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October 2009

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# CORRALLING GREASE

Houston attacks FOG with  
pipe maintenance, repairs,  
and public information

PAGE 38



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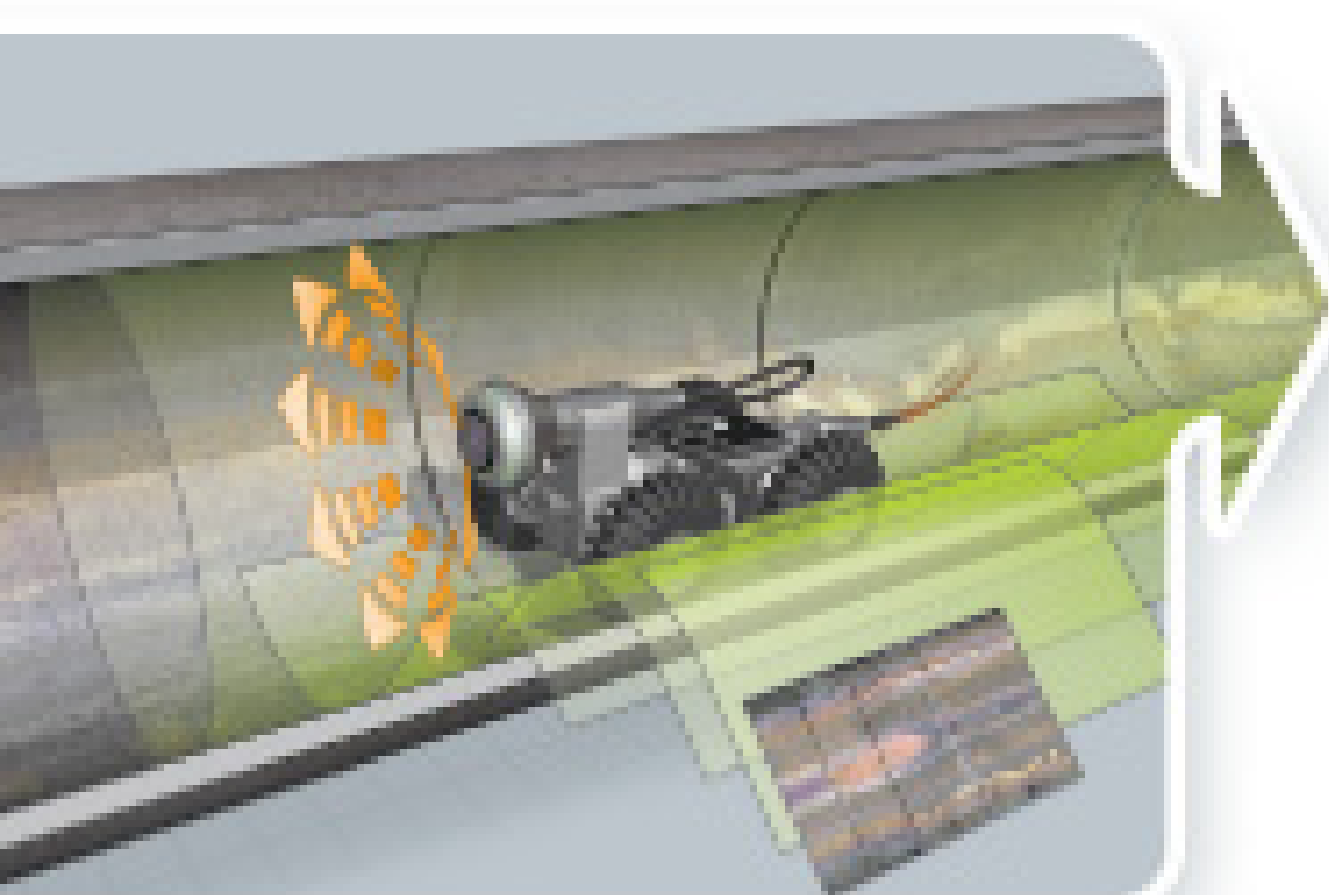
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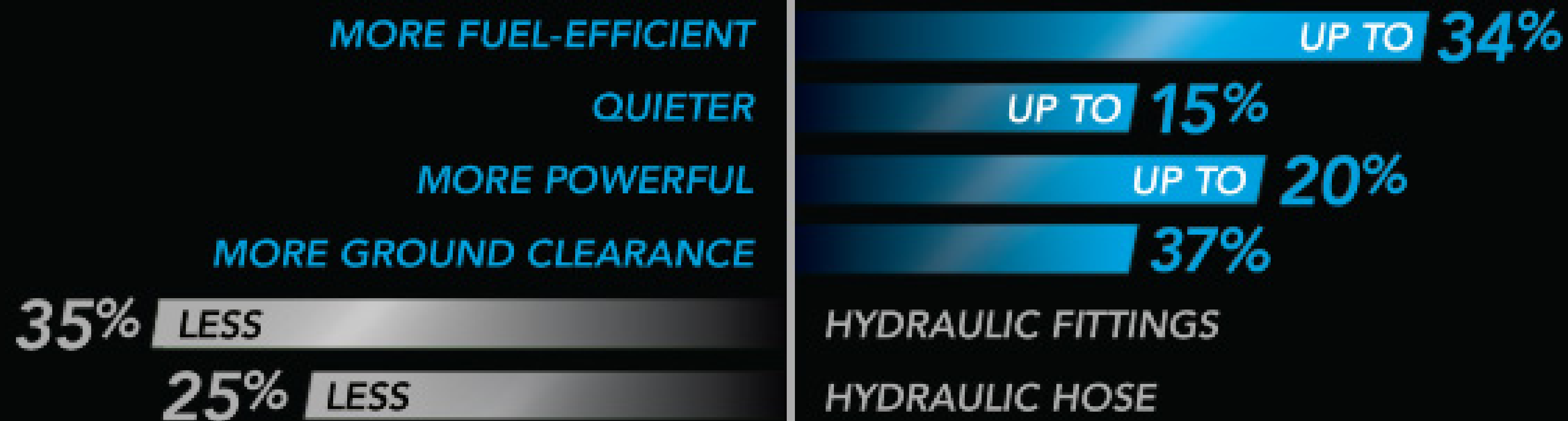
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# INSIDE:

## CLEANING AND MAINTENANCE STRATEGIES



### COVER:

The City of Houston's "Corral the Grease" program combines public information with an effective maintenance program in the street. Here, members of the Public Works Department team prepare a jetting nozzle for a cleaning job. The city uses Vacor combination trucks to clean as much as 4 million feet of lines per year. (Photography by John Everett)



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### Location and Leak Detection

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- ◆ Water: Leak detection and conservation initiatives in Austin, Texas
- ◆ Sewer: CMOM assessments help communities get maintenance on track
- ◆ Technology Test Drive: Non-stop hydroexcavating

