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A STEADY FORCE FOR COMMUNITY IMPROVEMENT

Award-winning operator
helps Chatham utility
navigate obstacles and
improve the community

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J.D. Crawford
Water and Sewer Foreman
Chatham, Illinois

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- When and where to use structural epoxies
- Overview of heated plural component equipment and support
- CPP product attributes and application procedures
- Tips and tricks to outbid the competition
- How the Tnemec/Epoxytec team plan to grow your market with specifications
- How to get a return on your investment



Luke Laggis

FEED THE CYCLE

Water and life both flow in a state of constant change

Water is a cycle, just like life. It rains down and rises back up. Precipitation to evaporation. Ashes to ashes. Dust to dust.

I was walking around Madison one night recently. I saw several Four Lakes Realty signs, passed the Wisconsin WaterFowl Association offices — Wisconsin's 15,000 lakes provide plenty of habitat — and caught alternating views of Lake Monona and Lake Mendota depending on my direction. There were signs for countless streets, buildings and businesses named for the local waterways. Lakes and rivers are a significant part of the community; they are a part of life. And all life is a cycle.



Change is constant, even if you can't see it on a day-to-day basis.

I was in Madison dealing with my own family's move through that cycle. My dad made it to 88 before he ever had any major health issues, but things started unraveling quickly after that. I spent most of February and March helping him when he was at my sister's house and spending as much time visiting as I could when he was in the hospital. Some nights I walked around town, past neighborhoods I'd lived in and places I'd hung out, thinking about how life has unfolded in the 18 years since I left Madison to go home and take care of my mom when she was sick.

Somewhere in those thoughts it occurred to me that there was a sort of poetry in those movements, and a naturalness to the cycle, the push and pull of life and death. And just like the evaporation of water, you rarely see it happening until one day its effects are unavoidable.

That can be said of plenty of the things you deal with on a daily basis. You might not see a sewer main clog gung up, but you can't ignore it when the blockage finally leads to an overflow. You won't see a fracture spreading across a waterline, but you'll know when it breaks. Your systems, like the people they serve, are alive. Every day they age and change, even if incrementally. It's a continuum. Change is constant, even if you can't see it on a day-to-day basis.

We talk about water, wastewater and stormwater in this magazine. I tend to think of life like stormwater, requiring constant management to keep it moving safely in the direction you want it to go. There are sunny days and rain, with the occasional storm that makes everything more difficult. You try to keep it from becoming too polluted and allow it to continue the positive cycle. It's the same with us: Try to stay healthy, do good and keep it all moving forward.

At best we can hope that our time was spent well enough that its impact will carry on. In the water and wastewater world, you know your impact will carry on. How you manage assets and resources, plan for the future and serve your communities will have a long-lasting impact.

Here's hoping it's a proud legacy.
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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CYBERSECURITY UPDATE

Risk Summary Released

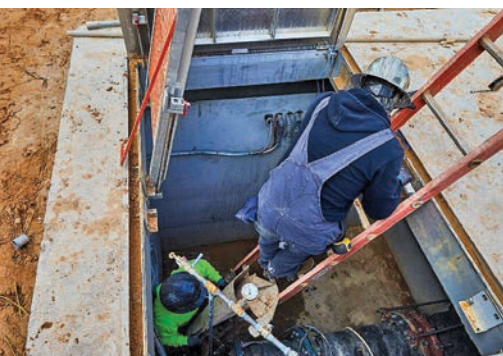
The Cybersecurity & Infrastructure Security Agency recently released a summary that identifies cybersecurity issues in the water/wastewater sector based on information collected from 44 service entities in fiscal year 2021.

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OVERHEARD ONLINE

“With the growth in coastal population and regional wealth, even a single landfalling major hurricane could make substantial damage.”

— *Experts Predict Hurricane Season Will Only Be Slightly Above Average*
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EMPLOYEE RECRUITMENT

An Everlasting Challenge

The challenges never cease for municipal water and wastewater utilities. In this online exclusive article, read about strategies to deal with one of the top challenges in recent years: The task of recruiting employees to replace an aging workforce.
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REDUCING OVERFLOWS

A Texting Outreach Campaign

The Milwaukee Metropolitan Sewerage District has enlisted residents' help in reducing sewer overflows during heavy rains by creating its Water Drop Alert text message campaign. Since 1994 the district has averaged 2.3 overflows per year, and the goal is to get that to zero by changing citizens' behaviors.
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VILLAGE OF
CHATHAM

A STEADY FORCE FOR COMMUNITY IMPROVEMENT

Award-winning operator helps Chatham utility navigate obstacles and improve the community

By Ken Wysocky

During the last 10 years, the Chatham Water and Sewer Department has overcome a series of significant challenges: A controversial conversion to a new water plant. A resulting problem with high levels of manganese in the water. The subsequent adoption of a unidirectional water-main flushing program.

In addition, a major water tank painting project took the central Illinois village's two water tanks offline for several months each.

But through it all, employee J.D. Crawford was a calm and steady influence on the department's other employees, always leading by example and getting the job done, says Dustin Patterson, general foreman of water, sewer and parks for the village. Chatham is located about 10 miles south of Springfield, in central Illinois.

Village of Chatham water and sewer foreman J.D. Crawford, who joined the village utility in 2015, was named the 2021 Operator of the Year for distribution systems by the Illinois Potable Water Supply Operators Association. (Photography by Bradley Leeb)

Crawford's skills and leadership ability are the chief reasons the 39-year-old water and sewer foreman, who joined the village utility in 2015, was named the 2021 Operator of the Year for distribution systems by the Illinois Potable Water Supply Operators Association.

"J.D. definitely is a leader for our department," Patterson says. "He's been very resilient while dealing with some complications from our water changeover, which occurred in 2012. He was out there helping residents even when social media outlets weren't very kind to our department.

"We're in a good place now and a lot of that is because of J.D."

Along with being ultra-dependable, Crawford also is very willing to show younger team members how to do things. He's also been known to go back to customers' homes after work to help them with issues on his own time.

As an example, Patterson cites an instance several years ago where a resident had a water leak on the homeowner's side of the meter. The resident, an older man, said he would fix it himself. So Crawford went to the man's home and

explained what kind of parts he'd need and how to make the repair, Patterson says.

Big surprise

"It's the first time in my life I literally was speechless," Crawford says about his reaction when the IPWSOA announced he won the Operator of the Year award at an annual conference. "I don't have a problem with public speaking or talking to people, but I couldn't say a word."

Crawford also gives credit to his colleagues, Patterson and Patrick McCarthy, the village manager.

"I wouldn't be able to do the things I do without the work and support of my very dedicated crew," he says. "Patrick McCarthy has always supported me and never doubted me, even through the toughest of times.

"And I couldn't ask for a better boss than Dustin — he understands all aspects of the job and can relate to any situation and help out."

A former paramedic, Crawford started his water industry career in 2004 as a maintenance worker in the Water Department in Petersburg, about 25 miles northwest of Springfield. After seven years there, he took a job as a maintenance

employee in the Department of Public Works in Rochester, just east of Springfield.

Crawford worked there for four years before joining the Chatham utility in 2015.

Crawford earned a water operator's certificate from the Illinois Environmental Protection Agency in 2005. He also has a collections system operator certificate for sanitary sewers, which he obtained in 2012.

"I enjoy my job because every day presents something different," he says. "I'm a hands-on problem solver. Sure, it sucks when problems come up, but I enjoy solving them.

"I don't quit until I figure a problem out. And I learn a lot from solving those problems, which is one reason I like it when problems come up."

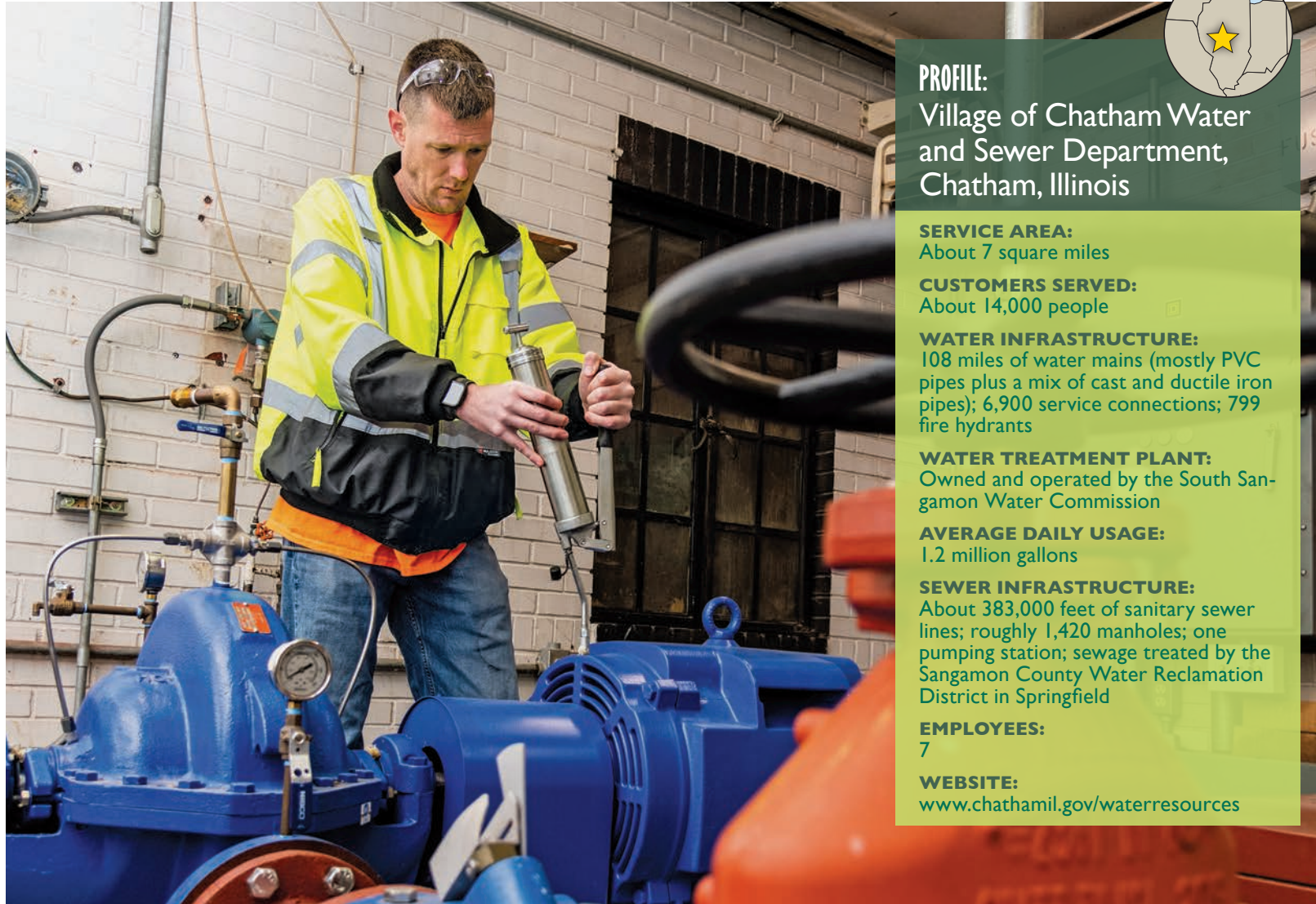
Good influence

It's second nature for Crawford to go out of his way to help customers after hours.

