.com](mailto:tback@cinci.rr.com)

If you are interested in having a class at your facility or in your area, contact Gerry Muenchmeyer at 252-626-9930 or [gerry@muenchmeyerassoc.com](mailto:gerry@muenchmeyerassoc.com)

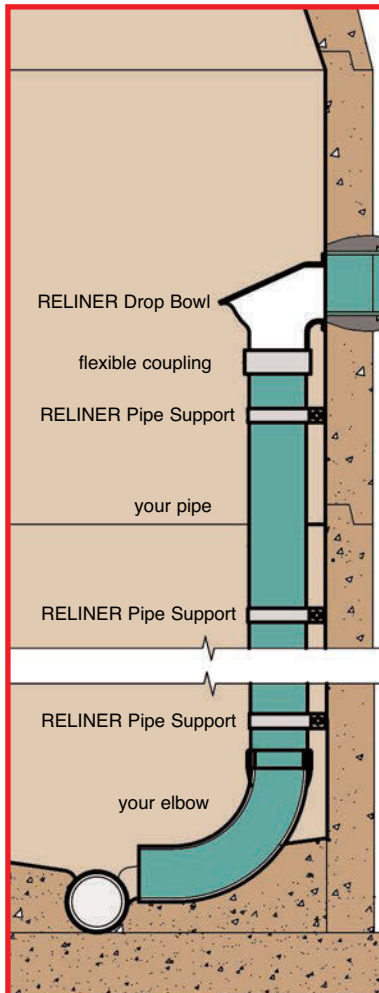
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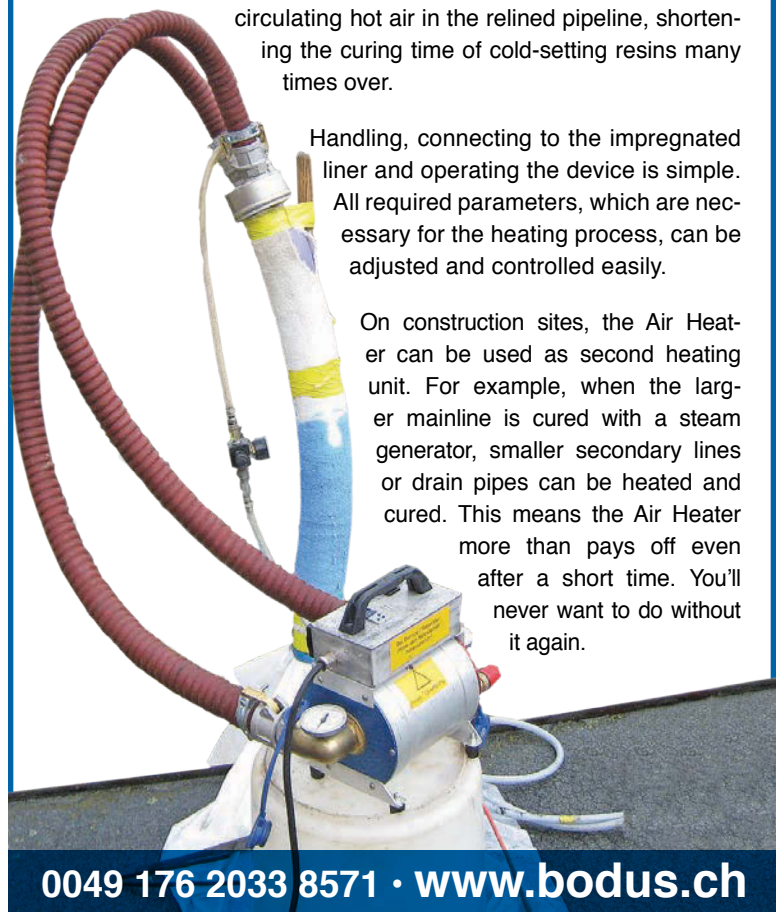
**The Air Heater from bodus is a compact and powerful air-circulating heating unit, designed to accelerate the curing process of inliner in house connections.**

It is ideally used in the renovation of drain pipes or on short sections, when installation of large heating units would be time-consuming or laborious. With its lightweight and compact design, the Air Heater can be installed and used in confined spaces or inaccessible sites. Sewer rehabilitation that meets quality demands is no longer an issue!

The operating principle is similar to a hair dryer, circulating hot air in the relined pipeline, shortening the curing time of cold-setting resins many times over.

Handling, connecting to the impregnated liner and operating the device is simple. All required parameters, which are necessary for the heating process, can be adjusted and controlled easily.

On construction sites, the Air Heater can be used as second heating unit. For example, when the larger mainline is cured with a steam generator, smaller secondary lines or drain pipes can be heated and cured. This means the Air Heater more than pays off even after a short time. You'll never want to do without it again.



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# HYDROEXCAVATION AND INDUSTRIAL JET/VAC SERVICES

By Craig Mandli

The tools for jetting and hydroexcavating, including trucks, trailers and nozzles, not only clear roots and grease blockages, they can also expose utilities, remove paint and other coatings from surfaces, and cut pipe. Here is a look at some of the latest hydroexcavation and jet/vac technology.