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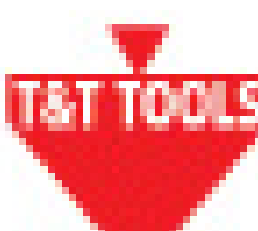
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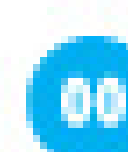
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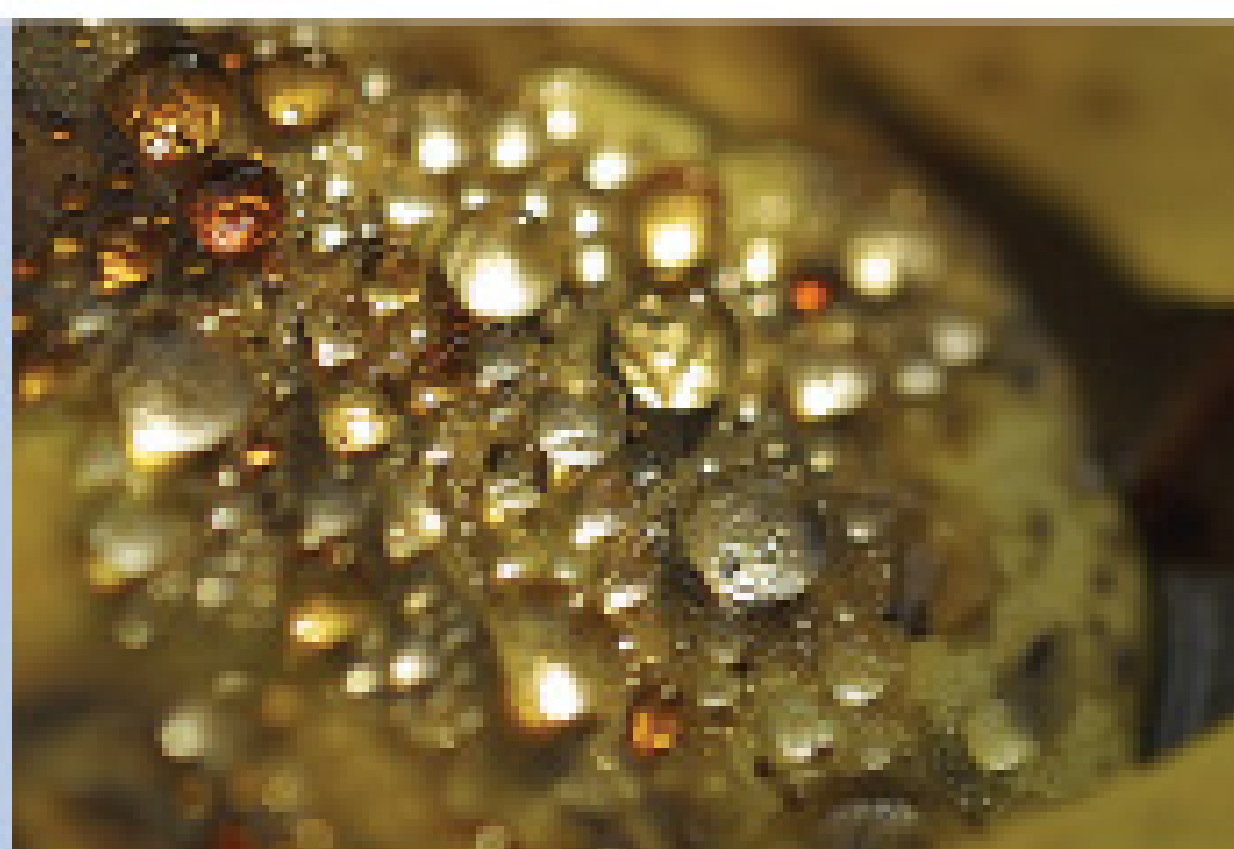
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## LETTERS

### TO THE EDITOR

### Trouble With Tapes

I must comment on the wisdom of using videotapes to store pipeline inspection data ("Rooting for the Future" article, *MSW*, August 2009).

Although most agencies are wisely making the transition from VHS to digital, many will be stuck with archives of VHS tapes, and plans to digitize at some point when funds are available. You can digitize the tapes in-house, but that's extremely time-consuming, even with dedicated hardware.

The fact is, there are a lot of VHS tapes out there that will be sitting on a shelf for some time. The story quoted the National Film and Sound Archives as recommending specific temperature and humidity ranges for videotape storage, and you can trust what they say.

But there are a few other things to consider if videotape longevity is important. Some are obvious, some less so. First, and perhaps

most obvious, tapes should never be stored near sources of magnetic fields: transformers (even common "wall warts"), speakers, some radios, and older CRT monitors are all frequent culprits.

Second, they should be stored on edge, either long or short, but not laid flat. There is sufficient play in the tape spindles that the weight of the tape will cause it to sag, eventually stretching the tape along one edge. This can create playback distortion.

Finally, when preparing to digitize the tape, especially with tapes that have not been played in the last five years, it is best to play them through to the end at normal speed, then rewind, then proceed with digitization. Old tapes can sometimes stick between layers, and that causes jerky playback and synchronization problems. If there are any stuck layers, this two-pass process will unstick them.

And one note about the playback hardware: As the article mentions, at some point, VHS videotape players will be rare, though likely still available through special media restoration companies. If you want to do the digitization in-house, have a head-cleaning tape ready for the player. Older VHS

tapes tend to shed their layers as tiny particles that can adhere to the tape head. If playback starts to look grainy, it would be worth running a head cleaner.

**Daniel Heim  
New River, Ariz.**

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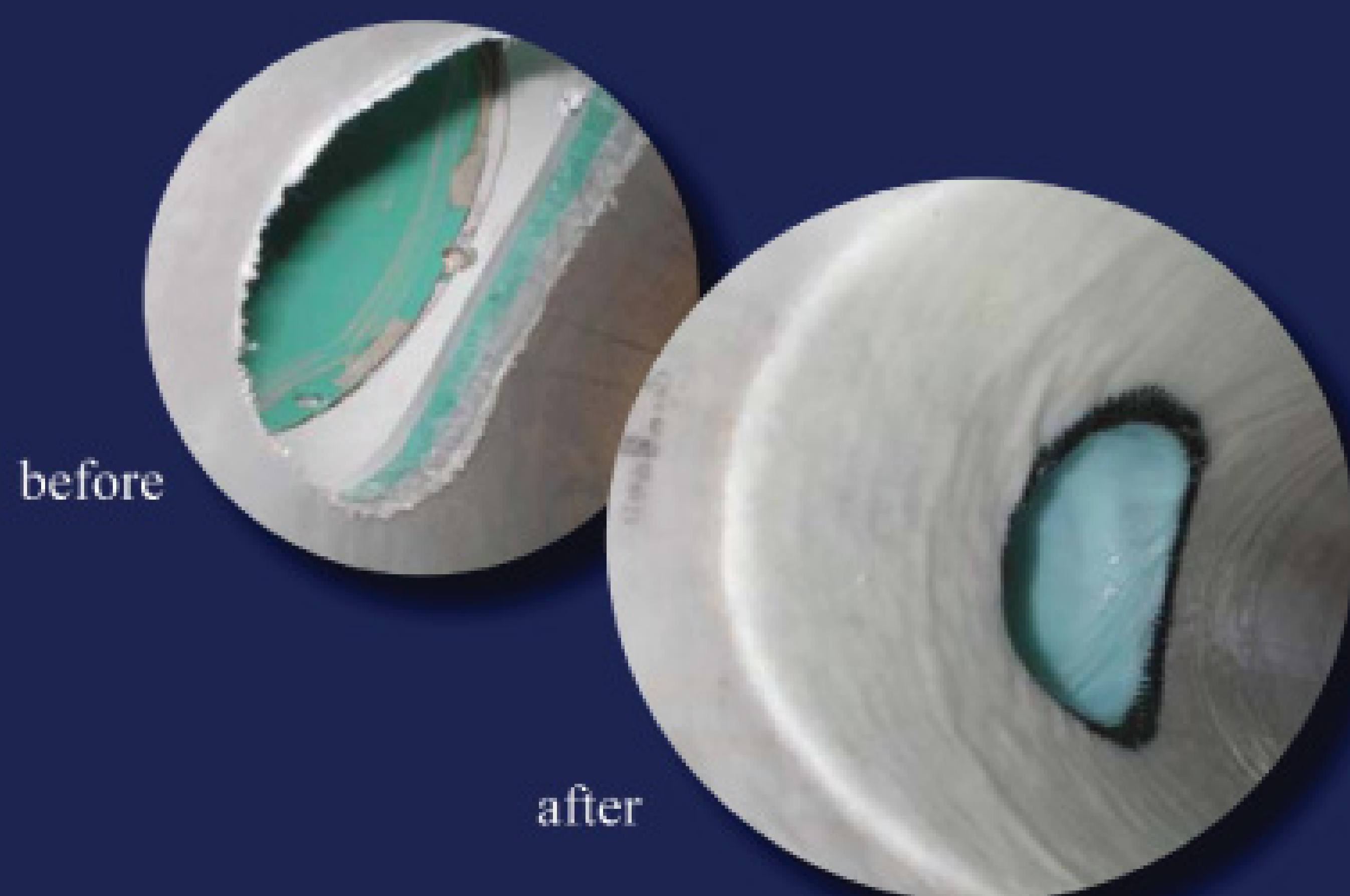
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# ISN'T IT AMAZING?

