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STEP BY STEP

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a different approach to wastewater
collections to better serve
rural residents and protect
the Chesapeake Bay

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Todd Mohn,
Director of Public Works
Queen Anne's County, Maryland





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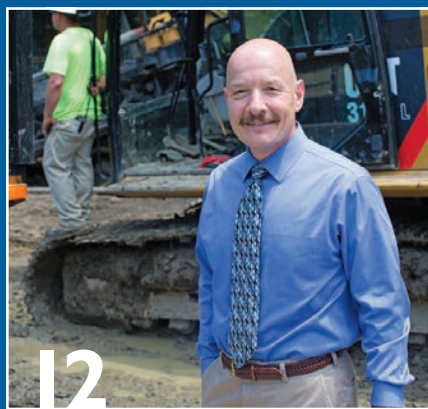
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INSIDE:

PIPELINE INSPECTION, SURVEYING AND MAPPING



ON THE COVER: Todd Mohn is the director of Public Works in Queen Anne's County, Maryland. He was influential in setting up the county's STEP tank system to provide sewer service for a series of isolated island homes in the utility's service area. (Photography by Allison Zaucha)



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SOLUTIONS FOR I&I ISSUES

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FROM THE EDITOR

Luke Laggis

Stopping inflow and infiltration can be expensive. Allowing it to continue can cost even more.

Inflow and infiltration causes serious problems for municipal utilities, furthering degradation of infrastructure, contributing to sewer overflows, and increasing flow to treatment plants, all of which come at a high cost. Preventive maintenance and rehabilitation can be expensive, but proactive utilities can save millions in the long run by taking the necessary steps to keep I&I out of their collections systems.

To help in that effort, we're launching *I&I – Inflow & Infiltration Solutions and Equipment*. The new magazine will be a quarterly supplement to *Municipal Sewer & Water*, featuring case studies, technical columns and how-to stories demonstrating the



tools, technology and approaches utilities are using to improve their systems.

A recent EnviroSight white paper citing several studies highlights the high cost of inflow and infiltration. One study of all municipal sewer systems in Tennessee conducted by George Kurz, P.E., DEE, found that I&I represents nearly 105 billion gallons per year, accounting for 45 percent of the annual flow to treatment plants. Processing the extra flow is estimated to cost at least \$188 million annually statewide, a conservative figure compared to the U.S.

EPA's recommendation for using an O&M rate of \$2 to \$5 per thousand gallons, which results in a cost estimate of up to \$522 million.

It's such a big issue. So much money is being spent to treat the symptoms rather than cure the underlying cause. But I&I is different from many issues you face. It comes from so many sources and enters collections systems at so many points — manholes, pipe defects, failing laterals, illegal connections — that a simple approach like lining mains won't solve the problem. Just as that excess flow is likely entering your systems from multiple sources, using multiple techniques to solve the problem is often the best approach.

Regardless of how effective your favorite rehab technique is in solving a specific problem, no single technique can solve all your I&I-related issues. The key is combining techniques, using each where it's most effective, to tighten up your system and reduce unwanted flow. And before you can do that, you need to understand where it's coming from so you can develop an effective and efficient systemwide approach.

The content in *I&I* will be aimed at helping you do just that. We're striving to bring you the information and insight to make your systems better.

If you have a great story about successfully reducing or eliminating I&I, I'd like to hear about it. One of the great things about *MSW* is none of you, the readers, are in competition with one another. You all have your own systems, but those systems are part of the larger county, state and national infrastructure. Successful approaches in one utility can be shared and modeled in others to lower cost and improve efficiency, and everyone wins in that scenario.

The first issue of *I&I* will be mailed with your copy of *MSW* in October. I sincerely hope you find it helpful in your efforts to improve your systems.

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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LOOKING AHEAD

Online Tool Provides Financial Forecasts for Infrastructure Work

Dealing with the financial side of upgrading infrastructure is one of the biggest challenges that utilities face. That's where an online tool developed by the American Water Works Association can help. The tool provides cost estimates as well as financial deferrals based on a utility's inputted data. Estimates can even be broken down by pipe size or material. Learn more about how the tool can benefit your utility's infrastructure planning. mswmag.com/featured



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— *Utility Launches Income-Based Water Bill Program* mswmag.com/featured

Utility Provides Real-Time CSO Tracking to Public

Like many utilities, Kingston, Ontario, struggles with overflows and is in the midst of a decades-long effort to eliminate them. In the meantime, the utility is at least taking a more proactive approach in notifying the public about CSOs when they do occur — real-time tracking on the utility's website. The mapping feature provides a current status of 15 different CSO outfalls around Lake Ontario and other areas so that citizens can make educated decisions about how they're using local waterways. mswmag.com/featured



STEADY PROGRESS

Utility Makes Strides on Private Lead Pipe Replacements

The water utility in Green Bay, Wisconsin, has been a solid model for how to go about replacing lead in a distribution system, particularly on the private side of the service lateral. The utility still has work ahead, but through a concerted effort to educate customers, identify the locations of all the existing lead, and secure funding, the utility has already completed many pipe replacements and continues to make steady progress. See if Green Bay Water Utility's approach to tackling its lead pipe problem can produce some ideas you can take back to your utility. mswmag.com/featured



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STEP BY STEP

Queen Anne's County is using a different approach to wastewater collections to better serve rural residents and protect the Chesapeake Bay

By Peter Kenter

Sometimes collections systems are simple: Bury some pipe and let gravity do the work. Sometimes, it takes a more creative approach.

The Department of Public Works of Queen Anne's County, Maryland, is committed to providing safe and efficient wastewater services to residents in unincorporated areas. Bringing sewer service to just 1,500 isolated homes experiencing septic system failure on South Kent Island has been a longtime goal. By combining an efficient septic tank effluent pumping system with a new county ordinance for property owners, the DPW expects to have the problem licked as early as 2025.

The DPW's service area is on the Delmarva Peninsula and straddles Kent Island, the largest island in the Chesapeake Bay. Untreated wastewater can quickly enter the ecologically sensitive waters of

Chesapeake and Eastern bays, so it's a major focus of the department's energy.

"The South Kent Island (SKI) sewer extension project has been on the books since the mid-1970s," says Todd Mohn, P.E., director of the county's DPW. "But now it's full speed ahead."

A newer system

The county's 128-mile sewer system was built in 1981, one of many of the federal government's Clean Water Act initiatives. Wastewater is primarily transported by vacuum sewer to overcome flat topography and high water tables, and the sewer network was once the largest vacuum system in the country.

Pipes are made of PVC with a little ductile iron and HDPE. They

range in diameter from 3 inches on the vacuum side to 24 inches on transmission force mains.

"It's a relatively young system and its condition is very good," says Mohn. "The area soil is quite corrosive, so when we do have leaks it's in the ductile iron pipe, which we replace with HDPE or PVC. Our biggest challenge is I&I drawn into the vacuum system through damaged gravity-fed service laterals and broken clean-outs. That can make the system sluggish."

(continued)

"The South Kent Island sewer extension project has been on the books since the mid-1970s. But now it's full speed ahead."

— Todd Mohn

Queen Anne's County Director of Public Works Todd Mohn (right) and Chief Sanitary Engineer Alan Quimby watch as a section of new HDPE pipe is staged for installation along Romancoke Road in Stevensville, Maryland. (Photography by Allison Zaucha)



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"If a pump goes out, only that one homeowner is inconvenienced. The pumps last a minimum of 20 years and cost about \$500 apiece, so they're relatively cheap to switch out."

— Todd Mohn



Todd Mohn watches as a crew from Cole Ventures finishes installing a 1,500-gallon Orenco STEP system tank at a residence in Stevensville, Maryland.



PROFILE:

**Queen Anne's
County Department
of Public Works –
Sanitary District,
Centreville, Maryland**

YEAR ESTABLISHED:
1981

POPULATION SERVED:
15,000 (sewer); 11,500 (water)

CURRENT AREA SERVED:
11.2 square miles (SKI project will add
2.4 square miles)

SANITARY DISTRICT STAFF:
50

CURRENT INFRASTRUCTURE:
Sewer — 128 miles (SKI project will add
36 miles); water — 64 miles

ANNUAL BUDGET:
\$6.7 million (sewer), \$2.6 million (water)

WEBSITE:
www.qac.org/364/Public-Works

PROJECT WEBSITE:
www.skisewer.com

In-house crews perform most repairs and small construction projects. A high groundwater table means trenching is difficult, so pipes are located close to the surface. Full replacement is often cheaper than trenchless rehabilitation, but horizontal directional drilling is used to cross roads and streams.

The vacuum system is self-scouring, so cleaning and maintenance is primarily relegated to valve pits and other accessible infrastructure. The department owns two vacuum trucks (International chassis with Transway Systems vacuum equipment) and a Vivax-Metrotech vCam-5 camera system.

Across the bridge

The SKI project has its roots in the construction of the Chesapeake Bay Bridge in 1952, which connected rural eastern and urban western shores. "We saw new subdivisions with houses on small lots and a lot of land speculation on the island. The county didn't even have a zoning ordinance during this time, all you had to do is record a plat in the land records and start selling lots," Mohn says. "New residents relied on septic tanks."

Failing septic systems were recognized as a problem by the mid-1970s. The county's original Kent Narrows/Stevensville/Grasonville (KNSG) wastewater treatment plant was completed in 1981, utilizing rotating biological contactor technology to

serve the affected communities along Route 50. The plant was replaced and expanded with an enhanced nutrient removal technology in 2007 as part of the Chesapeake Bay cleanup initiative.

Failing septic systems in the communities of Cloverfields and Bay City, also on Kent Island, were eliminated when vacuum sewer service was extended in the mid-1990s.

A County Health Department sanitary survey conducted in 1995 confirmed that 80 percent of remaining septic systems on the island discharged directly into groundwater — a condition meeting the regulatory definition of a failure. However, officials faced three major challenges in fixing the problem — a lack of treatment capacity, finding the appropriate technology to convey wastewater, and a host of vacant lots, potentially doubling the island's population.

The treatment capacity problem was addressed in 2004, when the county commissioners reserved 500,000 gallons of sewer treatment capacity from the pending expansion at the KNSG treatment plant. Selecting the right collection technology was the next hill to climb.

Choosing a system

The DPW considered a vacuum system, but concerns over cost and I&I on private property ruled out that approach.

"We also looked at a pressurized system with grinder pumps," Mohn says. "But that would have required the extra cost of intermediate pumping stations."

Working with consultant H50 Solutions, of Roseberg, Oregon, the county developed a proof-of-concept design using a septic tank effluent pumping (STEP) system as manufactured by Orenco Inc.

"We traveled to Oregon and Washington where these systems have been used successfully for 20 years," Mohn says. "Operators said the system was easy to operate and maintain. It's simple technology, essentially a waterline in reverse."

The Queen Anne's County system includes a 1,500-gallon seamless two-compartment concrete tank located in the yard of each homeowner. Wastewater drains into the tank by gravity. A baffle allows solids to settle in the larger compartment of the tank, and liquid to spill into a pump chamber. Individual filtered electric pumps switch on when necessary to transport liquid effluent to the collection lines and main trunk, then on to the treatment plant.