"It all goes back to solving problems, plus I love to be able to help people," he explains. "It's always been my nature to help people. That's why I was a paramedic a long time ago.

"As long as people are kind and courteous,

J.D. Crawford greases a high-service Mueller pump serving the village's distribution system.



PROFILE:

Village of Chatham Water and Sewer Department, Chatham, Illinois

SERVICE AREA:
About 7 square miles

CUSTOMERS SERVED:
About 14,000 people

WATER INFRASTRUCTURE:
108 miles of water mains (mostly PVC pipes plus a mix of cast and ductile iron pipes); 6,900 service connections; 799 fire hydrants

WATER TREATMENT PLANT:
Owned and operated by the South Sangamon Water Commission

AVERAGE DAILY USAGE:
1.2 million gallons

SEWER INFRASTRUCTURE:
About 383,000 feet of sanitary sewer lines; roughly 1,420 manholes; one pumping station; sewage treated by the Sangamon County Water Reclamation District in Springfield

EMPLOYEES:
7

WEBSITE:
www.chathamil.gov/waterresources



Aaron McLaughlin sets up to hydroexcavate for the installation of a fire hydrant.

Unidirectional flushing program

Using a plan developed by the consulting firm Crawford, Murph & Tilly Engineering, Crawford led the unidirectional flushing program.

Unidirectional flushing differs from conventional waterline flushing because water flows only in one direction — downstream from a water tank or treatment plant. Moreover, the flushing occurs only in one isolated pipe segment at a time.

By isolating sections of pipe, the velocity of the flushed water, created by opening fire hydrants, increases to 5 to 10 feet per second, compared to 1 to 3 feet per second in conventional flushing, experts estimate.

“We already had a flushing program in place before, but not as extensive as this one,” Patterson says.

The plan split the village into three zones. Under the current plan, the village flushes the mains in the biggest and most difficult zone in fall and the other two in spring.

“First we isolate the major water mains that run under our major roadways,” Patterson explains. “Then we isolate and flush the mains that branch off those major mains.”

“We have three water pumps in our system, and we start from those pumps and work our way through town from there.”

The village plans to keep doing unidirectional flushing every year to minimize the presence of manganese in water mains.

Big paint job

The department also tackled another major project in late 2018 and early 2019: painting the interiors and exteriors of its two water tanks, a 1.5 million-gallon ground tank and a 120-foot-tall, 750,000-gallon elevated tank, Patterson says.

“We had to take each one out of service during the work, which was a pretty complicated process,” he says. “It’s tough around here when you have to take a tank out of service.”

The ground tank was painted during about a four-month stretch starting in January 2018. Work on the elevated tank started the following fall and finished in spring of 2019.

To maintain pressure in the system, an IT group first had to rewrite the code for the SCADA system so it performed operating calculations off the existing pressure load and not the level of water in the tanks.

“SCADA basically is the brains of our system and very vital to our operations,” Patterson says. “It reads and monitors our system’s water pressure and tells the pumps when they need to turn on to move water into the tanks and then when to shut them off.”

Under pressure

In addition, the department hired a company



Crawford draws a sample from the water distribution system.

I’ll bend over backwards to help them and maybe save them some money. I guess that mentality was beaten into my brain by my parents, who always taught me that if [you’re] kind to other people, they’ll be kind to you.”

Crawford also gives a lot of credit to his former boss and mentor, the late Roger Davis, who was head of the Petersburg Water Department.

“He was way more than just my boss because I lived next door to him since I was 8 years old and his son, Korrie, and I were best friends,” he says. “He was like a second father to me.”

Crawford says he and Korrie — they now work together in Chatham — often accompanied Davis to the water plant.

“Working under Roger definitely set the bar high for me. He gave me a window into that world. ... I saw how that little world fell on his shoulders

and how he kept it all together.

“I wouldn’t be working in the water industry if not for him.”

Water issues emerge

That mentoring came in handy when Crawford joined the water department in Chatham, which has 108 miles of water mains (mostly PVC pipes, plus a mix of cast and ductile iron pipes), 6,900 service connections and 799 fire hydrants.

For a variety of reasons, village officials had decided in 2010 to join with nearby New Berlin to form the South Sangamon Water Commission, which would own and operate a new water plant in Rochester.

The \$31 million water plant went online in 2012, but water quality issues soon emerged in the form of high levels of manganese, a naturally occurring mineral found in rocks, soil and groundwater. While it’s an essential mineral for proper nutrition, it can be harmful in elevated concentrations.

The manganese levels in Chatham’s water rarely exceeded the secondary standard for water quality, but residents were justifiably unhappy when their tap water turned brown, Patterson says. “It was not very pleasing to the eye.”

The SSWC started adding sodium permanganate to the water, which significantly reduced the manganese levels. But manganese oxidizes and clings to pipe walls, so the village in 2019 implemented a unidirectional flushing program aimed at scouring the pipes clean.

to deploy four large water tanker trailers, which were connected to the system via fire hydrants. The tankers provided a backup in case one of the system's pumps failed.

Pump failures were a concern because they were working under more stress than normal to maintain the water pressure normally provided by the water tank taken out of service.

"If a pump would break down, having those water trucks would buy us some time while repairs were made," Patterson says.

"It was a huge deal for us. It was the first time those tanks had been painted in 30 or 35 years, so the process was all new to us."

Once again, Crawford played an instrumental role in the project's success, Patterson says.

Crawford also helped establish a new fixed-network meter-reading system. That required converting roughly 6,900 water meters to "smart" units compatible with the new technology; about 1,400 still need to be converted.

The system collects very specific data about water usage that can be used to quickly reveal leaks in water pipes that business owners and homeowners otherwise might not find out about for some time, he says.

"We can run reports that show a customer's water usage hour by hour."

Looking back over the past 10 years, Patterson says he's grateful to his team — and to Crawford for his leadership.

"It's been a pretty crazy 10 years. But we've



Village of Chatham Water Department staff in front of their Vector 2100.

learned a lot. And one thing about J.D. — he just kept moving forward to help the citizens of this town. That's what makes him special.

"He never complains — just keeps moving forward. I'm not sure what we'd do without him." ♦

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HANDLING THE RESIDENT SLACKER

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.

Avoidance isn't an option, but what you say and how you say it truly matters

By Ken Wysocky

“People make assumptions that things can’t ever change. But unless someone tries, people miss out on eliminating potentially damaging issues.”

Stacey Engle



It's a rare workplace team or department that doesn't have a resident slacker — that certain employee who always seems to shirk his or her fair share of work on projects, yet still gets credit for their success.

Spotting these laggards is easy. But dealing with them is not. If you tell your manager about this underperformer, you run the risk of being branded as a tattletale. But letting it slide carries downsides, too, like the stress of working longer hours to cover for the slacker's deficiencies. Or higher turnover and decreased productivity as team relationships slowly erode.

So what's a beleaguered employee to do?

Step one: First talk to the slacker, not your manager, advises Allan Cohen, a professor emeritus in global leadership at Babson College in San Francisco and co-author with David Bradford of the book *Influence Without Authority*.

Tread lightly, however. Slacking off could be a response to marital trouble or personal health issues. Or perhaps the colleague lacks the skills to do his or her job effectively and needs training, or is resentful about not getting a promotion, Cohen says.

Context is everything

Moreover, don't make it a personal attack. For example, asking slackers why they're so lazy will result in a very short conversation. Instead, frame the conversation as concern for their well-being, Cohen advises.

“Perhaps you could say something along the lines of, ‘It seems like you're having trouble delivering on assignments — what's up?’ Or, ‘Things don't seem to be going well for you, is something wrong?’”

But at some point, you need to specifically point out how the slacker's behavior is adversely affecting colleagues' ability to work.

“You can tell them that you're not out to get them in trouble, just interested in solving the problem,” Cohen says. “Always leave open the possibility that there's a positive solution — that it can be converted into a collaboration, not just a slash-and-burn approach.”

“These problems rarely occur because someone is a bad person. Sometimes all it takes is some education or training or moving them to a job that's better suited to their skills.”

Fine balance

If the situation doesn't improve, things inevitably reach a tipping point where the only recourse is to involve a manager. It's helpful if the colleague is willing to join you. If not, then it's fine to proceed alone, Cohen says.

But again, use a well-reasoned, low-key approach to avoid political and career repercussions, he recommends.

“Make it in the spirit of an inquiry. Tell the manager you need help addressing a problem, instead of just saying that ‘X’ is a lousy person who's always messing things up.”

Providing specific, factual examples of how work has been adversely affected (project deadlines missed, quotas not filled, etc.) will help bolster your position. It also will reinforce to your manager that you're bringing up the matter for sound, objective business reasons, not political gain, he says.

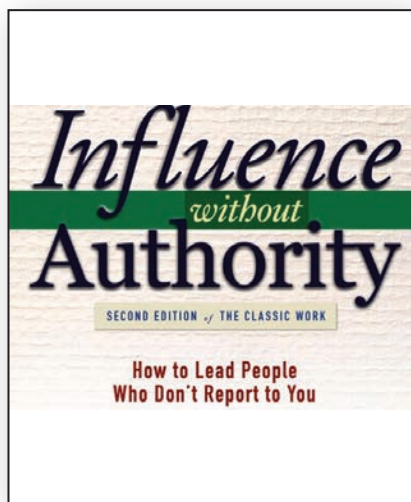
“There's a very fine balance involved in building a case. If not done correctly, you often can sound very one-sided and make it look like you're trying to harm somebody, which doesn't make you look good.”

Furthermore, be sure to tell your manager what you've already tried to do, he adds.

Don't let it fester

Whatever you do, don't ignore the situation. Being nice is great, but putting on an autopilot smile and pretending everything is cool isn't a good idea.

In short, a culture of niceness for the wrong reasons can actually derail organizational success, says Stacey Engle, the co-founder and CEO of Authority Circle and the former president of Fierce Inc., a training company that teaches people how to have effective conversations.



“Most people aren’t encouraged to effectively address issues head-on,” she explains. “We tend to avoid difficult conversations or conversations that we frame in our own minds as difficult. But as

The irony is that, when asked, most employees want colleagues to share any issues or concerns and work toward solutions.

“Almost always, the answer is yes,” Engle says. “Yet we still avoid confrontations. We all need to keep in mind that we connect more deeply with people who level with us. And when that happens, it’s even easier to talk about real issues and challenges.”

Like turning that resident slacker into a productive workplace citizen. One conversation at a time. ♦

more and more organizations emphasize transparency and accountability, it forces people to face issues directly; so they need to be skilled at this.”

Moreover, putting on a happy face and ignoring an issue only makes you a victim of the situation instead of proactively trying to change it, Engle says.

It’s helpful to develop a 60-second opening statement that clearly outlines the issue at hand. It should include a brief example or two and explains the negative effects. Brevity and simplicity are critical.