Sometimes it pays to step back and look at what all the latest technologies can do to improve municipal infrastructure maintenance

**F**or a long time I was trying to be the last person on earth not to have a cell phone — sort of like that Herb fellow in the old Burger King ads who was the only remaining human who had never tasted a Whopper.

Well, I failed, and when I finally gave in a few months ago, I went the distance, getting a BlackBerry on which I can check e-mail, get travel directions, read maps, watch TV, listen to the radio, keep my calendar, surf the Internet, shoot pictures and videos, send text messages, and probably do things I haven't figured out yet.

The technology we can carry in a shirt pocket today is incredible — but it shouldn't draw our notice away from the ever-advancing range of technologies available to those whose job it is to keep underground piping clean and sound.

You see these technologies if you go to trade shows like WEFTEC and the Pumper & Cleaner Environmental Expo International. But do you really stop to take them all in? And see how they really could help you?

## Seeing the trees

I'm exposed to new technology all the time. A lot of it comes across my desk in the form of press releases from manufacturers. Some of it shows up in our profiles of exemplary cities and utilities. When you're surrounded by it on an almost daily basis, you become a little immune to excitement. So, once in a while, it's good to step back and look at the trees instead of the woods, and see what technology has wrought.

Let's take just a few examples from issues of COLE Publishing magazines. In a future issue (October? November?), we'll carry a report on a hydroexcavator that actually dewateres as it digs. What does this mean? Well, in traditional hydro-excavating, you cut the soil with water under

pressure, then vacuum out the mud. When your truck's debris tank is full, you have to go somewhere to dump the spoil and probably to refill the truck's freshwater tank. That takes time, which of course is money. This new technology constantly dewateres the slurry and recycles and reuses the water — so you can just keep on going.

In fairly recent issues we have described pipe inspection systems (a few companies make them) that essentially take rapid scans of the pipe wall in very little time. People back at the office then sit at a computer and note, measure

**The technology we can carry in a shirt pocket today is incredible — but it shouldn't draw our notice away from the ever-advancing technology available to those whose job it is to keep underground piping clean and sound.**

and code defects. A future issue of *MSW* will include a Technology Test Drive that shows how one company applies this same technology to manholes and other shafts.

## Looking deep

Five years ago, who would have thought a small, handheld device, driven by only a few flashlight batteries, could locate any solid object underground? We profiled such a tool on these pages back in June.

Last month we looked at a way of gathering data on manhole inspections, line cleaning, lift station condition, and many other activities electronically, without paper, and then uploading it to the computer system in the office.

In July, we told how a county in the State of Washington uses laser and sonar technology, in addition to CCTV inspection, to get accurate data on the condition of pipes, even when they are filled with water and a traditional camera can't see a thing.



## FROM THE EDITOR

*Ted J. Rulseh*

Even the lowly manhole gets into the act. Last month we described a new method of adjusting manhole frames to grade in a system that uses set screws. That's not flashy technology, but it is a highly ingenious way to solve the nagging problem of manhole frames that create bumps in the street, and that break down and allow major infiltration to the sanitary sewer system.

This is just a short list of things we've covered recently. There's more out there, and more gets invented every day.

## Are you investing?

Of course, running your department isn't like having a no-limit toy store gift card. You have a budget that limits what you can spend, and you need to justify what you buy. But for starters, you might consider getting a good fix on what is out there, investigating what might fit your needs, and looking at the long-term cost-benefit equation. If you're not using some of these new tools, maybe now is the time to find out definitively how they can help you — or how not using them might hurt you.

I more or less got dragged, kicking and screaming, out of pure necessity, into the world of wireless communication. I am certain that already my investment in technology has been paid back many times.

The first text message I got on my BlackBerry came from my 27-year-old daughter. By way of her own BlackBerry, she said: "Dad — hope you like it here in the future." As it turns out, I do. Explore what's out there in pipe rehab technology, embrace what you can, and you will probably enjoy it, too. ♦

Comments on this column or about any article in this publication may be directed to editor Ted J. Rulseh, 800/257-7222 or editor@mswmag.com.





