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August 2014

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brings work in-house and
saves big with lateral
rehabilitation program

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Muminu Badmus,
Acting Manager of Sewer
Construction and Repair
Washington, D.C.

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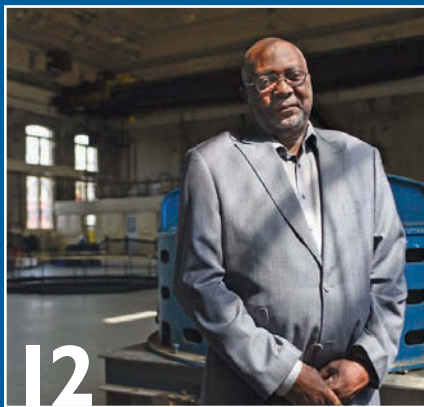
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PIPELINE INSPECTION, SURVEYING & MAPPING



ON THE COVER:

Muminu Badmus, DC Water's acting manager of sewer construction and repair. DC Water began using CIPP technology to rehabilitate failing lateral lines in 2011, and the utility has realized huge savings over conventional replacement methods in the three years since. (Photography by Autumn Parry)



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June 5, 2014

Cobra Technologies
Mr. Alan Grant, CEO
4806 Wright Drive Bldg. C
Smyrna, GA 30082

Re: Cobra Camera Start-up

This week we took delivery on our new Kubota mounted Cobra Sewer Camera, and wanted to complement you and Cobra Technologies on the quality of not only the equipment, but of the start-up process. Will Hunt (field tech) and Letty Eberly (software support) were patient, thorough and extremely knowledgeable, making sure it all worked and more importantly, that we understood the process. There was never a moment when they were not fully involved on our behalf to make it all work smoothly – and in conjunction with our ESRI software. Although it took several days, it all came together very well and in fact, exceeded our expectations.

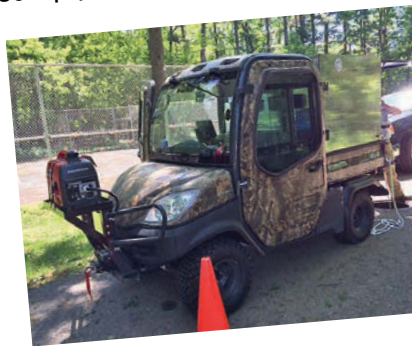
As a small utility agency, this was our first camera “truck” and we greatly appreciate the time spent pre-order, during the construction of the truck, and especially the delivery and start-up procedure. On our first trial run we easily did 1000 feet, the video was perfect (and in-sync with ESRI), and we found two “illegal” sump pumps discharging into the public sewer.

Many thanks again.

Respectfully;



Rich Pierson, Director
Gull Lake Sewer + Water Authority



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DON'T WASTE A DROP

Report points to the power of conservation in preserving our water supplies



FROM THE EDITOR

Luke Laggis

There is no doubt that the water industry faces significant challenges, from the huge price tag to upgrade and maintain existing infrastructure, to guaranteeing an adequate supply of the resource itself.

Depending on your geographic location, one of those issues may be far more pressing than the other. In some locales, both issues are ratcheting up the pressure on municipal utilities to deliver a product and service at rates that are becoming increasingly difficult to maintain.

One of the utilities featured in this month's issue of *MSW* is the Anaheim Water Utility. Anaheim is

located in Orange County, part of the Los Angeles metropolitan area, and its water supply supports its citizens, a large industrial base and several large tourist destinations. It was the plentiful supply of water that attracted the area's first settlers, and while Anaheim is doing great work to ensure an adequate supply of quality water for its customers, the entire state of California is experiencing a severe drought.

A recent report from the Natural Resources Defense Council (NRDC) and the Pacific Institute examines the large and growing gap between water use and the state's available water supply. It is esti-

mated that California suffers from a water deficit in excess of 6 million acre-feet. On average, the state diverts approximately 5 million acre-feet per year more from the Sacramento-San Joaquin watershed than can be sustained by the estuary, and it overdrafts groundwater by at least 1 to 2 million acre-feet annually. Excessive surface water diversions and groundwater overdrafts have led to shortages for some users, degraded ecosystems and compromised water quality. Drought conditions only add to the problem.

Those issues play out in many states, particularly across the West. In Anaheim, utility leaders have tried to combat potential problems through leak detection efforts, proactive maintenance, increasing available water supplies, enlarging storage capacity and improving pumping efficiency. The city is currently completing construction of a new high-capacity potable water well designed to replace two shallow wells. And conservation has also played a big role in ensuring an adequate water supply.

According to the NRDC and Pacific Institute report, California could be saving up to 14 million acre-feet of untapped water – providing more than the amount of

water used in *all* of California's cities in one year – with an aggressive statewide effort to use water-saving practices, reuse water and capture lost stormwater.

The report says wider adoption of modern irrigation practices could reduce agricultural water use by 5.6 to 6.6 million acre-feet annually. In urban areas, improved efficiency, stormwater capture and greater water reuse could save a total of 5.2 million to 7.1 million acre-feet per year, enough water to supply all of urban Southern California and still have water to help restore ecosystems and recharge aquifers.

You all know water utilities can't accomplish all this on their own. Education may ultimately be the most important factor in developing a stronger conservation ethic that can help ensure the wells don't go dry. So take advantage of every opportunity to teach your customers about where their water comes from and what they can do to keep it flowing for decades to come.

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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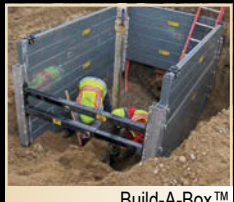
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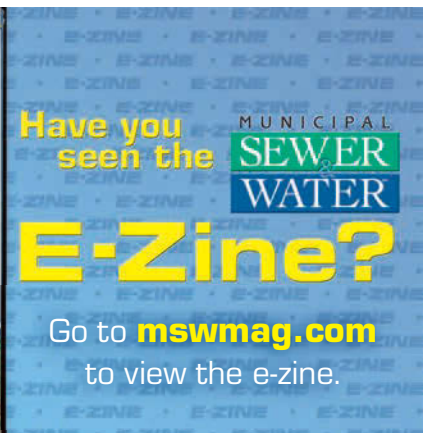
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A PIPE CRISIS

Dissecting a Water Main Break Outbreak

When pipes start popping like fireworks on the Fourth of July, people take notice. This May, the City of Milwaukee fought a rash of water main breaks that occurred after a pressure increase. Learn more about how the problem started, which pipes were affected, and how the city managed the situation. www.mswmag.com/featured

NEWS BRIEFS

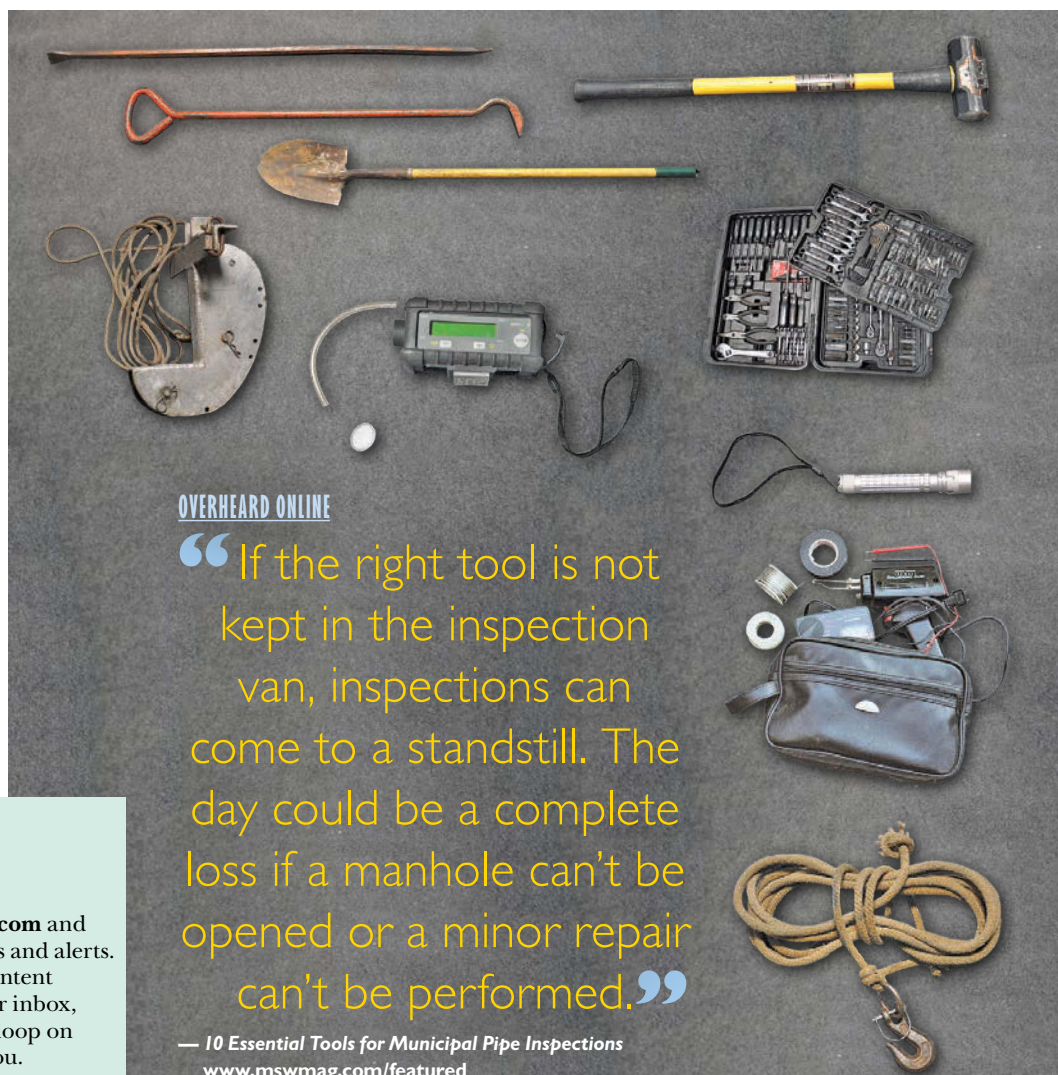
A New Pipe Inspection Device?

A self-propelled device could change how municipalities handle pipe inspections. Researchers from several institutions have created a device that uses a drum-like membrane to sense pressure gradients. Find out about its benefits, challenges and how it could help municipalities. www.mswmag.com/featured

BEST PRACTICE

The I&I Budget Conundrum

Budget. Just say the word, and most of us bristle. Budgeting is difficult enough when things are stable, but add unpredictable factors such as precipitation, flooding and customer connections and you've got a tricky situation. Learn how St. Louis plans for infiltration and inflow, and use these best practices as you enter the next budget cycle. www.mswmag.com/featured



OVERHEARD ONLINE

“If the right tool is not kept in the inspection van, inspections can come to a standstill. The day could be a complete loss if a manhole can't be opened or a minor repair can't be performed.”

— 10 Essential Tools for Municipal Pipe Inspections
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See what you're missing.

DC Water & Sewer Authority crew member Reginald Howell Jr. (center) uses the Perma-Liner Perma Inverter System to insert a CIPP lining into a residential lateral line in Washington, D.C. (Photography by Autumn Parry)



PROFILE:
DC Water,
Washington, D.C.

DATE FOUNDED:
1996 as an independent authority of the District of Columbia providing services to the region, succeeding prior organizations. District's sewer system dates to 1810

POPULATION SERVED:
Approximately 2.3 million

AREA SERVED:
725 square miles, including the District of Columbia, plus wholesale wastewater treatment for adjacent counties in Maryland and Virginia

CONNECTIONS:
600,000 residential, commercial and governmental connections in the District of Columbia

WASTEWATER INFRASTRUCTURE:
1,800 miles of sanitary and combined sewers, 22 flow-metering stations, 9 offsite pumping stations, 25,000 catch basins, Blue Plains Advanced Wastewater Treatment Plant (370 mgd)

EMPLOYEES:
1,100

ANNUAL OPERATING BUDGET:
\$441.7 million

WEBSITE:
www.dcwater.com

A CURE FOR WHAT AILS

DC Water goes trenchless, brings work in-house and saves big with lateral rehabilitation program

By *Jim Force*

Trenchless technology and in-house expertise are enabling DC Water to reline and repair sewer laterals at a fraction of the cost of the open-cut approach.

According to Muminu Badmus, DC Water's acting manager of sewer construction and repair, the utility is using its own crews to replace more than 100 laterals a year with CIPP liner technology and is realizing a savings of \$1 million or more per

year over conventional excavation methods. The cost of replacing a typical 25-foot lateral with CIPP technology is running about one-third

Pumper & Cleaner Environmental Expo International in Indianapolis.

"The average cost of a single lateral replacement so far is about

"As we expand the use of CIPP, we anticipate an annual savings of \$2.9 million in capital spending based on the current replacement rate."

— Muminu Badmus

the cost of open cut, he reported in a presentation last February at the

\$3,900 – or a \$7,300 savings over open cut," he says. CIPP not only seals



At Left: DC Water & Sewer Authority crew member Berone Jones uses a RIDGID camera system to inspect a lateral before cleaning the line. Above Left: Open-cut lateral replacements were much more common for the utility before it moved to more cured-in-place rehabilitation. Right: An old, rusty pipe is exposed at the start of a residential lateral replacement project.

openings in the pipe walls, preventing infiltration and root intrusion, it also eliminates surface disruption and restoration. “As we expand the use of CIPP, we anticipate an annual savings of \$2.9 million in capital spending based on the current replacement rate,” Badmus says.

Old system

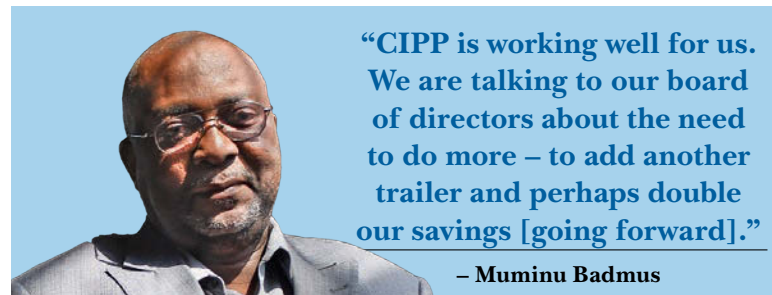
The DC Water sewer system is about as old as it gets with some pipes dating back to before the Civil War, and construction materials including everything from brick to vitrified clay to cast iron to concrete. “We still find wood in some of the pipes in older sections of the city,” Badmus says.

More than 630,000 residential, commercial and governmental customers in the District of Columbia receive wastewater collection and treatment services from the utility, which also provides wholesale wastewater treatment for about 1.6 million people in neighboring counties outside the District in Maryland and Virginia.

The DC Water collection system consists of 1,800 miles of sanitary

and combined sewers, 22 flow-metering stations, nine offsite wastewater pumping stations and 25,000 catch basins. The sewers range from 8-inch pipelines to 27-foot arches. About two-thirds of the system is separated, with combined sewers carrying both sanitary and stormwater in the downtown and other older sections of the service area.

The utility’s Blue Plains Advanced Wastewater Treatment Plant provides wastewater treatment.



Designed for an average daily flow of 370 million gallons, it is the largest advanced wastewater treatment facility in the world.

Laterals

As in most cities, DC Water’s cus-

tomers are responsible for the portion of the sewer lateral on their property, while maintenance of the lateral from the sewer to the property line is the responsibility of DC Water’s department of sewer services. There are 150,000 laterals in the service area, typically 4-inch pipes running 5 to 100 feet in length.

For decades, the department has used open-cut replacement methods to maintain the integrity of its laterals. This approach resulted in significant costs to restore the surfaces and roadways that were disrupted by the process – to say

nothing of the inconvenience to customers, Badmus says.