Practice your approach

Like anything else, practice makes perfect. Also consider that reading the statement to yourself can be drastically different than actually saying it. So it may help to read it aloud to a trusted friend or colleague, Engle says.

If the situation is with a manager, not a colleague, Engle says the concept and strategy remains the same, although the stakes are certainly higher when confronting a supervisor.

In either case, it helps to schedule a specific time for such conversations; it’s not fair to catch someone completely off-guard with a spur-of-the-moment conversation about a complex topic, she says.

Not doing anything is often more appealing than confronting issues; after all, candor can have consequences. But any real change — both personally and professionally — requires healthy conversations. And you enhance your chances of affecting change if you do it the right way at the right time, Engle notes.

“People make assumptions that things can’t ever change. But unless someone tries, people miss out on eliminating potentially damaging issues. In addition, lots of people leave jobs simply because they think something never will change.

“If you don’t do anything, it’s likely that everything stays the same,” Engle says. “And if what’s happening right now isn’t what you need to get where you want to go, you need to move the needle yourself.”



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THE COSTS OF UNEVEN MANHOLES

Properly leveling manhole and other utility covers goes a long way toward preventing weather-related problems

By Aaron Barr

When all is working smoothly, underground utilities operate largely undetected by the community. Manholes and other utility covers offer the only visible reminder of these and other critical systems, and most people don't give them a second thought until they drive over a bad one.

Utility managers are constantly balancing high public expectations (and low awareness of what is involved) with the need to be as cost-effective as possible, while also meeting sustainability goals. Manholes are a potential weak link — and added cost — in all of these areas.

The most obvious, direct costs associated with poorly installed manholes and other utility covers are the labor and material costs of repair-

“Workers have accidents with tools like pry bars frequently and get hit or caught in heavy equipment all the time.”

Beth Stinson

ing roadways. To avoid these costs, paving crews need to be given the proper tools to make sure manhole leveling is done right the first time and as roads are repaired.

Cities like Longview, Washington, are now including specifications for screw-adjusted technologies like RimRiser that make sure manholes and catch basins are set correctly. The more precisely manholes and other utility covers match the designed pavement elevation, the longer the pavement will last. Proper manhole function also plays a big role in storm-water management and is essential for efficient wastewater systems.

Heavy rains can cause the base around bad manholes to weaken, crack or sink, creating gaps around utility covers and grates and allowing water to seep into manholes and underground utilities.

Ensuring that manholes and other utility covers are as level as possible goes a long way toward preventing weather-related pavement problems. Civil engineers, public works and water managers should include manhole leveling as a strategic part of a city's sustainability planning, to alleviate frequent and costly future repairs and ensure safer roads that are resilient to the effects of weather.

Equipment damage

There's also a danger when utility covers are not level with the road's surface. The National Library of Medicine recently called out poorly installed and maintained manholes as the culprit for unexpected driving hazards on our roadways, especially for motorcycles.

But when these poorly leveled utility covers are hit by city maintenance equipment, such as asphalt laying augers during road construction, street cleaners and snowplows, the cost of repairing these large pieces of equipment is considerable. Raised and tilted manhole covers are particularly vexing and even hazardous for snow removal services.

“In most municipalities you don't have redundancies in equipment,” says Ray Schwab, a public works civil engineer in the Village of Lombard, Illinois. “If there isn't another snowplow available or it's damaged, you've lost a plow and perhaps a person's shift. Depending on resources, you could lose a significant part of your operation — especially in a small community.

“The cost of repairing or replacing a snowplow blade can be as high as \$2,000, and that's not factoring in the added cost to cities and counties when snow removal crews and equipment are sidelined and roads are not plowed in a timely way.”

(continued)

Traditional manhole installation presents both performance longevity and worker safety issues.





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TECH TALK

Worker safety

When it comes to installation and maintenance of manholes, there is a lack of standardized methods and processes, and that can lead to injuries,



Screw-adjusted systems like RimRiser ensure manholes and catch basins are set correctly.

particularly with less skilled workers on the job. Worker injuries lead to lost time, short-staffed crews and higher insurance costs.

Construction crews installing manholes are using processes that haven't significantly changed in the last 75 years and which put the safety of essential workers at risk — that is, raising manholes to grade using pry bars and hand-placed shims. This requires multiple people and, in addition to being less precise, manual lifting and shimming with clay or wood (or, too often, whatever is handy) can easily result in crushing injuries.

"Workers have accidents with tools like pry bars frequently and get hit or caught in heavy equipment all the time," says Beth Stinson, vice president for Education Operations at the American Road & Transportation Builders Association. "If it takes more than one person to do the installation, along with heavy equipment, and tools like pry bars, the chances of an accident go up."

But there are newer alternatives, like RimRiser bolt- and screw-adjusted leveling systems, that are far more precise, require fewer people to install, and



“I like how quick and easy it is to set to grade simply using a power tool to set it into place.”

David Coffey

are simpler, faster and safer to use for workers of any skill level. With the current shortages of skilled labor, having a technology that only requires the adjustment of a few screws to level a manhole means crews can get the job done right with fewer people and fewer risks.

“We used to use bricks, wedges or wood shims, but it took a lot more time to set manholes to grade, and in time the bricks and shims would either break down or rot out and the manholes would typically sink,” says David Coffey, wastewater crew leader for the city of Vancouver, Washington. “With RimRiser, I like how quick and easy it is to set to grade simply using a power tool to set it into place. And when we grout the inside, it seals with the sturdy bolts in place, providing a strong base for the castings to sit on.”

Public works managers have an opportunity to design safety into manhole installation and maintenance processes by creating specifications for precise manhole leveling that enhance worker safety, save project costs and result in higher quality, longer lasting and much safer paving around utilities.

Big impact

Manholes, like the utilities they provide access to, are largely invisible when they’re working well. But they are a significant lever in helping communities be safer, more cost-effective and more sustainable over time. And that can pay dividends in good PR for your public utilities.

And perhaps the most unsung benefit is the pleasant experience of a smooth ride on the roadways of your community – keeping manholes as unnoticeable as they should be. ♦



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MONITORING FOR YOUR OBJECTIVE

Stormwater management requires an understanding of the volume moving across the landscape and through municipal infrastructure

By Tim Dobbins



Stormwater monitoring can be challenging. With what seems like endless variables and situations impacting data, documenting and calculating stormwater isn't as simple as putting a rain gauge on your garden post.

In a recent webinar presented by Xylem, Dr. Stephanie Smith discussed these challenges and provided examples of monitoring projects in different scenarios. She provided tips that can help you set up a successful monitoring program.

Whether it falls on prairie land, wooded forests, airport runways or metropolitan rooftops, precipitation eventually runs into tributaries, rivers, lakes, streams and, ultimately, the ocean.

Monitoring the amount of water moving across landscapes and through our municipal infrastructure during a storm is an integral part of deciding how to manage stormwater. Data collected is used to support sewer system programs, for regulatory decisions, and to detect point source discharges as well as nonpoint source pollution.

Methods of monitoring

YSI, a Xylem brand, has had its hand in numerous studies involving stormwater in the U.S., and Smith highlights three successful monitoring programs, the first involving an oil refinery in Texas.

"Refineries, if you've ever been around one, you recognize they are like little cities," Smith says. "They're really big, lots of paved surfaces, lots of metal, things that water is just going to bounce off. But, of course,

the things going on there are also not necessarily things you want running off into your waterways."

It's not uncommon for refineries to take monitoring into their own hands, measuring pollutant concentrations in runoff from their site. Many are even setting up monitoring systems in nearby rivers, streams and lakes to get more information on what from the plant reaches specific downstream locations. In this situation, the Texas refinery used a SonTek-IQ, a doppler instrument that measures volumetric flow. Data from that instrument is paired with a storm data logger and telemetry to give them a constant stream of cellular transmissions.

Data is sent to HydroSphere data management platform, allowing the refinery to constantly see river flow downstream. "By doing this, they are able to always keep track of what their discharges likely are, based

"You have to start with what your real objective is before you start stormwater monitoring."

Dr. Stephanie Smith

on those early estimates just by measuring volumetric flow," Smith says. "This is a very cost-efficient way to do long-term stormwater monitoring from a site like a refinery."

The second example relates to hurricane monitoring and also takes place in Texas, where two regions are monitored by the Texas Commission on Environmental Quality through its Clean River Program. Many stakeholders engage in this program; in this case, the Environmental Institute of Houston. "They were doing monitoring on creeks in two regions in Texas, the San Jacinto-Brazos region and the Brazos-Colorado region," Smith says.

Monitoring sites were set up in 2017, shortly before Hurricane Harvey hit Houston. They started with pre-installation research to better understand discharge in the specific sample creeks. They used SonTek's FlowTracker2 and RiverSurveyor M9 to understand instantaneous discharge measurements. "This is called a passive sampling approach where they can basically have the M9 on a board and understand discharges as they occur across that creek in normal conditions," Smith says.

They would measure the stage, or water level, and when pairing with discharge data, they created stage discharge relationships. To measure stage in a continuous manner, Amazon Bubbler, devices that constantly measure water level, were installed at each station. The team also used a storm data logger and Geostationary Operational Environmental Satellites for transmissions.

"They were using satellites," Smith says. "They have the data going up to HydroSphere. They're actually processing that data and putting it on their own website, so it is always available to the public."



**“Don’t start with sensors,
start with the objective.”**

Dr. Stephanie Smith

Another aspect is that the equipment was battery-powered; that is critically important, according to Smith. And not only was it battery powered, but also solar recharged.

During Hurricane Harvey, the level in the creeks where two of the stations were positioned rose 7 to 8 meters. They were able to use those stage measurements and the discharge relationships they had previously built to analyze potential pollution through each creek during that storm event.

The third case Smith highlights is the Terrebonne Levee in the Gulf Coast. After several years of substantial hurricanes, a citizen group formed and began working with the Delta Coast Consultants Group, a group that manually operates barge gates requiring the operator to know how to manage the flow through the gates.

“In the long run, they needed to always understand level, always understand flow, but they also wanted to see what was coming,” Smith says. “Weather monitoring and understanding the rain patterns in the region was really important to them. But they needed to know more than just the national weather service forecast.”

The group chose a Nile Radar noncontact water level sensor instead of a submersible sensor so it could not get swept away by the current created

from barges going through the gates. Because of the vast volume of water being measured, they knew water level changes would be small. They placed a SonTek Side-Looker combined with radar at several gate locations to get accurate readings on the subtle changes.

An extremely important aspect of this monitoring technique was the use of redundant power sources and telemetry. Both satellite and cellular telemetry was used at each site, allowing them to persist with measurements through several severe storms since installation.

Case commonalities

Each case discussed in the webinar was a successful and useful example of stormwater monitoring. There are several factors that made them effective, and one crucial aspect was that each case had something definite to measure.

“You have to start with what your real objective is before you start stormwater monitoring,” Smith says. Without a clear goal, it’s easy to just record measurements that never amount to useful data.

Another thing these programs had in com-

mon was redundancy in power and telemetry. Backup in these areas will come in handy. It’s often during storm events that collected data is most valuable, which is also when the first line of power and telemetry have a higher chance of failure.