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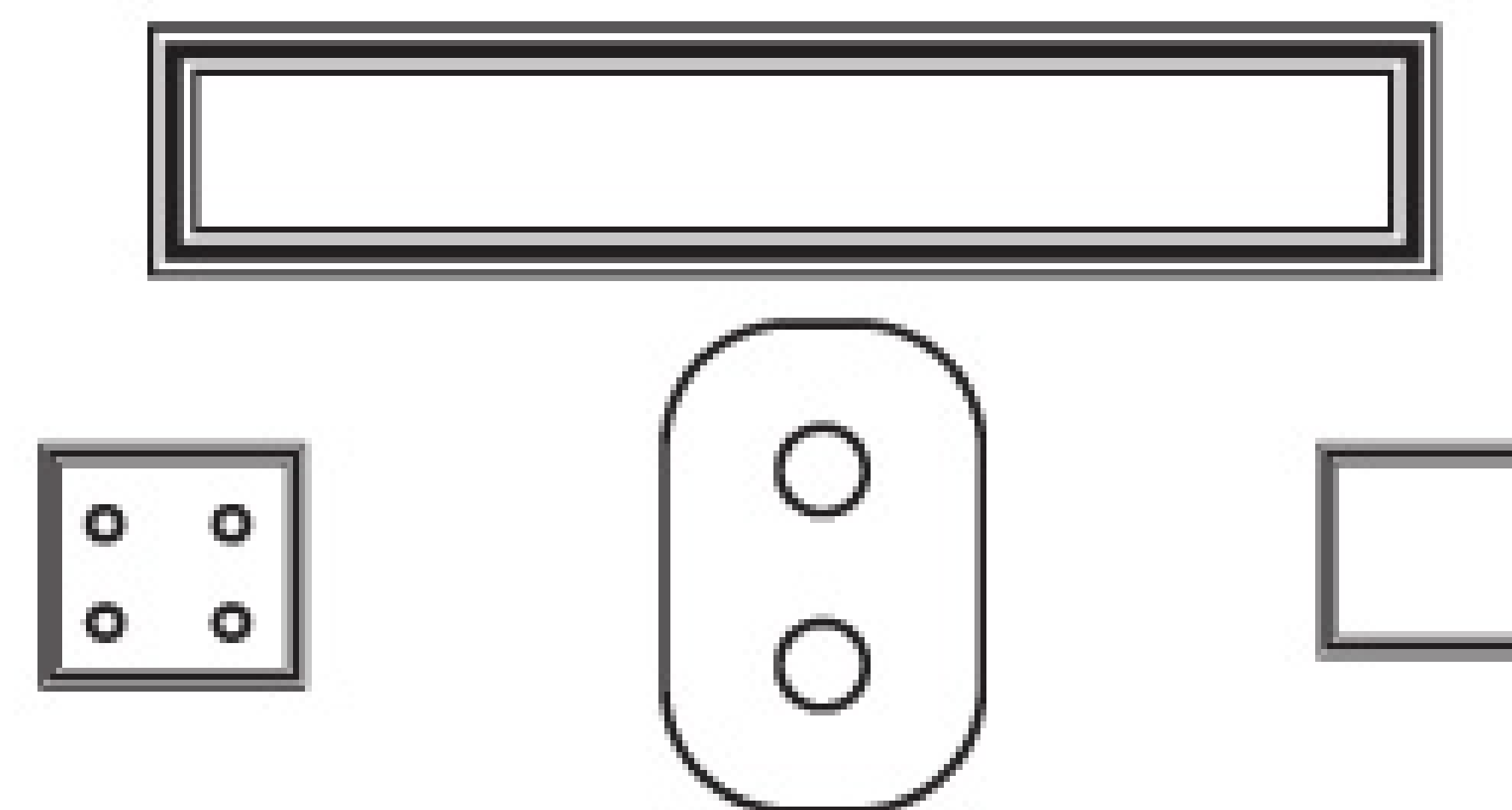
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690-0444	Vac Breaker Lid Outlet Seal	31-3/4" x 4-1/4"	\$24
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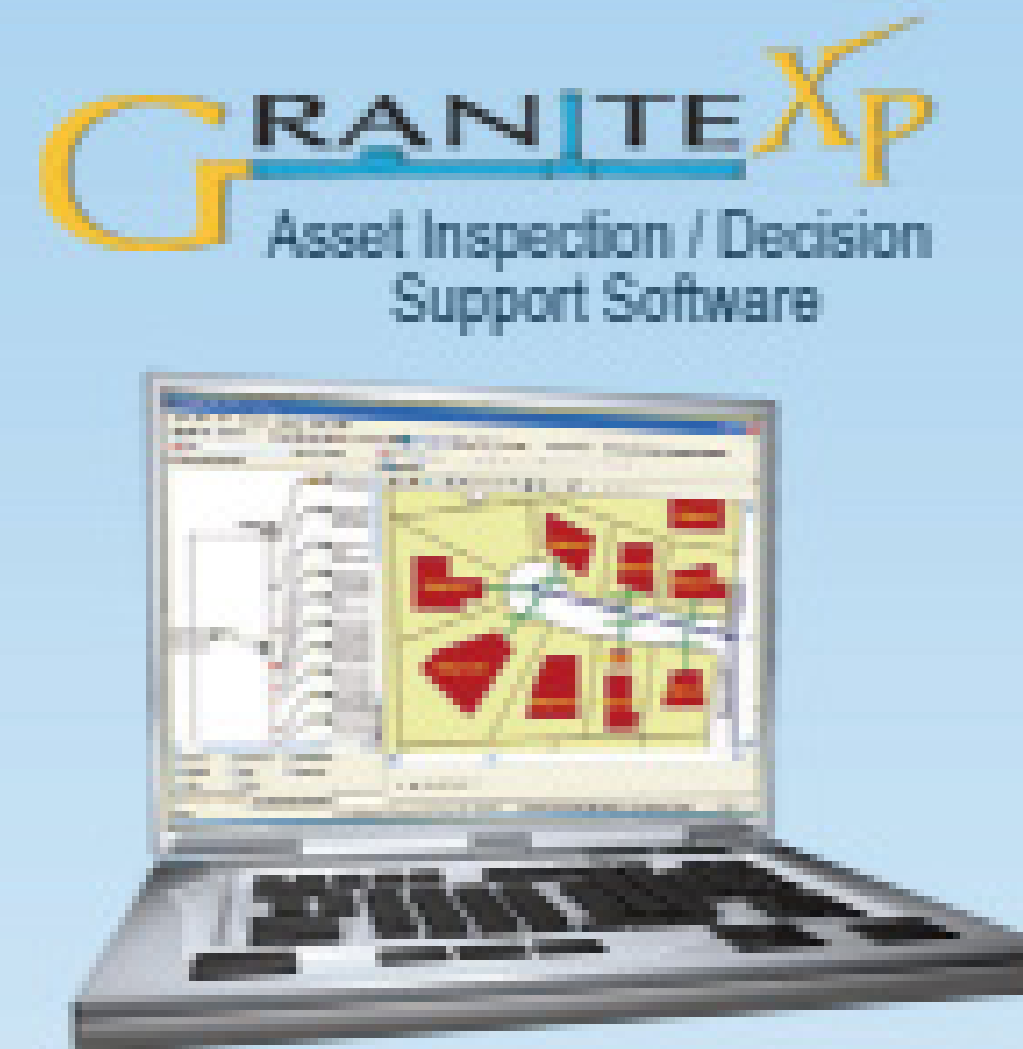
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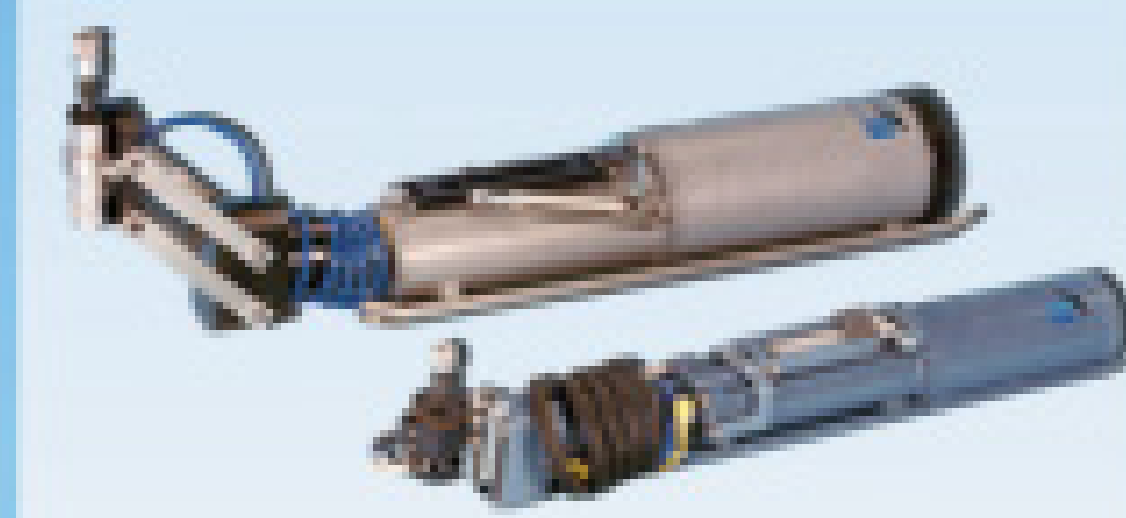
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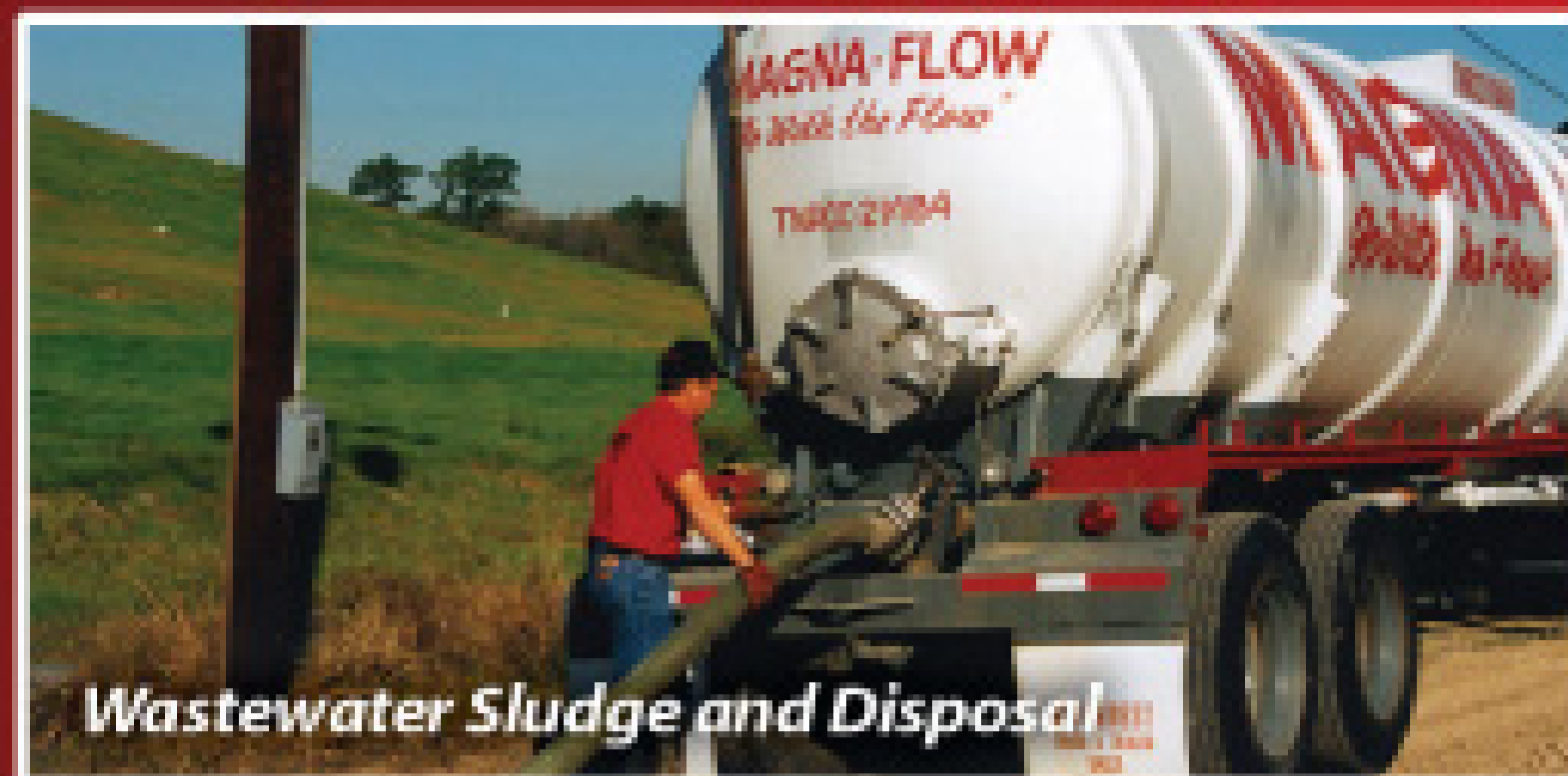
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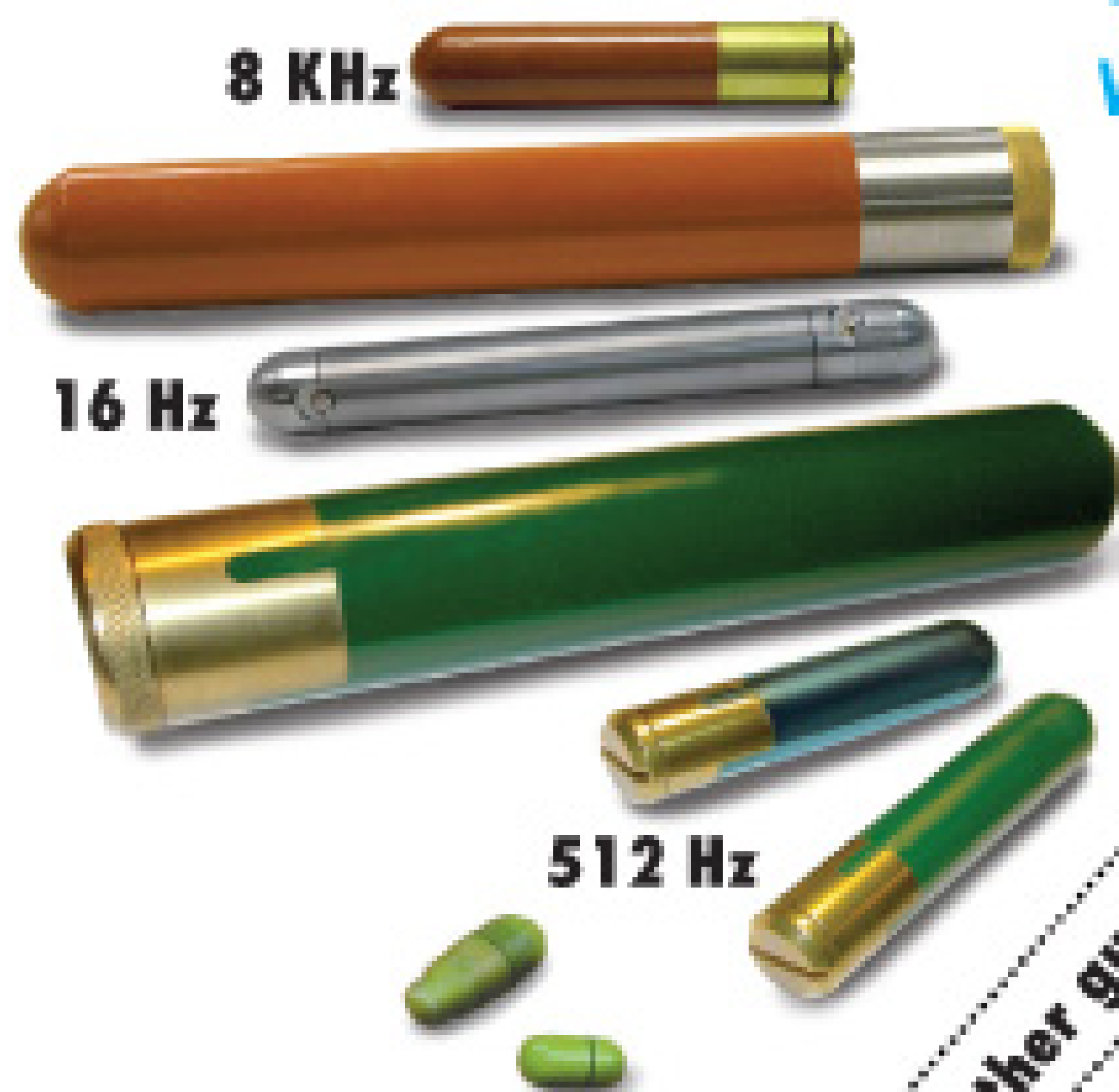