"The STEP high-head well pumps drive enough pressure to convey the liquid portion of the wastewater all the way to the treatment plant without the use of intermediate pump stations," Mohn says. "If a pump goes out, only that one

(continued)

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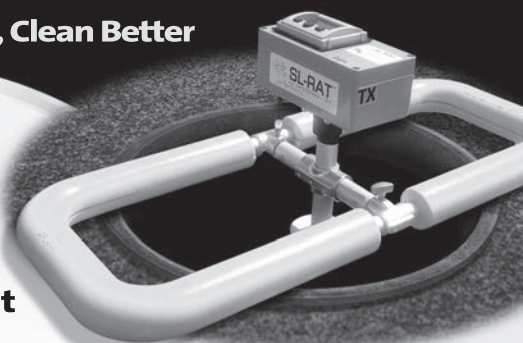
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The Queen Anne's County Department of Public Works' Sanitary District team includes (from left) Lawrence Gannon, Dave Crow, Lloyd Barron, James Sager, Alan Quimby, Todd Mohn, Michael Torre, Gene Legg, Dawn James, Steve Cohoon, Sam Stanton, Dave MacGlashan and Tyler Pease.

homeowner is inconvenienced. The pumps last a minimum of 20 years and cost about \$500 apiece, so they're relatively cheap to switch out."

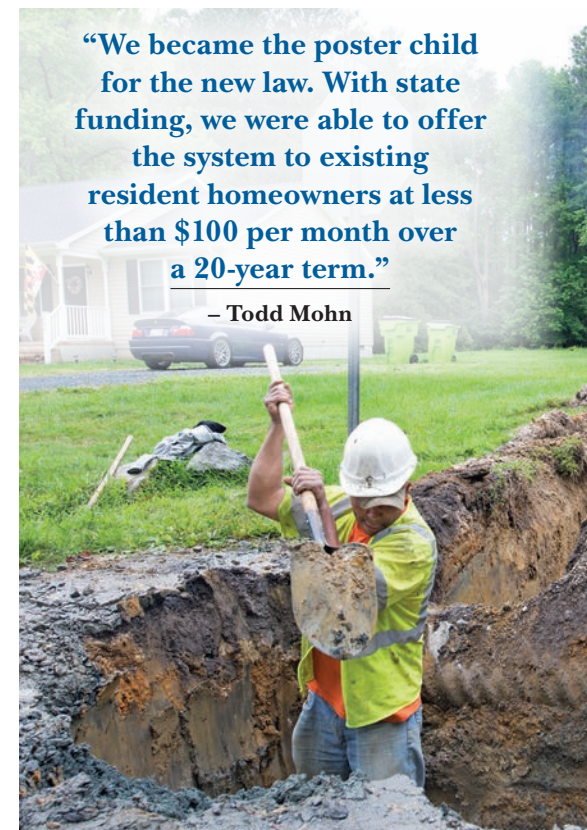
Audible alarms will sound if the system fails or if a float reaches a high-level mark. At that point, DPW crews are dispatched to repair the system and pump out the tank. Mohn says a typical tank would need to be pumped out an average of every five to seven years using a standard vacuum truck.

Expensive lots

Limiting the number of installations was essential to getting the project built.

"Infill was the gorilla in the room," Mohn says. "Our objective was to provide a permanent solution and correct the environmental problems created by the existing homes affordably. We had 1,500 houses in the proposed service area, but 1,600 additional infill vacant lots could build with a sewer extension. We were constrained by a state law that required a new sewer system to connect to all properties, even vacant lots, if the collections system passed in front of the vacant lot. We weren't ready to extend sewer lines down streets that existed only on paper, so these larger blocks of vacant lots were strategically excluded from the defined service area."

Many infill lots were as small as 5,000 square feet. In 2013, the county drafted an ordinance that required adjacent lots under common ownership to be merged. This provided a means to achieve current land use and zoning regulations and limit new infill development. The county assumed the costs of lot mergers under a streamlined legal process.



"We became the poster child for the new law. With state funding, we were able to offer the system to existing resident homeowners at less than \$100 per month over a 20-year term."

– Todd Mohn

DRONE RANGERS

Todd Mohn recently sought the shade of a tree and heard a buzzing above his head.

"I thought it might be bees," he says. "But 10 feet above my head, I saw our drone."

Mohn is director of the Department of Public Works in Queen Anne's County, Maryland. The department likes to stay on top of current technology, but this latest purchase — a pair of camera-equipped drones — has put the technology on top of the county. The drones were purchased from Aerial Media Pros for joint use by the county's IT department and QACTV, the county's public video network. Aviation Company ASEC Inc. provided operator training and helped to establish the county's drone program.

The Federal Aviation Administration once required organizations operating a drone to keep a licensed pilot on staff, but regulations passed in summer 2016 relaxed those requirements and allowed staff to operate a drone after obtaining a Remote Pilot Certificate with a Small Unmanned Aircraft Systems (sUAS) endorsement.

Two GIS staff members have completed drone certification and typically fly the units 30 to 40 feet above the ground while collecting information that's incorporated into the county's digital asset maps using ArcGIS by Esri. Cloud-based software, Drone Deploy, is used for flight control and imagery processing.

"We've had drones for about a half-year, but they've already proved very useful, particularly on our South Kent Island sewer expansion project," Mohn says. "We've used them for surveying and mapping and to get photographic records of as-builts and open trenches. We've also used them to locate and map division valves, collection points, valve pits and fire hydrants. We're incorporating all of this into our GIS system."

Aerial photography is not only valuable to the DPW — photos are also used to keep residents informed of key construction milestones. For example, recent photos of directional drilling on the SKI project were uploaded to Facebook.

"Everyone's eager to think of new uses for the technology," Mohn says.



A drone view of a work site on Kent Island where new wastewater lines are being installed.

"The limited service area boundaries and merger ordinance eliminated 1,000 lots," Mohn says. "That number allowed us to move forward on the project."

The project didn't initially qualify for Maryland's State Bay Restoration Fund, which prohibited funding for projects outside of identified priority zones. County representatives went straight to the General Assembly of Maryland to convince representatives to change the law and succeeded in obtaining a \$15 million grant.

"We became the poster child for the new law," Mohn says. "With state funding, we were able to offer the system to existing resident homeowners at less than \$100 per month over a 20-year term."

Another funding provision the county used was the Economic Benefit Premium. This policy applied to vacant lots that became buildable with the extension of a public sewer collections system. The county completed an appraisal study that concluded a vacant unbuildable lot became significantly more valuable than a developed lot with a septic system when public sewer was provided. This provided the option of assessing an additional EBP fee to vacant lots in the service area, which also helped keep the cost lower for current homeowners.

Construction begins

Construction is proceeding in four overlapping phases on a geographic basis, grouping small population centers:

Phase 1: Kent Island Estates 1 Romancoke on the Bay, from 2016 to 2021

Phase 2: Tower Gardens, from 2019 to 2023

Phase 3: Queen Anne's Colony & Kentmorr,

from 2020 to 2024

Phase 4: Chesapeake Estates, Sunny Isle of Kent, Normans & Matapeake Estates, from 2021 to 2025

"Construction contracts for Phase I were awarded in August 2016, and the first homes should be going live by the summer of next year," Mohn says. "Once complete in 2025, the project will meet 33 percent of our goal under the Chesapeake Bay Watershed Implementation Plan, reducing our yearly nitrogen discharge by 17,300 pounds. That may allow our wastewater treatment plant to be rerated for additional flow. The entire

project is a great achievement for us and for the Chesapeake Bay ecosystem." ♦

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A crew from Schummer Inc. digs a trench to grade for a new wastewater line on Kent Island. Residential STEP systems will feed into the line.

SMALL ENOUGH TO GET THE JOB DONE

New ECO Series machines provide a more efficient platform for vacuum excavation in tight spaces

By Luke Laggis



TECH CLOSE UP

PRODUCT:
ECO Series

MANUFACTURER:
Vermeer by McLaughlin
641/628-3141
www.vermeer.com

APPLICATION:
The need for smaller vacuum excavation units, yet fully equipped and completely capable machines

BENEFITS:
Designed for efficiency

The new ECO Series from Vermeer by McLaughlin is a smaller yet fully capable line of vacuum excavators. The skid-mounted units can be equipped for sewer cleaning work and are built for easy installation on both new and used truck chassis.

more than 50 percent compared to PTO-powered options in certain applications. The ECO Series also features lower maintenance costs compared to truck engine service and the versatility to mount on new or used truck chassis or on off-road crawler carriers.

MSW: Is Vermeer (McLaughlin) trying to establish a larger foot-

print in the municipal market?

Jeffords: The municipal market has been key to our success over the years. The ECO Series is just one component of the full lineup of McLaughlin vacuum excavators. This variety allows our company to meet the many needs of all our customers.

MSW: What are the advantages of a smaller truck-mounted unit?

Jeffords: Smaller truck-mounted vacuum excavators not only have the ability to work in tighter spaces but also give owners the flexibility of hiring drivers without a commercial driver's license when they adhere to spoil weight regulations.

MSW: What specific types of tasks is this unit designed to tackle?

Jeffords: The ECO Series is effective in all the same tasks/markets as its trailer-vac counterpart. It serves the utility market, in particular, by providing a productive way to safely dig around and expose existing utilities.

Vacuum excavation continues to grow in prevalence and popularity, but huge hydroexcavators and jet/vac trucks aren't always able to get into all the tight spaces municipal utility crews need to work.

Vermeer by McLaughlin has addressed the need for smaller yet fully equipped and completely capable machines with the ECO Series of vacuum excavators. The skid-mounted vacuum excavation units can also be equipped for sewer cleaning work and are built for easy installation on both new and used truck chassis — even all-terrain vehicles for more remote work. Everything is designed around the goal of efficiency.

Municipal Sewer & Water talked to Jake Jeffords, regional sales manager at McLaughlin, about the new series of excavators.

MSW: What was the philosophy in developing this series of vacuum excavators?

Jeffords: The ECO Series gives an owner/operator the ability to utilize a proven truck-mounted vacuum excavator that also delivers fuel savings of

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MSW: Was the design driven more by excavating functions or sewer cleaning capabilities?

Jeffords: The ECO Series was designed with utility work in mind. We know this market needs a compact vacuum excavation system that focuses on performance and improved fuel efficiency.

MSW: Why put a skid-mounted unit on a truck instead of building the whole unit directly on the truck chassis?

Jeffords: The ECO Series has great versatility since the entire skid can be mounted to many different chassis. This gives a customer the ability to mount an ECO Series vac to a new truck, a used truck they currently have in their fleet, or even to a nonstandard all-terrain vehicle for pipeline work.

MSW: How are the units spec'd out?

Jeffords: 1,025 cfm with 15 inches of Hg, the patented cam-over hydraulic rear door, the three-stage cyclonic filtration system, and the in-tank washdown system and auto belt tensioners. There is also the option to select the hydraulic boom.