In DC Water’s experience, contractors may need as many as four days and up to six workers to complete an open-cut replacement at a cost of about \$11,500 including sur-

face restoration.

Then, in 2011, the approach changed.

“We visited a CIPP demonstration in Maryland,” Badmus recalls. The DC Water sewer team liked what it saw and came back and recommended to the utility’s management that trenchless technology was the right choice for DC Water’s lateral replacement program.

After careful review, the utility selected the CIPP process offered by Perma-Liner Industries, purchased the necessary equipment, and trained an in-house crew of four employees (see sidebar).

About 80 percent of the DC Water lateral system lends itself to CIPP, with the other 20 percent of the lines requiring open-cut restoration because they are completely collapsed, or contain 90-degree bends. For these excavations, DC Water uses outside contractors.

In 2012, the first year of the project, the utility was able to rehabilitate about 100 laterals using CIPP. In 2013, the utility completed 130 rehabilitations, and as of spring 2014, another 100 had been completed. The number of jobs completed often depends on whether a new clean-out is required.

SPECIAL TRAINING PAYS OFF

Successful adoption of CIPP lateral replacement at DC Water required more than investment in technology and equipment. Employees needed specialized training in order to do the work in-house and save on outside contractor expense.

At the same time that DC Water purchased the equipment for CIPP, the utility began training employees in how it works.

Muminu Badmus, DC Water’s acting manager of sewer construc-

tion and repair, says each employee went through a two-week specialized training program, some of it off site. “Perma-Liner did the original training,” he says. Perma-Liner also supplied a video that helped familiarize employees with the new process.

Experience has been a good teacher, too, Badmus says. “Twice we’ve had a liner not cure properly, and we had to actually go in and remove it. We’ve learned from our mistakes.”



Left: DC Water & Sewer Authority crew member Berone Jones (right) helps pull the calibration tube and liner through the roller, which helps evenly coat the liner with resin before inverting it in the host pipe. Above: Crew members (from left) Jones, Reginald Howell Jr., Tony Lipscombe and Derrick Young prepare a calibration tube and liner for inversion in a lateral line.

Working out of a trailer housing the compressor, the CIPP inverter and a root cutter, the liner crew first inspects the lateral using CUES CCTV equipment. The camera is directed through the line to assess the condition and the material type and determine if the line is a good candidate for CIPP.

If it is, the crew uses a small jet-

ter (US Jetting) to clean the lateral of debris and cut any roots that may have intruded into the line. The CIPP process uses a PVC coated liner impregnated with liquid resin. A roller applies a uniform coating of resin inside the liner. Then the liner is inserted into the lateral through a Y-connector at the clean-out, using the inverter. The liner is pushed

through the lateral by air pressure, which unfolds the liner inside the pipe and fully inflates it to the desired diameter, forcing the saturated lining against the inside lateral wall. The resin cures in a few hours.

Badmus explains that DC Water is using ambient air and temperature conditions to cure the liner rather than steam. "It's taking us a

bit longer [up to three hours to cure], but until we get more experience with the technology, we had some safety concerns with steam," he says.

The finished product is worth the wait. "Once the process is done, the inner pipe wall is smooth and seamless and has an expected life span of 50 years," Badmus says.



DC Water & Sewer Authority crew members Reginald Howell Jr., Kevin Jhingory, Derrick Young, Berone Jones and Tony Lipscombe pose for a group portrait near their CIPP trailer in Washington, D.C.

Replacement of a lateral with the CIPP approach usually takes just one day on the job, Badmus explains, and if the properties have existing clean-outs and are in close proximity, it's possible to accomplish two to three lateral replacements in a single day.

Normally, though, installing a clean-out is necessary before the lining can take place. "Most locations don't have a clean-out," Badmus says, explaining that his crews use a backhoe to make the new clean-outs wide enough.

Good results

Now in the third year of the CIPP lateral lining project, DC Water is convinced it made the right decision. Badmus has been calculating the savings over open cut and reports saving \$900,000 in 2012, \$1.5 million in 2013, and over \$700,000 just a few months into the 2014 construction season.

Customer satisfaction is another benefit. "Our customers love it," Badmus says of the liner approach. "Not only are we saving money, we get in and get out. There's no mess, no construction, no traffic controls.

"CIPP is working well for us," he says. "We are talking to our board of directors about the need to do more – to add another trailer and perhaps double our savings [going forward]."

That's the goal. Badmus says his department would like to get the additional trailer and be able to add more four-person crews to achieve even more savings.

He says his department envisions pushing the trenchless approach to the point of doing 400 or more replacements a year using CIPP.

Reaching that level will require more personnel. "We need to train more people," Badmus says, noting that with a small crew, an employee sick day or other absence can disrupt the schedule. Turn-over can have a negative impact, as well.

One approach might be to pull more people from traditional work to do the clean-outs, freeing up the lining teams to concentrate on lateral replacement.

Badmus is optimistic. "We're not where we want to be just yet," he says. But at the end of his presentation at the Pumper & Cleaner Expo, he concluded:

"Imagine spending 65 percent less for the cost of a replacement or installing 182 percent more at the same funding level simply by working smarter. All our investment decisions should be that easy." ♦

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A TOOL TO DIVERSIFY

Versatile iPad-ready SparVision camera system generates big interest at Expo

By Craig Mandli



Spartan Tool Long Island territory manager Tony Marini, left, explains the features of the iPad-ready SparVision 200 pipe inspection system to an Expo attendee. (Photo by Craig Mandli)

Spartan Tool had a huge booth at the 2014 Pumper & Cleaner Environmental Expo International, with dozens of representatives ready to answer questions from thousands of Expo attendees. One product in particular, though, the iPad-ready SparVision 200 pipe inspection camera, grabbed a lot of attention.

Two demos in the Spartan booth displayed the versatility of the unit. One gave attendees the opportunity to snake the flexible pushrod camera through an S-shaped toilet trap, while the other showed how the optional Spartan Tool Trap Eze camera extension system fits through narrow sink drains and traps.

"Attendees really liked being able to see how this system would operate in real-world scenarios," says Tony Marini, the company's Long Island territory manager. "Allowing people to demo it here at the show really gets across how easy to use the SparVision actually is."

The system is lightweight for easy maneuverability and comes with 200 feet of slick pushrod, a color self-leveling camera head with scratch-resistant sapphire glass lens, 512 Hz locating beacon, 110-volt or battery operation (up to six hours of use per charge), a built-in transport cart with extending handle and high-clearance wheels, and a heavy-duty rotationally molded case to protect the unit in harsh conditions.

"It's a great unit for the septic technician looking to diversify into drain cleaning and pipe inspection," says Marini. "It can handle almost any sort of pipe inspection, yet is portable and lightweight enough to fit in a toolbox. With so many drain cleaners and septic professionals at the Expo, it's the perfect fit for the SparVision."

Perhaps the most innovative feature of the system is the iPad 4's Retina display offering technicians flexibility on and off the job site. It allows freeze-frame snapshot capa-

bility, the addition of text to any video or snapshot, changeable font sizes, colors and locations, communication via Wi-Fi connection (allowing the technician to move anywhere on the job site), the capability to email a recorded file, a built-in microphone for easy job site narration, an on-screen repositionable footage counter and camera light intensity rheostat.

"Plus, if you already have your own iPad, or an Android Nexus tablet, you can save money and just download our app to use your own unit as the display," says Marini. "You can even detach the iPad and, using the Wi-Fi router, walk up to 30 feet away and still get your camera signal. That could come in very handy to show the customer a blockage or some other issue."

The optional Trap Eze ultra-flexible black-and-white 7/8-inch camera expands the system even further, attaching to the SparVision 200 system and allowing quick peeks into

small drainlines without removing the trap. The 4-pound unit comes with an additional 50-foot ultra-flexible pushrod, a convenient carrying reel and a 10-foot cord for connection to the SparVision 200.

"I think what customers are really excited about is that we've incorporated a tool, the iPad, that many of them already use every day, and made it a functional part of our system," says Marini.

While he's a 20-year veteran of the drain cleaning industry, the 2014 Expo was Marini's first as a Spartan employee. Experiencing the show as an exhibitor was exhilarating.

"It's been a lot of fun seeing things from the sales point of view," he says. "Everyone here is so excited to see the new products out there. I know Spartan always tries to bring something new and innovative to this show, and I know they're working on something good for next year." 800/435-3866; www.spartantool.com. ♦

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The City of Anaheim Public Utilities management team includes (from left) Assistant General Manager Don Calkins, Water Field Operations Manager Mike Jouhari, Water Resources and Planning Manager Rick Shintaku and Water Engineering and Design Manager David Shen. (Photography by Collin Chappelle)

SoCAL OASIS

Anaheim relies on proactive water service management to provide abundant and affordable water – even in significant drought conditions

By Peter Kenter



PROFILE:
Anaheim Water Utility, Anaheim, Calif.

YEAR UTILITY ESTABLISHED:
1879

CUSTOMERS SERVED:
More than 345,000 residents and more than 15,000 businesses

AREA SERVED:
50 square miles

DEPARTMENT STAFF:
Approximately 100 full-time personnel

INFRASTRUCTURE:
750 miles of water distribution pipe; 575 miles of sewer lines

ANNUAL DEPARTMENT OPERATING BUDGET:
For fiscal year 2013-2014, the combined operating and capital budget for the Water Utility is approximately \$81.5 million; for sewer/sanitation, \$66.9 million

ASSOCIATIONS:
American Water Works Association, Orange County Water Association, Water Research Foundation, California Municipal Utilities Association, Association of Metropolitan Water Agencies, Southern California Water Committee

WEBSITE:
www.anaheim.net

California reported one of the driest years on record in 2013, prompting Gov. Jerry Brown to declare a drought State of Emergency in January 2014 and to ask Californians to reduce their water consumption by 20 percent. Careful planning and targeted capital investment have armed the City of Anaheim with the tools it requires to weather the drought.

Anaheim is a city of about 350,000 people located in Orange County, part of the Los Angeles metropolitan area. A robust water supply supports not only its citizens and industries but also a thriving tourist trade with such attractions as the Disneyland Resort, Angel Stadium of Anaheim, Honda Center and Anaheim Convention Center, the West Coast's largest convention center.

It's no surprise that water first attracted people to the area. "It was settled in 1857 by winemakers of German descent who irrigated their vineyards with the resources of the Santa Ana River," says Don Calkins, assistant general manager of Water Services with the City of Anaheim

Public Utilities. "The settlement's municipal water system opened on Sept. 15, 1879, with one shallow well, a 20,000-gallon storage tank built of redwood and a 4-inch wooden pipe to distribute water down four blocks of the main street."

"The settlement's municipal water system opened on Sept. 15, 1879, employing a 20,000-gallon storage tank built of redwood and a 4-inch wooden pipe to distribute water down four blocks of the main street."

– Don Calkins

Diverse water supply

Today, the city is served by 750 miles of water distribution pipe and relies on a diverse water supply sourced from groundwater from its own deep wells, and water imported from Northern California and the Colorado River by the Metropolitan Water District of Southern California. The Anaheim Water Utility serves the city and a few additional unincorporated areas in Orange County.

The utility is responsible for the quality of the city's water supply, transporting water to and through-

out the city and operating the system. It oversees system planning, design and maintenance but outsources most construction, other than emergency repairs and installation of short lengths of pipe.

Rapid growth in the 1950s

resulted in construction of new water infrastructure with 95 percent of the city's water pipes installed after 1950. Pipe diameters range from 4 to 36 inches. Slightly more than half the smaller water pipes are cast iron, and one-third are ductile iron. In descending order, asbestos cement, PVC and steel make up the rest. Concrete cylinder pipe is used for some larger transmission mains.

"A lot of Anaheim is located on the alluvial plain of the Santa Ana River and we're fortunate that it's

(continued)



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GOING UNDERGROUND: WATER, SEWER UTILITIES HELP ANAHEIM BURY POWER LINES

The cost of burying electrical lines previously located on utility poles can be prohibitive. The publicly owned electric utility in the City of Anaheim, Calif., is making that transition affordable on major thoroughfares by working closely with water, sewer and other utilities in a long-ranging 50-year plan.

By 1990, the city had stopped building new overhead distribution lines and established the Underground Conversion Program to improve visual aesthetics along major transportation corridors by removing overhead power lines, phone and CATV communication cables. Funding for the process is provided by a 4 percent surcharge on electric bills.

Coordinating street work

“The public hates it when you dig up and repave a city street, then a year or two later dig it up and pave again,” says Don Calkins, assistant general manager of Water Services with the City of Anaheim Public Utilities. “We realize that’s not a good way to do business. By coordinating necessary street work with undergrounding, we’re making steady progress on the program while minimizing customer disruption.”

The Underground Conversion Program presents a rolling five-year construction plan updated every year, providing plenty of notice to residents and businesses. An undergrounding subcommittee meets regularly to help coordinate construction efforts. A project tracking website keeps all utilities informed of planned work during the period, allowing effective piggybacking of construction activity. Private utilities, including telephone, data and cable television, are mandated by the city to share the same trenches identified by the public utilities.

“In planning work, we look at such factors as geographic diversity of projects,” Calkins says. “You can’t concentrate too much construction activity in one location over a short time span. Both the pain and the benefits need to be spread evenly. As a result, we have an undergrounding program that’s supported by both Anaheim’s policy body and the community.”

noncorrosive soil,” Calkins says. “However, there are some pockets of corrosive soil in the parts of town located on hilly terrain. That’s where we’ve installed the PVC pipes.”

The city installs an average of three to five miles of pipe each year as part of its program to replace aging infrastructure and to improve

tem is in very good condition,” Calkins says. “Compared against other water utilities in the country, the number of main breaks as well as the number of unplanned outages per customer account in Anaheim have both been rated consistently below the American Water Works Association top quar-

“If there’s one thing that irritates customers it’s asking them to conserve water and then raising their rates. As the economy comes back we can expect to see increased revenue going forward.”

– Don Calkins

fire flows in certain areas.

“Back in the 1990s, we conducted an extensive multiyear program of rehab and replacement of cast iron pipes in the older part of town,” Calkins says. “If the pipe was undersized, we’d replace. We’re familiar with the various trenchless repair technologies, but it has rarely been deployed in Anaheim. In this program, if the pipe was adequately sized, we’d rehab it by pigging out the interior and installing a cement mortar liner. That work was completed in 2003.”

In-house crews conduct inspection and acoustic leak detection programs, with additional leak detection performed by outside contractors.

Water system in good condition

“Overall, Anaheim’s water sys-

tile benchmark.”

The city has been a hive of water-related construction activity in recent years, focusing on increasing available water supplies, enlarging rebuilding storage capacity, and improving pumping efficiency and capacity.

Recently completed projects include: an expansion of its Hidden Canyon Pump Station; rehabilitation of its 920-million-gallon Walnut Canyon Reservoir; construction of the Nohl Canyon Water Storage Tank, a 10-million-gallon, above-ground drinking water storage facility; and completion of the Linda Vista Complex, a new 4-million-gallon water storage facility.

On tap for the near future:

- Refurbishing the La Palma Complex. Built in the mid-1950s, the existing facility includes two water

(continued)



Water Production Superintendent Mark Adams (left) and Technician Supervisor Josh Riddle watch as Seth Moore and Tim Nhan install a replacement motor on one of the pumps at the City of Anaheim’s 5.3-acre Linda Vista water storage complex. The facility includes a 4-million-gallon reinforced concrete storage tank.

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Left: The City of Anaheim's Water Recycling Demonstration Facility. Right: Fed by four onsite deep groundwater wells, the Linda Vista complex's 4-million-gallon reinforced concrete storage tank provides one-third of all the water supplied to the residents and businesses of Anaheim.



storage reservoirs and a pump station. Planning includes 4 million gallons of water storage and pumps with a capacity of more than 14 mgd. Construction is anticipated to begin in 2015.