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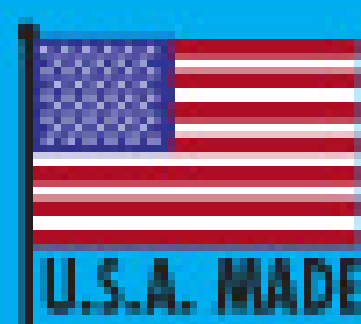


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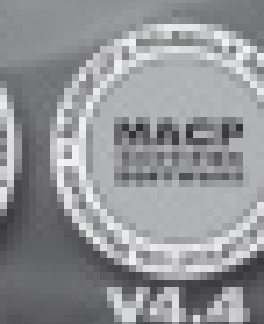
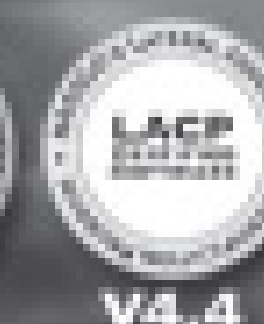
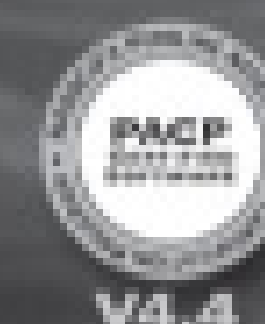


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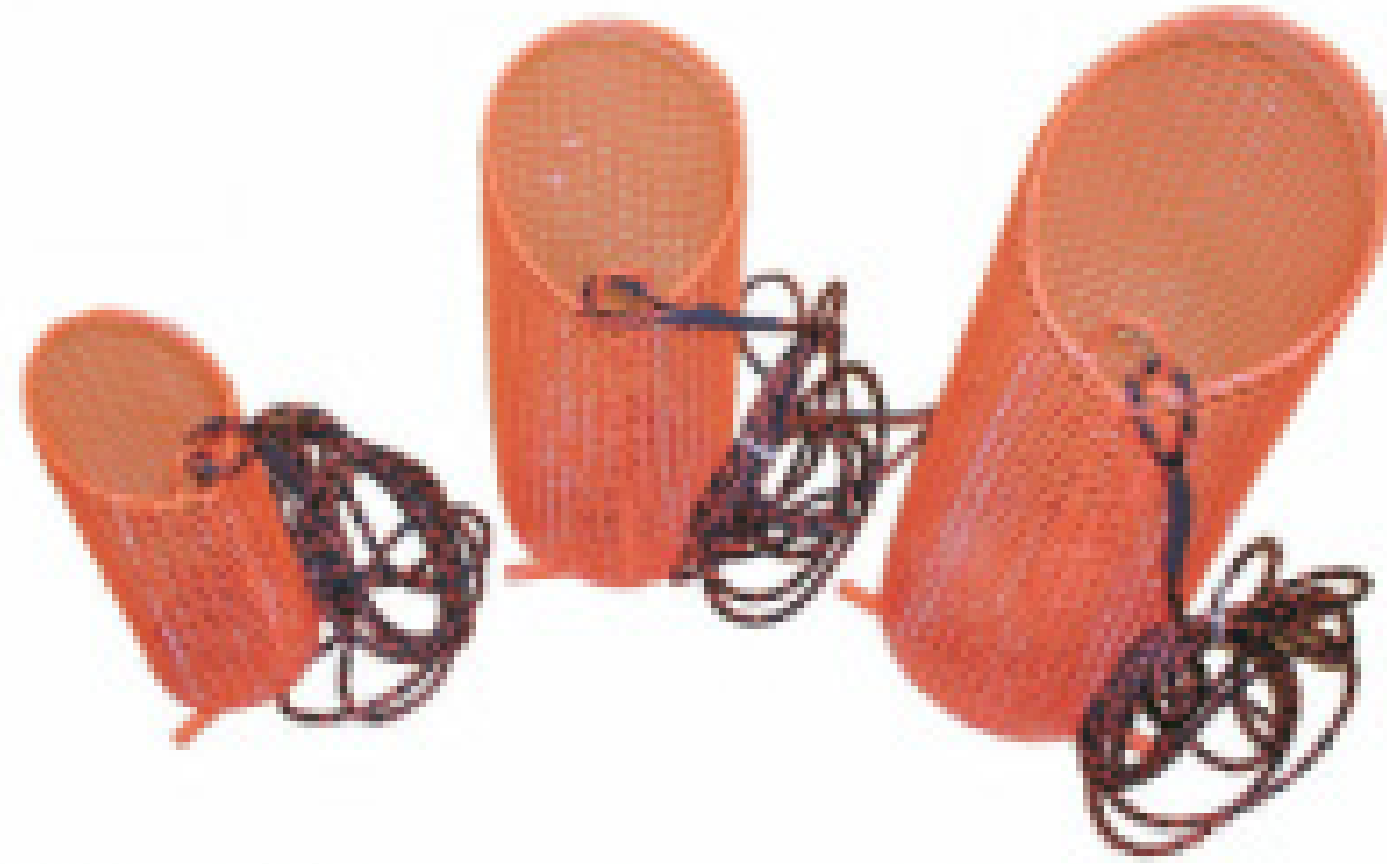
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# MAX-LIFE Manhole Tools