MSW: What features set this series of vacuum excavators apart?

Jeffords: It has a proven power system that uses a pony motor package that doesn't rely on a truck's PTO drive for power. The Kubota 49 hp (36.5 kW) diesel engine burns 50 percent less fuel per hour than a 270 hp (149.2 kW) diesel truck engine, which can yield up to \$13,000 per year in fuel savings. The Kubota engine delivers constant power to the vacuum excavator, versus the lower, intermittent power provided by a truck PTO drive. And it only requires routine maintenance every 400 hours, compared to diesel truck engines with service intervals every 125 hours.

MSW: What jetting equipment is included if people choose that option?

Jeffords: Customers can pick between a 12 gpm or 18 gpm sewer jetter. If this option is chosen, the machine is equipped with 500 feet of 1/2-inch jetting hose, a lead section and one standard nozzle.

MSW: Is there room for an onboard freshwater tank?

Jeffords: Yes. Freshwater is standard on all ECO Series vacuum excavator units.

MSW: How do each of the units in the ECO Series differ?

Jeffords: The primary differentiating factor for each of the ECO Series models is horsepower range.

- ECO50 Series has a 49 hp (37 kW) diesel engine
- ECO80 Series has an 85 hp (63 kW) diesel engine
- ECO100 Series has a 99 hp (74 kW) diesel engine

There is also the ability to add a sewer jetter on the ECO80 and to add air excavation on the ECO100.

MSW: How will municipal utilities benefit from owning one of these units instead of or in addition to a larger jet/vac truck?

Jeffords: The ECO Series gives municipal utilities the ability to operate an efficient piece of equipment in compact areas. With certain configurations, there is no need for a commercial driver's license (depending on spoil tank size and GVWR of truck). This gives them the ability to expand the performance of their utility locating process while keeping operating costs low. ♦

A SYSTEMATIC CHANGE IN APPROACH

Durango builds a proactive maintenance program and uses trenchless rehabilitation to keep its customers happy

By Erik Gunn

The Colorado city of Durango is famed for year-round recreation and a popular tourist train. But when it comes to upgrading municipal infrastructure, both of those assets pose major challenges.

Durango has risen to the occasion, though. As the city embarked on a comprehensive rehabilitation of its systems five years ago, it also moved from reactive maintenance to a preventive approach.

"It's paid big dividends," says Steve Salka, Durango's utilities director. "Our maintenance costs have been cut in half. Our operational costs have been cut 25 percent."

Nestled in the southwest corner of Colorado amid the Rocky Mountains' San Juan and La Plata ranges, Durango has a population of about 18,000 that nearly doubles in the summer thanks to tourist traffic. But that can be deceptive: While those months may be the peak season, the tourist trade is busy year-round.

"What's unique about the city is we have visitors here winter and summer," says Salka. "In the wintertime they're here skiing. In the summertime they're here hiking and biking and rafting."

The dependence on tourism was among the special challenges that Durango faced when it launched its sewer system overhaul five years ago. No city wants to tear up streets or shake up residents' lives when undertaking such a major rehabilitation project, of course. But for Durango, where some streets are more than a century old and tourist dollars power the local economy, the stakes were especially high.

"We have to learn how to do it smarter instead of harder, and be able to keep our community's businesses up and operational," Salka says. "The worst thing we can do is work on a sewer line that can disrupt traffic. We have to learn how to use technology to our advantage."

(continued)



Durango, Colorado's water and wastewater utility has turned to pipe bursting to replace aging and undersized sewer mains with larger-diameter HDPE without inconveniencing customers or disrupting the city's bustling tourism industry. (Photography by Carl Scofield)

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Mining town

Founded in 1880 as a mining town, Durango installed its first sewer lines in the early 20th century just to carry away raw effluent. Some lines in operation today go back as far as the 1920s and '30s, Salka says.

Actual treatment of the sewage came decades later. The hodgepodge of lines extended over the decades was corralled into an actual sewer system in the 1950s. The city's current treatment plant wasn't built until the early 1980s.

The earliest lines were made out of clay, with other stretches constructed of Orangeburg pipe. Those oldest lines — the Orangeburg especially — have been failing with predictable frequency in recent years, Salka says.

Salka joined the utilities department, which is responsible for both water and sewer service, in 2012 after a 25-year career in the Navy. His objective was to help fix what local officials had come to see was an increasingly problem-ridden system. There was no systematic cleaning procedure or any equipment maintenance routine, for example.

He made it his first goal "to show them how to kind of rebuild this town so it was sustainable and to take care of our infrastructure," he says.

Almost immediately it became clear that what lay ahead was a costly proposition. The city "hadn't

raised water and sewer rates in over 30 years," he says. "We had to tell the public the truth. We had to raise these rates to take care of the infrastructure. Once we told everybody the truth, everybody was behind us."

New routines

Part of that investment was in new equipment, but part of it was also for new personnel. The utilities workforce grew to allow for routine maintenance and cleaning, as well as to build a workforce with the skills and numbers needed for the repairs that lay ahead.

"The city is addressing every water and sewer issue aggressively," he says. "We are educating our community" — both homeowners and business operators.

Durango had purchased its first sewer camera in 2011, the year before Salka arrived. After a first round of inspection, cleaning and repairs, the city was able to institute a regular inspection, cleaning and preventive maintenance program that covers the entire system every year.

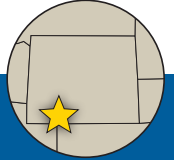
The first inspections and repair jobs uncovered just how bad things were. "We had sewer lines that had no bottoms in them — we had mini-leachfields out there," Salka says. The fats, oils and grease problem — not surprising in any tour-

ist-driven economy that supports a thriving restaurant industry — showed itself, too.

As the inspection and cleaning routines took hold, Durango logged the findings into its Lucy asset management software package, then began a prioritized program to replace the sewer lines throughout the city. "We started taking care of all the worst problems first."

The need for minimal disruption led Durango to choose pipe bursting as

(continued)



PROFILE:

Durango, Colorado, Water and Wastewater Utilities

POPULATION SERVED:

Winter – 18,000; summer – 34,600-plus

SERVICE AREA:

City of Durango, Colorado

TREATMENT CAPACITY:

3,000 mgd, average daily flows
2,600 – 3,000 mgd

NUMBER OF EMPLOYEES (WATER AND SEWER BOTH):

35

INFRASTRUCTURE:

156 miles of sewer mains;
18 lift stations; 2,448 manholes

ANNUAL OPERATING BUDGET:

Water \$7,442,385; sewer \$8,459,406

WEBSITE:

www.durangogov.org

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"We had to tell the public the truth. We had to raise these rates to take care of the infrastructure. Once we told everybody the truth, everybody was behind us."

– Steve Salka

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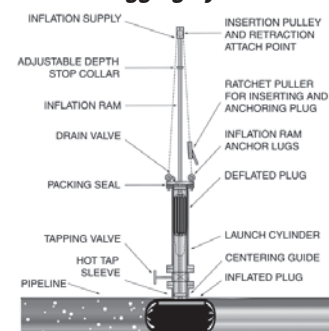
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The Durango water department crew works on a leaking commercial water hookup.

“With pipe bursting we’re able to replace the line, upgrade the line and still keep the sewer lines open and operational. For the customers, it had no effect. In some cases they didn’t even know we were doing it.”

– Steve Salka

its go-to solution for line replacement. “Pipe bursting became a very easy way, and also a way to save 25 percent over the cost of digging a trench,” Salka says.

The pipe bursting technique’s ability to accommodate all the upsizing that the rehab program has required — the city’s replacing 8-inch lines with 10-inch, and 10-inch lines with 12-inch, for example — was an extra benefit. But minimal surface disruption was another key advantage.

“With pipe bursting we’re able to replace the line, upgrade the line and still keep the sewer lines open and operational,” he says. “For the customers, it had no effect. In some cases they didn’t even know we were doing it.”

That’s not for lack of communication; Durango has consistently sought to spread the word of the project. But for the city’s hospitality industry, the repairs were simply business as usual.

“The hotels were still in operation, they were still doing their laundry, the people staying in them were still renting the rooms and had no idea that we were working on their sewer lines. One of the worst things you could do is say, ‘Mister hotel owner, you can’t rent rooms for the next two weeks because we’re working on your sewer line.’ That just doesn’t cut it.”

Railroad crossing

Durango also uses CIPP lining for some projects. But pipe bursting really proved its worth when the city’s rehab work ran into one of its star attractions.

(continued)

CROSS-TRAINING AND DOUBLE-CHECKING

The Durango sewer and water utilities department employs a total of 34 people, including seven assigned to the city’s sewer treatment plant, six to the water plant, and 17 who are cross-trained to do all maintenance on both the water distribution and the sewer collections systems.

The department’s management staff is cross-trained as well, but in a slightly different way, Utilities Director Steve Salka explains.

Superintendents and chief operators conduct spot checks on their personnel, but it doesn’t stop there.

“Sometimes I’ll swap it around so the wastewater plant superintendent will do a spot check on the water plant and the water plant superintendent will do a spot check on collections and distributions,” Salka says. “You learn more as a management person by talking to your people and doing those spot checks — getting out there in the field and listening to them — than you do sitting behind your desk.”

It’s an approach that carried over from his days in the U.S. Navy.

“When I was in the military they had this saying, ‘Expect what you inspect,’” Salka says. “If you don’t get out, don’t expect it to be done right. Until you get out there, you’ll never know.”



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Steve Cijka, Chief Operator, Town of Brandon, VT

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The Durango Utilities team includes (from left) Patrick Farrell, Corey Griffis, Director Steve Salka, Bobby Martinez, Jason Strain and Jarrod Biggs in front of one of the utility's Vactor 2100 Plus trucks.

The narrow-gauge Durango & Silverton tourist railroad has been called "one of the most spectacular narrow-gauge steam train rides in America" by the train magazine *Tourist Trains Guidebook*. It's one of the crown jewels of the city's tourism industry.

In March 2017, the city replaced a stretch of 8-inch sewer line running under the railroad track with 10-inch main. Open-trench work would have required tearing up the tracks entirely. The railroad has employees who do track repairs, but to have to re-lay such an extensive portion of the line simply to accommodate the sewer repair would have shut down train trips, potentially for days.

That wasn't all. Next door to the historic station where the work was to be done is a stand of trees that, like the depot, dates back more than a century. Digging a trench there would have required felling many of them.

With the pipe bursting equipment, Durango crews simply had to weave the pipe underground through the area: no trees felled, no tracks torn up, no train rides canceled.

"We pulled 256 feet of pipe and installed it in the ground in an hour and half," Salka says. "Now tell me where you could do that just digging a trench. It didn't disrupt any of their operations."

That even caught the attention of one of the

nearby TV stations, which broadcast a short news story on the job.

Upgrades and education

Durango's new, aggressive approach to sewer cleaning, inspection and repairs has been accompanied by a concerted effort to inform the public and business owners about the nature of the problems in the system. As a result, it has gotten widespread support for its increased budget and expanded practices.