## HAZARDOUS TRUCKS/TRAILERS



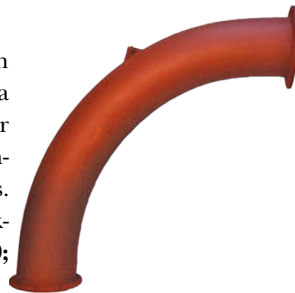
### Benlee Super Mini

At 25 feet 11 inches, the **Super Mini** roll-off trailer from **Benlee** is as short as a straight truck when attached to a tractor, but has a tighter turning radius and can be maneuvered into tighter spots. It weighs 12,400 pounds and can carry up to 50 percent more payload weight by law than a roll-off truck. It can carry 20-, 30-, 40- and 50-yard-tall boxes, and frees up the tractor to be attached to another trailer when not in use. **734/890-6822; www.benlee.com.**

## HYDROEXCAVATION EQUIPMENT AND SUPPLIES

### Custom Boom Elbows

**Custom Boom Elbows** manufactures both 70- and 90-degree boom elbows available for a range of hydroexcavating and municipal sewer work vehicles. Both feature a 25.1-inch circumference and 8-inch diameter with flanged ends. All models are built with a 1/2-inch wall thickness for longevity and endurance. **604/835-0199; www.customboomelbowsbc.com.**



### Easy-Kleen Pressure Systems Wildcat Heaters



High-pressure oil-fired hot water/steam **Wildcat Heaters** and hydraulic pump systems for vacuum trucks and hydroexcavators from **Easy-Kleen Pressure Systems** are available in options such as dry steam, redundancy packages, Schedule 40, 80 and 160 stainless steel or A53 boiler pipe, fine-tuned temperature, and flow control systems. They can be mounted in a cabinet or supplied as a completed cabinet unit that is ready to install. High-pressure hydraulic driven pump systems have a variety of pump options to choose from, including Cat, General, Giant and Hawk. **800/315-5533; www.easycleen.com.**

### Hydra-Flex Ripsaw

The **Ripsaw** rotating hydroexcavation nozzle from **Hydra-Flex** blasts a zero-degree straight water stream at up to 3,200 psi, while rotating at a high speed to provide an 18-degree cone of coverage. Its optimized stream qual-



ity results in greater impingement, allowing the operator to use a smaller nozzle size while getting the same impact as nozzles with higher flow rates. These heavy-duty, high-impact nozzles are constructed with stainless steel housings and tungsten carbide wear surfaces. Nonconductive urethane coating on the nozzle body protects the user and sensitive underground assets. Repair kits are available. **952/808-3640; www.hydrflexinc.com.**

### NozzTeq MONRO-JET

**MONRO-JET** nozzles, distributed by **NozzTeq**, combine the power of a solid stream pencil jet with the large coverage of a fan jet. Their circular water jet motion generates high power at modest gpm rates, allowing operators to move faster whether hydroexcavating, surface cleaning or cleaning sewer lines. They can be used to surface clean concrete, steel, castings and large surface areas including line removal from runways. They can be modified for internal pipe cleaning of sewers and pipes of all types. The orbital design offers pressures as high as 36,250 psi. **866/620-5915; www.nozzteq.com.**



### Soil Surgeon

The **Soil Surgeon** hydroexcavating tool fits any sewer combination truck equipped with a telescopic 6- or 8-inch boom. The tool has a 1-inch water connection. The operator controls water pressure and power with 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.soilurgeoninc.com.**

### StoneAge Hydro-X Lance Assembly

The **Hydro-X Lance Assembly** from **StoneAge** is a hydroexcavation jetting tool that can be used to locate utilities and precisely excavate an area with high-pressure water. Jetted with a single replaceable OC1H 1/4 NPT carbide nozzle, this 60-inch lance with a 1/2 NPT male connection gives extra reach for digging deep, focused holes. The assembly includes a guard and collar system to protect the nozzle. **866/795-1586; www.stoneagetools.com.**





### US Jetting safety clothing

Safety clothing from **US Jetting** includes gloves that can withstand a blast up to 7,500 psi rotary jet or 3,000 psi single jet. Work aprons, trousers, jackets and coveralls are also available to help keep operators safe, all of which can withstand a 7,500 psi rotary liquid blast or 3,000 psi single jet. Eye protection,

hard hats, face shields and other safety equipment are also available. Protection vests come with fluorescent safety markings built in for high visibility. **800/538-8464; www.usjetting.com.**

### USB – Sewer Equipment Corporation Hydro-Excavation Nozzle

The oscillating **Hydro-Excavation Nozzle** from **USB – Sewer Equipment Corporation** uses pressurized water to excavate soil. The oscillation is caused by high-performance ceramic balls, and the internal parts are protected by a high-density plastic cover. **866/408-2814; www.usbsec.com.**



## JET/VAC COMBINATION TRUCKS/TRAILERS



### Camex Hydrovac

**Hydrovacs** from **Camex** are ideal for daylighting, trenching, pole and pylon holes, and service repair pits. Because the Hibon pump is reversible, they can be used for water and debris removal and tank clean-out. Remote control on the 6- or 8-inch-diameter booms

provides one-man manipulation and operation. The boom has a 30-foot reach. The unit can dig effectively in all soil types, including clay, and with the aid of an onboard boiler, it provides a safe means of digging in frozen ground, enabling work to be done in areas of limited access and extreme conditions. **780/955-2770; www.camex.com.**