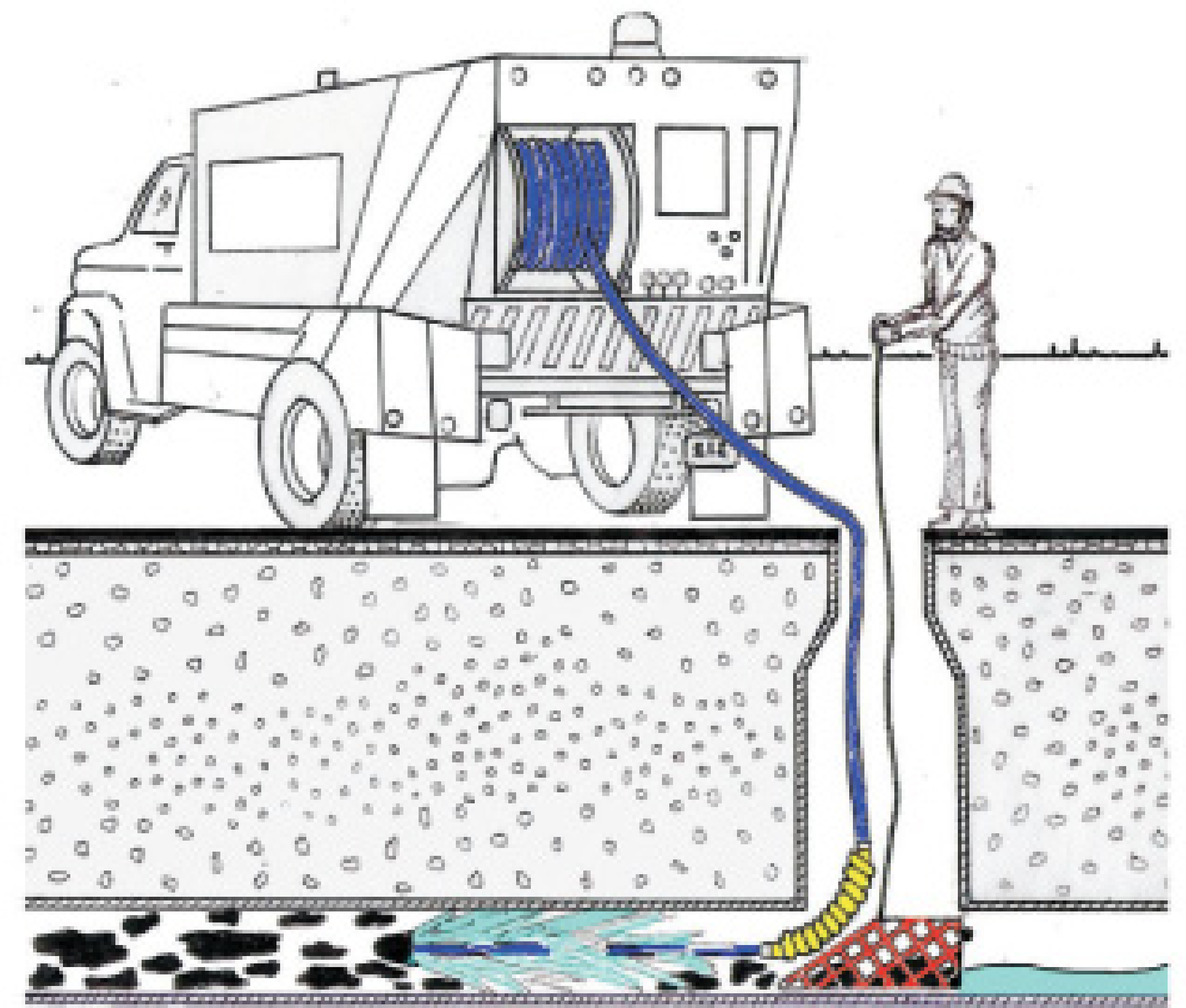
## Debris Catchers

Use Debris Catchers with Jet instead of Combo. Ideal where small amounts of debris are expected. Standard **MDC-6** model Comes with 20' of Poly Rope. Available from 6" to 24".



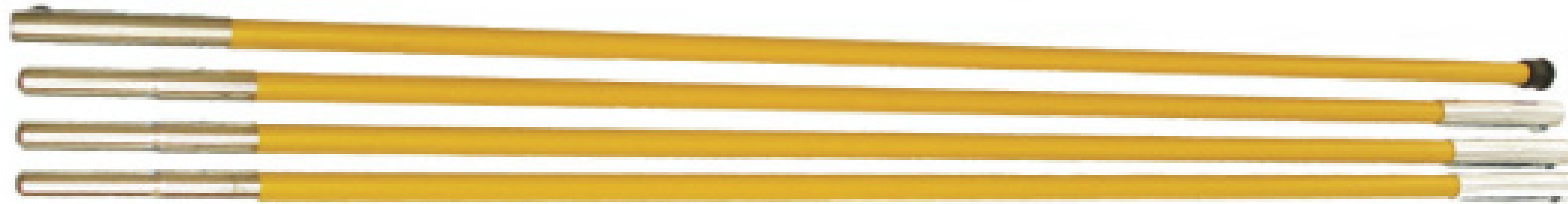
## Grit Catchers

**MDC-6CW** are similar but have half moon bottom around sides and back to stop finer grit and black sand from Flowing thru. Fills with material faster.



## MPF-24 Quick Connect Fiberglass Poles

24' pole set used with above Tools and Debris Catchers. Each set Includes 3 ea. 6' male x female and 1 x 6' end pole. These are Light, Strong durable poles with positive lock Aluminum quick couplings. Other lengths available. Use with Debris and Grit Catchers and assortment of tools below.