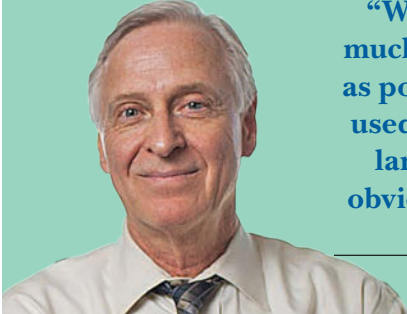
- Construction of the 1.6-million-gallon Windy Ridge Water Storage Tank in east Anaheim, expected to be completed by summer 2017.

The city is currently completing construction of Well 58, a new high-

impacts on groundwater quality.”

Prepared for drought

Anaheim is taking the current drought seriously. It's in good shape to handle this emergency thanks to securing additional water supplies, increasing storage capacity, reducing system water loss and encouraging conservation. The city has calculated that it already has enough water to take it through much of 2015.



“We want to encourage as much voluntary conservation as possible. Half of the water used in Anaheim is used for landscaping, so that’s an obvious place to concentrate on conservation.”

— Don Calkins

capacity potable water well designed to replace two shallow wells.

“We typically divide these projects into two contracts,” Calkins says. “We’ve already drilled the 1,200-foot well to the deeper aquifers and now we’re headed for the second phase, which involves installing a well house, pump, and associated mechanical and electrical equipment.”

The city also recently constructed the Anaheim Infiltration Well Pilot Project, a large-diameter infiltration well designed to capture, treat and infiltrate city stormwater runoff. Stormwater passes through a settling tank designed to eliminate heavy particles and then passes through a hydrocarbon filter before infiltrating into the aquifer.

“It’s a small-scale project,” says Calkins. “Infiltrating the water will help reduce flows to the storm drain system and simultaneously recharge the groundwater basin, but we’re monitoring the site to see if it has any

“We want to encourage as much voluntary conservation as possible,” Calkins says. “Half of the water used in Anaheim is used for landscaping, so that’s an obvious place to concentrate on conservation.”

However, reduced demand places the utility in a conundrum. With rev-

enue based on water consumption, conservation is taking a bite out of the utility’s revenue stream.

“About 80 to 90 percent of revenue is based on commodity sales and 10 to 20 percent is fixed revenue relating to the expense of selling water,” says Calkins. “Over the last five years, we’re adjusting to a combination of reduced revenue and reduced demand that is the result of both conservation outreach efforts and the recession.”

Balancing rates with consumption

The utility recently hired a consultant to help optimize the balance between rates, consumption and costs against future demand forecasts.

“If there’s one thing that irritates customers it’s asking them to conserve water and then raising their rates,” says Calkins. “As the economy comes back we can expect to

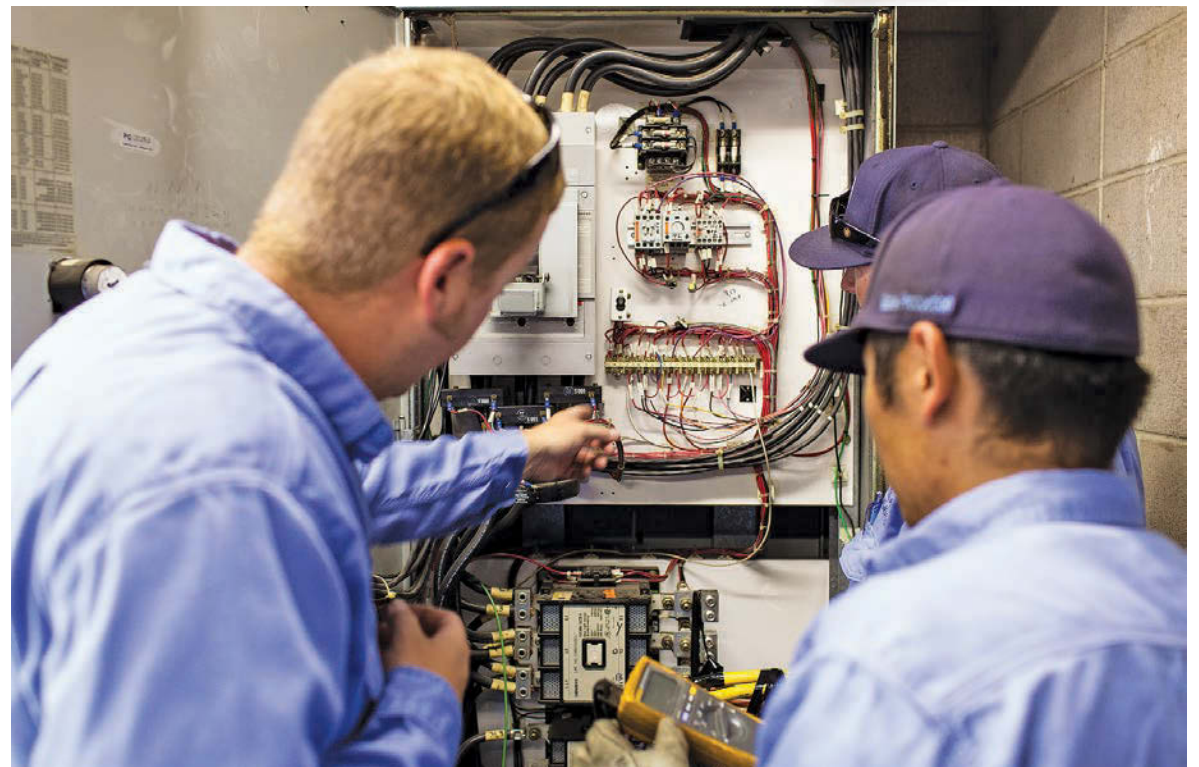
see increased revenue going forward. In the meantime, we’ve tweaked up rates a little each year to avoid hitting the customers hard.”

Calkins says that he believes a city-owned water utility will find itself more capable of accommodating the concerns of water customers over the long haul.

“With a city-owned utility, there’s no stockholder and no dividend to be concerned about,” he says. “Our owners are our customers and that allows us to make sure we concentrate our focus on them.” ♦

WATCH THEM IN ACTION

To learn more about the Anaheim Water Utility, view the video at www.mswmag.com.



Crew members examine the electronics of a recently replaced electric motor on one of the Linda Vista's pumps as they prepare to “bump” it to confirm it rotates in the correct direction.



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A PIPE FOR EVERY PROJECT

Choosing the right materials requires an understanding of conditions and the strengths and weaknesses of each material

By Jennifer West

Agging infrastructure is a prime concern in the water and wastewater world. And with good reason. According to a 2007 EPA survey, the nationwide infrastructure need is estimated at \$334.8 billion from January 2007 through December 2027. The largest portion of that figure – \$200.8 billion – represents needs in water transmission and distribution projects.

Municipalities indeed face a gigantic task: Many pipes are nearing the end of their life spans, and the time to choose a replacement has arrived. In a long-term project like pipe replacement, where life span can exceed 100 years, proper material choice is critical. Here, we examine the most common types of municipal pipe material along with a general guide of the strengths, weaknesses and uses for each.

Ductile iron pipe

Cast iron pipe, which is the predecessor of ductile iron, is part of the infrastructural backbone of this country. Currently, more than 600 municipalities boast 100-year-old working cast iron pipe systems, and more than 20 have pipe that's reached the 150-year mark.

"It's held up very well," says Gregg Horn of the Ductile Iron Pipe Research Association. "Our argument would be if the infrastructure needs to be rehabilitated, that ductile iron would offer a similar or bet-

ter service than cast iron."

Primarily used on the water side, ductile iron is a cast product manufactured almost entirely from ferric scrap. The pipe's materials are 95 percent recycled, a feature that has helped it earn a SMaRT sustainable product certification. Ductile and clay pipe are the only products in the buried infrastructure industry to claim this bragging right.

Despite its strength, ductile pipe is subject to corrosion from aggressive environments caused by acids, either in the interior of the pipe from acidic sewage materials or on the exterior from acidic soil conditions. To combat the problem in water service, the inside of the pipe is lined with a cement mortar lining, which protects the pipe and forms a barrier. Sewers can be a little more challenging for ductile iron, so a special internal pipe lining is sometimes needed.

"It also improves the hydraulics and helps water through the pipe," Horn says. "Its good flow characteristics are maintained. We're not that worried about internal corrosion from water."

The Ductile Iron Pipe Research Association has been researching external corrosion for decades, and its most recent recommendation is an enhanced polyethylene encasement. Horn references a recent case study in which workers dug up and examined ductile iron pipe that



Primarily used in gravity-flow sanitary sewer systems, vitrified clay pipe has improved greatly in recent decades. Computer-controlled kiln firing means the final product is uniform and meets quality standards. (Photo courtesy of National Clay Pipe Institute)

was installed in 1958 in Lafourche Parish, La.

"When you peel the polyethylene off, the pipe looks beautiful. It looks brand-new," he says. "If you protect against external corrosion, there's really nothing that can go wrong."

Steel pipe

Steel pipe, which was first introduced in the early 1800s, has a long history of use in the United States and has been recognized for its excellent resistance to high internal pressures and pressure surges. Large-diameter steel piping is most often used in pressure pipes for water and wastewater applications. It can be made using three methods: seamless, welded and casting mold.

Like other metal pipes, steel is prone to corrosion, so it is lined with an asphalt coating when used in water mains to protect against acidic water. This also retains its good flow characteristics. The drawback to the various coatings and linings is that they can

be damaged during installation.

Steel's primary benefit is brute strength. Cracking typically doesn't occur, and under abnormal loads, the material bends rather than breaks.

Vitrified clay pipe

Clay pipe has been used for millennia, with the earliest examples dating to 4000 B.C. The material was used in Mesopotamia, the Minoan civilization and the Roman Empire, and has a long pedigree of city sewer system applications. But today's clay pipe is nothing like those early examples. Nor is it anything like what was prominently used in the United States in the 1950s and '60s.

"Most people who aren't familiar with modern clay pipe associate it with something that's been in their system for more than 100 years, and they're different," says Jeff Boschert of the National Clay Pipe Institute. "Their opinion of the product is

(continued)

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Concrete is one of the most common gravity-flow pipe materials. It's also one of the most versatile, as it's manufactured in several shapes, including round, elliptical, arched and box, and is used in sanitary sewers, storm drains and culverts. (Photo courtesy of American Concrete Pipe Association)

based off of something that isn't made anymore."

Primarily used in gravity-flow sanitary sewer systems, vitrified clay pipe has improved greatly in this age of technology. Computer-controlled kiln firing means the final product is uniform and meets quality standards. Gone are the laminations in the pipe body thanks to a high densification extruding process.

"Years ago, there were probably 100 different factories manufacturing a porous product that needed glazing on the interior and exterior," Boschert says. "But the modern day pipe is tight, dense and nonporous. The body of the material itself is totally different and stronger."

The joints have also evolved. Decades ago, clay pipe did not have a factory-applied joint, which meant infiltration and exfiltration along with root intrusion and loss of pipe support. Now, joints are factory-applied using polyester with an O-ring or a polyurethane material that creates a leak-free joint. Although the pipe is rigid, the flexible compression joints provide forgiveness if the ground moves.

Clay, which has an average compressive strength of 18,000 psi, can also be used as a direct jacked pipe in trenchless applications. Vitrified clay jacking pipe was introduced to the trenchless market in 1992, and since then, it has been used in pilot-

tube microtunneling, slurry microtunneling, static pipe bursting and sliplining applications.

Vitrified clay pipe really shines in highly corrosive environments, even in the presence of sewer gases and solvent-based chemicals. The only chemical known to affect clay pipe is hydrofluoric acid, which is not likely to be found in sanitary sewers.

"No pipe material can hold a candle to the corrosion-resistant properties of clay pipe," Boschert says. "Many breweries have used it because of its corrosion resistance and temperature parameters."

Clay pipe is valued for its longevity, corrosion-resistant properties and sustainability. However, it does have some limitations: It is typically limited to gravity-flow applications, and the maximum pipe length is 10 feet due to the kiln firing process.

Concrete pipe

Concrete, which is one of the world's most common building materials, is used in both gravity-flow and pressure pipe. Precast gravity-flow pipe is manufactured in several shapes, including round, elliptical, arched and box, and is used in sanitary sewers, storm drains and culverts. Concrete pressure pipe, which is a separate classification, is primarily used for potable water.

"Concrete pipe is pretty simple," says Matt Childs, president of the

American Concrete Pipe Association. "You've got a big, strong, heavy pipe, and as long as you don't mess it up, it's going to be there for a really long time. We've got pipe that's been in the ground for 150 years."

This rigid pipe system is 85 percent dependent on pipe strength and only 15 percent dependent on the soil envelope for underlying support, which makes it a good candidate for low-lying or marshy environments.

"Our biggest advantage is durability, strength and longevity," Childs says. "We also have very good flow characteristics because we have a smooth surface."

Despite its durability, concrete is susceptible to H₂S attacks, and in extremely acidic soil, it can corrode. To combat these problems, concrete pipe can be coated with a plastic liner, and special measures can be used to prevent corrosion in acidic soils.

"We do like to be honest and say that you have to plan for it," Childs says.

Just like with any other pipe material, concrete pipe can fail due to improper installation. Childs reinforces a common theme in the industry: Installation is key.

"If there's a failure, typically it's the installation," he says. "We can have problems with a contractor driving over a pipe before it's installed ... maybe driving heavy equipment over the top to cause heavy compacting. We have problems with installation, too. If it's not put in straight, we can run into cracks."

HDPE pipe

Borrowing technology first used by the gas and oil industry, high-density polyethylene pipe has also become a popular choice for water and wastewater applications because of its noncorrosive, highly flexible characteristics. Also, its heat-fused joints mean zero water loss, which is an important quality as worldwide water value increases.

"In other countries, water is gold. Not in the United States," says Camille Rubeiz, director of engineering at the Plastics Pipe Institute. "[Water loss] is unacceptable. Today we have new technologies, and they should be embraced."

This fusion process creates an unbreakable bond and a joint as strong as the rest of the pipe. HDPE is also highly resistant to corrosion and has a low failure rate, which further decreases life span costs. But Rubeiz states that proper planning, design, installation and inspection are essential when using HDPE.

"It's very forgiving, but that is really a weakness because it can get abused," he says, referring to installation shortcuts. "We're not buying a T-shirt that we can throw away after Christmas. This is a 100-year project. Utilities, consultants and contractors have to be given enough time and resources to do a project well."

Municipalities in earthquake-prone areas should consider HDPE because of its flexibility and ductility. According to a report by the Water Research Foundation, which studied

High-density polyethylene pipe has become a popular choice for water and wastewater applications because of its noncorrosive, highly flexible characteristics. And its heat-fused joints mean zero water loss. (Photo courtesy of Plastics Pipe Institute)





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recent earthquakes and their implications on U.S. water utilities, HDPE capably withstood tremendous seismic activity. The study states that in the 2010 Chile earthquake, for instance, "while the rest of the water system suffered thousands of damaged pipes, no HDPE pipe was damaged." The report recommends HDPE for common distribution pipes and service laterals in high seismic zones.

HDPE is available in sizes from 1/2 to 65 inches, covering everything from service lines to distribution and transmission mains. Its use has expanded across Europe, and according to Rubeiz, nearly 90 percent of new pipe installations in Europe are HDPE.

"When installers and designers follow the book, there should be no issues," he says. "All conditions need to be considered at design. There shouldn't be shortcuts on something you want to last more than 100 years."