### Ditch Witch FXT50

The **FXT50** truck vacuum excavator from **Ditch Witch** mounts directly to a truck's frame rails, allowing the system to flex independently of the truck, promising stability and confidence. Dealers can mount the unit to the single-axle truck of customers' choosing and can customize the truck with toolboxes and other support equipment, such as a 1,020 cfm blower and 3,000 psi water system flowing 5 gpm. It is quiet and offers ideal filtration. **800/654-6481; www.ditchwitch.com.**



### GapVax MC Advanced Series

The **MC Advanced Series** combination jet/vac from **GapVax** includes a monitoring system allowing the operator to observe and troubleshoot the entire system. Two display screens control most functions, while providing man-

ual control should something go wrong electrically. All body, boom and hose reel functions, vacuum break, throttle and lighting are wirelessly controlled, still maintaining proportional boom and hose reel control. Specs include 3/16-inch ASTM A572 Grade 50 Exten steel, 5- to 12-cubic-yard debris body and stainless steel water tank with capacity up to 2,000 gallons. Vacuum pump options range from 3,500 to 5,000 cfm, with up to 27 inches Hg. The boom is an 8-foot, front-mounted telescopic design with dual lift cylinders, reaching 26 feet with a 270-degree rotation. **888/442-7829; www.gapvax.com.**



### Foremost Hydrovac 2000

The **Hydrovac 2000** from **Foremost**, mounted on a tridem or quad-axle chassis, has a 2,000-gallon water tank, a 13-yard debris body, and a 70-inch aluminum, heated, lit and insulated van body that provides ample storage room, a shelving unit and microwave on the driver's side. It is available with either a Robuschi RB-DV125 or RB-DV145 blower. The water system is composed of a CAT 3560 wash pump, 740,000 Btu boiler and full winterization package. The 26-foot rear-mounted extendable boom is controlled with a wireless Omnex controller, allowing for control of the off-loading, vacuum, wash and vehicle rpm functions. This boom is stored on the rear fender, with the dig tube attached for digging to 18 feet of depth prior to adding any extension pipe. **403/295-5800; www.foremost.ca.**

### Hi-Vac Aquatech B-10

The **Aquatech B-10** combination jet/vac truck from **Hi-Vac Corp.** has a single-engine design for lower fuel and maintenance costs, rear-mounted hose reel and 360-degree top-loading rotating boom. The low center of gravity makes full loads more stable, while the self-cleaning tanks are corrosion- and abrasion-resistant. The air/vacuum system has an operating capacity of 2,700 cfm and a 204-inch water column. Options include extended boom, pneumatic foot control for one-man operation and lockable vacuum tubes. An internal boom allows for pickup of materials above and below water. **740/374-2306; www.hi-vac.com.**



### Keith Huber Corporation Knight PD

The **Knight PD** air-mover from **Keith Huber Corporation** uses a Robuschi RB-DV145 blower capable of 6,176 cfm. The Huber Master Control allows the operator to control all functions with the push of a button from one centralized location, including a separate baghouse and cyclone clean-out. It has a 3,000-gallon carbon steel tank with 5/16-inch shell, a DOT-approved boom mount, centrifugal nine-stage cyclone, hydraulically operated full-opening rear door with integrated safety cylinder valve, tank-mounted hydraulic vibrator, 53-degree dump angle, 6-inch discharge valve (mechanical or air operated), 6-inch intake valve with internal standpipe, rear work lights, LED running lights, a backup alarm and grounding reel. Options include ASME/DOT 412, pressure off-load, Huber Lock rear door, hydraulically operated boom with 22 feet of reach and wireless operation, and a HammerHead Armor front bumper. **800/334-8237; www.keithhuber.com.**

(continued)



## LMT Smart-Dig HX4000

The **Smart-Dig HX4000** modular hydroexcavator from **LMT** can be mounted on a wide variety of new or used truck chassis. Its compact design is ideal for smaller, single-axle trucks, providing increased maneuverability and overall efficiency. It has an onboard 85 hp Kubota diesel engine to eliminate wear and tear on truck power. The Tuthill blower provides 1,300 cfm of airflow combined with a 3,000 psi Udor water blaster and 675 gallons of freshwater. It has an easy-to-use fully hydraulic rear door and wireless remote control telescoping boom. A 445,000 Btu diesel-powered water heater is available for colder climates. **800/545-0174; www.vaxsteel.com.**

## McLaughlin Vermeer VX 50-500

The **Vermeer VX 50-500** vacuum excavator from **McLaughlin Group** has a Tier 4 Final engine and an engine enclosure to help reduce engine noise levels and vibration. The unit's 3-stage cyclonic filtration system allows for wet and dry vacuum excavation while prolonging filter life and keeping maintenance costs low. An improved external hydraulic door opens at an 85-degree angle, allowing for easy and rapid dumping and cleaning of the spoils tank. A mechanical cam-over locking system provides a 360-degree positive door seal, even under reverse pressure, without additional clamping requirements. The lockable control console has a color graphic monitor. Its low-profile design allows access to areas limited by height restrictions. **800/435-9340; www.mclaughlinunderground.com.**