Smith says that having real-time visibility to data recorded was vital, especially during times of storms when manual data collection is near impossible. “That is why telemetry was so important.



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You're trying to get away from the storm in many cases, but you need to be able to see the data coming in and have a reliable system for delivering that data even when power is lost in a region."

Developing a monitoring program

According to Smith, step one in creating a stormwater monitoring system is to start with the objectives. Before doing anything else, determine exactly what you want to measure and why.

"Don't start with sensors, start with the objective," she says. "For the levee, their objective was to know how to manage those barge gates and what information they need to know to do that. For the oil refinery, their objective was completely different. They wanted to really understand what their discharges were related to their permitting levels. Completely different, and you have to take a different approach."

The key is to think about what you're trying to achieve, and the types of sensors and equipment needed will come from answering that question. Once sensor types are chosen, think of the environment and specific site to refine the sensors and chose the exact model that best fits the scenario.

Once the objective is set and sensors are chosen, it's time to develop a sampling routine. Decide when samples need to be collected and how often. This will determine whether manual collection is enough or if automated is necessary. Any objective that requires data collection during a storm event obviously favors automated samplers.

Along with choosing the method of collection, this is the time to select the area where sam-

ples are to be taken. "This always is going to tie back to your objective and what it is you need to know," Smith says. "You're going to need some sort of a sampling program nine times out of 10 with stormwater monitoring. Now, if you're monitoring just for flooding, that might not be necessary for you."

The third step to defining your stormwater monitoring system, according to Smith, is to define the notification requirements. This comes down to deciding exactly what you want to know and when you want to know it.

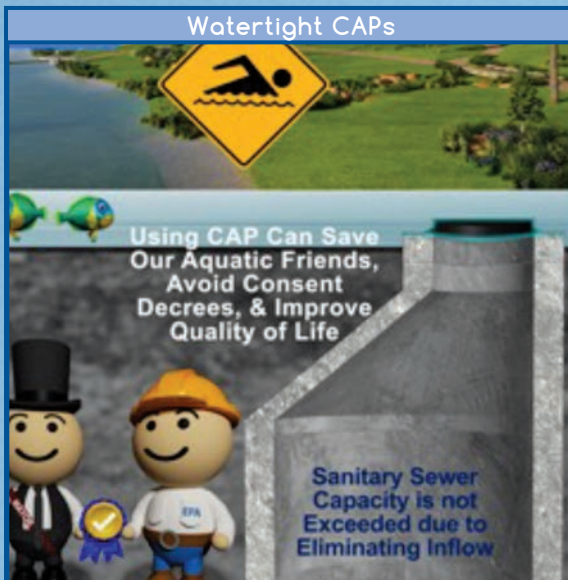
"If you're monitoring for a pollutant directly in the water, maybe the only time you want to know something is when you've exceeded some limit," she says. "This is also highly relevant for National Pollutant Discharge Elimination System permitting. So, define when, where and how you want to get your notifications."

Once alerts are decided, move on to determining power requirements. This is where Smith says a lot of people make mistakes. Between all the samplers and different types of sensors, the power load needed is crucial to understand and acknowledge. "Doppler sensors always have to have hard power to them," Smith says. "When we start talking about that, you really need to understand the load requirements of those sensors and how much

(continued)



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“You have to secure that equipment so it’s not going to get washed away during a storm.”

Dr. Stephanie Smith

power you have to set that station up with. The ideal situation is to have redundant power.”

She goes on to say that many systems are set up with main power and a battery backup. Some even have dual batteries to give another line of power during storms if main power is lost. Adding solar charging modules to the batteries is another line of power security that is easy to achieve. “I never recommend having single-layer power for a stormwater monitoring system in particular,” she says.

And finally, Smith says to secure all necessary equipment. At this point the objective is clear and equipment has been purchased. Now it’s time to protect the investment. Though it may seem obvious, it can’t be stressed enough to properly fasten all sensor and measuring devices to ensure they remain in place.

“You have to secure that equipment so it’s not going to get washed away during a storm,” Smith says. “But you also want to make sure there’s good sun if you’re using solar recharging for the power system. With things like a radar, you really need to secure it well on a bridge or some other type of structure that’s not going to get blown away.”

It pays to consider human tampering as well, especially in heavily populated areas where sensors

are easily accessible. Make sure devices that are available to vandalism are locked and protected.

These specific examples of successful stormwater monitoring provide a framework on which to base future monitoring programs. The ideals behind the strategies are what should stick and will prove helpful for planning stormwater monitoring, whether downstream of a refinery or in

municipal collection systems.

Stormwater events can wreak havoc on sanitary sewer systems and cause severe infrastructure damage. Collecting accurate data is vital to designing systems that can handle stormwater surges, limiting flooding, erosion and sewer system overflows. ♦





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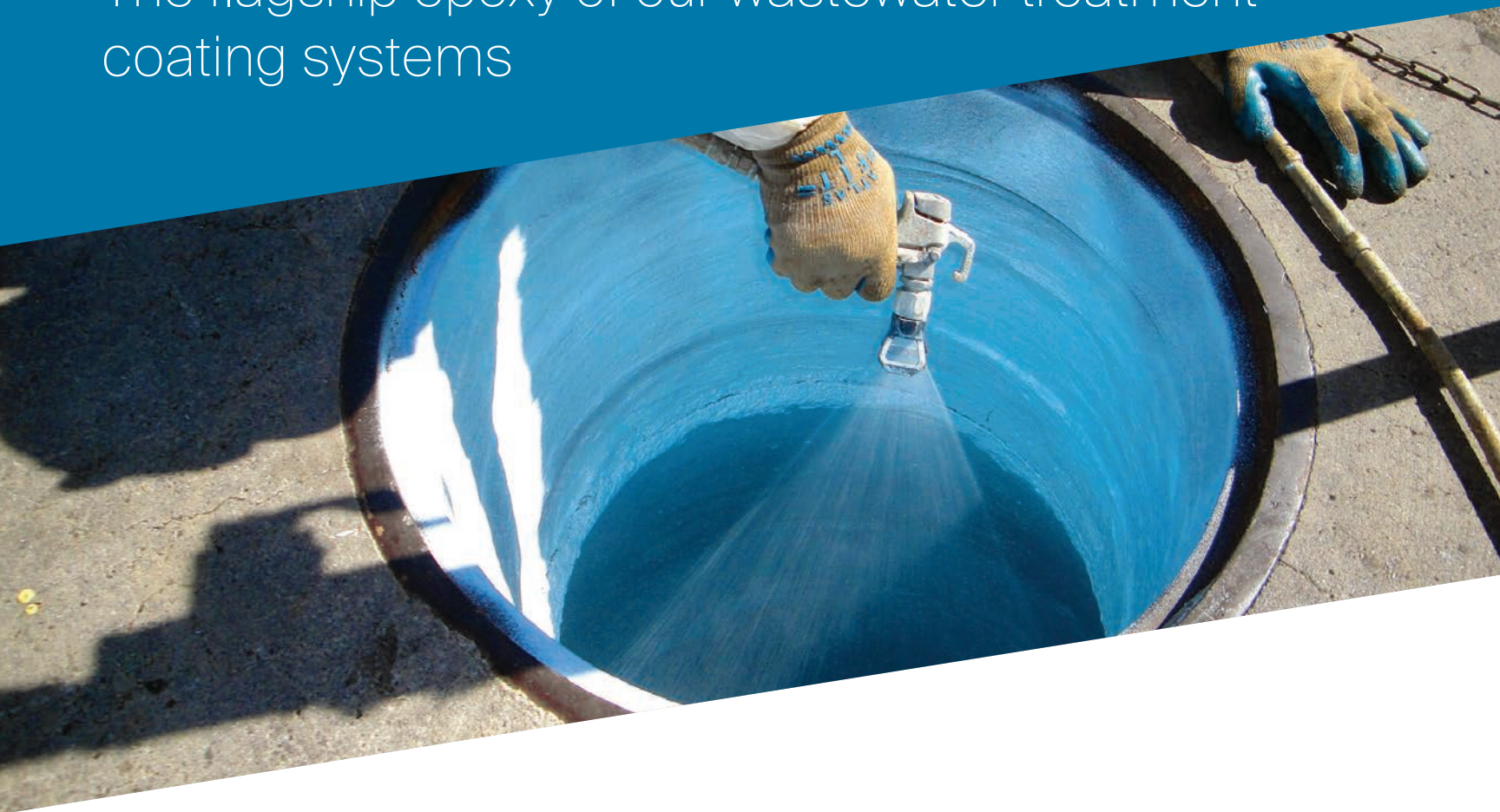
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7

MOLDING A BETTER MANHOLE

Composite Access Products provides lightweight, corrosion-free access covers

By Luke Laggis

Manhole rehabilitation has improved significantly over the past couple decades, and composites are playing a big role.

Chad Nunnery started his career in composites manufacturing after graduating with engineering and chemistry degrees from Dartmouth College in 1994. He set up and managed composite businesses in Latin American countries where he first witnessed nonmetallic manhole covers being used primarily for theft prevention. After analyzing other material benefits, he realized that composites would solve additional problems like inflow, SSOs, corrosion, weight, data transmission, asset management, install efficiency and environmental impact.

Municipal Sewer & Water recently spoke with Nunnery about the role that composite manhole covers and accessories play in improving performance and access.

While society passes over these manholes without a second thought, increased floodwaters leak into our wastewater systems, exceeding collections system capacities.

Chad Nunnery

existing market share, the BNCI team focused on increasing the overall market size with new applications. BNCI's main customers molded automotive headlamps, valve covers, circuit breakers and a variety of other applications. After analysis and research regarding the material property requirements, it became clear that molded manhole covers produced using this fiberglass composite would address many problems associated with traditional materials.

In 2015, my two co-founders and I formed Composite Access Products in McAllen, Texas, to mold composite manhole cover assemblies. CAP is the first U.S. compression molder of traffic-rated composite manhole covers. In 2020, CAP won the Award for Composites Excellence from the American Composites Manufacturers Association. In 2021, Fulton County, Georgia,

MSW: Tell us a little about the history of Composite Access Products and how it got started.

Nunnery: Prior to CAP, I formulated, manufactured and sold composite fiberglass materials for Bulk Molding Compounds Inc. The company's mission was to improve end products by converting metals and other materials into a molded thermosetting composite. Rather than fighting with competitors over

acknowledged CAP as "key" to eliminating sewer spills into the Chattahoochee, after suffering millions of gallons of pollution for 30-plus years.

MSW: Why are manholes such a universally important topic for municipal utilities?

Nunnery: Utility access holes are not sexy. But we rely on these access points to maintain our wastewater collections, drainage, water and other utility distribution. While society passes over these manholes without a second thought, increased floodwaters leak into our wastewater systems, exceeding collections system capacities. The resulting flow reversal, called a sanitary sewer overflow, is a leading cause of pollution into our natural waters. Some calculate that sewer spillovers contribute over 32 trillion gallons per year of pollution into rivers, lakes and oceans. So manholes — necessary for utilities — can have a major environmental impact affecting our health, water activities, aquatic life and possibly our drinking sources.