PVC pipe

Polyvinyl chloride, which scientists first stumbled upon in the 19th

century, is one of the oldest synthetic materials. It wasn't until World War II, however, that demand for the material accelerated when it was used to insulate wiring on military ships. In the decades following, PVC use skyrocketed, and now it's commonly used for sanitary sewers and potable water distribution lines. PVC is a thermoplastic, meaning it can be softened and reformed, and a fusible version is now available, which competes with HDPE in trenchless construction.

This pipe is very corrosion resistant and is often used to coat other materials that are affected by acidic conditions. In a 2008 study by the Water Research Foundation titled "Impact of Hydrocarbons on PE/PVC Pipes and Pipe Gaskets," researchers concluded that PVC is also impervious to gasoline, the most common hydrocarbon contaminant.

This corrosion resistance translates to a low failure rate. A 2012 survey by Utah State University indicated that when compared to cast iron, ductile iron, concrete, steel

and asbestos cement, PVC had the lowest failure rate with only 2.6 failures per 100 miles of pipe per year.

"This is space-age stuff," says Bruce Hollands, executive director of the PVC Pipe Association of North America. "It's a high-technology material that removes corrosion completely from the equation."

Cost is a large reason why municipalities are drawn to PVC. Even when including backfill and labor expenses, PVC is typically a less expensive replacement option than other materials. Hollands states that in some situations, a 70 percent savings can be realized when using the material.

That said, PVC is not without some limitations.

"There are two reasons you wouldn't use PVC," Hollands says. "You wouldn't specify it for situations with operating pressures higher than 305 psi, and you wouldn't use it in an application that requires temps above 140 degrees. These conditions, however, are extremely rare in water and sewer systems."

An American Water Works Asso-

ciation Research Foundation study estimates the life expectancy of PVC to be in excess of 110 years. Pipe sizes range from 4 to 60 inches for both sewer and water applications. The 54- and 60-inch-diameter water pipes are a relatively new addition to PVC and are currently not as widely available.

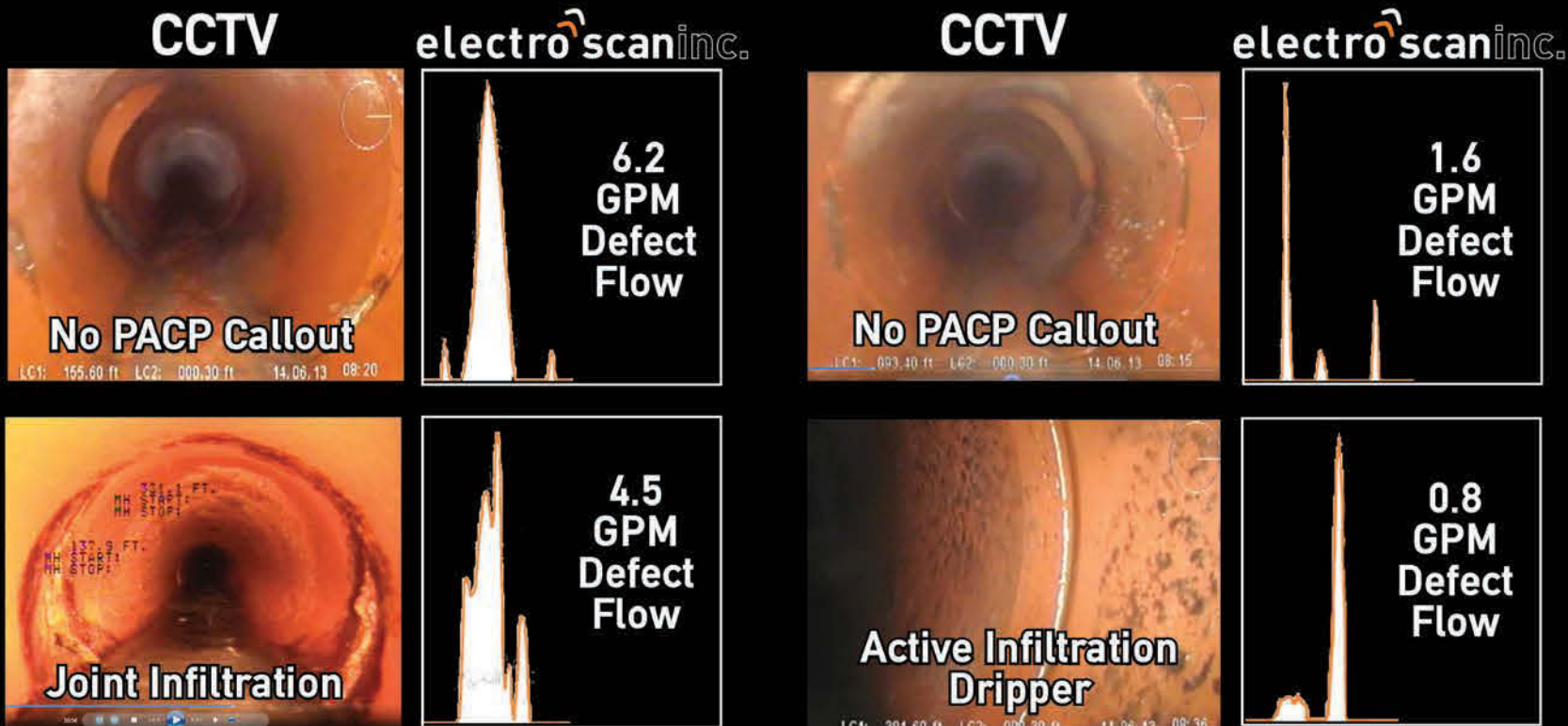
Making decisions

Pipe material selection can be a complex process, filled with politics, preconceived ideas and budget parameters. And to complicate the matter, municipal leaders must now navigate through marketing hype as manufacturers fight for a piece of the infrastructure pie.

What it boils down to is considering uses, soil conditions and reasons for previous failures, and then making a well-informed materials decision. After all, if all goes well, a pipe replacement decision should only come around once every 100 years. ♦

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(1) EPA Region 3 and Pennsylvania Department of Environmental Protection, CCTV and Electro Scan Benchmark, Lancaster, PA, May 20, 2014.

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- CCTV can't accurately identify or quantify defects inside joints,
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- CCTV operators oftentimes rate the same defect, using different codes,
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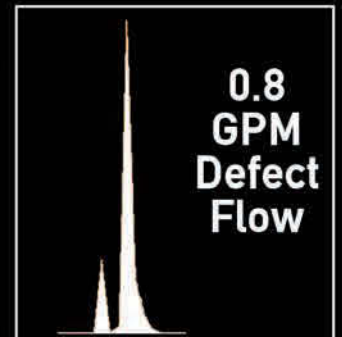
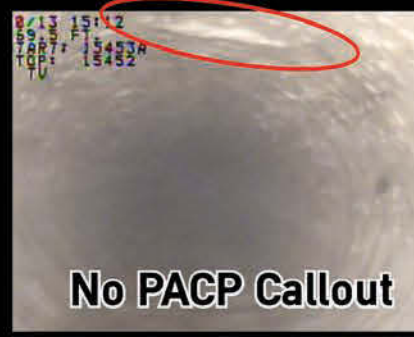
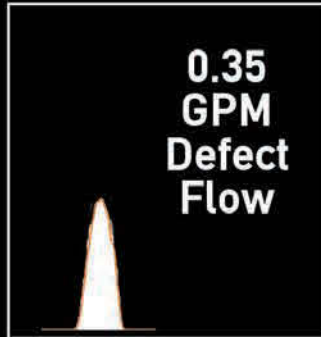
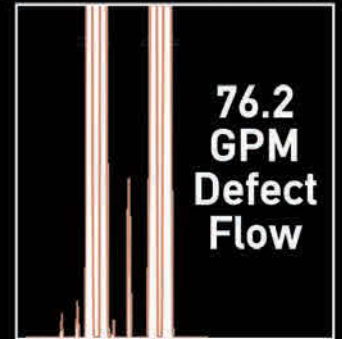
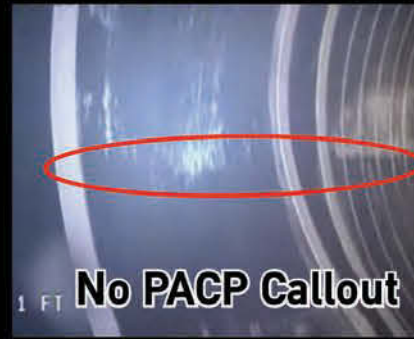
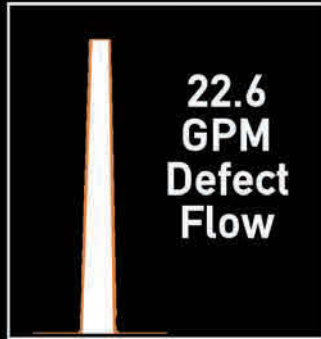
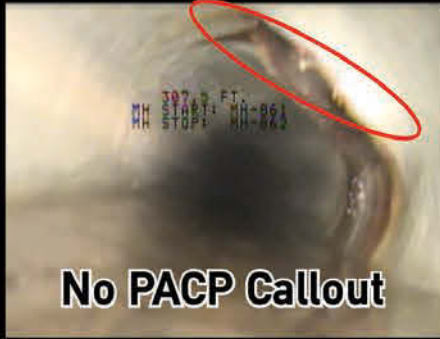
Post-Rehabilitation Assessment ⁽²⁾

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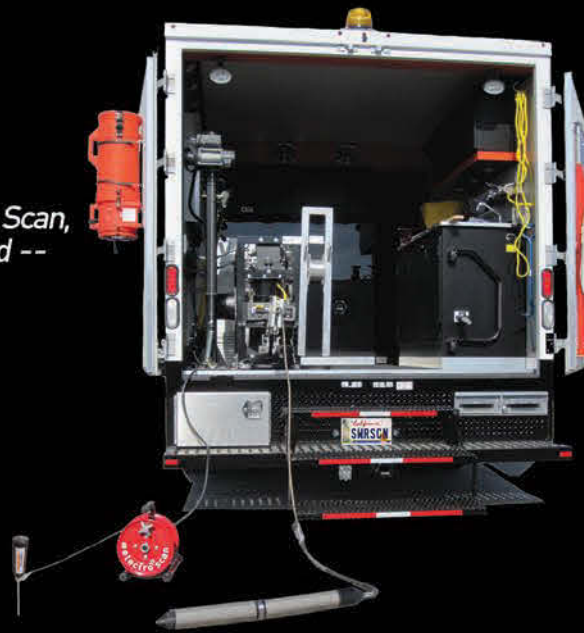
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(2) Represents post-rehab projects in 2013, with no defects identified by CCTV. In 2014, a major metropolitan sewer agency electro scanned forty-nine (49) post-CIPP sewer mains that were lined in the year 2000 (i.e. 14 years old); 100% showed defect flows, while 40% showed defect flows greater than 10,000 GPD, each, or 80% of total defect flows for all lined pipes.



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BETTER EVERY DAY

Creating a culture of continuous improvement isn't easy, but the rewards are well worth the effort

By Ken Wysocky

In 1995, Freese and Nichols Inc. – a prominent water and wastewater engineering and architectural firm based in Fort Worth, Texas – found itself in dire straits. The firm had posted an annual profit of -1.7 percent, the first unprofitable year in the history of the then-100-year-old company, and morale was heading lower than wastewater flow at a broken lift station.

“We were literally on a burning platform,” notes Bob Pence, the company’s president and chief executive officer. “We were very much a clan organization ... a great place to work, because everyone took care of each other, but no accountability. If you didn’t do well, no one called you out on it.”

Today, Freese and Nichols is the proud recipient of a coveted and prestigious Malcolm Baldrige National Quality Award, earned in 2010. The company is the only engineering and architectural firm to win the award, the country’s highest honor for business-performance excellence.

What happened in between – the organizational changes that created higher levels of employee and client satisfaction, reduced employee turnover, and greatly improved accountability and profitability – can be summed up in three simple words: continuous-improvement (CI) management. And the lessons behind this company’s journey from cultural complacency to utmost competency can be easily applied to the municipal water and sewer utilities, Pence notes.

“Continuous-improvement management principles are very applicable to other industries and

operations,” he says. “They’re non-prescriptive too. They don’t tell you what to do, they show you how to examine what you’re doing, find the areas of weakness and figure out how to fix them. And the beauty of it is that none of it is rocket science.”

Back to basics

Fortunately for Freese and Nichols, the company’s CEO in 1995, Bob



“When we found gaps between our goals and how we really were doing, CI showed us how to do root-cause analysis and take action to fix things, then go back and measure them to make sure they’re fixed.”

– Bob Pence

Herchert, also sat on the board of directors for a local hospital that had embraced CI. Intrigued by what he heard at a hospital board meeting, Herchert decided a CI program might resolve Freese and Nichols’ woes.

“We didn’t start out to win a Baldrige award,” explains Pence, who was a division manager at the time. “We just wanted to implement a continuous-improvement management system that would measure the things we do. ... When we found gaps between our goals and how we really were doing, CI showed us how to do root-cause analysis and take action to fix things, then go back and measure them to make sure they’re fixed.”

To introduce the CI concepts, the company held several lunch meetings with managers and employees. “You’ve got to tell people about it several times,” Pence advises. “It took me four meetings before I could see where we were going, which was to identify key areas that need improvement, then develop key focus indicators that track whether or not we’re improving.”

Performing a form of corporate triage, company officials decided to focus first on profitability, realizing that if that issue wasn’t fixed, nothing else would matter. Analysis revealed that the company was over-staffed; at the time, several large projects had been completed, but no replacement business was coming in to keep the pipeline full.

“So first we had to get right-sized, which involved letting 60 people go,” Pence said. “The company had never laid off anyone, so it was very hard to do. But when you never lay off employees, you’re inevitably keeping onboard people who aren’t doing a good job.”

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.

The company also had a problem because two of its four divisions weren’t performing very well, but employees there weren’t being held accountable. So Pence and another employee were promoted to operations managers, responsible for managing those divisions. They developed budgets, set goals and examined things like billable utilization and other efficiency measures.

Monthly status meetings also helped the company hold managers and employees accountable. Whenever gaps emerged between goals and actual performance, managers used root-cause analysis to reveal the problem. The efforts bore immediate fruit when the company regained profitability in 1996, but Pence says part of that was due to the so-called Hawthorne effect, in which performance improves merely because something is being studied. Improvements in other areas developed more slowly.

Monitoring results

Measuring the results of operational changes is one of the keys to any successful CI program. And by many measures, Freese and Nichols has been very successful. Bookings in 2014 are expected to hit \$97 million, compared to \$20 million in 1995. The company employs 540 employees, more than double the employment of 235 in 1995. And on a scale of one to five, with five being the best, employee satisfaction rose to 4.85 from 4.5 during the last 15 years – an incremental gain but no small feat considering the large increase in employees, Pence notes.

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In addition, employee turnover stands at less than half the industry's national average – 6 or 7 percent compared to up to 16 percent. And the percentage of new employees who stay for two years stands at around 88 percent. Moreover, in the last 15 years, client satisfaction also increased to 4.85 from 4.5. Again, that's not much of a gain, Pence concedes – unless you also consider that the company's client base is considerably larger now, he says.

Another key point: Once begun, the CI journey never ends; it just becomes incorporated into an organization's culture. Pence says that despite all the measurable improvements over the last two decades, the company still annually determines three or four areas that require improvement, though the areas of focus tend to remain the same: employee satisfaction, client satisfaction, financial growth and technical excellence.

One root-cause analysis even changed how Pence operates, he says, noting that so far this year, he's

already visited 28 clients in person. "It just popped out as a factor in client satisfaction," he says. "We compete against national firms where senior executives don't always have time to visit clients. But I do.

"Visiting clients in person takes up about 30 percent of my time now and it's the best thing I do," he adds. "It's not that I'm some sort of great salesman. But when a senior executive visits a client, it indicates the level of focus we're putting on a project."