**MGLC-1**  
Grease Log Chopper. Blade cuts thru heavy pieces.



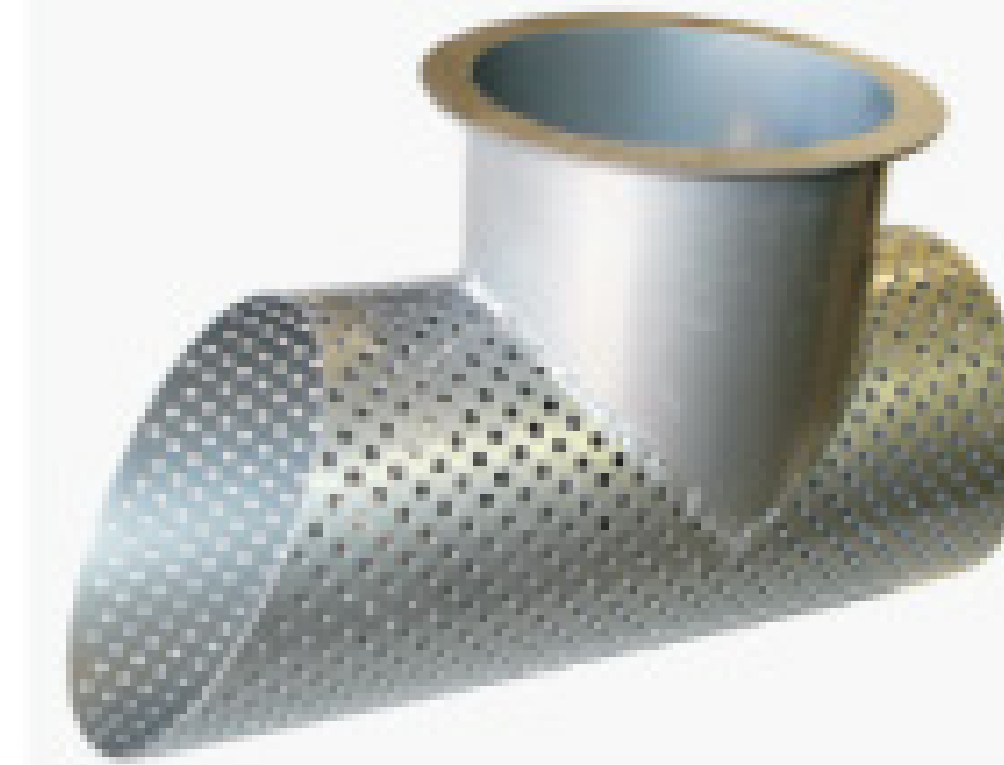
**M3PG-1**  
Three Prong Grabber. Great for Rocks and Roots.



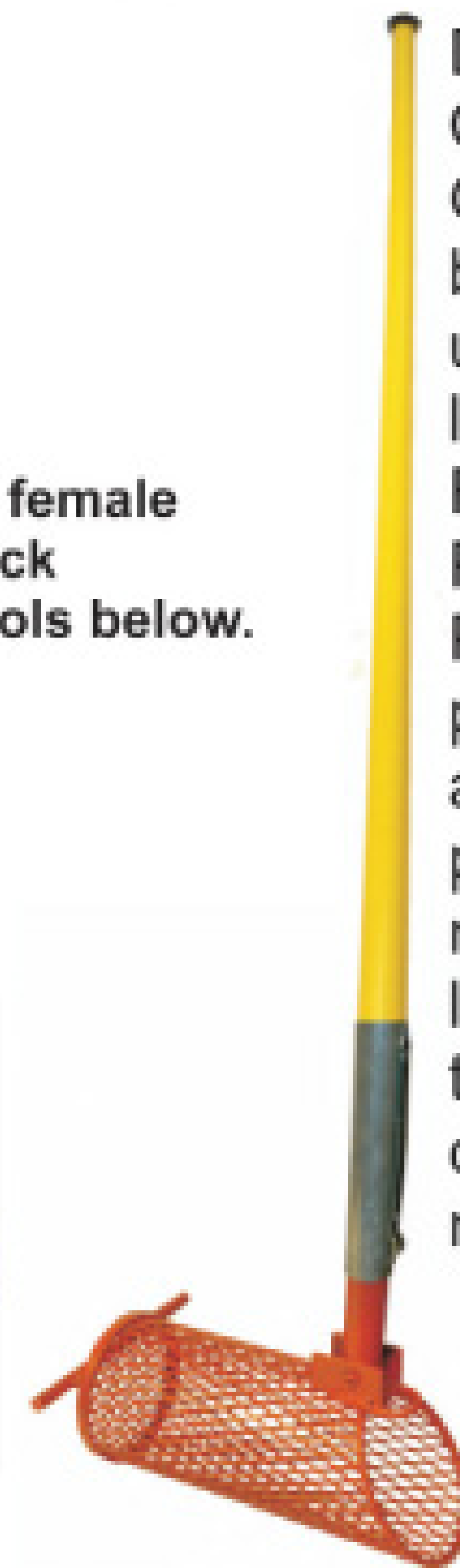
**MHG-2**  
Horse-Shoe Grabber. Great guiding hose in and out of sewer lines.



**MDS-6**  
Debris Scoopers Heavy duty construction For 6", 8" and 10" Pipe sizes.

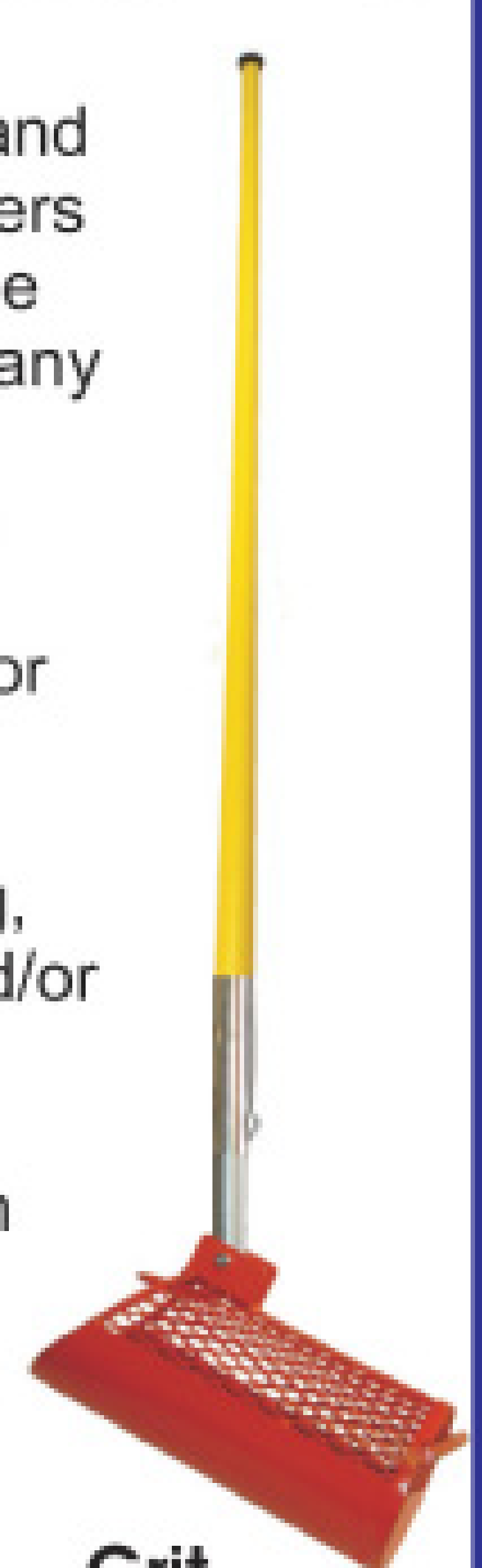


**VT-8V**  
Vac-Trap. New item connects to end of 8" suction tubes. Fills with debris while jetting upstream. Once full then turn on Vacuum pump. Saves pump wear and tear. From 6" to 24" sizes available



Debris Catchers and Grit Catchers both can be used with any length of Fiberglass Poles. Provides for positive action of positioning, raising and/or lowering these catchers in manholes.

**Debris Catcher**



**Grit Catcher**

## Catch-Basin Spoons

Easily connects to Fiberglass poles. Also available with wood Handles.



**MDG-1 DEBRIS GRABBER** 5' -15' Telescopic Extendable Debris Grabber with Steel body construction and articulating end fork. Rope opens and closes jaws for positive grabbing.