Cleaning and camera inspections are now conducted annually, covering on average 3 miles of line a week. The city now has a fleet of three Vactor trucks (two Model M2106V units, one 2012 and one 2014, both built in Freightliner platforms, and an older 2008 Model L8500 on a Sterling platform); each truck has jetter/rodder units on the front. It's also taking delivery on a \$74,000 ROVER X sewer camera (Envirosight), which will be paired with the same 2013 GMC R.S. Technical TrackStar operation vehicle that the city's now-retired camera used.

This summer, Durango began work on a \$64 million dollar treatment plant upgrade with widespread support.

At some point the entire system will be replaced with new pipe, and Salka is determined

to make as light a footprint as possible. "Disrupting an entire community one block at a time creates a lot of disgruntled customers."

"Disrupting an entire community one block at a time creates a lot of disgruntled customers."

— Steve Salka

It'll take a while, but the goal, Salka says, is to simply keep the repairs going step by step.

"There's a lot of work that has to be done in the city." ♦

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REFERRAL SERVICE

When it comes to recruiting new employees, an oft-overlooked resource can reduce costs and increase the quality of job candidates

By Ken Wysocky

Recruiting new employees is expensive. Experts estimate that organizations spend billions of dollars a year — some peg the cost at more than \$4,000 per new hire — as they strive to fill job openings.

Yet too often, the results don't justify the cost. Consider this: About one-third of new employees quit their jobs within the first six months, according to one study. And a recent Gallup poll shows that 70 percent of workers are disengaged from their jobs. With this kind of disparity between hiring costs and employee turnover/disengagement, it's easy to question what organizations get in return for their investment.

But it doesn't have to be that way. In fact, organizations can reduce their recruiting costs, increase their return on investment and reduce employee turnover by tapping into a resource that's found in the halls, cubicles, offices and meeting rooms right under their collective roofs: their own employees.

"Employee referrals provide an easy and inexpensive way to leverage your employee bases to expand the talent pools beyond just job boards and career websites," says Jenna Filipkowski, Ph.D., the vice president of research at the Human Capital Institute (www.hci.org), a consulting group that specializes in strategic talent management. "They're already vetted because your employees know them. They're a great way to get your organization's brand out in front of people."

Referred candidates are three to four times more likely to be hired than traditionally recruited candidates, according to a recent HCI study entitled, *Making Referral Programs Count: Sourcing Quality Hires through Employee Networks*. The study, which polled more than 200 organizations, also found that employee-referred candidates are typically a better cultural fit because they most likely have values and beliefs similar to the ones held by the referring employee. And while the study found that referred employees don't necessarily perform better than nonreferred employees, they typically stay with organizations longer, Filipkowski says.

That's no small matter in light of the high cost of employee turnover. According to a study performed by the Society for Human Resource Management, employers typically shell out the equivalent of six to nine months of an employee's salary to find and train a replacement. Moreover, a study conducted by the Center for American Progress showed that filling the position of highly trained executives could be as high as 213 percent of their salaries.

Gaining popularity

The study showed that 29 percent of the organizations surveyed have increased their usage of employee referrals compared to the previous year.

While the reasons for that are difficult to pinpoint, one thing is certain: As unemployment rates continue to drop, the pool of qualified job candidates keeps shrinking.

That, in turn, makes it more and more challenging for employers to fill open positions. As Filipkowski puts it, "It's a candidate's market, which isn't so great for employers trying to fill those positions."

As such, organizations must be more strategic about how they recruit new employees, which could explain why employee-referral programs are becoming more popular. But in order to be effective, there are several things organizations must consider. For starters, follow the KISS philosophy, as in Keep It Simple, Stupid. "It must be simple for employees to use, not some complex, multi-hurdle program that's hard for employees to wrap their brains around," she says.

Despite the need for simplicity, organizations still need to consider many factors as they develop a referral program. For example, management must decide things such as which employees can or cannot make referrals, whether to weight all recommendations the same or give more preference to some employees because they hold senior positions or are long-tenured employees, the job performance of the referrer, and so forth. The HCI study showed that 78 percent of respondents weight all employee referrals the same and 60 percent allow all employees to participate in the program.

In addition, organizations need to give employees incentives to feel enthusiastic about referring job candidates. "They need to know why they should do this — why they should go out on a limb and ask people they know to become part of the organization," she explains.

Cash is king

Financial incentives and some kind of public recognition/acknowledgment are two common motivators. Filipkowski says the study showed that 92 percent of the participating organizations in the study offered cash incentives, with \$1,000 as the median value. While most employees prefer cash, each organization needs to figure out what would incentivize employees to make job referrals. An employee survey can help pinpoint those motivations, she says.

Organizations must also develop a formal communication plan around the program that explains its basic guidelines, as well as why such a program is needed. "If the program isn't formalized, it's not top of mind," Filipkowski says. "And the communication can't be a one-and-done effort. You have to continually promote the plan so the enthusiasm doesn't die out."

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.

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Programs also need the involvement and support of senior management. If they see value in the program, employees are more likely to see it, too. "Without support from senior leadership, the program won't get off the ground," Filipkowski says.

Of course, there's a bigger issue in play here in which senior management plays a crucial role: creating a corporate culture that's so dynamic that employees can't wait to invite people they know to apply for jobs. Just as people wouldn't recommend a lousy restaurant, they certainly won't encourage someone they know to apply for a job at a place where they themselves don't like to work, she notes.

"Senior leaders should understand that if they're asking employees to refer job candidates, they better be sure that they've created a culture that employees want to promote," Filipkowski says. "You're asking employees to be an extension of your brand — communicate why others should want to work there."

Organizations can help in that area by making it easy for employees to share reasons why their organization rocks. Let employees write blog posts on social media platforms, encourage them to write positive reviews on websites like Glassdoor, or even let them create video testimonials that they can share on social media. "Not many people do that, but I think it's a smart thing to do," Filipkowski suggests.

Good job-referral programs also typically include a monitoring component that allows management to judge whether or not they're effective. That would include tracking things such as how many new hires come from referral programs versus internal hires or job boards and the retention rates for job-referral employees, as well as their level of engagement and performance. "You also should track how many employees make referrals," she adds. "If it's always the same three people, you just might have a problem." ♦

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VACUUM EXCAVATION — KEEP YOUR CREWS SAFE

New wearable technology is providing a higher level of protection on job sites

By Cory Dellenbach

The dangers on your job sites are constant, and staying safe requires more than a hard hat, gloves and glasses. As technology advances, manufacturers are finding new ways to keep workers safer.

Warning lights on hard hats, belt-clip sensors that monitor lifting mechanics, and devices that warn you when entering dangerous work zones are just some of the technologies hitting the market this summer.

"It's still early days. You're going to see improvements in the near future with technology and safety," says Jonathan Horne, vice president of product management for Redpoint Positioning. "I think we're right at that point where technology is about to start taking off."

Safety badge



The indoor GPS system from Redpoint Positioning provides audible and visual alarms to alert workers when they enter restricted zones or dangerous areas.

Redpoint Positioning is just beginning the commercial deployment phase of its indoor GPS system, which allows contractors to warn workers if they enter a dangerous area.

"If you think about it as GPS, you've got satellites that are broadcasting timing signals to the planet, but those signals don't penetrate buildings or underground," Horne says. "We go in and install equipment that takes the place of GPS. It's effectively a wireless mesh network that's broadcasting timing signals. We install that in the building or underground and it can be extended to a large area."

Workers wear ID badge-like devices with a dis-

play, visual alarm and audible alarm that attaches to a vest or jacket. The badge is how the Redpoint system tracks the employee. The supervisor sets up work zones and dangerous areas using software on a tablet. If an employee enters that zone when they aren't supposed to, both visual and audio indicators will alert them.

It can be set up on a credential basis too. If there is a confined-space work zone, only properly trained workers will be allowed to enter that area. If a worker without qualified training passes into that zone, the badge will alarm.

"At the end of the day, we're really hoping that we can make a difference in the safety aspect of construction sites," Horne says.

Disposable monitors



The Single Gas Clip from Gas Clip Technologies never requires battery changes or calibration, and is disposed of after two years of service.

Sticking with devices that can attach to your vest, technical advances have made H₂S monitors easier to use and more reliable, according to Patti Dutton, marketing supervisor for Gas Clip Technologies.

"We offer a single-gas 'disposable' H₂S monitor, the Single Gas Clip, that is relatively inexpensive up front, extremely rugged, never requires battery changing or calibration, and is disposed of at the end of its two years of operational life."

The Texas-based company also has a multi-gas clip monitor used for general field operation or confined-space entry that provides two months of continuous runtime. "One employee can wear it all day long and then hand it off to another employee at the start of the next shift," Dutton says. "This can be repeated day after day for two months without having to take valuable time out to recharge the battery."

In the case of multigas monitors, there are two basic kinds of technology for detecting combustible gases — catalytic bead sensors and nondispersive infrared sensors (NDIR). Catalytic bead sensors were developed in the 1960s, while the new version of NDIR sensors using a low-power photodiode/LED source are more recent, says Bryan Bates, Gas Clip's president and chief executive officer.

Gas Clip Technologies uses the infrared technology for several reasons, including its ability to operate in low-oxygen environments — something the traditional catalytic bead sensors cannot do.

Managing hazardous gas exposure is essential for ensuring continuous protection, which is why Gas Clip Technologies' monitors also serve as a mini "black box," recording various information and data that can later be downloaded and analyzed.

Proper lifting

Poor lifting mechanics are one of the most common workplace injuries. According to a study by the Bureau of Labor Statistics, over 36 percent of the injuries involving missed workdays were

(continued)

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The StrongArm Technologies Ergo-Skeleton is an external spine that attaches to the worker's back and improves lifting dynamics, safety and efficiency.

the result of shoulder and back injuries. Overexertion and cumulative trauma were the biggest factors in these injuries.

Both Caterpillar and StrongArm Technologies have developed tools to help the workforce with its lifting problem.

Caterpillar recently debuted a small belt-clip device that will detect when an employee performs a high-risk lifting motion and provide immediate feedback in the form of vibration.



Caterpillar's new belt-clip device detects when a worker performs a high-risk lifting motion and provides immediate feedback in the form of vibration.

"This feedback allows employees to self-correct behavior, save their back from accumulated stress, and keep safety top of mind," says Cody Renshaw, strategy and analytics manager for Caterpillar.

During testing at a large construction site, the crew wearing the device experienced a 46 percent reduction in high-risk postures after three weeks of use.

StrongArm Technologies is aiming to help the workforce with lifting power with its V22 Ergo-

Skeleton. The V22 is an external spine that attaches to your back using a belt across the worker's waist. Hand effectors attached to ropes coming from the shoulder area attach to the worker's middle finger and ring finger on each hand.

The ErgoSkeleton integrates with the worker's musculoskeletal system to improve lifting dynamics, safety and efficiency. "The hand effectors have strings that transfer the load you are lifting from your hands, across your shoulders, down the spine and around your iliac crest," says Mike Kin, chief technology officer for StrongArm. "So you kind of have strings attached from your hands all the way down to your waist."