## Presvac Systems Hydrovac

The **Hydrovac** hydroexcavator from **Presvac Systems** is designed for cold weather operation and is offered as an option to be in full compliance with DOT collection and transportation of hazardous materials. The high-vacuum blower allows extraction of all types of soils, gravel, rock, clay, water and silt material with knock out features in the debris tank to minimize carryover. Modular filtration configured to blower size provides blower protection and minimal maintenance. It comes with a heavy-duty 8-inch boom up to 25 feet long, with six-way hydraulic power and wireless controls for all boom functions, soft-start water pump, vacuum breaker and truck engine speed. **800/387-7763; www.presvac.com.**

## RAMVAC by Sewer Equipment HX-12

The **HX-12** conventionally sized hydroexcavator from **RAMVAC by Sewer Equipment** has a 12-yard debris tank so the operator doesn't need to leave a big job to unload the material frequently. Its temperature-controlled environmental chamber and directional discharge system enable the off-load of debris back into the excavation site when finished, without the mess of dumping the tank. It comes with a long-range wireless remote, NEMA 4 electrical system, a 400,000 Btu water boiler, a three-stage cyclonic filtration system and efficient 3,000 cfm blower. It is available with a RamAir air excavation system to avoid adding water to a problem area. **800/323-1604; www.ram-vac.com.**



## Super Products Camel 1200

The **Camel 1200** 12-yard combination truck from **Super Products** is available with a hydroexcavation package that includes cartridge filters, dig tubes and specially designed water lances. Coupled with powerful waterjetting and vacuum capability, these tools allow operators to safely and effectively expose utility lines, remove debris and clean out a variety of structures, dig in congested spaces and perform many other hydroexcavating applications. A Camel 900 9-yard version is also available. **800/837-9711; www.superproductsllc.com.**

## Petrofield Industries Tornado Hydrovacs F4 Slope

The **Tornado Hydrovacs F4 Slope** hydrovac from **Petrofield Industries** holds 13 cubic yards of mud and more than 2,100 gallons of freshwater. It includes a water boiler and a 3,600 to 6,300 cfm positive displacement vacuum blower to pull spoils to the tank via a boom. The boom has a 342-degree rotation and a 26-foot reach. All critical components are housed in an insulated and heated aluminum van body. Its mud sweep empties the tank without hoisting, which eliminates the dangers of dumping on uneven ground and around overhead power lines. **877/340-8141; www.tornadotrucks.com.**



## Transway Systems Terra-Vex

The **Terra-Vex** all-season hydroexcavator from **Transway Systems** has a direct-drive 6,400 cfm blower, silencers and water system contained within an insulated heated acoustical walk-in enclosure, including 23 square feet of usable storage space. The enclosure reduces sound levels by several decibels, enabling hassle-free residential work while ensuring operators and water components don't freeze. The hydraulically driven water pump delivers 10 gpm at 6,000 psi, and the 1,200-gallon HDPE water tank and 425,000 Btu burner are protected from the elements. The 3,000-gallon debris tank comes with hydraulically operated hoist, full open rear door and locks. A 26-foot, 8-inch suction boom is hydraulically operated with a joystick and wireless remote control. **800/263-4508; www.transwaysystems.com.**

## Vac-Con X-Cavator

The easy-to-operate **X-Cavator** from **Vac-Con** comes with a hydrostatic drive that uses the chassis engine to eliminate the need for PTO, clutch and gearbox operation. It offers water systems up to 4,000 psi, and a mobile wireless remote control enabling the operator to work the chassis engine rpm, boom, automatic vacuum breaker, dump controls and hydraulic door locks from remote areas up to a half mile away. The boom rotates up to 270 degrees. **855/336-2962; www.vac-con.com.**



## Vacall – Gradall Industries AJV R Series

The **AJV R Series** with a rear-mounted hose reel from **Vacall – Gradall Industries** was designed for customers who prefer rear-mounted reels located



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away from engine noise and providing an unobstructed view of the job site. Its heavy-duty tailgate design with vault style latches and dual cylinder lift system allows optimized rear seal performance. Galvanized debris tanks are available in 6-, 8- or 10-yard capacities. **800/382-8302; www.vacall.com.**

## Vacstar 800

The **Vacstar 800** vacuum excavator allows the spoils tank to be emptied in a controlled and safe manner. The rotary vane pump provides a strong vacuum for greater depths, distance and speed. It allows the operator to vacuum and pothole up to 200 feet from the unit, permitting backyard and previously inaccessible work areas. Units can be used to clean out manholes, catch basins, wash pits, valve and meter boxes; wash equipment and property; and safely locate utilities. Damage to buried utilities is avoided using high-pressure water to dig in all types of soil. **319/656-3434; www.vacstar.com.**



## Vector HXX HydroExcavator

The **Vector HXX HydroExcavator** is available in positive displacement and fan configurations, providing up to seven hours of continuous operation with the onboard water. Lower water flow results in less operator fatigue and a cleaner, more precise digging process. It comes with a

12-cubic-yard debris body fabricated from corrosion- and abrasion-resistant steel; a 1,200-gallon high-density polyethylene water tank that retains heated water temperature longer, reducing the likelihood of freezing during operation in harsh winter weather; and a top-mounted, 7-foot hydraulic extendable boom that provides 320-degree rotation. Heated pump cabinets and a built-in boiler allow it to work on frozen ground in sub-zero temperatures. **800/627-3171; www.vector.com.** ♦