MSW: What's the most common problem you see your municipal customers are facing?

Nunnery: In addition to stormwater inflow, corrosion-prone infrastructure materials like concrete and iron plague our municipalities. Cor-



Since its first covers were molded, CAP has improved fastening systems and pick-hole openings, added custom logo options and attachment points, and expanded size offerings. Encapsulated magnets have also been added as a standard feature to help detect hidden covers.



rosion occurs from obvious culprits such as water and saltwater, but even more destructive is a bacterial conversion of sewer gases (specifically hydrogen sulfide) into sulfuric acid. The bacteria called *Thiobacillus* creates an acid that degrades most materials, while polymers generally resist acidic corrosion. Interestingly, some researchers say that an iron molecule that exists in U.S. concretes, and of course iron manhole covers, is in fact necessary for these bacteria to consume and produce the acid. So, while a polymer solution is acid resistant, it also doesn't provide the "food" necessary to create the acid in the first place.

MSW: How has your product line evolved to better meet the needs of customers with aging infrastructure and limited budgets?

Nunnery: CAP pays close attention to customer feedback. Since our first molded covers, we have improved our fastening systems, pick-hole openings and custom logos, added attachment points, and expanded our

size offerings. In addition, we added — as a standard feature — an encapsulated magnet to detect hidden covers. Some contractors will overlay manhole covers or even bury covers. To later locate concealed covers, utility operators use metal detectors. Composite materials and stainless steel accessories do not alert metal detectors, creating a challenge for composite cover suppliers. CAP's proprietary (patent-pending) solution encapsulates strong natural magnets in the raw compound during the molding process. The magnets

Since our first molded covers, we have improved our fastening systems, pick-hole openings and custom logos, added attachment points, and expanded our size offerings.

Chad Nunnery

amplify signals to metal detection devices alerting the user as far as 6 feet away and several feet underground. Our customers are very satisfied with this feature.

MSW: What does the full suite of CAP products provide for municipal utilities?

Nunnery: CAP's composite manhole covers offer a traffic-rated, watertight, corrosion resistant access cover that is half the weight of traditional options. The product properties will help eliminate sewer spillovers — remember, a leading cause of water pollution. Cover corrosion creates unsafe conditions for both pedestrians and utility operators, so CAP products provide a safer solution. Our covers look great with attractive logos, colors and stone-

like appearances. As a bonus, they're transparent to transmission signals for the use of smart city technologies without the necessity of drilling antennae holes commonly seen with signal-blocking metals.

MSW: Is your product line aimed more at infrastructure rehabilitation or new construction?

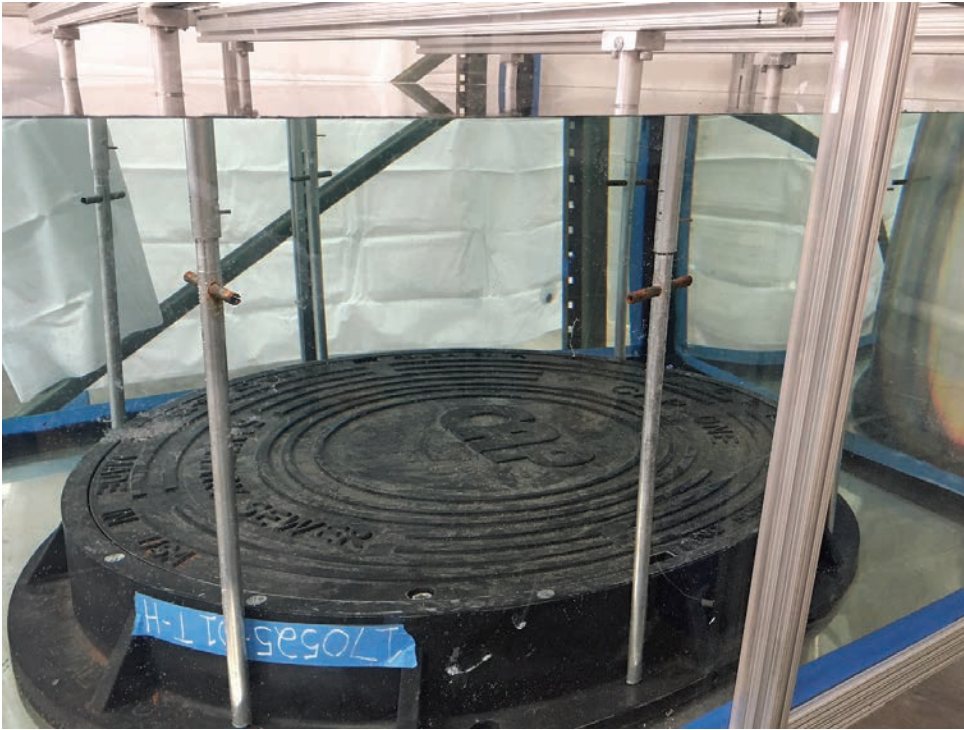
Nunnery: Both. Municipalities specify CAP for new construction and want to use polymer solutions to replace older decaying systems. For decades, cured-in-place piping has been utilized for pipes. More recently filament-wound and other polymer manhole columns were introduced. Polyethylene, expanded polypropylene and rubber solutions have been specified for use in the chimney sections of manholes. Finally, municipalities can make a completely corrosion resistant, watertight polymer system with CAP frames and covers. We like to say, "From pipe to CAP," meaning, why invest extra dollars for premium polymer utility access materials just to place metal assemblies that can corrode on top? It just doesn't make sense. So, "Just CAP That" became our slogan.

For decades, cured-in-place piping has been utilized for pipes. More recently filament-wound and other polymer manhole columns were introduced. Polyethylene, expanded polypropylene and rubber solutions have been specified for use in the chimney sections of manholes. Finally, municipalities can make a completely corrosion resistant, watertight polymer system with CAP frames and covers. We like to say, "From pipe to CAP," meaning, why invest extra dollars for premium polymer utility access materials just to place metal assemblies that can corrode on top? It just doesn't make sense. So, "Just CAP That" became our slogan.

MSW: What differentiates your manhole covers and accessories from other composite options?

Nunnery: CAP offers many unique options. The encapsulated magnet described earlier is one example. CAP can make vented covers while maintaining traffic-rated strengths — not seen from our competitors. CAP provides gasketing for perfectly watertight covers — no leaks while sub-





CAP offers many unique options, including vented covers that maintain traffic-rated strengths and gasketing for perfectly watertight covers.

confidence for street use. CAP molds all features — bolt holes, pick channels, etc. — while many competitors machine or drill these features post-molding. This is not preferred for composites. All CAPs are molded with attachment points to facilitate fastening technology onto the cover. CAP's lead times are two weeks from raw material to final product while others require months. Finally, CAP is one of only two made-in-the-USA composite options for the water/wastewater markets.

merged in at least 20 inches of water. CAP's logos and artwork "pop" with pronounced depth and intricate detail. While CAPs are much lighter than iron, CAP is the heaviest of the composite options, which gives users more

MSW: Could the average municipal utility install CAP products with an in-house crew?
Nunnery: Yes. There are not many installation differences for CAPs versus traditional covers. However, we emphasize a couple important details.

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If using CAP's watertight stainless steel bolted solution, installers should hand-tighten the bolts and not use impact wrenches to avoid stripping the corrosion-resistant, but softer stainless steel hardware. Also, users should avoid inserting shims, rocks or other objects under the frames to slant the cover to achieve a desired grade. Riser ring manufacturers produce angled surfaces that create the appropriate grade without a point-force from a shim. Point loads can result in hazardous conditions.

MSW: Do you sell direct to contractors and utilities or go through distributors?

Nunnery: We partner with factory representative firms and distributors that provide CAP a broader geographic availability. Without these firms, CAP would likely not be able to sell to all 50 states. In the five years since we started molding product in Texas, we are installed in over 400 cities and 46 states.

MSW: What's coming up for CAP in 2022 and what can customers expect out of you in the future?

Nunnery: We are excited to introduce three new products: 1) A cover for air release valves, 2) a 36-inch clear opening assembly and 3) our "CAP ALERT." This third product is a cover and frame with a preassembled sen-



CAP offers custom artwork with depth and detail.

CAPs are molded at about 275 degrees while iron is casted at 2,700 degrees. Many iron foundries use coke, a high-carbon-content form of coal, for the energy to power the casting process. While the fiberglass upstream in the composite supply chain is also formed at high temperatures, this raw material represents only 40% to 60% of the final composite product. One hundred percent of the iron material is cast at extreme temperatures. Furthermore, fiberglass typically uses natural gas rather than coke to energize the ovens.

sor and transmitter that fits inside the CAP's ribbed geometry. Today's devices hang below the cover bottom surface leaving them to be potentially damaged when opening and closing the cover. The CAP ALERT protects this expensive technology while also eliminating field assembly and antennae hole drilling. In addition, this CAP product will be more affordable than most current options in the market.

MSW: What else would you like people to know about Composite Access Products?

Nunnery: In addition to the many benefits listed, we believe that the CAP manufacturing process is more sustainable (relative to cast iron) with less environmental impact. As a quick example,

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RECOGNIZING THE FUTURE

NASSCO releases guidance document on artificial intelligence for condition assessment

By Sheila Joy

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

Written in 1976, our mission statement is as true today as it was back then. I wonder if the authors could have ever in their wildest dreams imagined that this statement would hold true in 2022 as we apply it to automated defect recognition — or artificial intelligence — as the technology is being

After a year of hard work by an internal NASSCO workgroup, a guidance document on ADR has also been published to help guide our industry as we move forward with this emerging technology.

adopted in the assistance of identification of conditions in underground infrastructure.

Over the past two years, NASSCO has seen a significant uptick in companies bringing to market software and services that utilize our intellectual property: The Pipeline Assessment Certification Program codes, in addition to codes from NASSCO's Lateral and Manhole Assessment Certification programs. Working with these companies to ensure they

are in full compliance as they develop products and services that utilize NASSCO's intellectual properties, we have made available NASSCO's ADR licensing agreement. This agreement applies to programs that employ machine learning, artificial intelligence, ADR or other technologies to assess, either with or without operator assistance, the condition of pipelines, manholes and manhole components, and/or laterals using NASSCO's intellectual prop-

erties. If you are a provider of ADR technology that utilizes NASSCO PACP, LACP or MACP codes, please contact Heather Myers at heather@NASSCO.org to ensure full compliance.

After a year of hard work by an internal NASSCO workgroup, a guidance document on ADR has also been published to help guide our industry as we move forward with this emerging technology. The document (available for free download at www.nassco.org), presents the authors' current understanding of the technology and its advances.

While ADR software is making strides in the underground infrastructure assessment market, products may not yet meet the current NASSCO standards for conventional assessment (import/export) software programs. Given that many ADR platforms rely heavily upon NASSCO's intellectual property, NASSCO must allow a way for those companies wishing to use its assessment programs to be licensed and evaluated for accuracy without diminishing the standards NASSCO has established.