Pence takes great pride in another indicator: the company's profitability. A review of financial results during the last 20 years revealed that Freese and Nichols did well when the economy fared well and poor when it was poor. But ever since the company embarked on its CI journey, it performs solidly no matter how the economy performs. And that sure beats standing on a burning platform. ♦

To learn more about continuous-improvement processes and the Baldrige award, visit www.nist.gov/baldrige.

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WELL SCHOOLED

Jeff Romero learned lessons in the Marines and from his hard-working father that helped him succeed in the water and wastewater field

By Trude Witham

Pipefitter Jeff Romero wears many hats at the Los Alamos County (N.M.) Department of Public Utilities. He oversees maintenance and construction projects for water, wastewater and gas systems, troubleshoots customer problems over the phone, and makes sure the people of Los Alamos receive reliable, high-quality utilities service.

Romero has faced challenges on the job, and they include overseeing a 50-person crew that rebuilt water, wastewater and gas infrastructure damaged by the 48,000-acre Cerro Grande wildfire in 2000.

years in the military, and his mentors. His greatest mentor was his father: “My dad was a meat cutter who hardly ever missed a day of work. I learned from him about what it means to be responsible and do the best job you can every day.”

Highly motivated

A native of Santa Fe, Romero joined the Marines right out of high school. After six years of duty, including a tour in Kuwait for Operation Desert Storm, he left the Marines and enlisted in the National Guard. “In the desert, they treated the water

“My dad was a meat cutter who hardly ever missed a day of work. I learned from him about what it means to be responsible and do the best job you can every day.”

Jeff Romero

After a 17-year career at the utility, Romero was recognized for outstanding work. He received the 2012 Water Distribution System Operator of the Year award from the New Mexico Water and Wastewater Association.

“My supervisors are taking notice of my self-motivation and ability to complete all the tasks assigned to me,” he says. “Those who work with me in the field [Joseph Montoya, Sammy Maestas, David Gomez] wanted me to win this award.”

Romero’s success comes from pride in a job well done, a strong work ethic learned during eight

with a reverse osmosis system, and that was my first experience with water treatment,” he recalls. In the National Guard, his fluency in Spanish landed him in Panama.

While out of the United States, Romero noticed the lack of sanitation in many areas. “There were open sewers or one spigot for drinking water,” he says. “I became interested in working in the utility business to maintain and improve the infrastructure. And here I am today, working in not just one area but in water, wastewater and gas.”

After leaving the service,
(continued)



New Mexico Water Distribution System Operator of the Year award winner Jeff Romero works in Los Alamos. (Photography by Eric Draper)

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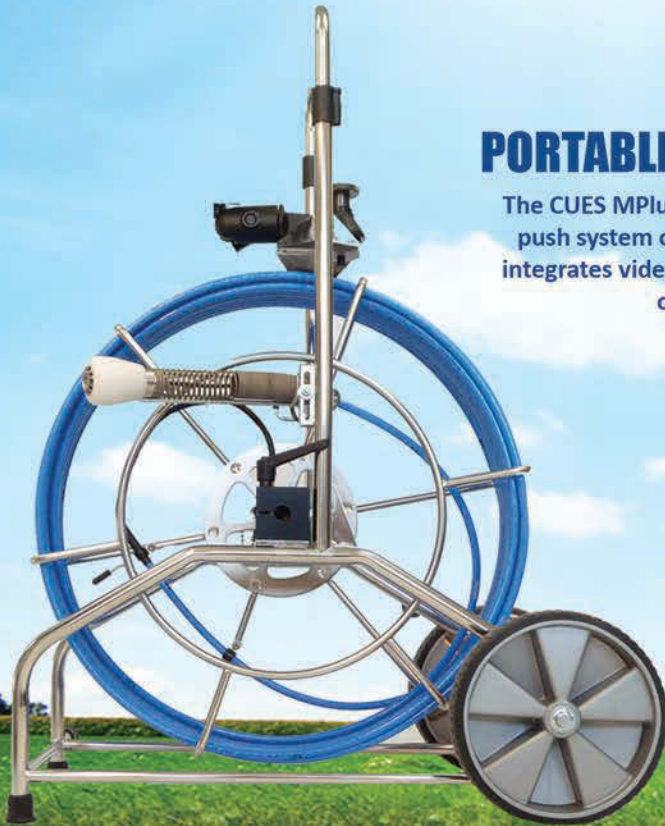


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Above: Jeff Romero does a walk-around inspection of the Sycamore Water Tank (capacity 7.75 million gallons). Right: Romero inspects a water meter can with a customer in Los Alamos.

Romero connected with a friend who became his mentor. “Martin Flores taught me about the gas industry,” he says. “I’ve known him since I was 5. He worked for the gas company as a welder and put me to work. I started as a meter reader and

moved to senior crew member laying gas lines.”

He later went to work for Larry Maestas, another mentor. “Larry owned a business that contracted work out to other gas companies. I worked for him for a few years, and when he downsized, I went to Los Alamos County DPU.”

He started as an apprentice and observes, “If you want to move up at Los Alamos, you must have credentials. I had only a gas fitter’s license, so they gave me six months

activated sludge plant. Drinking water is drawn from 12 aquifer-fed wells. Four disinfection sites treat the water with a MIOX system (MIOX Corporation). The water production and distribution divisions provide water to about 7,000 customer meters in Los Alamos County, Bandelier National Monument and Los Alamos National Laboratory.

On a typical day, Romero might be found working on water meters, wastewater pipes or gas lines. “There

employees. “Every six weeks from 7:30 a.m. on Friday to the following Friday, I am on call,” Romero says. “The overtime in this job is good, but it does wear on the body.”

Long days

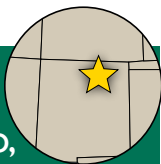
The days can be strenuous. After the 2000 wildfire destroyed more than 400 homes and much of the city’s infrastructure, Romero was assigned to oversee a 50-person water line construction crew. “This involved new mains and services, disinfection, hydrostatic testing, hydrant installations, line rerouting,” he says. “It was a huge undertaking.”

With more than one crew at any time performing the same work in different locations, the lead crew person on each job looked to Romero for guidance. “They were constantly asking questions about one thing or another and coordinating change orders in the field,” Romero says. “There was no downtime, and it was a strenuous task to say the least.”

He recalls that when the fire ravaged the city, the utility crews responded on a Wednesday and worked 18 hours a day for three straight days. “My family told me it

(continued)

PROFILE: Jeff Romero, Los Alamos County (N.M) Department of Public Utilities



POSITION:
Pipefitter

EXPERIENCE:
17 years

AWARDS:
2012 Water Distribution System Operator of the Year, New Mexico Water and Wastewater Association

CERTIFICATION:
Class 4 water operator license

GOAL:
Obtain a supervisory position

“Now it’s my turn to mentor someone. EZ started a year ago, and we work as a team. When anyone works for me, it’s like a partnership.”

Jeff Romero

to get my water and wastewater certifications.” Today, he holds a class 4 (highest) water operator license and supervises apprentice Escquiel “EZ” Garcia. Says Romero, “Now it’s my turn to mentor someone. EZ started a year ago, and we work as a team. When anyone works for me, it’s like a partnership.”

Treating the water

Los Alamos County operates its own gas company, a trickling filter wastewater treatment plant and an

is a lot of variety; it’s not a boring job,” he says. Based in the utility’s shop area, Romero reviews his work orders in the morning and spends the day in the field. “I come in early, get on the computer, and pull work orders and pull all the parts and equipment and personnel we need for that day’s job,” he says.

Romero is periodically on call for seven days at a time and is one of six distribution system employees with primary (lead person) status. There are 12 secondary status

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READY TO BOOGIE

When not working long shifts overseeing water, wastewater and gas distribution system maintenance and construction projects, pipefitter Jeff Romero loves to camp out and fish with his grown son.

“When I was in the military, I spent most of my deployment near water – in San Diego, North Carolina and Japan – so I love the water,” Romero says. “When I retire, I want to be near the ocean.”

Although the ocean is a long way from the Los Alamos County Department of Public Utilities where he works, Romero finds time to go boogie boarding in places like Ocean Beach, San Diego. “A boogie board is a smaller version of a surfboard, and I used to do this when I lived in San Diego,” he says.

He also plans to let down his hair: “Since I was a little kid I never had long hair, so I’m going to let my hair grow as long as possible.”

“I’ve been here 17 years and would like to move into one of the supervisory jobs that may be available in the near future.”

Jeff Romero

was Saturday when I got home, since I had lost track of what day it was,” he says. “In the military service, they don’t care if you sleep or not as long as you are still alive, so I got used to it.”

Face of the utility

Romero especially likes working with the public: “I deal directly with contractors, businesses and residential customers. I appreciate that people are diverse and from different walks of life.

“I remember once I went into a Japanese person’s home, and I noticed that they take off their shoes. OSHA doesn’t allow us to do that when we’re working, so I asked her to get me plastic bags and I put them over my shoes. You have to be safe, but if you make the effort to respect their customs, they appreciate that.”

Dealing with the public can be challenging. For example, Romero visits restaurants to check their grease traps. “If a lot of grease gets into the sewer, it can cause a problem at the wastewater plants, so we do spot inspections at 36 restaurants and 100 commercial businesses,” Romero says. “We can show up on a given day without notice and inspect the traps. Some of the businesses try to get out of the expense of fixing the problem, but once the state board of health gets involved, they usually comply.”

Looking to the future

Romero’s greatest challenge is learning the Los Alamos County construction rules and regulations: “Everything we do in the field needs to be done a certain way, and contractors have to go by the book too. I need to know all the rules and regulations so I know if the contractors whose work I oversee are following the book.”

His greatest accomplishment: “Getting this far and learning three different trades – water, wastewater and gas.

“I’ve been here 17 years and would like to move into one of the supervisory jobs that may be available in the near future,” he says.

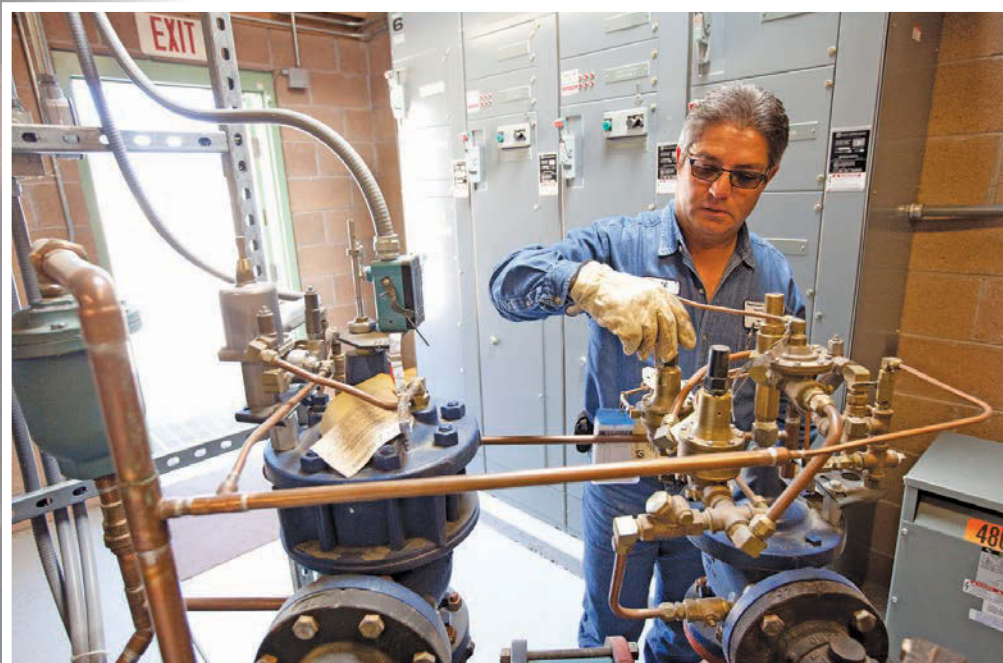
Until then, he will keep doing the best job he can for the customers he serves: “I love coming to work, and if a project needs to get done, I will do everything to make sure it goes smoothly and safely.” ♦

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Jeff Romero adjusts a CLA-VAL surge anticipator valve at a Los Alamos water pump station. Right: Romero works on a 14-inch CLA-VAL pressure regulating valve.



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SNIFFING OUT TROUBLE

Canine crews scent human waste to help trace failing wastewater systems

By David Steinkraus



Logan, one of the dogs from Environmental Canine Services, checks the Little River outlet where it flows into the Atlantic Ocean at North Hampton State Beach in New Hampshire. Below: Scott Reynolds and his dog, Sable, from Environmental Canine Services, search a stream while doing a shoreline investigation in Maine. (Photos courtesy of Environmental Canine Services)

For thousands of years they have tracked game for humans. Now the humans have something new. Dogs still track with those incredible noses, but they're tracking threats to human health.

Several years ago Scott Reynolds realized he could use dogs to detect wastewater, and his thought has blossomed into a tool for the quick detection of wastewater system problems. Now, after a few years of training and field experience, his Environmental Canine Services of Vermontville, Mich., is forming a partnership with FB Environmental Associates of Portland, Maine, and Portsmouth, N.H. The companies will benefit but so will anyone who needs a simple, effective tool to track the source of water contamination.

Same nose, different scent

The idea came to Reynolds from his experience as a law enforcement officer where he trained with dogs used to find narcotics and search buildings. He left that career, earned

“We collect all sorts of scat to use in our training process and not only pet waste. For example, we also use raccoon scat because raccoons are infamous for living in storm drains.”

Scott Reynolds

a degree in environmental science, and was hired by a large engineering firm to look for illicit discharges. “On one job we realized that we were spending an enormous amount of time taking samples that were ultimately coming back clean,” he says.

He began thinking about employing dogs, and in early 2007

he and his wife, Karen, adopted their first dog, Sable, a male German shepherd mix, from an animal shelter. They began offering their service in 2009, and when it became clear the idea would work, they

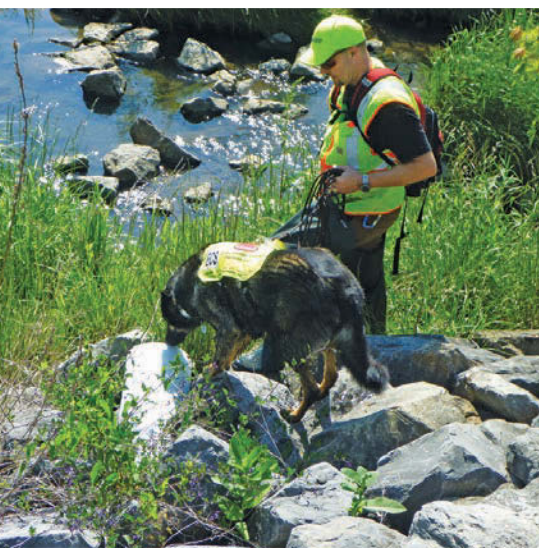
added a second dog.

Forrest Bell, principal scientist at FB Environmental Associates, learned about Reynolds from a client. At the time, his company was working on impairment of surface waters by bacteria. He saw potential, talked it over with his staff, and then arranged to have Reynolds and

a couple dogs come to New England. “I wanted to learn whether this is a viable tracking tool, and the more I learned the more I thought it was. We have a lot of issues in New England, and we really wanted to see these dogs in action,” Bell says.

Many of Bell's clients are municipalities trying to discover what is contaminating beaches and where sewage overflows originate. One of the company's projects was to test beaches in Kennebunkport, the





Clockwise from above: Scott Reynolds and his dog, Sable, check over an outfall during an investigation in Milwaukee; Karen Reynolds and her dog, Logan, stand beside an outflow at White Sands Beach on the shore of the Atlantic in York, Maine; an Environmental Canine Services crew investigates a catch basin in Durham, N.H.

small Maine town that for generations has been a retreat of the wealthy, such as the presidential Bush family. It's a beautiful coast where a rental house is \$4,000 or \$5,000 a week, Bell says, but there were regular warnings or complete closures of the beach because of bacterial contamination. Suspected sources included septic systems, a sheep farm and wild geese.