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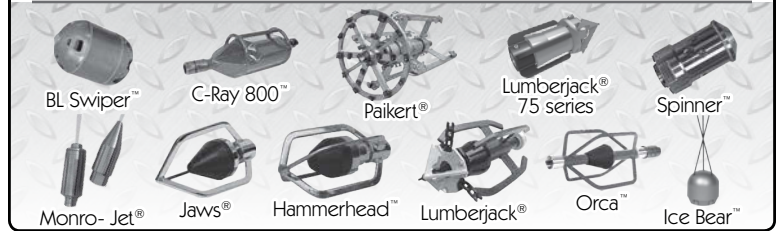
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truck and was able to extend its jetter from the outlet to the sand plug 375 feet away. Using the powerful waterjetting system and grit and sand removal process, the crew was able to jet the sand downstream to the downhole pump for removal. The sand and grit was then filtered into a containment tank and hauled away for disposal. Water used in the process was returned to the stormwater line.

**RESULT:**

The sand deposit was completely removed, flow to the stormwater line was fully restored and the work was

**Solution:**

Polston Applied Technologies employed a PAT 949 combination

accomplished in two days. Due to the quiet operation, the project had almost no impact on daily neighborhood activities. 844/765-7866; [www.polstonprocess.com](http://www.polstonprocess.com).



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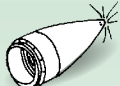
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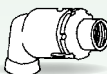
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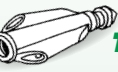


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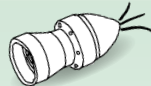
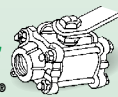
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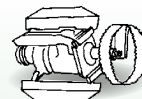
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# Product Spotlight



Inspection data capture device combines video, encoder, GPS and text overlay

By Ed Wodalski

The 2253P USB device from Sensoray combines the functions of a 2253 A/V codec video capture and compression device, incremental encoder interface, GPS receiver and text overlay in one unit. It can be used with any kind of inspection system that has a camera with composite video output. Operating power is supplied by a single USB port.

“This unique combination allows the operator to capture and display live video from the crawler vehicle, archive the compressed video, determine the exact position of the vehicle and overlay position information over the video in real time,” says Alexander Khvilivitzky, director of engineering-vision systems at Sensoray. “Having one unit instead of four increases reliability and reduces downtime.”

The 2253P (5.14 by 3.28 by 1.14 inches) is specifically designed for pipe-line inspection applications. With an operating temperature range of 32 to 158 degrees F, the device captures composite video from the remote camera on a crawler or other deployment device and displays it on a monitor at the base station for analysis. H.264 compression is used for encoding archived video, while a simultaneous low-latency uncompressed stream is used for real-time preview.

Each digital multifunction port can operate as an incremental quadrature

encoder interface or as dual general purpose digital inputs (GPIO). Data from encoders, GPS and GPIO is sent to the host over USB. GPS data identifies the pipe entrance point. The quadrature encoder measures the cable length to track the vehicle’s position from the GPS starting point.

Up to 1,024 bytes of application-supplied data can be inserted in the H.264 or MPEG stream at regular frame intervals or as a single shot. Closed captions are supported for H.264 streams. Image transformation such as resizing, rotation and mirroring are independently configurable for each stream, as are compression type and bit rate.

Digital port inputs are compatible with TTL/CMOS and differential RS-422 signals. Incremental encoders can be powered by the 2253P or external power. When a port is used as dual GPIOs, the host can manually monitor GPIO states or the port can automatically send notifications over USB upon state changes. Each GPIO can also be used to control stream flow.

“The device does not require any maintenance,” Khvilivitzky says. “Updates are provided, if necessary, in the form of software installed on the host computer of the base station.” 503/684-8005; [www.sensoray.com/2253](http://www.sensoray.com/2253).



**McElroy hydraulically adjustable pipe stand**

## McElroy hydraulically adjustable pipe stand

The hydraulically adjustable pipe stand from McElroy Manufacturing is designed to align 4- to 20-inch-diameter thermoplastic pipe on butt fusion job sites. The stand has a hand-pumped hydraulic lift that gives the operator the ability to adjust the height of the stand without having to remove the pipe. 918/836-8611; [www.mcelroy.com/fusion](http://www.mcelroy.com/fusion).



**Asahi America wafer check valve**

## Asahi/America wafer check valve

The 3-inch PVC wafer check valve from Asahi/America, installed on the discharge side of pumps, is designed to prevent back-flow flooding. The valve’s body, disc and stopper assembly are machined from solid PVC plate stock that conforms to ASTM D1784 cell classification 12454A. The check valve is available in 3- through 12-inch PVC with EPDM seals and no spring. All 3- through 8-inch check valves operate at a maximum pressure of 150 psi (10- and 12-inch at 90 psi) and up to 120 degrees F. 800/343-3618; [www.asahi-america.com](http://www.asahi-america.com).