As the market evolves, NASSCO's Software Committee, Infrastructure Assessment Committee, Technical Advisory Council and other industry professionals will determine the best approach for assessing and rating ADR software products and their level of accuracy as they pertain to NASSCO's PACP, LACP and MACP codes. While that process has not yet been defined, NASSCO will ensure that it presents a fair picture of the technologies' current capabilities and how they are applied in the field, knowing that it will evolve as the technology becomes more developed, advanced and accepted in the future.

To learn more, to become involved in the development of specifications and guidelines pertaining to ADR technology and to become a NASSCO member, please visit www.nassco.org. ♦

NASSCO is located at 5285 Westview Drive, Suite #202, Frederick, MD 21703; 410-442-7473; www.nassco.org

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

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OTHER CLASSES FORMING

Contact one of the trainers listed above if you are interested in having a class at your facility or in your area.

Did you know that mechanical seals cost the same as applied seals but last 3.5 times longer?

The American Society of Civil Engineers (ASCE) reported a mechanical seal and an applied seal cost about the same, but mechanical manhole frame-chimney seals will last 3.5 times longer.* Contact a Cretex representative to learn more about the LSS Internal Chimney Seal advantages for new construction and rehabilitation projects.



* Data provided by the ASCE Manuals and Reports on Engineering Practice No. 92, "Manhole Inspection and Rehabilitation", 2008 Update.



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OLD REPUBLIC INSURANCE GROUP

MANHOLE EQUIPMENT AND REHABILITATION

By Craig Mandli



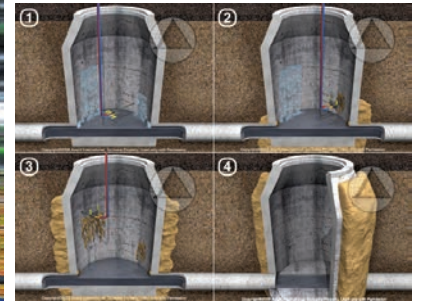
APM SpinCaster



HammerHead Trenchless HydroBurst 100XTR



Perma-Liner Industries Perma-Main Top Gun



Avanti International injection grouts

APPLICATORS

APM SpinCaster

For cities with sufficient manpower, the City Self-Install Program for sanitary and storm manholes and catch basins is a dollar-saving choice. Factory training and the bidirectional **SpinCaster** from **APM** enable a three-person city crew to reinforce, seal and protect four to eight structures per day. Supervisors schedule crews as they are available on a day-to-day basis, and cities typically save \$250,000 or more by doing 100 to 500 structures during the season. The system includes a pneumatic, spark-free, explosion-proof motor. The bidirectional rotation ensures and even application even with the rotation of 3,500 rpm to maximize radial impingement of mortar to the substrate. The high rpm speed keeps the unit centered in the structure and applies material at the best design thickness calculated for the diameter, depth and conditions of the existing pipe. **515-276-9610; www.waterliner renewal.com/apm**

HammerHead Trenchless HydroBurst 100XTR

The **HydroBurst 100XTR** from **HammerHead Trenchless** gives operators the ability to take on a wide range of sewer, water and gas line replacement jobs with just one machine. The unit's 100-ton capability is rated for up to 16 inches in diameter, yet it is compact enough for use on pipe down to 4 inches. It comes with an easy-to-learn, easy-to-use radio remote control. Freeing operators from the pit allows them to position themselves for the best view of a bursting operation and increases workspace in the pit for rod handlers. Its lightweight, heat-treated alloy rods feature an API-style joint that resists buckling under the greater thrust loads required by longer burst runs, sweeping bends and encrusted and collapsed lines. Used in combination with specialized tooling, operators can burst the toughest steel and ductile steel pipes. **800-331-6653; www.hammerheadtrenchless.com**

Perma-Liner Industries Perma-Main Top Gun

The **Perma-Main Top Gun** from **Perma-Liner Industries** is a manhole-to-manhole, continuous inversion lining system. It is specifically designed to rehabilitate 8- to 24-inch-diameter pipelines in only a few hours with no excavation or disruption in substrate. The liner is air-inverted through existing manholes and steam cured in as little as 90 minutes using compact 750,000 Btu dry steam generators. This minimizes repair time, road closures and reconstruction, and allows for safe reactivation of the repaired pipeline in just hours. Because the system can be continuously fed, there is no limit to the length of material it can invert. Depending on the infrastructure, the installation lengths for liners typically average 300 to more than 600 feet. Prep time is minimal because all liner materials are pre-measured and delivered to the repair location pre-saturated. **866-336-2568; www.perma-liner.com**

CHEMICAL GROUT

Avanti International injection grouts

Infiltration enters underground systems every day through defects or faulty joints in manholes, causing system capacity issues, overload at treatment plants and possible injury to the community. **Avanti International** injection grouts have historically proven to be an economic and long-term solution to combatting infiltration entering all areas of a collections system, including manholes. Injection grouts are engineered to stop leaks, stabilize soil and control groundwater, and be used in precast barrel joints, brick and concrete masonry units, pipe penetrations, vertical or horizontal cracks, void fill and pinholes. Each technique enables the technician to stop several leaks at once and helps to extend the life of the structure. **800-877-2570; www.avantigrout.com**



**Infrastructure Repair Systems
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**Picote Solutions Dual-Color
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Sauereisen SewerGard 210XHB



**Source One Environmental
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EPOXIES

Infrastructure Repair Systems Infragard

Infragard concrete and manhole rehabilitation products from **Infrastructure Repair Systems** include Top Coat and Chim-Coat, which are non-hazardous ambient-cure epoxy systems for a small patch, entire manhole or retaining wall. This cost-effective solution requires no expensive equipment as it has an easy trowel-on application. They are corrosion resistant and high strength, with an impermeable structural bond to the substrate or to almost any concrete or metal surface. Chim-Coat is engineered with a flexible feature that maintains adhesion while expanding or contracting with changing temperatures and traffic loads. **877-327-4216; www.irsi.net**

Picote Solutions Dual-Color Epoxy Brush Coating System

The **Dual-Color Epoxy Brush Coating System** from **Picote Solutions** allows technicians to rehabilitate pipes from 1.25 to 12 inches for drains, sewers, water pipes, electrical conduits and heat and air-conditioning ducts by brush-casting a coating. The coating resin forms a pipe inside the original pipe that is tested, safe and environmentally friendly. The new pipe is damp-proof, corrosion-resistant and wear-resistant. It is ASTM and NSF certified (NSF/ANSI 61-5). It is a 100% solids epoxy, and the method allows for clear visual verification during the application process. Apply to small areas or all drains in multistory buildings. The system is practical and easily fits in tight places. **219-440-1404; www.picotesolutions.com**

Sauereisen SewerGard 210XHB

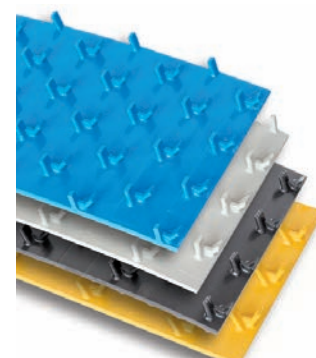
SewerGard 210XHB from **Sauereisen** is an epoxy protective lining specifically formulated for municipal wastewater environments. It provides a chemical-resistant barrier for concrete, masonry, brick and steel substrates. As a 100% solids epoxy polymer, it sets fast and provides a quicker return to service. The high-strength lining enables high-build capabilities from 10 up to 300 mils in a single coat, reducing need for a second coat. It is moisture-tolerant to accommodate damp substrates and may be applied to SSD substrates, reducing time spent waiting for the substrate to dry out. It is available in 15-gallon Large Units and 200-gallon Bulk Units. **412-963-0303; www.sauereisen.com**

Source One Environmental Quadex Structure Guard Epoxy

Quadex Structure Guard, distributed by **Source One Environmental**, is a high-build epoxy coating formulated to provide long-term corrosion protection and structural enhancement for manholes, pump stations, treatment plants or any wastewater infrastructure subject to high levels of corrosion and/or abrasion to include both municipal and industrial applications. It is also suitable for invert repairs. It can be trowel and/or spray applied, and is a 100% solids material with no VOCs and a fast set time. **877-450-3701; www.s1eonline.com**



**Simple Solutions Distributing
Wolverine Brand Manhole
Odor Filter Insert**



AGRU America Monoform PLUS

INSERT

Simple Solutions Distributing Wolverine Brand Manhole Odor Filter Insert

Hydrogen sulfide-based sewer odors emanating from manhole covers are an extreme nuisance for residential homeowners or users of nearby public facilities. **Simple Solutions Distributing** offers the **Wolverine Brand Manhole Odor Filter Insert** to combat the issue. Made with durable and corrosion-free high-density polyethylene copolymer, each odor insert is made to order based on specific manhole measurements. The insert sits flush on the rim so it won't interfere with the installation or removal of the manhole cover. They install easily with no tools necessary. Each insert comes with the initial 20 pounds of Norit Darco's H2S Sulforsorb activated carbon, and its H₂S breakthrough indicator to let the user know when maintenance is required. The insert requires no routine maintenance other than occasional replacement of the carbon, which is easily replaced and does not require removal of the insert from the manhole. **866-667-8465; www.industrialodorcontrol.com**

MANHOLE LINERS

AGRU America Monoform PLUS

Monoform PLUS from **AGRU America** is a manhole and wet well rehabilitation solution that combines HK Solution's Monoform technology with AGRU-ULTRA GRIP. The technology comprises a concrete forming system installed within existing manhole structures. Inner forms wrapped with ULTRA GRIP pair with the existing structure, which serves as the outer form. Concrete is then poured between the two forms to create a new structure. The concrete cures around the anchors, making the liner mechanically bonded permanently into the structural frame. The solid construction

(continued)



Epoxytec CPP Sprayliner MH



Sprayroq SprayWall



**The Strong Company
Strong-Seal MS-2A and MS-2C**



**Cherne Plate Style
Manhole Testers**



CUES SPiDER



Prime Resins Soakum Oakum Kit

meets the Cooper E-80 locomotive load testing criteria. It offers equal performance and design life compared with a typical replacement job, with the benefit of minimal traffic disruption, cost-effectiveness, faster installation, no required external bypass pumps, and no compaction issues. Finish most sites in two days without being taken out of service. **843-546-0600, www.agruamerica.com**

Epoxytec CPP Sprayliner MH

CPP Sprayliner MH from **Epoxytec** is designed to rehabilitate sanitary sewer collections system assets and other underground, cylindrical and/or small box structures in contact with hydrogen sulfide and in need of I&I mitigation with sealed lining. It performs in areas subject to chemical attack and, as a seal preventing oxidation while holding back water migration, I&I and hydrostatic pressure. The material can be sprayed ultra-high-build, up to 1/4 inch per pass. Blended with reinforcing agents and various fibers, the material when cured creates reinforcement lining as a fiber-reinforced polymer, with high-strength and flexural properties for partially or fully deteriorated structures. **877-463-7699; www.epoxytec.com**