"We set up a project and did a lot of testing, but at the end of the work we couldn't say what percentage of the problem came from human waste and what percentage came from the geese living in a nearby marsh," he says. At \$350 or more per sample, testing DNA to distinguish goose waste from human waste was prohibitively expensive. Had he known about Reynolds' service at the time, it would have made the Kennebunkport project much easier because dogs can test a sample in seconds, Bell says.

Bring in the dogs

Training a dog to recognize waste requires eight months to a year, a bit less for animals that have had scent training, such as for com-

petitions. Reynolds and his staff look for sporting or working breeds, the types of animals that have drive and will work for a reward. Dogs that hunt by sight, such as greyhounds, are out, as are dogs with flat faces such as bulldogs. They tend to have poor scenting ability and have difficulty breathing in hot weather. Age isn't a great factor, Reynolds says. A dog's body, sight and hearing deteriorate before the sense of smell. Sable is 8 and still doing well.

Handlers are trained as well, although it is not as rigorous a course as police officers go through simply because police face so many intense situations, Reynolds says. The process teaches dogs not just to recognize waste but also to distinguish human waste from other types. "We collect all sorts of scat to use in our training process and not only pet waste. For example, we also use raccoon scat because raccoons are infamous for living in storm drains," he says.

"That's an important point, that the dogs scent only human waste," Bell says. It relates to that beach in Kennebunkport where it was very difficult for the usual tests to deter-

mine what type of waste was causing contamination. Dogs can immediately recognize traces of human waste and won't be distracted by goose waste.

Fast work but hard work

"In the case of beaches or tributary streams, we can say with confidence whether there is human input. Clients can focus on the animal problem or the human waste problem. In other words, using the dogs allows our clients to target their resources efficiently," Reynolds says.

And the dogs are fast. In just a few seconds they decide whether a

sample or a location is or is not contaminated with human waste, Reynolds says. That ability makes them very cost-effective. This does not mean field technicians don't take samples, Bell says. They do because the samples can provide other information such as how much bacterial contamination there is or what sort of animal it came from. By distinguishing types of waste and the location of contamination, the use of dogs can cut the cost of testing from thousands of dollars to hundreds.

"The slowest part of the process is the humans. It takes us longer to write down data and talk than it does



“In the case of beaches or tributary streams, we can say with confidence whether there is human input. Clients can focus on the animal problem or the human waste problem. In other words, using the dogs allows our clients to target their resources efficiently.”

Scott Reynolds

for them to take a scent,” Reynolds says. And this is hard work, he adds. One summer in Maine the temperature was in the 90s. Dogs and handlers work in mud, in the rain and on hot pavement. They tramp across fields, through streams and brush. In one case, a dog testing a beach in Kittery, Maine, was signaling the presence of human sewage everywhere. It was groundwater seepage, and the dog and his handler tracked that seepage through a wetland and to a grassy area where there was an out-house used for outdoor weddings.

“You come back bloody and bruised,” Reynolds says.

“I second that,” adds Bell.

An extra benefit of bringing in dogs has been the opportunity for public education. Despite being around for several years, this service remains a novelty. People are curious about the dogs, what they do and how they do it, and this pro-

vides openings for conversations about wastewater. In Maine they did many public events using an alternate method of testing: People collected water samples and brought them to one place for the dog to examine. If news reporters show up, the message is spread widely.

Medical noses

There are more threats to human health than untreated or partially treated sewage. If you’ve been watching the news in the last few years, you have probably seen stories about dogs being used to detect the early stages of cancer in people. A few experiments have found dogs can sense the presence of various kinds of cancer, but no one is using dogs systematically for this.

One group of researchers in England found dogs can sense the presence of *Clostridium difficile*, a particularly nasty bacteria that



Above: Scott Reynolds and his dog, Sable, investigate stormwater outfalls in Beckley, W.Va. Below: Reynolds and Sable check outfalls along North Mill Pond in Portsmouth, N.H.

causes some hospital infections. Dogs are best at this in a patient’s room, where the scientists think they can smell the odor soaked into bed sheets. There is a risk from bringing an animal into a hospital, but the use of dogs suggests an entire ward could be screened for disease in a matter of minutes.

Yet dogs remain a mystery. Many scientists are trying to develop electronic noses, sensors that can smell what dogs smell with perhaps more sensitivity, but the work isn’t progressing quickly because although expensive equipment can find out what is in the air, no one knows exactly what the dogs are smelling.

The company has two dogs field certified for the Northeast and two more in training. Two dogs are in training for the Midwest, and in California the company has employees who own four dogs. The partnership with Bell and his staff allows the two companies to provide a wide range of services to customers, Reynolds says.

Although the company began in the Great Lakes region serving the needs of communities worried about beach contamination, it is being called in to other jobs where leaking sewers or any sort of contamination needs to be traced, Reynolds says. There are now three regional teams limited only by car travel. (The dogs face too much risk in the cargo bays of commercial aircraft.) Regions such as Chesapeake Bay, the Great Lakes, or Florida’s Indian River Lagoon could easily

support the constant use of dogs.

Hitting the beach

Beaches form a common thread in his work, Reynolds says. When he started offering canine services in Michigan, municipalities were interested in finding sewer line breaks or overflows from combined sewers. For those municipalities, the issue was pure economics, as it is for other communities. When prosperity depends on tourism, the last thing a community needs is a wonderful beach that no one can use.

It’s easy to see a business opportunity in this. If dogs cannot be replaced in the near future, it is possible for people to offer this service as either a primary or ancillary business. With the U.S. Environmental Protection Agency and state environmental agencies paying more attention to water quality along beaches, and with constraints on government funding, the market for using cost-effective dogs looks good.

But this is not an easy business to enter. Many times people call his company and ask how they can train dogs to track waste. While Reynolds is always open to conversations, it’s not a simple process, he says.

“They don’t consider the depth of training. The difficult part is taking the dog from a controlled environment in your garage, or wherever, and moving out into the real world.” Also, you need to have a dog with the right temperament, and you need the right sort of person to handle the dog. ♦



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PIPELINE INSPECTION, SURVEYING AND MAPPING

By Craig Mandli

The ability to quickly and efficiently locate a blockage or damage in a municipal water or sewer pipeline can save utilities and taxpayers substantial sums. This selection of inspection camera systems, leak detection equipment, data recorders and software programs can help municipalities and contractors stay ahead of potential problems.

Mainline TV Camera Systems

Heavy-duty inspection camera

The **Viztrac II AM240-200** pipe inspection camera from **Amazing Machinery** has 200 feet of durable 1/2-inch push cable with fiberglass rod inner core, a 20-inch cage reel and attached water-sealed case containing the controls, a high-resolution 7-inch LCD monitor and wheels to increase mobility. It also has a 1-inch powder-coated lay-flat frame with upright rolling stand; a 1 3/8-inch O.D. metal camera housing; nine dimmable high-output 5 mm LED lights; high-resolution color camera with a self-leveling head; scratch-resistant sapphire glass lens; high-grade 512 Hz sonde locator with an average range of 12 to 15 feet; and an integrated digital video recorder with remote control, compatible with most standard SD cards. **800/504-7435; www.amazingmachinery.com.**



Pipe inspection camera

The **EasyCAM E3200** was designed from a plumber and drain cleaner's perspective, using easily replaceable modular components. When repairs are needed, the owner can easily do them as no special tools are required. It includes a lightweight titanium color camera head, 200 feet of HYTREL abrasion-resistant pushrod with molded waterproof connectors, 512 Hz transmitter, onboard 8-inch daylight-readable monitor, powder-coated aircraft aluminum frame, RCA video jack for laptop or DVR use, safe 12-volt operation and heavy-duty wheels. **239/260-2056; www.easycamllc.com.**



Pipeline inspection camera system

The **Ecamm PRO 2** from **Electric Eel** is used to inspect 3- to 10-inch pipelines. It includes a stainless-steel-housed 1.68-inch self-leveling color camera with sapphire lens, 20-LED light ring and a high-resolution CCD element. A flexible camera spring navigates 3-inch P-traps. The auto iris adjusts lighting automatically. It provides industry standard 512 Hz sonde and has a 10.4-inch daylight readable display with an on-screen footage counter. Up to 16 pages of text writing is available with memory saves and click touch controls with one-touch recording. It records directly to a USB flash and allows for voiceover recording with



audio/video out jacks. It has an 8x zoom function and adjustable light controls, with a two-hour battery with built-in charger. It comes standard with 200 feet of Kevlar-braided 1/2-inch pushrod, and powder-coated steel tube and bar construction with a secure-locking reel brake. It rolls on 8-inch wheels for easy maneuverability. **800/833-1212; www.electriceel.com.**

Pan-tilt pipe inspection camera system

The **FB-PIC3688B** pan-and-tilt pipe inspection camera system from **Forbest Products Co.** allows users to have panorama pictures with remote directional control. It comes with 2 1/4-inch waterproof 360-/ 180-degree pan-and-tilt high-resolution color camera head with zooming and 400 feet of 9 mm fiberglass cable with a reel with meter counter. The 600 TVL camera head has high LED lights with 130-degree wide angle and 10-60 mm focus, and can work 30 meters underwater. The heavy-duty waterproof control box includes a 10-inch LCD color screen with USB and built-in SD card to record photos and videos. Control buttons on the front panel are designed for remote controlling camera head rotation for over 20,000 hours continuously. On-screen status indicators include footage of the cable pushed through the pipe. The built-in rechargeable battery lasts about three hours. **650/757-4786; www.forbestusa.net.**



Municipal inspection system

The **MY400 Municipal Inspection System** from **MyTana Mfg. Company** is ideal for the small to medium municipality that is responsible for operating, documenting and maintaining sanitary sewer systems. It includes a color self-leveling camera with 36 Super-Brite LEDs for illuminating larger municipal sewer lines, and a built-in 512 Hz transmitter for locating. The DCB12 control system incorporates a touch screen with drag-and-drop icons to identify common problems. The laptop-based system also allows for easy recording, uploading and backup of inspection activities. Its 400 feet of pushrod is adequate for inspections between manholes. Its AccuSonic 512 Hz locator-receiver pinpoints problems before digging up a sewer line. The Super Sonde transmitter provides a strong signal for locating problems in deeper municipal sewer systems. **800/328-8170; www.mytana.com.**



Wi-Fi-enabled pipeline inspection camera

The **Elite SD Wi-Fi** pipeline inspection camera from **Ratech Electronics** records pipe inspections wirelessly to iOS or Android devices, and takes live video and digital still photos that can immediately be uploaded to YouTube. Downloading an app to an iPhone or iPad allows for wireless video streaming. It is available with a sun-readable 10-inch LCD monitor and either a self-leveling camera, small ultra micro-camera or a pan-and-tilt push camera. Systems come in cable lengths from 100 to 400 feet. **800/461-9200; www.ratech-electronics.com.**



CCTV pipeline inspection system

The **Mainline High Cube** CCTV pipeline inspection system from **RS Technical Services** has single-conductor technology with customizable high cube van installation. Plug-and-play components can be added onto existing systems without the need for additional system controllers or upgrades. Cameras, transporters, lateral launchers, cutters and laser profilers can all be easily and precisely operated on one single conductor. Longer inspection runs and smaller diameter cable come standard. It is available in a variety of sizes (usually 12- to 16-foot box lengths), providing ample storage room while allowing for customizable system installations. Extra workspace, countertops, toolboxes and onboard bathrooms are available. Power sources, safety lighting, air conditioning, heat, floor and wall coverings, and cab access is configured to the customer's requirements. **800/767-1974; www.rstechserv.com.**



Long-distance inspection system

The **vCam-5** inspection system from **Vivax-Metrotech Corp.** has the ability to locate the entire length of pushrod, in addition to having a locatable sonde. Simply connect the hot lead from a cable locator transmitter to the reel and the ground lead to ground. The Type-CP Systems reel comes with either 200 or 400 feet of 12 mm Kevlar-reinforced pushrod stiff enough for long distances and flexible enough for easy entry and turns. The control module has a daylight-readable display, volume control, wireless mouse support and RS232 support for MuniXS, POSM and Wincan software. **800/446-3392; www.vivax-metrotech.com.**



Visual inspection camera

The **VIS 350 Plus** visual inspection camera system from **Wohler USA** comes with both a 1 1/2-inch, 360-degree pan and 180-degree tilt camera head, and a 1-inch straight camera head. Both are waterproof and have LED lights with adjustable brightness levels for an all-encompassing view. Follow the camera's path on a color monitor and watch as it glides around 90-degree bends up to 100 feet away. The digital distance measurement feature pinpoints the exact location of trouble spots. It can take still photos and record video via SD card or USB port. It is packaged in a tough, self-contained



carrying case and comes with two rechargeable batteries providing up to four hours of mobility. **978/750-9876; www.wohlerusa.com.**

Versatile camera system

The **Xcam** camera system uses a 1.38-inch stainless steel camera head and 1/2-inch-diameter pushrod to navigate 3-inch, 90-degree corners with ease. Files are recorded to a USB stick in MPEG format that can be played back on any computer. The unit comes with a self-leveling camera head with skid, 512 Hz sonde transmitter, adjustable lighting, internal microphone, 200 feet of push cable and a 10.4-inch monitor case. Options include a portable battery pack and a text writer. **855/863-9226; www.xcamcameras.com.**



Inspection Vehicles

Pipeline inspection system

The **Pathfinder** pipeline inspection system from **Aries Industries** operates over long distances through harsh pipe conditions. The transporter sets up quickly to match pipe contours and conditions. Adjustable camera lifts enable easy transitions from small to large pipes. A gear-driven drive train powered by two continuous-duty motors ensures navigation through deteriorating, debris-filled pipeline. A rear-facing camera provides complete visualization and quick retrieval. A high-resolution camera and high-intensity LED array provide picture clarity. An auxiliary high-power detachable light head provides clear images in larger pipes. It operates in 6- to 24-inch sewer lines, and the Pathfinder XL handles 8-inch-diameter and larger pipes. **800/234-7205; www.ariesindustries.com.**



High-definition camera system

The **PEGASUS HD** camera system from **RapidView IBAK** provides visual clarity in full 1920x1080 high definition. It has full pan, tilt and zoom capabilities, and includes built-in laser measurement for measuring defects inside the pipe. A 10x optical zoom and one-push, intelligent auto focus provides crisp, clear images of larger dimension pipes. **800/656-4225; www.rapidview.com.**



Crawler Cameras

Lateral launch system

The **ROVVER X-SAT** lateral launch system from **Envirosight** allows a remote operator to perform pan/tilt video inspection 150 feet into a 4-inch sewer lateral from an adjoining sewer mainline. The system allows municipalities to confirm the presence of blockages in laterals and helps utility contractors locate gas line cross bores. Its steerable six-wheel-drive crawler helps it maneuver to troublesome launch points as far as 500 feet down mainlines 6 inches and larger. The system's auto-leveling color camera with shadowless illumination pans 360 degrees
(continued)



and tilts 90 degrees to capture both sidewall detail and distant targets, and is equipped with a sonde to facilitate locating. Additional cameras mounted to the crawler assist with navigation and lateral deployment. **866/936-8476; www.envirosight.com.**