The ErgoSkeleton directs 80 to 90 percent of the load force to the strong muscles in a person's buttocks and legs over the span of the lift. It concurrently transfers 50 to 75 percent of the force from the weaker tissues and muscles in a person's hands, arms and lower back.

"The V22 is very specific to certain job functions and tasks, it's not one solution for all lifting tasks," Kin says. "If you're lifting anything above your shoulder, we don't recommend you use a V22 for that, but if you're lifting something that's over 15 or 20 pounds and you're carrying it over a long distance, those are the kind of things we recommend."

Lighting the way

Your work regularly exposes you to traffic, and visibility is critical for safety. Many contractors rely on safety vests and lights from the nearby work trucks to light them up.

Illumagear introduced a new way to keep workers safe with its second Halo product in March. The Halo is an LED light ring that clips securely around any hard hat.

"It uses spring-tension clips and you press it down," says Andrew Royal, president and chief product officer for Illumagear. "It works like a Chinese finger trap where the more you press down, the harder it is to come off. It's important

it stays on the hard hat, but at the same time it's also important that we don't invalidate the ANSI rating of the hard hat, that's why it will slide off with the right motion."

Unlike the first Halo model introduced three years ago, the newest version isn't tethered to a battery pack worn on a belt. The new version holds the battery right on the Halo.

The Halo has four modes. The first mode puts out 276 lumens in 360 degrees. The second mode still has all of the lights on, but they are rotating around the hard hat. The third mode is the task mode, where most of the power is pushed to the front and you can see what you are working on. The fourth mode is a dim mode for when people come to talk to the worker.

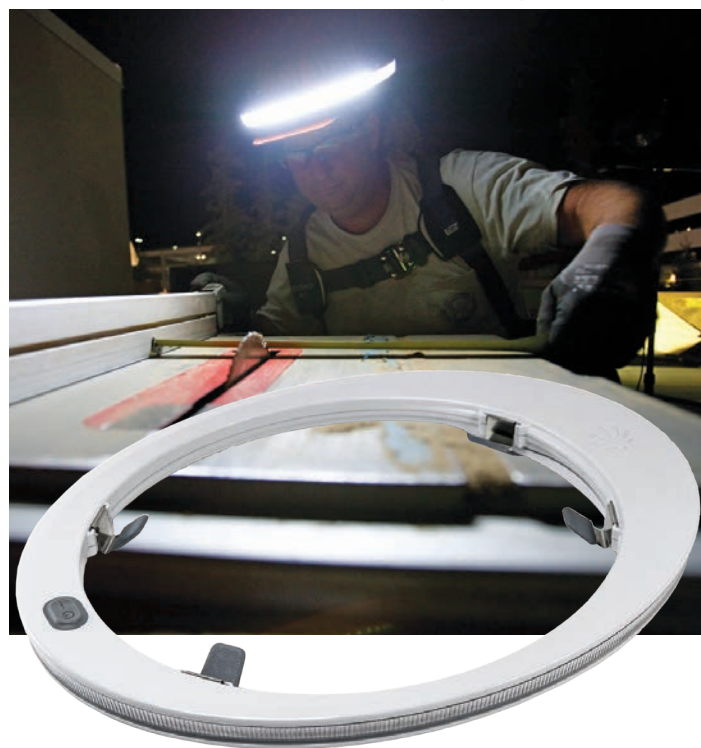
A single battery charge can power the Halo for 5 1/2 hours.

Connecting it all

Royal is excited to see where safety features are heading in the industry and expects to see manufacturers working together in the future to improve upon their effectiveness.

"We don't think of personal active safety systems as an Illumagear thing, we think of it as an important construction industry thing and we just

Illumagear's Halo is an LED light ring that clips securely around any hard hat and works for 5 1/2 hours on a single charge.



want to be a part of that," Royal says. "We see other companies doing things with regard to GPS tracking, monitoring of proximity to danger, things like that. All those things we're looking into as well and working with other manufacturers." ♦

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STAY CERTIFIED

NASSCO is working to help you stay up to date on the most current assessment information

By Ted DeBoda

Every year around this time we like to take a look back at our mid-year accomplishments and report on the NASSCO-driven activities and updates that benefit our members, as well as others involved in the underground construction industry. One of those updates is an upcoming change in the recertification for the Manhole Assessment and Lateral Assessment certification programs.

Recertification in the Pipeline Assessment Certification Program, MACP and LACP is critical in setting standards for the assessment, maintenance and rehabilitation of underground infrastructure and to ensure the continued acceptance and growth of trenchless technologies. After all, if the most current information for effective coding is not a priority, you can't provide the best service possible, and that affects us all.

The Pipeline Assessment program requires recertification every three years. We provide a variety of convenient ways to get recertified in order to make it as easy as possible, including an online recertification course, choosing a one-day PACP recertification course taught in a classroom setting, or attending the traditional two-day PACP course for a complete refresher, as if you were a brand new user. PACP recertification also earns you 0.8 CEUs.

It is also important to become recertified every three years in MACP and LACP, which follow the same expiration dates as an individual's PACP certification. While there will continue to be a fee for PACP recertification, MACP and LACP recertification will soon be free.

Other important initiatives to report as we move into the second half of 2017 involve the Inspector Training Certification Program (ITCP). We have made updates to the CIPP curriculum for ITCP, and have been work-

ing on the introduction of online ITCP recertification classes, which will be available in the near future.

This year, the *NASSCO Trenchless Manual of Practice* was peer-reviewed by volunteers throughout the industry, as well as the Water Environment Federation Collection System Committees. The goal was to improve and update the manual, which provides a baseline reference for a wide range of trenchless technologies for municipal managers and engineers, contractors and consultants. The manual provides basic information from asset management to assessment, to design and rehabilitation.

NASSCO is also working with the American Society of Civil Engineers/Utility Engineering and Surveying Institute to update the *ASCE Manual of Practice 92*, which focuses on manhole inspection and rehabilitation. NASSCO's collaboration with organizations, such as WEF and ASCE, result in resources that are fully vetted and beneficial for the entire industry.

Finally, in the first half of 2017, NASSCO's Sewer History Exhibit has been on the road, sharing our rich history and heritage with audiences across the country. The exhibit was displayed at the Underground Construction Conference in Fort Worth, Texas, in January; at the Water & Wastewater Equipment, Treatment & Transport Show in Indianapolis in February; and the ASCE/UESI Pipelines Conference in Phoenix this month. The exhibit is also available for smaller, regional conferences.

To learn more about sponsoring NASSCO's Sewer History Exhibit or bringing it to your town, contact us at info@nassco.org or call 410/442-PIPE (7473). ♦

NASSCO (National Association of Sewer Service Companies) is located at 2470 Longstone Lane, Suite M, Marriottsville, MD 21104; 410/442-7473; www.nassco.org



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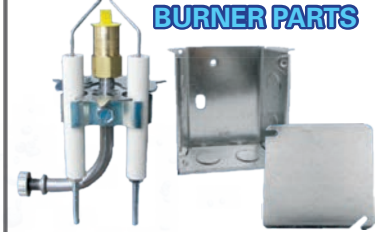
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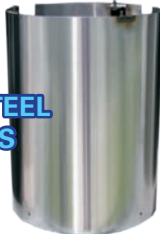
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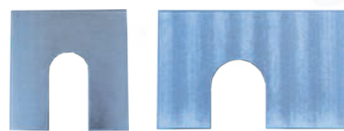
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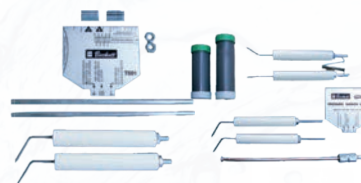
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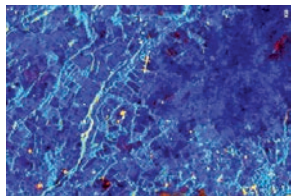
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PIPELINE INSPECTION, SURVEYING AND MAPPING

By Craig Mandli



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Asset Management

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The **PermaNet+ Trunk Main** system from **Fluid Conservation Systems** is designed to offer continuous leak monitoring for sensitive trunk main pipelines. Leak noise data is collected using high-performance hydrophone sensors for long-distance monitoring on large-diameter mains. Data is transmitted to the base system via GPRS/3G telemetry, and analyzed for potential leaks with dedicated alarm profiling software. The system continuously monitors noise and will auto alarm when threshold levels are reached. Secondary validation can be used to eliminate false positives and localize the leak's location. The system works in conjunction with Google Maps to provide live on-screen tracking, allowing leakage teams to respond quickly to problem areas. **800/531-5465; www.fluidconservation.com.**

2. Matchpoint Water Asset Management

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3. SmartCover Systems SmartClean

The **SmartClean** approach from **SmartCover Systems** enables agencies to maintain their collections system lines based on need rather than an arbitrary time-based cleaning cycle, significantly reducing the cost of unnecessary truck rolls, while also avoiding the risk of overflows. It can reduce cleaning runs by more than 90 percent, while effectively preventing the occurrence of SSOs. It helps improve system visibility and uses real-time data to drive maintenance,

lowering cost and preserving assets. **760/291-1980; www.mysmartcover.com.**

4. t4 Spatial t4 Vault

The **t4 Vault** from **t4 Spatial** provides wastewater professionals instant access to their library of CCTV pipeline inspection videos at any time, from anywhere and on any device. From a familiar and intuitive search bar interface, it accelerates insight from PACP-compliant inspections by making streaming videos, images, observations and other asset information easily accessible through simple queries, searches and sorting. Knowledge that was previously confined to a DVD is now stored in a secure, incorruptible cloud-based archive that can be shared across the organization and with consultants and contractors. There is no limitation to the number of users or the amount of data that can be stored and, as a hosted solution, there is no software to install or support. **805/309-0310; www.t4spatial.com.**

Crawler Cameras

5. Aries Industries Sentinel

The **Sentinel** inspection system from **Aries Industries** is an integrated system with all components operated by an all-in-one controller. The compact, portable unit combines a lightweight reel, a quick-setup tractor and a state-of-the-art camera. A convenient controller operates all components in the system. The control unit, with an 8.4-inch LED screen and internal DVR, can be hand-held or mounted on a desktop. The reel is easy to transport for use in hard-to-access locations. The tractor, with various wheel sizes available, sets up quickly for standard operation in 6- to 15-inch pipe. A large line kit facilitates navigation in pipes up to 36 inches. The unit captures high-quality video with a pan-and-tilt camera. Auto focus and white balance, and a 40-1 optical zoom capture fine detail. The system is designed with minimal parts, providing long service life and low maintenance. **800/234-7205; www.ariesindustries.com.**

6. Cobra Technologies from Trio Vision CT601

The small **CT601** crawler from **Cobra Technologies** from **Trio Vision** has been tested to 20 psi with superior traction, with its brass construction making it a hardy performer for its size, without adding undue weight. It