Sprayroq SprayWall

SprayWall from **Sprayroq** is a rigid polyurethane material that provides structural integrity and infiltration control to underground infrastructure assets. It is a 2-1-ratio product that is applied via a heated, plural component spray system. It begins to gel in about eight seconds and is tack-free after two minutes. Within 30 to 60 minutes, the initial cure is complete and the structure is capable of accepting flow. The benefits include its structural capacity, which provides for protection against multiple load components within an underground asset including water, soil and traffic loads. In addition, it allows an asset owner to return a structure to service quickly, creating a huge savings on bypass cost, as well as decreasing the overall downtime for a given structure. It is also third-party tested and most recently has under-

gone significant successful evaluations through AASHTO. **205-957-0020; www.sprayroq.com**

The Strong Company Strong-Seal System

Strong-Seal MS-2A and MS-2C from **The Strong Company** are designed to rehabilitate municipal concrete and masonry structures, and effectively stop inflow, infiltration and exfiltration. When spray-applied to a minimum of a 1/2-inch thickness, the cementitious mortars are impervious monolithic liners with compressive and flexural strengths exceeding that of the original structure. Made with Portland cement, MS-2A is the most cost-effective solution for stopping infiltration and restoring structural integrity. MS-2C provides high early strengths and added corrosion protection in mild sulfide environments. High Performance Mix is a pure-fused calcium aluminate mortar that stops infiltration, restores structural integrity and protects against microbiologically induced corrosion in sanitary sewer systems with harsh sulfide conditions. **800-982-8009; www.strongseal.com**

MANHOLE PARTS AND COMPONENTS

Cherne Plate Style Manhole Testers

Cherne Plate Style Manhole Testers are an efficient, accurate, cost-effective method of testing new, existing and rehabilitated manholes. Their remote-inflation and monitoring system keeps users away from the danger zone. This product is designed to seal manhole cone surfaces and a wide range of manhole diameters. Included is a Neoprene gasket for a leak-free seal and a 20-inch hose with a gauge. Units are available in six size variations and replacement kits. **800-843-7584; www.cherneind.com**

CUES SPiDER

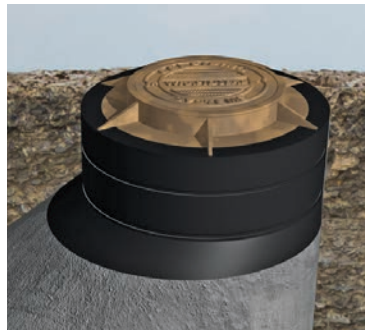
The **SPiDER** scanner from **CUES** is wireless, color manhole inspection technology in a lightweight and compact form. It is operated with a tablet computer that controls the scanners and lights. It does not require a truck or data/power cable for operational use. Scanning data is recorded on the unit. It collects millions of 3D points during each manhole scan, providing engineering and survey-quality information about manhole geometry and condition. Information gathered can be used for structural assessment, pre- and post-rehabilitation analysis, hydrological surveys and general condition assessment. It provides a 190-degree field-of-view live video stream, an ideal tool for I&I studies which depend on live video to detect moving water. **800-327-7791; www.cuesinc.com**

Prime Resins Soakum Oakum Kit

The **Soakum Oakum Kit** from **Prime Resins** is composed of a dry oakum soaked in a hydrophilic polymer solution. When wet and either packed or



RELINER/Duran Manhole Invert Channel



CCI Piping Systems WrapidSeal Manhole Encapsulation System



Cretex Specialty Products Internal Chimney Seal



Sealing Systems Infi-Shield

worked into a joint or crack, the resin will foam to form a flexible and tight joint to stop groundwater infiltration. It reacts with water and becomes a watertight rubber-like composite. The oakum cord gives strength and density to the composite, and makes the application of the resin easier, especially when gushers are present. **800-321-7212; www.primeresins.com**

RELINER/Duran Manhole Invert Channel

Improve manhole hydraulics with **RELINER/Duran Modular Manhole Invert Channels**. Molded fiberglass flumes with smooth sewer pipe interfaces are used to rehabilitate inverts without flow interruption and can be used for new construction. The field-installed modular components bolt together inside the manhole and serve as the form for a new concrete bench. The channels eliminate the inconsistencies associated with field-formed concrete channels. The full-depth lined channels are high flow and easy to clean and maintain. Standard 8- and 12-inch-depth channel sections fit through a 24-inch manhole frame and will accommodate 6- through 12-inch pipes. Larger sizes are available. **800-508-6001; www.reliner.com**

SEALANTS

CCI Piping Systems WrapidSeal Manhole Encapsulation System

The **WrapidSeal Manhole Encapsulation System** from **CCI Piping Systems** consists of an engineered primer and a wraparound, heat-shrinkable sleeve designed to seal joints and prevent groundwater from entering a collections system. This material has a high-shrink membrane (70% stretch and 40% recovery) designed to shrink around any manhole profile. In addition, the high-tensile strength accommodates structural movement, while the tough backing resists soil stress and provides suitable abrasion resistance. It can be used for new construction or for the rehabilitation of existing manholes to control infiltration through joints and prevent deterioration, thus eliminating costly maintenance repairs and the added expense of treating groundwater. **800-867-2772; www.wrapidseal.com**

Cretex Specialty Products Internal Chimney Seal

Cretex Specialty Products Internal Chimney Seals are mechanical, so there is no need to worry about surface adhesion or stopping active leaks prior to installation. The seals eliminate and prevent manhole chimney inflow. During wet weather, clear water enters the manhole through deteriorated and broken chimney joints, which may burden the collections system. The chimney seal has a 50-year design life and is available in four widths, allowing complete chimney coverage up to 24 vertical inches with a single seal. **800-345-3764; www.cretexseals.com**

Sealing Systems Infi-Shield

The **Infi-Shield** external seal from **Sealing Systems** prevents erosion and infiltration in manholes or catch basins. The one-piece molded seal is made from EPDM rubber, has a minimum of 460% elongation and has a reinforced preformed L-shaped corner. It can be combined with the Sealing Systems manhole insert to help stop unwanted inflow of rainwater through the manhole cover. The inserts are custom-sized to provide an enhanced fit and seal and are manufactured from ultra-high-density polyethylene. Both products are inexpensive and simple to install with in-house personnel. **800-478-2054; www.ssiselingsystems.com** ♦



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CASE STUDIES

MANHOLE EQUIPMENT AND REHABILITATION

By *Craig Mandli*

Contractor chooses steel manhole risers for multiple projects

Problem:

Founded in 1969, Herzog Contracting is a giant, with six divisions spread across rail, waste management and roadway construction and maintenance. In 2014, Herzog began implementing a roadway contracting innovation from another firm, the **Pivoted Turnbuckle Manhole Riser** from **American Highway Products**. “We’d



been using cast iron risers exclusively to raise manholes to grade,” says Bryan Jones, vice president of project delivery in Herzog’s Heavy Highway Division. “They were effective in many ways, but inventory was a persistent challenge. We perform work for a lot of different municipalities, all with differently sized manholes, and it was difficult to keep every size of riser we may need in inventory.”

Solution:

For Jones, the chief advantage of the risers was adjustability. They’re sturdy, flexible rings made of galvanized steel, are easy to set into original utility rims and the pivoted turnbuckle enables fast adjustment to securely fit variously sized manholes. “We first used AHP manhole risers for Wathena, Kansas. I ordered almost 100 risers for that project — we knew from the start they would be a great fit for our operations.”

RESULT:

Since then, Herzog has installed over 1,000 Pivoted Turnbuckle Manhole Risers, keeps a year’s inventory on hand, and “We have not had any failures to date.” Summing up, Jones says, “The AHP risers are a great asset to our operations, and they’ve been incredible to work with over the years.” 888-272-2397; www.ahp1.com

Corrosion protection of new manholes

Problem:

The fast-growing city of San Tan Valley, Arizona, built 57 new 48- and 60-inch manholes, averaging 10 feet deep. To meet the specified 50-year life span, the city required applying a corrosion-resistant polymer coating.



Solution:

Manhole Coatings, a local contractor that has completed many lining projects in Arizona, was awarded the project. They decided to use **NPR-5304**, a high strength, corrosion-resistant sprayable epoxy manufactured by **Neopoxy**. This product has passed ASTM 1216, Los Angeles County Sanitation District, and Green Book tests. The MHC crew applied NPR-5304 epoxy at a thickness of 125 to 150 mils using plural component spray equipment.

RESULT:

The project was completed successfully. The coating successfully passed the spark and adhesion tests, and the manholes were back in service promptly. Through the application of Neopoxy NPR-5304 Epoxy Resin, the life span of the manholes was extended by several decades. 510-782-1290; www.neopoxy.com ♦

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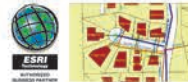
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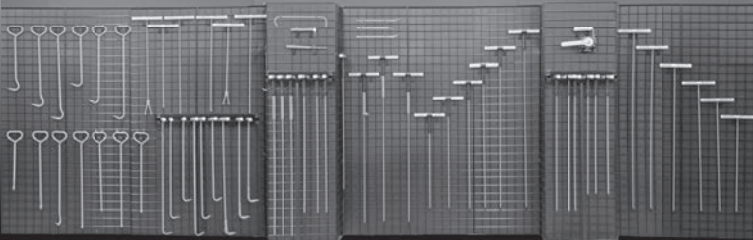
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Product Spotlight

Compact combination cleaner answers call in tight quarters

By Craig Mandli

Combination sewer cleaning trucks are an important tool in a municipality's toolbox. But when working in densely populated areas, the large trucks are often too cumbersome to operate.

Smaller trucks that offer the same cleaning power, while being more efficient and easier to navigate, are becoming more recognizable in the industry. The operator can focus on cleaning the line and resolving the customer's problem, rather than worrying about access points for a large vehicle. The Defender, a complete all-in-one skid-mounted system from Spartan Tool, answers the call.

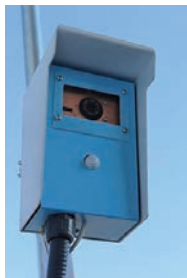
The Defender is delivered ready to mount onto a vehicle, the unit can be purchased in a package with a truck. According to Mike Sekach, national sales director for Spartan Tool, the Defender is known as a "single resolution vehicle," meaning one vehicle that can be used to complete the whole pipe cleaning job. There's no assembly required on the customer's end, meaning the Defender is ready to work from day one.

"You can remove waste with the powerful onboard vacuum pump and then clean and clear the line with the high-pressure jetting system," he says. "If you were relying on mechanical drain cleaning machines or hydrojetters alone, you would have to bring a secondary vehicle on site to remove waste before you can attempt to clear the blockage."



The Spartan Defender was designed in partnership with Spartan's sister company, Rioned, which also developed the company's Urban line of skid-mount jetters. It includes a 396-gallon tank with 264 gallons of waste and 132 gallons of freshwater capacity, a powerful Speck NP45 pump offering 3,000 psi at 10 gpm, a Kubota D1105 24 hp diesel engine, a Gardner Denver SLS54V suction pump, an Econtrol digital display, a Riomote nine-channel radio remote control, a side-mounted suction hose reel with direct connection to the waste tank, an engine and pump compartment, and side-mounted storage boxes. It allows the operator to remove waste from an operating sewer and is suitable to be used for grease trap or small septic tank cleaning and maintenance.