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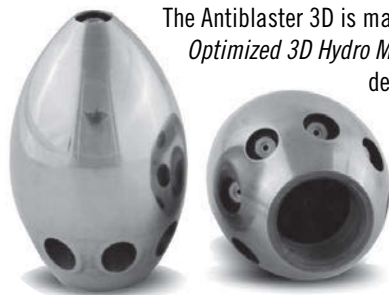


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**Peerless Cole Hersee 75920**

## Spire Metering vortex flowmeter

The 602VF vortex flowmeter distributed by Spire Metering Technology is designed for accurate, low-maintenance flow measurement in gas, steam and liquid applications. **888/738-0188; [www.spiremt.com](http://www.spiremt.com).**

## Victaulic plug valve and coupling

The Series 466 plug valve from Victaulic is available in 10- to 16-inch sizes with StrengThin or original groove system (OGS). Features include duplex body, bonnet, PTFE seats and ductile iron housing with VC-200 coating. The D08 rigid coupling is designed to join pipe, valves and fittings with StrengThin ends. **610/559-3300; [www.victaulic.com](http://www.victaulic.com).**

## Centork modular valve actuation system

CK modular electric valve actuators from Centork are compatible with hardwired digital or analog control protocols. The actuators are environmentally sealed to IP68 and comply with international design standards EN15714-2 and EN ISO 5210. Features include multi-turn output torque of 7,966 ft-lbs and part-turn output torque up to 151,643 ft-lbs. **585/233-3353; [www.centork.com/en/range](http://www.centork.com/en/range).**

## Flexaust Flex-Tube Series hose

Flex-Tube Series hoses from Flexaust are made from polyurethane or PVC and available in OEM colors with plain ends or screw cuffs. The medium-weight hoses with smooth interiors are available in 1-, 1 1/4-, 1 1/2- and 2-inch diameters in lengths up to 100 feet. **800/343-0428; [www.flexaust.com](http://www.flexaust.com).**

## Kohler air-cooled, three-phase generator

The 14/20 kW air-cooled, three-phase generator from Kohler Power Systems is designed for commercial applications where 20,000 watts or less are needed during power outages. The generator runs on LP or natural gas and has a corrosion-resistant enclosure impact tested to -30 degrees F. **800/544-2444; [www.kohlerpower.com](http://www.kohlerpower.com).**

## GPS Insight Garmin custom forms

Garmin custom forms from GPS Insight enable drivers to fill out forms in the cab on the job or send submittals to the office in real time. **866/477-4321; [www.gpsinsight.com](http://www.gpsinsight.com).**

## FCI analyzer flow switch/monitor

The Model FS10A analyzer flow switch/monitor from Fluid Components International is approved for FM Division 1, Zone 1 on remote probe configurations. Designed to continuously verify flow within gas or liquid process analyzer sampling systems, the flow switch/monitor has no moving parts and requires little maintenance. Wetted parts are made from corrosion-resistant 316L stainless steel with Hastelloy-C22 sensor tips. **800/854-1993; [www.fluidcomponents.com](http://www.fluidcomponents.com).**

## Hackney Ford Transit Performer body

The Performer body from VT Hackney, available on the Ford Transit cab and chassis, has a maximum payload of 3,000 pounds. The all-aluminum body is available in a 12-foot model for the 9,950 GVW Transit chassis and 12 1/2-foot body for the 10,360 GVW Transit chassis. **252/946-6521; [www.hackneyservice.com](http://www.hackneyservice.com).**

## Peerless battery disconnect switch

The 75920 Cole Hersee master disconnect switch from Peerless Electronics has a capacity of 300 amps at 12 volts DC. Designed to protect vehicles against tampering, theft and battery drain, the switch can be used in positive or negative path applications. Waterproof and dustproof to IP67 (immersible), the switch is made from engineering grade plastic. The large divider on the base prevents accidental shorting. **800/285-2121; [www.peerlesselectronics.com](http://www.peerlesselectronics.com).**

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## Reelcraft stainless steel hose reels

Series LC stainless steel hose reels from Reelcraft Industries are designed for light-duty, spring-driven reel applications in corrosive or sanitary environments. Made for stationary indoor and outdoor use, four base slots enable the reel to be easily mounted or adjusted. Models are available for up to 70 feet of 3/8-inch I.D. or 1/2-inch I.D. hose. **800/444-3134; www.reelcraft.com.**

## Cla-Val electronic valve controller

The hand-held VC-22D electronic valve controller from Cla-Val provides remote or local setpoint control for valves in a variety of fluid applications, including pressure control with upstream or downstream feedback, flow control with mag meter or electronic flowmeter, modulating level control, ratio control, altitude and level control. Features include accurate and stable valve control, IP68 submersible enclosure and the ability to monitor and display multiple processes with accurate retransmission of parameters to SCADA systems. The controller has six analog 4-20mA and six digital inputs, four analog 4-20mA outputs, two output solenoid and two output relays. **949/722-4800; www.cla-val.com.**

## Trimble construction lasers

The Spectra Precision GL412N/GL422N grade lasers, LL400HV laser level and HV302 horizontal/vertical laser from Trimble feature automatic self-leveling, glass lighthouses, IP66 protection rating, metal sunshade and simple keypads. They can withstand drops of 3 feet onto concrete and tripod tipovers up to 5 feet. The single- and dual-grade lasers have a radio remote that operates from up to 330 feet. The LL400HV long-range exterior laser has a working diameter of 2,600 feet. The HV302 has a high-visibility beam for simultaneous rotating and 90-degree plumb references. **800/527-3771; www.spectralasers.com.**