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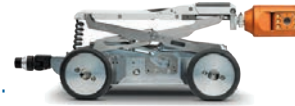
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can be configured with a powered camera lift and accessory wheels, making the system capable of inspecting 30-inch or larger lines. Conventional wisdom holds that 90 percent of pipe in the ground is 10 inches or smaller, making its size ideal the majority of the time. It can be paired with the Cobra PTZ Version 9 Camera, which is rated from 6 to 48 inches. **800/443-3761; www.cobratec.com.**

7. CUES Digital Universal Camera (DUC)

The **CUES Digital Universal Camera (DUC)** is a high-resolution, digital CCTV, side-scanning camera designed for rapid and detailed condition assessment. Inspect and assess 5,000 feet or more per day, increasing revenue while reducing expenses. The system produces a high-resolution digital video scan of internal pipe conditions in 6- to 60-inch pipe, and a flat unfolded view of the pipe to facilitate rapid assignment of observations. An expanded flat unfolded view of the pipe is provided for measurement purposes. This low-maintenance camera has no moving parts and is driven through the pipe without the need to stop or pan and tilt. Drive the unit on cruise control to the remote manhole or through multiple manholes for maximum efficiency. **800/327-7791; www.cuesinc.com.**

8. Envirosight ROVER X

The **ROVER X** inspection crawler from **Envirosight** is a one-pipe inspection platform that lets an operator control inspections, view and record digital video, log observations, generate reports and link directly to asset-management software. It is packed into a simple three-piece layout, with no CCU or other components to clutter the workspace. Twelve wheel options, plus camera lift, carriage and illumination accessories, mean ROVER X transforms in seconds to inspect any-size line. Its six-wheel drive with proportional steering navigates past obstacles, and overlapping wheels climb offsets effectively. Powerful motors and a geared six-wheel drivetrain maximize travel range. It is built on an expandable digital backbone. Side scanning and laser profiling can be added, and technicians can view data from onboard sensors, automate tasks with macros and measure defects on-screen. Its firmware updates automatically to the latest features. **866/936-8476; www.envirosight.com.**

9. Forbest Products FB215

The waterproof **FB215** crawler inspection camera from **Forbest Products** comes with three types of wheels on the six-wheel drive and double motors that can turn left or right with the creeping speed of 20 to 65 feet per minute suitable for 6- to 16-inch pipe. The waterproof 360-/180-degree pan-and-tilt, high-resolution color camera head focus can be adjusted with the high-brightness LED lights. It comes with 400 feet of 1/4-inch fiber-glass cable and a reel with meter counter and universal wheels with braking

function. 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. **877/369-1199; www.forbestusa.net.**

10. R.S. Technical Services TranSTAR and TrakSTAR

Ideal for assessment of lines 6 to 30 inches in diameter and up to 2,500 feet in length, the **TrakSTAR** from **R.S. Technical Services** has a 40x zoom camera in an integrated pan/tilt head with remote-controlled high-intensity dual LED light arrays. It has programmable pan/rotate limits with on-screen instructions, home function and onboard diagnostics, including internal pressure and humidity sensors. Options include inclinometer and laser crack measurement diodes. Paired with the **TranSTAR** six-wheel-drive steerable tractor, dual 90-watt motors provide inspection capabilities in larger lines without the need for additional gear trains or transmissions. It has three forward speeds, reverse and freewheel for rapid retrieval, a tilt-up connector, and integrated rearview camera. Optional elevator systems and multiple tire configurations make this combo versatile. **800/767-1974; www.rstechserv.com.**

11. RapidView IBAK North America ORPHEUS 2.0

The 6-inch **ORPHEUS 2.0 HD** camera system from **RapidView IBAK North America** provides users with visual clarity in full 1920x1080 high definition. It has full pan/tilt/zoom capabilities and includes built-in laser measurement for measuring defects inside the pipe. With 120x zoom, and one-push, intelligent auto focus, it is ideal for providing crisp, clear images of larger-dimension pipes. **800/656-4225; www.rapidview.com.**

GIS GPS

12. Vivax-Metrotech Spar 300

The **Spar 300** from **Vivax-Metrotech** is a precise utility surveying system that collects positions to site coordinates. It continuously logs the utility depth and offset, along with statistical confidence and automatic offset calculations. It outputs the 3-D positions to a Trimble TSC3 for real-time display on the Trimble Access map. During complex locating scenarios, it applies automatic tolerance masks to the position data, flagging these areas on the map. By only keeping casual contact to the underground utility line, the system logs geospatial positions and expected error of the utility regardless of the perspective of the spar relative to the line. FieldSens Technology is based on the joint optimization of data from sensors against a physical model of the magnetic field expected from a utility line. The method minimizes the need to bring the measurement equipment to specific points related to the utility line in order to validate position. **800/446-3392; www.vivax-metrotech.com.**

(continued)



Laser Profiling Equipment

13. Rausch Laser Profiler

The **Rausch Laser Profiler** performs CCTV inspection, crack measurement and laser profiling. A full Rausch camera is connected to the electric lift on the L135 steerable tractor. The system features two laser diodes integrated into a mainline TV camera head. The lasers project onto the pipe wall and the rotating camera head analyzes the pipe profile via spinning laser technology. No time-consuming, manual field calibration is necessary, as users simply place the profiler in the pipe and begin. All data is instantly and accurately generated on site using POSM Pro software. No third-party data processing is required, thus providing immediate and reliable on-site evaluation of the pipe. It meets ASTM F3080-14 standard, and can be used in 8- to 48-inch pipe. **717/709-1005; www.rauschusa.com.**

Mainline TV Camera Systems

14. Electric Eel Ecam PRO 2

The **Ecamm PRO 2** from **Electric Eel** allows users to quickly inspect 3- to 10-inch-diameter pipelines and locate a wide variety of pipeline problems. It has a stainless steel-housed 1.68-inch self-leveling color camera with sapphire lens, 20-LED light ring and high-resolution CCD element. A flexible camera spring navigates 3-inch P-traps. The auto iris adjusts lighting automatically. It provides an industry-standard 512 Hz sonde and has a 10.4-inch daylight-readable display with an on-screen footage counter, 16 pages of text writing with memory saves and click-touch controls with one-touch recording. Users can record directly to a USB flash. It has voiceover recording and audio/video out jacks, an 8x zoom function and adjustable light controls. It comes standard with 200 feet of braided fiberglass premium 1/2-inch-diameter 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.**

15. General Pipe Cleaners Gen-Eye POD

Lightweight **Gen-Eye POD** video inspection systems from **General Pipe Cleaners** offer optional Wi-Fi capability. A Wi-Fi transmitter inside the monitor lets the user send video to a tablet or smartphone to record the inspection. They can send the video on to customers or post it to YouTube from the field. The package combines camera, reel and monitor. The full-size unit sports a self-leveling camera and 200 feet of Gel-Rod for troubleshooting 3- to 10-inch drainlines. The MINI-POD version carries 125 or 175 feet of pushrod with mini self-leveling color camera small enough to troubleshoot 2- to 4-inch lines. A video out connection still lets the user record to an external device. A 7-inch LCD color monitor mounts on a rugged, flexible gooseneck that swivels for optimal viewing angles. **800/245-6200; www.drainbrain.com.**

16. MyTana PGR400 Municipal Inspection System

The **PGR400 Municipal Inspection System** from **MyTana** is ideal for small to medium municipalities, providing inspection capability of up to 400 feet suitable for 4- to 12-inch lines. It includes a CBx17 Control Box, daylight-readable monitor, three recording options including internal to a hard drive, external via USB and Wi-Fi to transmit to an iPhone, other smartphone, iPad or other tablet. Its improved pushrod is stiffer to push further and has a smoother skin that reduces hang-up and drag. Its color self-leveling camera head has built-in LED lights and a 512 Hz transmitter for easy locating. Different system configurations and related accessories are also available. **800/328-8170; www.mytana.com.**

17. Ratech Electronics Elite USB with Wi-Fi

The **Elite USB with Wi-Fi** from **Ratech Electronics** lets users record pipe inspections direct to a USB flash drive and wirelessly via an app to an iOS or Android device, while taking live video and digital still photos, which can be immediately uploaded to YouTube. The Wi-Fi interface is available on any current or existing Ratech systems in the field, and is available with a sun-readable 10-inch LCD monitor and either a self-leveling camera, ultra-micro camera or even the pan-and-tilt push camera. Systems come in cable lengths from 100 to 400 feet. **800/461-9200; www.ratech-electronics.com.**

Recording/Archiving/Data Devices

18. Endress+Hauser Promag 400

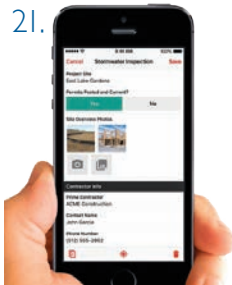
The **Promag 400** magnetic flowmeter from **Endress+Hauser** has built-in Heartbeat Technology that provides self-monitoring, device verifications and diagnostics per ISO 9001 for long-term operation. It means there's no need for dismantling the device and interrupting operations for unnecessary flowmeter calibrations. It provides inspection reports via web servers or asset management systems, complete documentation of a device's performance and saves verification results directly in the device. Models are available for pipe sizes from 1 to 90 inches. All models have corrosion protection and polyurethane, hard rubber or polyamide liners that have drinking water approvals. They have 4-20mA HART, EtherNet/IP, Profibus and Modbus RS485 communications, and current and pulse/frequency outputs. **888/363-7377; www.us.endress.com.**

19. Radiodetection Corporation RD8100

Featuring a unique arrangement of five antennas with optional integrated GPS and usage logging, the **RD8100** from **Radiodetection Corporation** keeps users on the right line while enabling them to demonstrate safe working practices and validate quality of work. It has integrated, automatic GPS and enhanced usage logging options. By analyzing usage patterns, users and



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management can assess individual locate operations to ensure compliance with best practices, or identify training needs. Additionally, the data can be used for internal audits or shared with customers to evidence task completion. 877/247-3797; www.radiodetection.com.

20. RIDGID SeeSnake CS6x

The **RIDGID SeeSnake CS6x** is a Wi-Fi and Bluetooth-enabled digital monitor that streamlines drainline inspection reporting by automatically generating reports for easy delivery from the job site. It streams and records inspections to a designated phone or tablet using the free downloadable iOS or Android companion app. The monitor can be mounted to the SeeSnake Max rM200 docking handle for easy transport and storage. It has a water-resistant keyboard for direct control of camera and monitor functions, and one-touch image recording for fast, efficient documentation of inspections. 800/769-7743; www.ridgid.com.

Software

21. Fulcrum

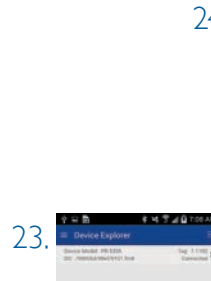
Fulcrum is a powerful mobile forms platform that enables managers to easily build custom apps for capturing information in the field. They can design forms using a drag-and-drop designer and quickly deploy them to a mobile workforce for collecting data. It allows users to use text entry and pick lists, take photos and videos, collect signatures, scan barcodes and record GPS locations. It can be used as a stand-alone data collection platform or integrated with existing services such as ArcGIS and other asset management systems. The live data feed can be accessed from anywhere for real-time mapping and analysis, or data can be exported in a variety of standard formats like Excel, CSV, shapefile or geodatabase. 727/216-2889; www.fulcrumapp.com.