"Our customers have been very excited about the Defender," Sekach says. "The compact, efficient footprint really sets it apart. The Spartan Defender is ideal for a lot of applications, and puts high-end combination truck capability within reach for most businesses and municipalities." **800-435-3866; www.spartantool.com**



Memoreyes Sentry video system for remote site management

Memoreyes Municipal's Sentry video system combines edge computers, high-speed cellular, high-definition cameras and battery-backed power supplies into a small custom industrial enclosure for long service life. The system can handle multiple cameras for indoor and outdoor applications. All video, images and data are cloud-stored automatically and can be viewed in real time on web displays. All of the services, including cell data costs, are combined into one stable, monthly fee. All cameras and electronics are NDAA compliant. **770-989-1776; www.mm4s.net**



Gauge JackHammer tracking devices

Gauge's JackHammer series GPS tracking products have a IP69K environmental rating, a negative 40 to 185 degree F operating range and a LTE Cat-M1 cellular module. The JH-BP2 is intended for non-powered assets like trailers, storage containers or roll-off boxes. It includes a 17-year battery based on one message a day. The JH-BP3 is intended for imple-

ments and attachments such as buckets, jackhammers, pile drivers and more. It includes a 4-year battery and an optional weld-on steel guard. **317-472-6455; www.gaugecorp.com**



Flomatic Valves Model 888VFD silent check valve

Flomatic Valves now offers its Model 888VFD wafer-style silent check valve in a size range of 2 through 10 inches. The model features a corrosion-resistant fusion-bonded epoxy-coated ductile iron body and a 316 stainless steel poppet and seat. With its unique poppet design, it operates quietly and efficiently across a wide range of flow velocities to help reduce water hammer shock. This design is recommended for booster pump systems, VFD-controlled pumps, municipal water, industrial and other clean water system applications. Features of this NSF/ANSI 61 and 372 certified model include a convex disc design which provides consistent and reliable laminar flow, a sturdy EPDM O-ring seal for drip-tight closure, lower headloss and easy serviceability. **800-833-2040; www.flomatic.com** ♦

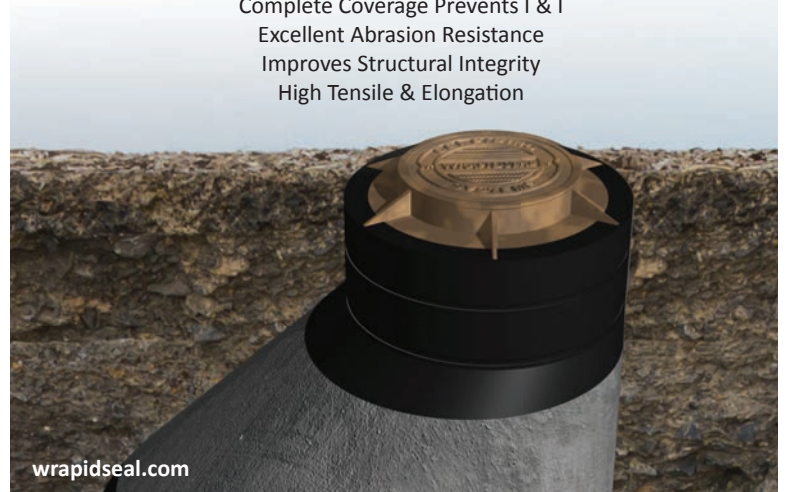


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SPECIAL REPORT



**Patterson
Manufacturing
davit cranes**

Give your operations a lift with Patterson davit cranes, available in ½-ton and 1-ton capacities. The low maintenance, easy-to-assemble design offers adequate reach to accommodate lifting large loads within tight spaces as well as a boom that can be adjusted to nearly 45 degrees to allow for clear-

ance over obstructions such as handrails. Built for durability, it comes standard with a hot-dipped galvanized finish and stainless steel hardware to prevent rust and corrosion in wet work environments. Following Patterson's tradition of safety-focused innovation, the davit features a reliable brake to keep loads in position without creeping. For over 160 years, Patterson has been a trusted supplier of winches, rigging, fittings and custom products for lifting applications. Patterson davit cranes are made in the USA and deliver on the company's promise of helping businesses run safer, easier and faster. Find out how Patterson can improve employee safety and positively impact your bottom line. 800-322-2018 www.pattersonmfg.com/davit-cranes

SPECIAL REPORT



**OZ Lifting
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OZ Lifting Products' patented CompOZite davit crane is made of advanced composite materials making it 40% lighter than equivalent capacity steel davits. With a total weight of only 83 pounds for the boom, mast and winch combined, a single crane is commonly moved to multiple base locations throughout a treatment plant. A ratchet screw jack allows the user to adjust the boom from horizontal to 45 degrees while under load and the 360-degree rotation of the crane allows a full range of motion. Smart-latch technology at the boom/mast means no tools are required for assembly. A zinc-plated finish on all noncomposite parts provides added corrosion protection. AC and DC electric winches are optional, or a manual winch comes standard with a drill drive adapter. The cranes are made in the U.S. and each one is individually tested and certified at 125%. 800-749-1064; www.ozliftingproducts.com

AC and DC electric winches are optional, or a manual winch comes standard with a drill drive adapter. The cranes are made in the U.S. and each one is individually tested and certified at 125%. 800-749-1064; www.ozliftingproducts.com



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IPT and APS join to supply pull-in-place system

American Pipelining Supplies and Internal Pipe Technologies have joined to have IPT supply APS and all its users with a full-branded pull-in-place pipe lining system. The pull-in-place process allows for renewal of under-slab and lateral lines without excavation, and is suitable for 1 1/2-inch-diameter pipe and larger sanitary pipes. The liners and epoxy resins will be manufactured by IPT in Abilene, Texas, and will be branded with APS.

“Our partnership with Internal Pipe Technologies will allow American Pipelining Supplies to have a full range of lining options for our clients,” says Jake Saltzman, CEO of APS. “Inversion lining is our specialty, and pull-in-place is theirs. By joining forces, we can provide all of our clients with every option they could need for small-diameter lining inside and outside buildings and homes.”

ARCOS names Odus Wittenburg as its next CEO

ARCOS named Odus Wittenburg as the company’s CEO. Wittenburg succeeds Bruce Duff who, after 10 years as CEO of ARCOS and 40 years in the software industry, announced his retirement. Duff will take on a strategic advisory role, supporting Wittenburg and the executive team through this transition.

Blanco, Texas, awards operations contract to Inframark

Inframark was awarded a multi-year partnership for contract operations for the City of Blanco, Texas. The contract will cover its water treatment and wastewater treatment plants, distribution and collection systems, and other public works functions. The project commenced on March 1.

Vermeer names new VP of operations

Mindi Vanden Bosch was named vice president of operations at Vermeer. Prior to joining Vermeer in 2008, she held roles in continuous improvement at Cascade Engineering and treasury management at Fifth Third Bank. At Vermeer, Vanden Bosch has held leadership roles in marketing, finance, human resources, continuous improvement and most recently served as the managing director for the Forage Solutions Product Group.



Mindi Vanden Bosch

Avanti launches new website

Avanti International launched its new website, www.avantigrout.com. The redesign better incorporates the markets Avanti’s injection grout products serve and simplifies the look and feel to focus on product knowledge and technical data. The sleeker and more polished, user-friendly design offers a collection of industry resources including animations, project case studies, white papers, product specifications and more.

Xylem moving headquarters to Washington, D.C.

Xylem announced it is moving its headquarters to Washington, D.C. The company’s new facility will be co-located with the Reservoir Center for Water Solutions, a hub for multiparty, water-focused stakeholder collaboration, in the Navy Yard district along the Anacostia River. The center is anticipated to open in June. ♦

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PEOPLE/AWARDS

Fort Collins Utilities (Colorado) hired **Kendall Minor** as executive director. The position provides strategic leadership over the City of Fort Collins' utility portfolio, which includes stormwater services.

The City of Mountain View (California) hired **Danielle Lee** as its first chief sustainability and resiliency officer. Preventing stormwater runoff from polluting local water systems is among the sustainability programs.

S. Doré Mead, a former Minneapolis (Minnesota) City Council member who had a 2-acre stormwater retention pond named after her, died at the age of 73. Mead was instrumental in helping city residents who dealt with frequent flooding issues.

The **Conservation Foundation of the Gulf Coast** received a \$75,000 grant from the Gulf Coast Community Foundation (Florida) in support of its joint project with the Sarasota Audubon Society. The project includes improvements to an existing stormwater pond at the Quad Parcels at the Celery Fields.

The **City of Aiken** received the Municipal Association of South Carolina 2022 Achievement Award in the Public Works category for its Hitchcock Woods Stormwater Project.

The **Southwest Missouri Council of Governments** received a \$47,500 grant from the Missouri Department of Natural Resources to help the City of Marshfield handle flooding.

Southeast Michigan Resilience Fund partners are providing \$1.6 million in grant funding to projects that will benefit communities in that area. The funding is aimed, in part, at adding 4.8 million gallons of stormwater storage and planting more than 900 trees for increased stormwater storage and habitat. Grant recipients include **Wildlife Habitat Council, Charter Township of Van Buren, The Greening of Detroit, Rescue MI Nature Now, Washtenaw County, Detroit Water and Sewerage Department** and **Friends of the Rogue**.

Roberto Clemente Park in the City of Grand Rapids (Michigan) received a Park Design Award from the Michigan Recreation & Parks Association. The park underwent several renovations, including a new infrastructure to educate visitors about the impact of stormwater on the environment.

The **City of Lakeland** received a \$280,000 State Water Quality Assistance Grant from the Florida Department of Environmental Protection for the Lake Bonny Stormwater Outfall Retrofit Project.

The American Council of Engineering Companies of Massachusetts named **Jillian Baumbach, PE**, of VHB, as the recipient of its Young Professional Award. ♦

CALENDAR

June 5-8

American Society of Civil Engineers World Environmental and Water Resources Congress, The Hyatt Regency Atlanta Hotel, Atlanta. Visit www.asce.org.

June 12-15

American Water Works Association ACE22, Henry B. Gonzalez Convention Center, San Antonio. Visit www.awwa.org.

June 27-29

Water Environment Federation Stormwater Summit, Hyatt Regency, Minneapolis. Visit www.wef.org.

Aug. 28-31

American Public Works Association Public Works Expo 2022, Charlotte Convention Center, Charlotte, North Carolina. Visit pwx.apwa.net.

Aug. 29-31

Smart Water Summit, Hyatt Regency Hill Country Resort & Spa, San Antonio. Visit www.smartwatersummit.com.

Sept. 11-14

American Water Works Association Water Infrastructure Conference, (hotel TBA), Portland, Oregon. Visit www.awwa.org.

Sept. 26-28

StormCon and National Rural Water Association WaterPro Conference, Gaylor National Resort and Conference Center, National Harbor, Maryland. These events are being held as parallel conferences. Visit www.nrwa.org or www.stormcon.com.

Oct. 24-26

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

Nov. 7-9

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

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