## Aclara Metrum LTE utility connectivity

The Metrum LTE network from Aclara Technologies provides cellular connectivity to utility devices, including SCADA, commercial and residential meters. Combined with Aclara's iiDEAS platform, applications include AMI, outage and restoration management, conservation voltage reduction, volt/Var optimization, fault detection and location. **800/297-2728; www.aclaratech.com.**

## Noncontact Meters portable ultrasonic flowmeter

The SMART portable clamp-on Ultrasonic Flow Meter from Noncontact Meters is designed to communicate with a smartphone through a downloadable app to monitor gpm rates or totalization in metal or plastic pipe from 2 to 20 inches in diameter. Transit Time technology sends a sound pulse across the pipe and monitors the return differential of the transmit pulse as well as the return time to calculate volumetric flow rate and total. **770/516-3999; www.noncontactmeters.com.**

## Water Cannon hot-water pressure washer

The Honda hot-water pressure washer (product ID 18H26) from Water Cannon has a Honda GX 390 engine and choice of a General or Cat ceramic plunger pump. Features include a portable four-wheeled push bar frame for support, 4 gpm, 4,200 psi, 118-degree temperature rise and overheat safety valve. **800/333-9274; www.watercannon.com.** ♦

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## NozzTeq names sales manager

NozzTeq named Bob Miller sales manager representative for the northeast United States. Based in New Jersey, he will be responsible for states along the East Coast, from Virginia to Maine.

## ePIPE barrier coating approved to NSF 61.5 standard

ePIPE, a hydrophobic epoxy-based protective barrier coating from Ace DuraFlo Systems, was approved by the National Sanitation Foundation (NSF) to standard NSF 61.5 for commercial water exposure with a two-hour cure.

## AWWA chooses president-elect

The American Water Works Association Board of Directors selected Jeanne Bennett-Bailey of Fairfax, Virginia, as the association's president-elect. The board also named Steve Dennis, Jon Eaton, Martha Segal and Brian Steglitz vice presidents and Sally Mills-Wright director-at-large. An AWWA member since 1990, Bailey is the public affairs officer for Fairfax Water and chair of the AWWA Public Affairs Council. She begins her one-year term as president in June.

## GapVax names Gulf Coast representative

GapVax named Alexander Teich sales representative for the Gulf Coast. Based in Deer Park, Texas, his territory includes New Mexico, Texas, Louisiana, Oklahoma and Arkansas.



Alexander Teich

## Asahi/America names president, CEO

Asahi/America promoted Daniel S. Anderson to president and chief executive officer. Anderson, who joined the company in 1988, was senior vice president of sales and marketing. He replaces Hidetoshi Hashimoto, who remains chairman of the board for the Massachusetts-based company.



Daniel Anderson

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## Smith & Loveless acquires Schloss Engineered Equipment

Smith & Loveless acquired the assets of headworks equipment designer Schloss Engineered Equipment, Aurora, Colorado. Schloss products will be incorporated into Smith & Loveless' municipal, industrial, aftermarket and international sales division offerings. The company will be relaunched as Schloss Environmental Equipment.

## Sioux Corp. becomes ISO certified

Sioux Corp.'s quality management system was certified to ISO 9001:2008 standards. The management system includes logging nonconformance or customer concerns and weekly management team review. Sioux also performs internal audits of all departments including receiving, fabrication, welding, paint, assembly, testing, packaging, engineering, sales, purchasing, human resources and management.

## Subaru Industrial Power redesigns website

Subaru Industrial Power redesigned the layout and functionality of its website, [www.subarupower.com](http://www.subarupower.com). Product pages include 360-degree views. Quick search provides parts accessibility and illustrated guides help ensure proper selection.

## All Jetting adds CNC technology

All Jetting Technology added CNC technology to the production of its UHP sapphire nozzles, rotating lances, UHP parts and hose accessories. The STAR SR-32J CNC machine has a feed rate of 24 m/min.



Pictured from left are Mike Silverman, Jeff Silverman, Steve Glick, Steve Silverman, Art Silverman, Marty Silverman, Bob Silverman, Lee Silverman and David Silverman.

## General Pipe Cleaners celebrates 85 years

General Pipe Cleaners, a third-generation, family-owned business founded in 1930, celebrates its 85th anniversary. The company's line of products includes drain cleaners, water and trailer jetters, video inspection systems, water leak detectors, pipe freeze kits, pipe thawing kits, and copper and plastic tubing cutters.

## CIPP Services acquires sewer robot distribution rights

CIPP Services acquired U.S. distribution rights for the full line of sewer robots manufactured by IMS Robotics. The robots operate by a single supply hose that provides air, water, video and electric power to the cutter. ♦



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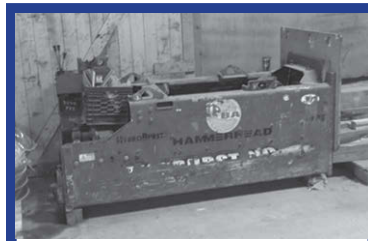
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New 50-ton TRIC pipe bursting equipment complete with 300 feet of 7/8" cable. Down hole unit 12-inch base, 8-inch head. M50 hydraulic puller. Cost \$38K, will sell for \$32,000. 415-883-3676 ask for Mike. (C06)

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## PEOPLE/AWARDS

**Greg Cannito** was named managing director of Corvias Solutions, a wholly owned subsidiary of Corvias Group. Cannito will oversee the application of Corvias' public-private partnership model to solve energy and infrastructure challenges facing U.S. public sector institutions. One of his current projects is to help manage the design, construction and long-term maintenance of stormwater management systems for a Clean Water Partnership with Prince George's County, Maryland.