22. iWater infraMAP

The **infraMAP** software system from **iWater** is a GPS-guided mobile GIS solution that allows seamless data collection and updates to a utility's asset management program. This easy-to-use software is geared toward field crews and doesn't require GIS experience, bringing together field crews, management, GIS and engineering into a commercial off-the-shelf product. It can be used to economically and conveniently monitor water and wastewater infrastructure assets at an optimized level, in order to provide greater efficiency returns and customer service benefits. 949/768-4549; www.inframapsoftware.com.

23. ProComSol HART Communicator App

The full-featured **HART Communicator App** for Android phone or tablet from **ProComSol** uses device descriptors (DD) to make all instrument parameters, including methods, available to the user. The full DD library is



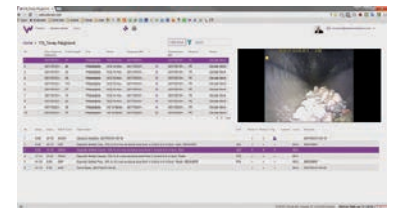
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included. It can be used to read process data and instrument status. The user can also edit instrument parameters and perform instrument trims. Save complete HART instrument configurations as PDF and CSV files for use in an asset management system. Detailed instrument configuration data can be easily shared throughout the plant using email. Saved configurations can even be downloaded to new instruments. The time and hassle to replace a failed HART instrument is greatly reduced. 216/221-1550; www.procomsol.com.

24. Smart Phone Meter Reading

SmartPhone Meter Reading allows users to read, install or change meters, or even manage AMR and AMI installations. They can perform ons, offs or cutoffs utilizing any smartphone's built-in GPS, camera, internet and mapping capabilities. It can be used to find meters using GoogleMaps, geolocate assets, validate work and readings with GPS and photos, download routes and work lists from anywhere, or upload readings and completed work tickets in real time. No paper or expensive equipment is required. 214/215-2665; www.smartphonemeterreading.com.

25. SplashLink Bids and Projects

The **Bids and Projects** feature from **SplashLink** offers the industry's latest opportunities and allows system administrators to expand their organization's project portfolio. It searches thousands of websites daily and posts projects from cities, municipalities and utilities looking for expertise in asset management, GIS/GPS, software updates, construction and engineering, and more areas vital to the proper maintenance and repairs of existing infrastructure. It has over 40,000 projects posted, and over \$8 billion in funding opportunities available on the site. 844/877-5274; www.splashlink.com.

26. WinCan Web

WinCan Web allows users to upload inspection footage for secure viewing anywhere, instantaneously, from any device. Once an inspection is complete, the operator simply uploads the project to be processed and published for authorized viewers. To view uploaded projects, a link can be sent by email, or an account can be created, giving authorized users access to a specific collection of projects. Aside from the convenience and speed of sharing data instantaneously online, it utilizes cloud-based data storage to eliminate many IT costs while also offering increased security and reliability. 877/626-8386; www.wincan.com. ♦

System helps locate pipes under mudflats



Problem:

The Wadden Sea in the North Sea with its coastal regions in Denmark, the Netherlands and Germany is the largest system of mudflats in the world. Local water utility Wasserverband Nord had to locate and document a freshwater pipe between the mainland and the island of Pellworm, but the tide comes in twice a day and the area is only safe to walk on for a maximum of six hours when the tide goes out.

Solution:

Wasserverband Nord enlisted the help of **Hermann Sewerin GmbH** to accurately locate and document the pipe using a cable running parallel to the pipe. Sewerin provided the **UT 9000**, which is supported by an external GPS system, the Geo-Explorer by S+H Systemtechnik GmbH. The device's self-explanatory menu navigation guides the technician to the position of the pipe one step at a time. Their lightweight and superior ergonomics make the devices easier to transport through the sticky mud. The high-contrast LCD monitor is clearly legible, even in extreme lighting conditions.

RESULT:

The device helped locate the pipe in a short time, save the coordinates and accurately document the location. **888/592-9916; www.sewerin.com.**

Leak detection sensor and swimming ROV used to find leak in Latin American conveyance tunnel

Problem:

A Latin American client was worried a leak within a large water conveyance tunnel could undermine nearby structures. The client needed to better understand the location and severity of the leak creating the problem.

Solution:

Hibbard Inshore was asked to locate the leak. Hibbard had recently tested a sensor that locates leaks and seepage by using electrical logging to measure amperage/voltage along with electromagnetic field readings from outside the pipe/tunnel. The measurement probe was carried into the flooded pipe with

a swimming ROV. The electrical logging inside the tunnel required a circuit with an outside connection. Electrical current deviations were recorded and logged with payout to identify potential leak sites. The electric current follows the preferential groundwater flow path, or the path of least resistance, to complete the circuit, therefore allowing Hibbard Inshore to identify magnetic field intensity to determine conductivity zones or transport porosity.



RESULT:

Reviewing the visual information along with the electric logging, technicians were able to narrow down the possible location of the leak, which was observed with CCTV while they remotely released dye to visually and physically verify the leak's location and cause. Technicians also provided a 3-D, georeferenced surrounding area map of the observed conductivity patterns. **248/745-8456; www.hibbardinshore.com.**

Acoustic inspection approved as part of cleaning mandate



Problem:

New Castle County, Delaware, serves a population of over 550,000 that generates 50 mgd of wastewater, which is conveyed using 1,700 miles of

underground sanitary sewer pipes. As part of a mandate from the Delaware Department of Natural Resources and Environmental Control, they are required to clean 500 miles per year, which roughly equates to a three-year cleaning frequency for the entire system.

Solution:

InfoSense's Sewer Line Rapid Assessment Tool, or **SL-RAT** technology was developed for rapidly identifying sewer line blockage conditions. It is based on measuring an acoustic signal transmitted between manholes in an active sewer line segment. As part of the initial pilot study, 56,000 linear feet were evaluated in mid-2014. An average of seven line segments (1,450 linear feet) per hour was achieved.

RESULT:

Results showed that less than 10 percent of the inspected pipes needed immediate cleaning, which created an opportunity to better allocate resources to pipes that actually needed attention. Pilot studies have continued, and to date over 1,450 inspections have been performed (320,000 linear feet). On average, over 55 percent of the pipes received a "Good" score (7-10) and only 11.4 percent needed immediate cleaning (acoustic score of 0-3). Use of the SL-RAT has been approved by DNREC and the EPA to count toward the annual 500-mile cleaning requirement. There are no immediate plans to reduce cleaning. Instead they'll use the preliminary acoustic inspection data to focus cleaning efforts on the pipes that actually need it. **877/747-3245; www.infosense.com.**

Camera system used to inspect backyard catch basins

Problem:

New stormwater requirements in Ontario, Canada, required adding catch basins to residential storm drains. All residential developments needed to add backyard 2- by 2-foot concrete basins for the collection of stormwater runoff. Inspection of these basins is standard maintenance, to be done on a regular basis by an inspection contractor. Kls Inspection Services needed a camera to do the job.

Solution:

Basins are located in backyards on the opposite side of the building lot driveway. The contractor must park on the street at the driveway to complete the inspections. Using his **Pearpoint P350** system from his mainline camera truck, owner Kurt Streick pulls his cable all the way around the house. Using yard rollers to protect his cable, he lowers his 354 P&T camera into the basin and drives around the 45-degree bends and the 100-plus feet of remaining pipe to show the connection to the main.

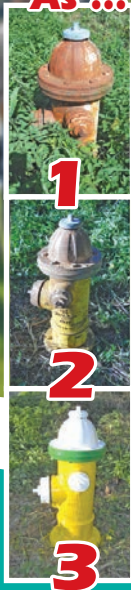
RESULT:

"My push cameras were too small for 10-inch pipe," Streick says. "I decided to try my small CCTV crawler and it worked perfectly." The compact size of the P350 allows it to drive around the 45-degree fittings and then power down the 10-inch main pipe. **800/688-8094; www.pearpoint.com.** ♦



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Product Spotlight

Low-maintenance SuperJet improves performance with extendable hose reel

By Jared Raney

The truck-mounted, high-pressure SuperJet cleaning machine from Super Products seeks to increase functionality via an extendable hose reel with 200-degree rotation. With a design capacity of 100 gpm and 3,000 psi continuous duty, the machine is targeted at light cleaning or regular maintenance of municipal and residential sewer lines.

Featuring a single-engine design that emits lower sound levels and results in 40 percent fuel usage reduction compared to dual-engine units, the SuperJet has a rear compartment that's heated with an 80,000 Btu/h heater, enabling year-round operation in freezing environments.

"The new SuperJet also offers some other features that weren't available on previous versions or other jetters on the market today," says Mike Perkins, Super Products sewer product specialist. "The water pump has less moving parts than others on the market, which can translate into fewer maintenance requirements. And the water pump is covered by a new standard three-year warranty."

The unit's double-acting, single-piston, hydraulically powered water

pump offers 1-1 oil to water ratio; its modular water tank setup easily accommodates capacities from 1,000 to 3,200 gallons, with rotationally molded noncross-linked polyethylene construction with ultraviolet stabilizer.

"Featuring the same technologically advanced single-piston water pump that's utilized on the Camel combination sewer cleaner, the SuperJet also offers a standard aluminum enclosure, a hose reel capacity of 1,000 feet of 1-inch-diameter sewer hose, a 7-inch tilting color LCD display for easy operation, and an extendable 82-inch-wide by 84-inch-long rear canopy to shield the operator from the outdoor elements," Perkins says.

An easy-to-use control panel performs a number of functions including adjustable engine throttle with water pressure speed dial; on/off water pump PTO; psi and gpm; and hose reel joystick, pay-in/pay-out with speed control.