Pushrod crawler system

The **P350 flexitrac** from **Pearpoint/SPX** has the simplicity and transportability of a pushrod system while delivering the functionality and performance of a crawler system. Its modular structure allows all its main components to be fully interchangeable. Modules available include a manual or powered drum, three interchangeable cameras, a range of wheels and tires, and multiple cable lengths and crawler sizes. The command module is also fully compatible with the P340 flexi-probe, giving users access to a range of pushrod reels, cameras and accessories. A built-in digital recording and reporting system are standard. It can be van or truck mounted. From there it can be wheeled on site using the transportable ergonomic barrow design. Once on site, the system is quick and easy to set up, deploy and use. **800/688-8094; www.radiodetection.com.**



Inspection camera system

The **TVS-15** inspection camera system from **Trio-Vision USA** is designed for use in 6- to 60-inch pipelines. Typical applications include the inspection and investigation of sewerage and rainwater pipe. It features a modular design, interchangeable cameras, water resistance to IP68, a short-wheelbase crawler powered by two DC motors, integral circuit protection, a high-resolution CCD camera with 0.01 lux light sensitivity, an auto-focus pan/tilt/zoom camera, and rearview camera and lighting. **707/793-0673; www.trio-vision.com.**



Profiling Equipment

Pipeline mapping system

The **AMP** autonomous, gyroscopic-based, multipurpose pipeline mapping system from **CUES** delivers exact 3-D positional data for rapid and accurate XYZ location of a wastewater system. Its data can be used for as-built drawing verification and defect locating, including pipe sags, misaligned joints, horizontal and vertical design problems, and hydraulic modeling. The system includes interchangeable wheel sets, allowing a wide operational range from 3- to 58-inch diameters in any and all pipe materials, including VCP, iron, plastic and concrete. Data can be used with a centralized system of record keeping, and be accessible to all decision-makers to ensure proper defensible spending. **412/839-1100; www.cuesmapping.com.**



Sewer defect locator

The **ES-620** from **Electro Scan** locates and measures sewer defects not typically seen by CCTV. Available as a stand-alone van or add-on to existing CCTV trucks, it finds and measures defect start and end points, size,

and estimated gpm of defect flow, in accordance with ASTM 2550-13. Since most pipes are made of non-conductive materials, no electrical current should be able to escape through the wall of a pipe, unless there is a crack or opening. The greater the electric current that flows through a defect, the larger the size of a leak. It is designed for 6- to 24-inch pipe diameters, traveling at the rate of 45 to 60 feet per minute. It measures defect flows for pre- and post-CIPP lines, with no operator observations required. **916/779-0660; www.electroscan.com.**



Recording/Archiving/Data Devices

Acoustic leak-detection correlator

The **TriCorr Touch** correlator from **Fluid Conservation Systems** uses information gathered from acoustic leak noise sensors placed at intervals along a pipeline to identify and locate leaks in a water distribution system. An automated filter intelligence system runs 55 different filter combinations on the correlation data to accommodate different pipe materials and sizes, allowing it to check the quality of the results and optimize filter settings until the clearest and most accurate result is presented. A VGA touch screen with high-contrast mode provides clear visibility in bright sunshine. **800/531-5465; www.fluidconservation.com.**



Digital recording monitor

The **Optimum HDD12.1** HDMI monitor from **Hathorn Corporation** has a super bright 12.1-inch monitor ideal for use when working outside. The system comes with adjustable lighting, 512 Hz sonde, 16 pages of text writing, 8x zoom, voice recording, a spill-proof keyboard, onscreen footage counter, multiple reel selections including other brands, and a four-hour battery pack with a built-in smart charger. Inspections can be recorded to a 320 GB hard drive, or directly to a USB stick. Files can also be transferred to a computer via USB cable. Available reels include a 200-foot standard with a self-leveling camera, a 200-foot mini with a color mini camera, and a 200-foot micro with a 7/8-inch color micro camera. **905/886-2835; www.hathorncorp.com.**



Location sensor

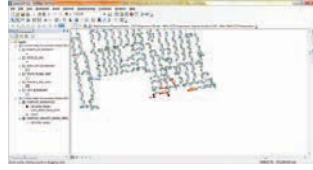
Location sensors from **RICO GmbH** are available on all of the company's camera systems. They have a standard frequency of 32.768 kHz for time measurement, matching most commercial location systems, meaning the user doesn't need a specialized system. All camera systems feature the smallest useable diameter on pushrod cameras (2-inch) up to the biggest pipes with crawler cameras (80-inch) using the same frequency. **www.rico-gmbh.de.**



Software

CCTV GIS connection application

A set of applications from **Cobra Technologies** makes the interaction between pipe CCTV inspection and ESRI ArcMap easy to use, requiring minimum user interaction for data exchange with complete detail in GIS maps. Users export inspections from the Cobra Toolbar into ArcMap to create pre-populated projects, automatically create linked maps and supplement GIS data with additional infrastructure detail. During the inspection review the user will have access to the inspection video to allow for data review while comparing against the video file. ArcMap tools allow for filtering on the map and color coding CCTV inspections using the inspection date, observation type (e.g. roots), inspection status (e.g. completed, abandon) and PACP ratings. The GIS module for the pipe inspection management software assists municipalities in managing sewer and stormwater infrastructure using GIS data. **800/443-3761; www.cobratec.com.**



Integrated management platform

The **ArcGIS** integrated, multidepartmental platform from **Esri** helps operators manage, plan, analyze, map, monitor and communicate from one complete technology platform. It allows operators to visualize information in the form of interactive, web-based maps, reports and charts. They can share select data with staff and stakeholders, analyze it for planning, maintenance and compliance, and integrate data with other systems. **800/447-9778; www.esri.com.**



Meter data analytics program

Itron Analytics for water helps utilities turn meter data into actionable intelligence. With a data store optimized for analytics, business intelligence dashboards and water-utility-specific analytics, the program helps water utilities improve operations and asset management. It provides revenue protection, district metering, flow analysis, and trending and forecasting modules to help utilities better manage the delivery and use of water. **866/374-8766; www.itron.com.**



Field mapping software

Aspect 1.2 field mapping software from **Juniper Systems** is designed for any job that requires locating, documenting and inspecting assets. It can import large amounts of data into Excel and operates on most devices running Windows Mobile 6.0 or higher. **435/753-1881; www.junipersys.com.**



Pipeline inspection/asset management program

WinCan VX pipe inspection and asset management software from **Pipeline Analytics** emphasizes cloud-based data access and workflows, plus reporting and analytical capabilities. It offers support for value-added processes like pipe cleaning, rehabilitation and leak detection, and augments existing functional areas like GIS, laser/sonar scanning, side scanning, image measurement and municipal database integration. It gives customers latitude as to how their data is stored: on a closed network, hosted on a cloud server, hosted off site at its server cluster, or any redundant combination of these options. It has been performance benchmarked on databases exceeding 5 million records. **877/626-8386; www.pipelineanalytics.com.**



Pipe inspection software

PipeLogix software from **PipeLogix Inc.** offers the power to cost-effectively collect data and accurately evaluate underground infrastructure assets. It is PACP certified, works with all CCTV systems and is backed by after-sales technical support. Data can be captured, analyzed and shared about mainlines, laterals, manholes, grout and inclinometer surveys. The program offers various reporting features. Built-in GIS tools enable the user to import accurate asset details from map programs directly into the pipe survey form; export shape files or feature classes in geodatabases from the program based on completed surveys, defect types, new assets found or pipe score values; and easily identify surveyed pipes on maps with color coding. A specially designed tool bar can be added to Esri ArcMap to quickly filter survey data. Movies, reports or survey detail can be viewed within ArcMap. The program also interfaces with many popular industry standard asset management programs. **866/299-3150; www.pipelogix.com.**



Online reporting program

The **RIDGIDConnect** online solution streamlines the reporting process, integrates digital media and files into a hosted archive environment, and produces shorable professional reports. It can be used to take notes on the job, utilize digital images or video, and share information with customers or co-workers. Users no longer need to duplicate media, produce one-off reports, use work time, or pay for postage to deliver information to the customer. Utilization of email and the Internet as a delivery vehicle solicits a faster response from customers, who can be reached anywhere in real time with a professional presentation of the findings. Customers can also respond directly in the system, which is instantly emailed and retained as part of the job record. **800/769-7743; www.ridgid.com.** ♦



Line assessment tool helps city find blockages in sewer



Problem:

The City of Starkville, Miss., needed to quickly get a handle on blockage conditions within its 171 miles of gravity-fed sewer as part of an EPA Agreed Order on Consent (AOC) to reduce SSOs.

Solution:

The city chose the **Sewer Line Rapid Assessment Tool, or SL-RAT**, from InfoSense, to help focus cleaning efforts around hot spot areas that had experienced SSOs or slow sewers. The unit is composed of a transmitter and a receiver. The transmitter is placed in an open manhole and transmits a sequence of tones through the air gap within the pipe. The receiver is placed in an adjacent manhole and listens for degradation in the tones

it hears compared to the tones it should hear in a clean pipe. It exploits the fact that sound and water flow similarly through the free space within a pipe. The algorithms are able to quickly analyze the result and present the operator with a simple blockage assessment in real time on a scale of zero to 10. Measurements can be conducted in three minutes or less with no flow contact, no confined-space entry and a low cost.

RESULT:

The SL-RAT's speed in narrowing down the segments in need of CCTV inspections was one of the considerations used by the city in agreeing to a three-year AOC completion date. They have inspected over 200,000 feet of pipe with the unit. **877/747-3245; www.infosenseinc.com.**

Mobile GIS improves field crew efficiency



Problem:

Jetting crews working in Thousand Oaks, Calif., clean over 400 miles of pipeline each year. Paper maps were being utilized in the jetting trucks to track the progress of this scheduled maintenance. However, rolling out a paper map and using a highlighter to make changes was not efficient. The city sought new software that would decrease paperwork along with overtime and increase efficiency.

Solution:

Since **infraMAP** software from **iWater** was already in use by the water department, the wastewater supervisor consulted with them and learned how to use it to improve productivity. The city also wanted the new software to include a function that talked directly to its Esri GIS environment.

RESULT:

The city is now operating in a fully digital environment, reducing citywide staff time. Supervisors can use the reporting tool to see how crews are progressing. The implementation of infraMAP has improved efficiency by 30 percent. **877/482-5834; www.iwater.org.** ♦

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tpo Read about original environmentalists like Jeff each month in *Treatment Plant Operator*.

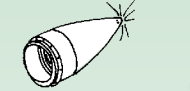
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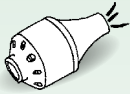


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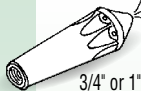
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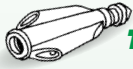
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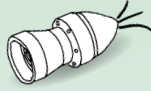
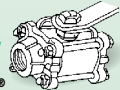
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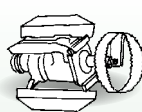
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Product Spotlight



Lateral pipe lining and bursting trailer keeps tools and accessories in one place

By Ed Wodalski

Containing everything a municipality or contractor might need for lateral and short mainline pipe repair, the HydraLiner lateral lining and bursting trailer from HammerHead Trenchless Equipment features resin racks, swing-out halogen work lights, 7,500-watt generator, Line-X lined floors, insulated walls and ceilings, 30-gallon 7 cfm air compressor, toolbox, roof-mounted air conditioning units, 5,600 Btu heat strips, LED lighting, first-aid kit, fire extinguisher, work tables and storage.

The mobile lining system is available in the 18-foot, steel frame Gold package and 26-foot Platinum aluminum trailer. The 18-foot package includes steel frame with Armaguard Frame protection and Z-tech undercoating. The 26-foot trailer includes a climate-controlled epoxy resin closet and 3/4-inch white interior walls protected by a 24-inch kick plate. Both trailers have

a screwless exterior, external GFI outlet and four 110-volt outlets.

“There’s also a professional outfitters package that allows you to have those extras, from rubber bands to hand tools,” says Ryan Boldan, HammerHead lateral product manager. “You could start lining and bursting out of that trailer from day one without having to go to the hardware store.”

Included in the package are adjustable wrenches, air hose, pliers, hammer, hose clamps, saw blades, locks, gloves, rags, push broom, shovel, calculator and tape measure.

Customizable features include color and size, liquid propane heaters, inversion nozzle holder and swing-out work light package. **800/331-6653; www.hammerheadtrenchless.com.**

Franklin Electric submersible turbines

STS Series submersible turbine pumps by Franklin Electric are designed for harsh environments. Features include ductile iron bowls, discharges, motor brackets, investment cast 304SS impellers, lengthened bronze discharge bearing and bronze motor bracket bearing, as well as custom options. **866/271-2859; www.franklinwater.com.**



Nu Flow drain collector

The Nu Drain Collector heavy-duty, portable wet/dry vacuum with discharge system from Nu Flow Technologies has a removable solids collection tray to trap scale, rust, grease and debris. The 55-gallon industrial vacuum has a 2-inch hose with attachments, 120-volt, 4 hp, 120 cfm motor and removable solids tray. **800/834-9597; www.nuflowtech.com.**



StoneAge 2-inch Badger pipe cleaning tool

The redesigned 2-inch Badger (BA-LK) pipe cleaning tool from StoneAge features a locking head that can only be removed with a disassembly tool. Designed for cleaning 2- to 4-inch tubes and pipes with bends and long radius elbows, the nozzle head has forward jets at 15, 30 and 45 degrees, two jets at 90 degrees, and two back jets at 132 degrees. **866/795-1586; www.stoneagetools.com.**



Precision Digital MeterView EX programming software

MeterView EX programming software for Vantageview PD6730 and ProtEX PD6830 pulse input flow rate/totalizers from Precision Digital Corp. provides plant operators with full control of the meter configuration process using an intuitive layout and easy-to-understand interface. Tabs include K-factor, display, pulse output, 4-20 mA output and data logging. Features are organized by related item. An onboard meter data log holds up to 1,024 records and can be downloaded to a PC. Logged records contain date, time, rate, total, grand total and log number. **800/343-1001; www.predig.com/meterviewex.**



ProSoft industrial cellular gateway

The ICX30-HWC industrial cellular gateway from ProSoft Technology provides wireless Ethernet and serial connectivity to remote devices and equipment over 3G cellular service, including PLCs, RTUs, DCS systems, electronic billboards and communication towers. Remote devices are accessed using secure VPN tunnels over Internet connections. **661/716-5100; www.prosoft-technology.com.**



McElroy socket fusion tool

The 15-pound Spider 125 socket fusion tool with universal clamping from McElroy Manufacturing is designed for polypropylene pipe installation in overhead, vertical and tight work spaces. The clamping feature eliminates the need for inserts. An assortment of heaters and heater adapters for 63 to 125 mm (2.48 to 4.92 inches) diameter pipes are available. **918/836-8611; www.mcelroy.com/fusion.**



ECCO wireless reversing camera

The EC5605-WK wireless reversing camera system from ECCO Safety Group includes 5.6-inch LCD touch-screen color monitor and CMOS color infrared camera. The system delivers high-quality images in low light conditions and can be expanded to four cameras. **800/635-5900; www.eccogroup.com.**



Lowell 4-in-1 ratcheting socket wrench

The 8C 4-in-1 ratcheting socket wrench from Lowell Corp. has four sockets that fit the most common nut sizes (1 1/4, 1 1/16, 1 1/8 and 15/16 inches) in utility and construction work. Ratchets have 36 teeth and 10-degree handle throw for tight spaces. The 2 1/2-pound wrench is 17 inches long and 1/2 inch thick. **800/456-9355; www.lowellcorp.com.**



Sierra Monitor gas detector

The 5100-15-IT intelligent hydrogen sulfide gas detector from Sierra Monitor Corp. utilizes MOS solid state sensor technology. Features include nonintrusive, one-person calibration; 4-20 mA; series RS-485 Modbus RTU interface; HART communication; SentryBus interface; optional 5-amp integral relays; and cast aluminum or 315 stainless steel enclosures. **408/262-6611; www.sierramonitor.com.**