The Stormwater Equipment Manufacturers Association announced the results of its board of directors elections for 2015-2016. SWEMA members elected **Will Harris** (Oldcastle Stormwater Solutions) as president, **Derek Berg** (Contech Engineered Solutions) as vice president, and **Kevin McKee** (Hydro International) as secretary/treasurer. The at-large board members are **Ernie Carrasco** (Rinker Materials), **John Moll** (CrystalStream Technologies), **Gene LaManna** (Terre Hill Stormwater Systems) and **Shawn Luton** (StormTrap LLC).

**David Majewski**, the principal of SRG of Buffalo, New York, received an Environmental Quality Award from the U.S. Environmental Protection Agency. The award is presented to people who have demonstrated an outstanding commitment to protecting and enhancing environmental quality and public health. Majewski has been the guiding force for the Urban Habitat Project at the Buffalo Central Terminal. The project serves as an outdoor classroom for local youth, an opportunity for urban ecology research and a demonstration of green infrastructure to manage stormwater. The site absorbs about 320,000 gallons of stormwater runoff from adjacent streets and redirects it to the site via adjoining bioretention cells.

**Addie Javed** was named the public works director for Haines City, Florida.

The **Alewife Stormwater Wetland**, part of the Boston Harbor Cleanup project, was named a 2014 Public Works Project of the Year by the American Public Works Association. The managing agency is the City of Cambridge (Massachusetts) Department of Public Works.

## LEARNING OPPORTUNITIES

### Wisconsin

The University of Wisconsin Department of Engineering-Professional Development is offering Using WinSLAMM v.10.1: Meeting Urban Stormwater Management Goals R174 on Nov. 5-6 in Madison. Visit <http://epdweb.egr.wisc.edu>. ♦

## What's New With You? Send In Your Industry News To Us!

Send your company's latest business news to [editor@mswmag.com](mailto:editor@mswmag.com). Newsworthy items may include business expansion, honors and awards, new contract announcements, employee promotions and executive hires, and new services. Please include high-resolution digital photos with the news releases.



## CALENDAR

### May 5-7

Montana Section-American Water Works Association Joint Conference, Holiday Inn Grand, Billings, Montana. Visit [www.montana-awwa.org](http://www.montana-awwa.org).

### May 6-8

Ohio Stormwater Association Conference, Sandusky, Ohio. Visit [www.ohiostormcon.com](http://www.ohiostormcon.com).

### May 6-8

Arizona Water Association Annual Conference and Exhibition, Renaissance Glendale Hotel, Glendale, Arizona. Call 928/717-9905 or visit [www.azwater.org](http://www.azwater.org).

### May 17-21

World Environmental & Water Resources Congress, Austin, Texas. Call 800/548-2723 or visit [www.ewricongress.org](http://www.ewricongress.org).

### May 17-20

West Virginia Section-American Water Works Association Annual Conference, Morgantown, West Virginia. Visit [www.wvawwa.org](http://www.wvawwa.org).

### May 20-22

Connecticut Section-American Water Works Association Joint Conference, Ocean Edge Resort and Golf Club, Brewster, Massachusetts. Visit [www.ctawwa.org](http://www.ctawwa.org).

### June 7-10

American Water Works Association Annual Conference and Exposition, Anaheim, California. Call 303/347-6181 or visit [www.awwa.org](http://www.awwa.org).

### July 26-29

American Society of Agricultural and Biological Engineers International Conference, New Orleans. Visit [www.asabe.org](http://www.asabe.org).

### Aug. 2-6

StormCon North American Surface Water Quality Conference & Expo, Austin, Texas. Visit [www.stormcon.com](http://www.stormcon.com).

### Aug. 17-19

Smart H<sub>2</sub>O Summit 2015: Sustainable Water Solutions, San Francisco. Visit [www.smartH2osummit.com](http://www.smartH2osummit.com).

### Aug. 18-20

National Association of Flood and Stormwater Management Agencies Annual Meeting, Jackson Hole, Wyoming. Visit [www.nafmsa.org](http://www.nafmsa.org).

### Aug. 30-Sept. 2

American Public Works Association International Public Works Congress and Exposition, Phoenix Convention Center, Phoenix. Visit [www.apwa.net](http://www.apwa.net).

### Sept. 28-30

National Rural Water Association WaterPro Conference, Oklahoma City. Visit [www.nrwa.org](http://www.nrwa.org).

### Oct. 11-14

American Society of Civil Engineers 2015 Convention, New York City. Visit [www.asce.org](http://www.asce.org).

### Oct. 12-16

American Water Works Association 2015 Water Infrastructure Conference and Exposition, Bethesda, Maryland. Visit [www.awwa.org](http://www.awwa.org).

### Nov. 16-19

American Water Resources Association Annual Conference, Grand Hyatt Denver. Visit [www.awra.org](http://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](mailto:editor@mswmag.com).

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