"The SuperJet is a general-purpose truck-mounted jetter that will be a valuable addition to any municipal or large sewer, plumbing and construction contractors' fleet," Perkins says. **800/837-9711; www.superproductsllc.com.**

SmartTrend from SmartCover



SmartTrend from SmartCover is a comprehensive software tool that supplies users with advanced methods to anticipate SSOs and CSOs at remote monitoring sites before they occur. It automatically analyzes trends in the collection system and determines conditions using advanced signal processing and pattern recognition, sending advisories to users when a trend is discovered. SmartTrend promotes advanced planning for maintenance and capital repairs. The software is a powerful management tool for making preemptive maintenance decisions before alarms occur. Since each monitored site can have its own personality, the sensitivity of the SmartTrend signal processing is adjusted on a site-by-site basis. **760/291-1980; www.smartcoversystems.com.**



Hydra-Flex Aqua-Rocket turbo nozzles

Hydra-Flex's Aqua-Rocket industrial turbo nozzles are constructed with stainless steel housings and tungsten carbide nozzle tips and seats to withstand harsh environments and provide longer life. The nozzles are equipped with a

high-temperature, drop-resistant cover for less maintenance. **952/808-3640; www.hydraflexinc.com.**

Hi-Vac X-Vac X-13 hydroexcavator



The X-13 hydroexcavator from Hi-Vac Corp. has a 27-inch Hg high-capacity vacuum system; a 10 gpm at 2,500 psi triplex water pump; a top-loading 360-degree boom; poly-graphite, rust-free water tanks; a power transfer with

OMSI heavy-duty transfer case design; and a noise-deadening, heat-retaining enclosure that surrounds both the water system and the vacuum system. It can carry up to 23,000 pounds and can transport and dump debris on site. **800/752-2400; www.hi-vac.com.**

General Pipe Cleaner Typhoon trailer jet



The Typhoon trailer jet from General Pipe Cleaners delivers 12 gpm at 2,500 psi to clean lines of grease, sediment and debris from 4- to 12-inch lines up to 400 feet. A 200-gallon holding tank carries water to handle remote applications where access

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to water is limited. It has electric brakes, safety strobe light, safety cones, rear fold-down stabilizer jacks, retractable hose guide arm and antifreeze system as standard equipment. The Typhoon comes with a 24 hp Honda engine with electric start and the on-demand Vibra-pulse helps slide the nozzle around tight bends and propel the hose down long lines. 800/245-6200; www.drainbrain.com.



COXREELS pin lock for Challenger Series

The pin lock mechanism by COXREELS is available for the Challenger Series. The lock secures the drum and prevents the hose from unspooling when the reel is not in use. The assembly can be used on any of the Challenger models, including the 12- and 17-inch disks. 800/269-7335; www.coxreels.com.



Picote wire brush

The Picote wire brush range is a safe option for smaller-diameter PVC pipes. They are designed specifically for lightly removing any buildup of scale. Used with the Micro or Mini Miller machines, they come in pipe diameters of 2, 3, 4 and 6 inches. There are additional brushes for the Maxi Miller machine in pipe diameters 4, 6, 8 and 10 inches. 219/440-1404; www.picotesolutions.com. ♦

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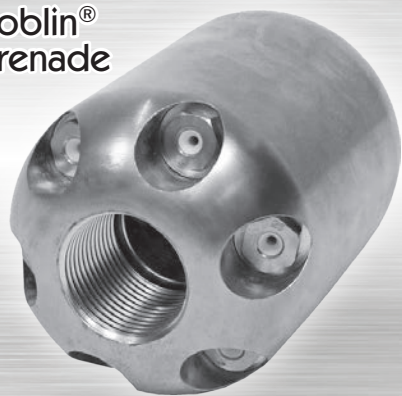
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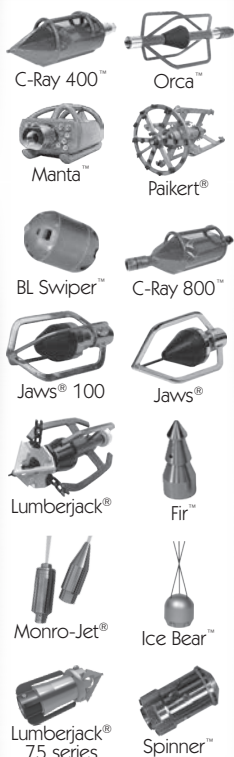
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INDUSTRY NEWS

AUGUST 2017

Federal Signal to acquire Truck Bodies & Equipment International

Federal Signal announced that it intends to acquire Truck Bodies & Equipment International for \$270 million, subject to post-closing adjustments. The transaction will allow the company to leverage its expertise in building chassis-based vehicles, expanding its exposure to industrial end markets.

Mutual Industries announces acquisition of Harris Industries

Mutual Industries announced the addition of Harris Industries, a manufacturer of safety identification products, including printed barricade tapes, underground tapes, pipe and electrical markers.

Badger Meter agrees to acquire D-Flow Technology AB

Badger Meter announced that it has signed a definitive agreement to acquire D-Flow Technology AB of Lulea, Switzerland. The acquisition will enable the company to further enhance its existing E-Series Ultrasonic product line and continued advancement of its ultrasonic capabilities.

Dust Control Technology changes name to BossTek

Dust Control Technology has changed its name to BossTek to better reflect all of the company's product lines. Headquartered in Peoria, Illinois, the company maintains a domestic rental fleet of industrial-strength misting cannons of all sizes for dust and odor suppression.

TMW Systems earns awards

TMW Systems has been recognized for its business intelligence marketing campaign as part of the 2017 Compass Awards program from the Transportation Marketing & Sales Association. The annual Compass Awards recognize excellence in marketing, customer communication and sales activities within the transportation and logistics industries.

Felling Trailers' employees earn CWI certifications

Ben Myhre, a welding trainer for Felling Trailers' Weld Training Center, and Kyle Wald, vice president of engineering for Felling, obtained their Certified Welding Inspector Certifications through the American Welding Society. The two will work together to create a set of certified weld standards that will be implemented throughout the company.

Scott Eicher joins Sprayroq

Sprayroq announced the addition of Scott Eicher to its corporate team as director of corporate development. Prior to joining Sprayroq, Eicher was president of Foam Fusion, a company he started to apply foam and coatings for the residential and commercial markets.



Scott Eicher

Ring-O-Matic makes additions to dealer network

Ring-O-Matic announced that its full product line of vacuum excavators, vacuum units and pit cleaners is now available from 22 more locations through six of the industry's equipment dealerships. ♦

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PEOPLE/AWARDS

The **American Public Works Association** announced its Top 10 Public Works Leaders of the Year list for 2017. The program recognizes the outstanding career service achievements of individual public works professionals from both the public and private sectors in North America. Recipients include:

- David Fabiano, town engineer, Gilbert, Arizona;
- Lee Gustafson, senior project manager, WSB & Associates Inc., Minneapolis;
- Patricia Hilderbrand, division manager/coordination services, Public Works Department, Kansas City, Missouri;
- Richard Howard, Public Works director, city of Orlando, Florida;
- Paul May, chief engineer, York Region Rapid Transit Corporation, Markham, Ontario;
- Robert Newman, director of Public Works, city of Santa Clarita, California;
- Jeanne Nyquist, president, Nyquist & Associates Inc., Tigard, Oregon;
- Darren Schulz, director of Public Works, city of Carson City, Nevada;
- Kevin Sheppard, Public Works director, city of Manchester, New Hampshire;
- Larry Stevens, project director, HR Green Inc., Johnston, Iowa.

The **Yolo County Flood Control and Water Conservation District** was named a finalist for the Clair A. Hill Water Agency Award for its Stormwater Capture and Groundwater Recharge Project. The award is presented by the Association of California Water Agencies. The Yolo County project diverts stormwater into the district's existing 160-mile unlined irrigation canal for percolation into the groundwater basin.

The village of **Homer Glen** will receive \$521,704 in grant funding from the Illinois Environmental Protection Agency. The funds will be used to pay for about 60 percent of the Heritage Park project for water quality and drainage-related work. The village said the work will reduce stormwater volume and nonpoint source pollution discharged to Long Run Creek by converting two of the existing ponds into two expanded, large stormwater wetlands (totaling 26.7 acres) as well as the construction of a 950-foot-long bioswale. Construction of the wetland basins and bioswale will include excavation and the installation of deep-rooted native vegetation and wetland plantings, and will be designed to filter, retain and infiltrate stormwater.

The city of **Gardnerville**, Nevada, will receive a Community Block Grant for \$539,350 that will be used for a stormwater detention basin project.

Talbot County (Maryland) received a 2017 Innovation and Leadership in Watershed Protection and Restoration Award from the Center for Watershed Protection. The county was honored because of its leadership in testing new technologies to reduce stormwater pollution to local waterways at a lower cost.

The town of **Garner** and **PEG Media Partners** received the North Carolina Source Water Protection Award of Excellence for their stormwater education public service announcements. The PSAs focus on pet waste, illicit discharges and pollution prevention tips for homeowners. The videos were primarily the work of Garner stormwater engineer Jaclyn Sumner and PEG Media Partners videographer, editor and director Adam Carroll. Town staff also participated in the projects.

A green project by an interdisciplinary team of **City College of New York** students won the United States Environmental Protection Agency's

fifth annual Campus RainWorks Challenge. Tasked with designing an innovative green infrastructure project that effectively manages stormwater runoff while benefitting the campus community and environment, the five-member City College team devised the "Castor Project." The plan calls for increasing tree canopy 15 percent by adding 89 trees and impervious area 38 percent by adding 23,000 square feet of permeable surface. Students on the team include Agata Bugala, Uziel Crescenzi, Alexander Fenichell, Deanna Greene and Lawrence Vulis. Faculty advisers were Naresh Devineni and Krish Ramalingam.

LEARNING OPPORTUNITIES

Florida

The American Water Works Association is offering a seminar titled Effective Utility Management on Sept. 21-22 in Orlando. Visit www.awwa.org.

Wisconsin

The University of Wisconsin-Madison is offering Essentials of Hydraulics for Civil and Environmental Professionals seminar on Oct. 11-13 in Madison. Visit epd.wisc.edu. ♦

CALENDAR

Aug. 4-6

American Society of Civil Engineers' Younger Member Leadership Symposium, ASCE Headquarters, Reston, Virginia. Visit www.asce.org.

Aug. 6-9

American Society of Civil Engineers' Pipelines Conference, JW Marriott Phoenix Desert Ridge Resort & Spa, Phoenix. Visit www.asce.org.

Aug. 27-30

American Public Works Association PWX (Public Works Expo), Orange County Convention Center, Orlando, Florida. Visit www.apwa.net.

Aug. 27-31

StormCon: North American Surface Water Quality Conference & Exposition, Meydenbauer Center, Seattle. Visit www.stormcon.com.

Sept. 18-20

National Rural Water Association WaterPro Conference, Reno, Nevada. Visit www.nrwa.org.

Oct. 8-11

American Society of Civil Engineers 2017 Convention, New Orleans Marriott, New Orleans. Call 800/548-2723 or visit www.asce.org.

Oct. 17-20

National Utility Contractors Association Fall Leadership Conference, Coeur d'Alene Resort, Coeur d'Alene, Idaho. Visit www.nuca.com.

Oct. 25-27

WJTA-IMCA Conference & Expo, Ernest N. Morial Convention Center, New Orleans. Visit www.wjta.org.

Oct. 30-Nov. 2

American Water Works Association Water Infrastructure Conference & Exposition, Westin Galleria Houston, Houston. Visit www.awwa.org.

Nov. 5-9

American Water Resources Association Annual Conference, Red Lion on the River-Jantzen Beach Hotel, Portland, Oregon. Visit www.awra.org.

Nov. 6-9

American Society of Civil Engineers' Operation & Maintenance of Stormwater Control Measures, Denver. Visit www.asce.org.

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



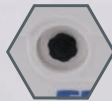
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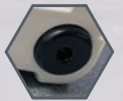
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