Val-Matic swing check valve

The swing check valve from Val-Matic Valve & Manufacturing Corp., designed for industrial water and wastewater applications, meets NSF/ANSI 372 standards. Closure options include lever and weight, air cushion, lever and spring. **630/941-7600; www.valmatic.com.**



ABB heavy-duty safety switches

Heavy-duty safety switches from ABB Low Voltage Products are designed to meet UL98, CSA and NEMA KS-1 standards. The 600-volt and 200kA rated switches are available fused and non-fused. **800/435-7365; www.abb.us/lowvoltage.**



Brookside-Agra microbial blend

Advanced Bio Pro Concentrate microbial blend from Brookside-Agra is designed to biologically degrade odors associated with agricultural and environmental conditions. The all-natural, liquid blend of stable microbial cultures, enhancers and nutrients also eradicate fats, oils, grease and other organic materials. **618/628-8300; www.brookside-agra.com.**



Super Products cold-weather vacuum truck

The Arctic Supersucker cold-weather vacuum truck from Super Products features a glycol-heated collector body and tailgate, heated and insulated heavy-duty tailgate drain valve, and low-temperature rated oil and hoses. Other features include 8-inch positive displacement vacuum system, 18-cubic-yard payload capacity and body dump, hydraulic boom with stainless steel cannon and abrasion-resistant liner, cold-weather-resistant wiring, and pendant. **800/837-9711; www.superproductsllc.com.**



SOR Controls magnetic level indicator

The 1100 series magnetic level indicator from SOR Controls Group provides an alternative to traditional sight glasses. Vessel contents are totally contained within the float chamber for use in high-pressure systems. External point level switches or continuous level transmitters can be incorporated into the system without breaking the pressure boundary or disturbing existing piping. Applications include oil and water separators, flash drums, surge tanks, gas chillers, vacuum tower bottoms, alkylation units, propane vessels and storage tanks. **800/676-6794; www.sorinc.com.**



Guardair Air-Spade 2000 excavation tool

The Air-Spade 2000 excavation tool from Guardair Corp. is designed for the safe excavation of objects. The tool is available in models ranging from 25 to 225 cfm at 90 psi, as well as 3- and 4-foot barrel lengths. Features include dead-man trigger, fiberglass barrel with adjustable dirt shield, adjustable, thermoplastic spray shield, stainless steel supersonic nozzle, 3/4-inch FNPT air inlet and Chicago-style swivel connector. **800/482-7324; www.guardaircorp.com.** ♦



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Thomas & Betts offers water, wastewater brochure

The Thomas & Betts brochure, *Electric Solutions for Water and Wastewater Treatment Facilities*, is organized by product groupings, including corrosion resistance, power quality, efficiency and reliability. The brochure is available at www.tnb.com.



Super Products names vice president

Super Products promoted Dan Koziczkowski to vice president of sales and marketing. He will oversee internal and field sales staff, manage and support the company's municipal distributor network, and identify growth opportunities.



Dan Koziczkowski

Sprayroq names certified partners

Sprayroq named Certified Foundations of Lakeland, Fla., and Empire Solutions of Hannon, Ontario, as members of its Sprayroq Certified Partner network. Certified Partners complete two weeks of training in the application of Sprayroq structural and protective coatings and undergo an annual performance review.

TRIC Tools attends commerce seminar

TRIC Tools participated in the U.S. Department of Commerce's fourth annual "Make it in America; Sell it to the World" seminar in Hayward, Calif. Michael Lien, director of operations, represented TRIC.

HammerHead to distribute Picote Cutting Systems

HammerHead Trenchless Equipment will distribute Picote Cutting Systems in North America, including products to clean pipe and reinstate branches from 2 to 6 inches in diameter.

Hydraulic Institute partners with ABB, Baldor

The Hydraulic Institute is partnering with ABB and Baldor Electric Co. to provide training programs, webinars and e-learning courses for pump end-users, distributors and consulting firms.

Ditch Witch names top dealers

Ditch Witch recognized its top dealers with membership in the 2013 Crescent Club Top 10. Club members include Ditch Witch of Oklahoma & Arkansas, Ditch Witch of Minnesota, Witch Equipment Company, Ditch Witch Central California, Ditch Witch Southwest, Ditch Witch of South Louisiana, Ditch Witch of Virginia, Ditch Witch Sales of Michigan, Brandt Tractor Ltd. and Ditch Witch of North Dakota.



Gary Wyeth

Singer Valve names account manager

Singer Valve named Gary Wyeth account manager for Southeast Asia. Based in Kuala Lumpur, Malaysia, his territory includes Southeast Asia, India and Pakistan.



Ed Paradis

Resiplast hires national sales manager

Resiplast US named Ed Paradis national sales director for the United States and the Caribbean. ♦

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Looking for experienced Vector, Guzzler, CCTV, grout and manhole rehab operators. Southern New England-based company. Some overnight travel required. Pay based on experience. Please send resume or contact info to peter@inlandwatersinc.com (C08)

LOOKING FOR CHANGE? 35-year Montana business has immediate openings for experienced drain technicians. Cleaning, jetting, video, pumping, lining, plumbing. Wages DOE. Relocation benefit negotiable. Call 406-788-3204 for information. (C08)

POSITIONS AVAILABLE

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Wanted! Global pump manufacturing company seeking a District Sales Manager for central United States. Based in Houston, TX. Send resume to scox@waterblast.com. (C08)

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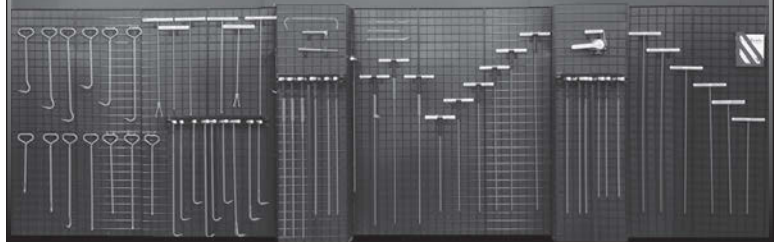
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SETTING THE RECORD STRAIGHT

NASSCO has made significant strides in supporting and promoting trenchless technologies

By *Ted DeBoda, P.E.*

Social media is a wonderful thing. It keeps information and ideas flowing in real time to cultivate discussions, open doors to new opportunities, and connect people and organizations with common causes.

A recent posting on a widely used social media network for professionals shared some of NASSCO's accomplishments, although it mentioned accomplishments from several years ago. This gave us the opportunity to share some of the important strides our member-driven organization has recently made to support industry advocacy:

We are fortunate to have Gerry Muenchmeyer, NASSCO's technical director and this year's Trenchless Technology Person of the Year, to impart much of his knowledge and experience on NASSCO's many training programs. Recently our focus has been to expand and enhance our main

training programs, the Pipeline Assessment and Certification Program (PACP) and the Inspector Training and Certification Program (ITCP).

NASSCO recently produced a sewer cleaning training video to accompany the Jetter Code of Practice.

We are also working with industry professionals throughout the U.S. and Canada to update the PACP program. This team is being very careful to enhance the program while maintaining flexibility in data collection and usage. We plan to have the update, version 7.0, available sometime next year.

ITCP training for installation of cured-in-place pipe has been growing significantly as more service providers see the value of requiring certified inspectors (and engineers) on their jobs. The ITCP for manhole rehabilitation was launched last year and is off to a great start. NASSCO is now working with the

International Pipe Bursting Association to develop an ITCP for pipe bursting.

NASSCO is also committed to teaming with organizations that share our vision for growth of the industry. The most obvious of these is the Water Environment Federation (WEF) and specifically its Collections System Committee. NASSCO and WEF entered into an agreement last July, and since then we have worked together on several webinars (available on www.nassco.org), workshops, congressional fly-ins and other joint opportunities. We will continue to work with organizations such as WEF, the North American Society for Trenchless Technology and others to better serve the industry. Our recent teaming with like-minded organizations provides better overall support for the industry.

NASSCO is also providing standards outside of the U.S. and recently updated agreements to provide train-

ing in Quebec and the rest of Canada through the Canadian Standards Association. We recently signed a new agreement with the Colombian Institute for Subterranean Infrastructure Technologies and Techniques, which we presented as the keynote address at its annual conference in May in Medellin, Colombia.

Everything we do is designed to further NASSCO's mission: set industry standards for the assessment and rehabilitation of underground infrastructure, and to ensure the continued acceptance and growth of trenchless technologies. NASSCO has accomplished many things over the years, and many more initiatives are coming up during our strategic planning process, which we hope to share soon in this space and through social media. ♦

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PACP TRAINING

August 11-13, 2014
Marriottsville, MD
 Includes Manholes and Laterals!
 Trainer: Ted DeBoda
 For more information or to register contact Dawn Jaworski at 410-442-7473 or dawn@nassco.org

September 9, 2014
Marriottsville, MD
 PACP User Recertification
 Trainer: Ted DeBoda
 For more information or to register contact Dawn Jaworski at 410-442-7473 or dawn@nassco.org

September 15-17, 2014
Marriottsville, MD
 Includes Manholes and Laterals!
 Trainer: Ted DeBoda
 For more information or to register contact Dawn Jaworski at 410-442-7473 or dawn@nassco.org

September 15-17, 2014
Eatontown, NJ (NJWEA Tech Transfer)
 Includes Manholes and Laterals!
 Recertifications Welcome
 Trainer: Brandon Conley
 For more information or to register contact the Camera Department at 248-349-0904 or pacp@dohenycompanies.com

September 23-25, 2014
Northville, MI
 Includes Manholes and Laterals!
 Recertifications Welcome
 Trainer: Brandon Conley
 For more information or to register contact the Camera Department at 248-349-0904 or pacp@dohenycompanies.com

September 23-25, 2014
Las Vegas, NV (Tri States Conference)
 Includes Manholes and Laterals!
 For more information or to register contact Marilyn Shepard at 916-899-8961 or mshepard1@hotmail.com

ITCP
August 11-12, 2014
Green Bay, WI
 Manhole Rehabilitation
 8:00 am – 5:00 pm Day 1
 8:00 am – 1:00 pm Day 2
 Trainer: Tim Back
 For more information contact Tim Back at 513-253-8461 or tback@cinci.rr.com

August 13-14, 2014
Long Beach, CA
 Manhole Rehabilitation
 8:00 am – 5:00 pm Daily
 Trainer: Rocky Capehart
 For more information contact Rocky Capehart at 916-834-2712 or rcapehart@sprayroq.com

August 25-26, 2014
Columbus, OH
 Manhole Rehabilitation
 8:00 am – 5:00 pm Day 1
 8:00 am – 1:00 pm Day 2
 Trainer: Tim Back
 For more information contact Tim Back at 513-253-8461 or tback@cinci.rr.com

September 10-11, 2014
Chicago, IL
 Manhole Rehabilitation
 8:00 am – 5:00 pm Day 1
 8:00 am – 1:00 pm Day 2
 Trainer: Tim Back
 For more information contact Tim Back at 513-253-8461 or tback@cinci.rr.com

September 15-16, 2014
Lansing, MI
 Manhole Rehabilitation
 8:00 am – 5:00 pm Day 1
 8:00 am – 1:00 pm Day 2
 Trainer: Tim Back
 For more information contact Tim Back at 513-253-8461 or 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

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PEOPLE/AWARDS

John Lundell, the mayor of Coralville, received an honor from the Iowa Stormwater Education Program for his local leadership efforts in water-quality issues and for the installation of green infrastructure practices for stormwater management within the City of Coralville.

The **United States Environmental Protection Agency** announced the winners of its second annual Campus RainWorks Challenge, a design challenge created to engage college and university students in reinventing water infrastructure and developing innovative green infrastructure systems to reduce stormwater pollution and build resilience to climate change. Winners include:

- University of Florida, first place, Master Plan Category
- Kansas State University, first place, Site Design Category
- Michigan State University, second place, Master Plan Category
- Mississippi State University, second place, Site Design Category
- University of Texas-Austin, honorable mention, Master Plan Category
- Purdue University, honorable mention, Master Plan Category
- Kansas State University (team II), honorable mention, Site Design Category
- University of Maryland, honorable mention, Site Design Category

The **American Public Works Association** announced its 2014 Top Ten Public Works Leaders. Award recipients include:

- David Derrick, public works director, City of Kissimmee, Fla.
- Terry Cox, city manager/city engineer/public works director, City of Harlan, Iowa
- Joseph Fennell, executive director, Northwest Suburban Municipal Joint Action Water Agency, Elk Grove Village, Ill.
- Ken Grehm, director of public works, Placer County Department of Public Works, Auburn, Calif.
- L. Tracy Mercer, public utilities director, City of Clearwater, Fla.
- Lisa Ann Rapp, director of public works, City of Lakewood, Calif.
- Stephanie Reid, city engineer, City of Lincoln City, Ore.
- Bonnie Teaford, Public Works Director, City of Burbank, Calif.
- Carl J. Weber, director of public works, City of Janesville, Wis.
- Daniel Woldesenbet, director, Alameda County Public Works Agency, Hayward, Calif.

John Michaux, the public works director for Oak Island, N.C., received the Oak Island Beach Preservation Society's highest honor, the Royal Starfish Award, for his ongoing work to improve the town's environment, which includes efforts to reduce stormwater pollution.

The **City of New Braunfels (Texas)** was honored with an American Planning Association Excellence in Small Town and Rural Planning John Keller Award for an Outstanding Planning Initiative for the New Braunfels Stormwater Management Strategy. The award honors an outstanding initiative or program in public education, workshops, ordinances or enforcement that promotes planning in small towns and rural areas.

Water Environment Services, on behalf of Clackamas County Service District No. 1 and Tri-City Service District, received a Certificate of Achievement for Excellence in Financial Reporting from the Government Finance Officers Association. Water Environment Services, based in Oregon, coordinates stormwater management, among other things, in its area.

Middlesex, North Middleton and South Middleton townships in Cumberland County, along with **Carlisle Borough**, received the Excellence in Intergovernmental Cooperation Award from the Pennsylvania

State Association of Township Supervisors. The association established the award to honor communities that work together to find creative ways to complete projects and provide services more efficiently and cost-effectively. The municipalities received the award for participating in the Letort Spring Run Sustainable Stormwater Pilot Project.

LEARNING OPPORTUNITIES

American Society of Civil Engineers

The ASCE is offering the following courses:

- Aug. 20 – Stream Restoration Bioengineered Retaining Walls for Riverbank Stabilization, online
 - Aug. 25 – The Pricing of Delay Costs for Construction Projects, online
 - Sept. 18-19 – Project Management, Arlington, Va.
 - Sept. 25-26 – Financial Management for the Professional Engineer, Las Vegas
 - Sept. 25-26 – Pumping Systems Design for Civil Engineers, Rapid City, S.D.
 - Sept. 25 – The Ethics of Leadership, online
- Visit www.asce.org.

Wisconsin

The Wisconsin Department of Natural Resources is offering the following courses:

- Sept. 16 – Confined-Space Entry, Wauwatosa
 - Sept. 17 – Permit-Required Confined-Space Entry, Plover
 - Oct. 27-31 – Cross Connection Control and Backflow Prevention, Madison
 - Dec. 9 – General Safety, Plover
- Visit <http://dnr.wi.gov>. ♦

CALENDAR

Aug. 3-7

StormCon, Oregon Convention Center, Portland, Ore. Visit www.stormcon.com.

Aug. 17-20

American Public Works Association International Public Works Congress & Exposition, Metro Toronto Convention Centre, Toronto. Visit www.apwa.net.

Oct. 6-8

National Rural Water Association WaterPro Conference, Sheraton Seattle, Seattle. Visit www.waterproconference.org.

Nov. 3-6

American Water Resources Association Annual Conference, Sheraton Premier Hotel, Tysons Corner, Va. Call 540/687-8390 or visit www.awra.org.

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