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FOCUS: SEWER

# A NATURAL PATH

An Eastern Kansas wastewater utility finds solutions for at-risk sewer infrastructure at stream crossings by taking a cue from Mother Nature

By Suzan Marie Chin



A shovel and work crew from Pyramid Excavation and Construction Inc. of Kansas City, Mo., relocate a manhole and exposed sewer lines after the creek bottom shifted near a residential neighborhood in Stanley, Kan. Johnson County Wastewater will try to stabilize the creek with plant life or rocks to prevent future erosion. (Photography by Glow Imagery)





Johnson County takes a systematic approach to maintaining and repairing infrastructure that crosses streams. The effort has helped cut maintenance and operation costs, while creating a system that exists in better harmony with the natural environment.

## GO WALK ABOUT

Faced with assessing the extent of its collection system risk during extreme weather, Johnson County Wastewater needed an effective way to gather data that was also simple, efficient and inexpensive.

The solution was to be like the folks Down Under Go walk about. The engineering department devised a simple plan using the agency's ESRI ArcView sewer mapping system. They generated maps that divided the area into small, manageable watersheds. The department then split into teams, each assigned to walk an entire watershed, following the sewer system as plotted on the maps.

Although not very technical, the method was highly effective. Teams entered some areas that had never or seldom been accessed or assessed during normal maintenance or CCTV inspection surveys.

For anyone having to visually survey a large area to look for external damage, engineering manager Aaron Witt advises, "Keep it simple. Don't make it difficult. A map, a simple form, and a clipboard are all you need. Everyone in the department can get involved if need be. You're definitely going to find things — just get out there and walk."



### PROFILE:

**Johnson County  
Wastewater,  
Olathe, Kan.**

**EMPLOYEES:**  
225

**POPULATION SERVED:**  
130,000

**INFRASTRUCTURE:**  
2,100 miles of sewer mains;  
5,300 stream crossings

**ANNUAL BUDGET:**  
\$55 million  
(capital improvements)

**WEB SITE:**  
[www.jcw.org](http://www.jcw.org)

of our streams with our maps and searched out any pipes with any type of potential problem. This step is now the initial phase of each of our scheduled surveillances."

The teams note specific measurements such as pipe size and

constantly changing the waterways' natural meandering pattern.

The true risk of these assets was revealed in October 1998 when rainfall over a seven-day period saturated the ground and caused significant collection system damage at several stream crossings. Then four more inches fell on top within just one hour and 15 minutes, flooding many local streams with torrential flows. During the cleanup,

**"We divided up into teams, took on different watersheds within our jurisdiction, and physically visited every crossing during the winter months. We walked along all of our streams with our maps and searched out any pipes with any type of potential problem."**

**Aaron Witt**

it became obvious that stream conflicts were a more serious threat to the overall health of the system than previously imagined. System capacity and water quality can be jeopardized by damage to sewers at these crossings.

Needing to know exactly where the system stood, JCW began what would become a routine program of stream-crossing inspections. "We divided up into teams, took on different watersheds within our jurisdiction and physically visited every crossing during the winter months," says Aaron Witt, engineering manager for JCW. "We walked along all

condition, and take photographs. Sewers that are buried or located on stable streams typically do not warrant further assessment. But if a line is exposed, a crew completes an additional evaluation of its condition, using CCTV inspection. An evaluation of existing stream reach condition is conducted as well.

### Regular inspections

Since 2003, the utility has taken a proactive approach, inspecting all 5,300 stream crossings every two years. As part of an asset management program, the inspection data is compiled in the utility's asset

**W**hen five inches of rainfall in a two-hour period revealed that its system's stream conflicts were more significant than originally thought, Johnson County Wastewater (JCW) decided to take a proactive approach to maintaining its sanitary sewer conveyance system.

Its efforts have gained national recognition for forward-thinking system management and maintenance that uses asset-management information, multi-tier physical pipeline inspection, and analysis tools such as geomorphology, hydrology and plant taxonomy to develop the most effective and sustainable means of rehabilitation.

By systematically approaching infrastructure that crosses streams, the county has reduced its long-term maintenance and operations costs, while creating a more sustainable system that can coexist with the environment.

### Risks revealed

Located in eastern Kansas, JCW serves more than 130,000 customers and is responsible for maintaining and operating 2,100 miles of sewer lines. The system contains an estimated 5,300 stream crossings, which are at-risk assets because of their exposure to stream-forming processes that are

management program, GBA Master Series. It is then analyzed, and all assets are assigned a condition rating and risk level.

Damage caused by erosion and natural water body movements are typically gradual, but can be accelerated during major wet-weather events. Through its inspections, JCW noted that over time, some streams may move up or down, or from side to side.

This shift is most often caused



by stream straightening or channelization, floodplain encroachments, and increased impervious areas in the watershed, all common in the thriving Johnson County area.

“We found that most of the significant stream changes have occurred in high-growth areas where, when the sewers were first laid, the streams were very small, more like little country creeks,” says Witt. “As the population grew and buildings went up, the amount of hard, impervious surface grew, too. All the runoff from the streets and the roofs began hitting those small streams, creating a lot more flow. The streams had to find a way to dissipate that energy, so they looked for ways to widen and cut through.”

### Working with nature

Typically, JCW repaired the stream-crossing lines using traditional techniques such as riprap or extension of concrete encasements to divert flows. But while calculations for the design of armoring methods allow for a rock or barrier size that cannot be dislodged during a storm event, these armoring techniques can actually block a stream’s natural movement and changes. In some cases, armoring had the potential to create more destabilization and increase the risk to the sewer at the repair site, as well as upstream and downstream.

To avoid creating problems from installation of solutions that might not be the best fit in the long run, JCW brought GBA Architects and Engineers onboard to assist in developing a stream characterization approach. This would help JCW understand the area’s current watersheds and how growth and development might change them.

In addition to watershed analysis, GBA provided localized stream reach surveys, because site-specific influences play an important role in determining the most appropriate repair approach for long-term sustainability. “People often underestimate the power of water and its erosive forces,” says Paul D. Miller, senior engineer and stream specialist with GBA. “You have to respect it and try to understand how it moves across your landscape in order to come up with solutions



**“It is important get out and be proactive and look in parts of your system that you don’t always get to during regular routine maintenance. That includes undeveloped areas — those places where we may never get a call and will only discover a problem after it becomes serious.”**

Aaron Witt

that work with nature’s flow and not against it.” Under these principles, the design for a repair takes into account the dynamics of the environment and the stream’s stability rating: dimensions, sediment load, pattern and profile.

### Scientific tools

This approach helps JWC develop more sustainable solutions that will need less maintenance and reduce the potential for infiltration and inflow issues in the future. The approach can use scientific specialties such as stream geomorphology, which analyzes

water and earth forces that form stream channels, floodplains, terraces, drain patterns and sediment movement. The tool kit also includes hydrology studies and riparian plant taxonomy to help JCW develop greener solutions.

JCW identified more than 30 crossings that required repair, either by JCW staff or through design and construction contracts. Whenever possible, the utility does the repairs in-house. Rehabilitation methods have evolved from traditional armoring to include:

- Blended material armoring with a layered design

**Johnson County’s approach often rejects conventional solutions in favor of innovative practices that will lead to longer-lasting repairs.**

- Installation of specialized stream grade control revetments over sewers.
- Realignment of segments of sewers to mitigate natural channel movement.
- Natural plantings.

“When we are dealing with an exposed line in a degraded stream, we take into account the water body’s present condition, the watershed characteristics and what the future trend of that stream will be — how it will want to stabilize itself,” says Miller. “Only when we gain knowledge of a stream’s tendencies can we design a long-term solution that will fit with nature and protect the asset.”

### Acting natural

One of the most common designs that Miller and his Stream Team have devised is a twist on traditional armoring. In the case of pipelines or other fixed utilities, traditional rock armoring doesn’t provide a long-term stable solution for the stream, especially during a storm event, as the water’s flow will keep shearing off the rock, creating a maintenance issue.

To combat this, the design team devised a layering technique to create a structure that mimics the natural streambed. At the bottom, large armoring rock is used, but unlike standard riprap, it isn’t uniform in size. The larger boulders are specifically selected for their shape and size based upon the stream stability parameters established during the review process.

Then, a blend of other materials including rocks of varying gradations, pebbles and fine sand is layered to the desired height around and on top of the foundation. “Instead of a design that has numerous voids that are typical of traditional armoring, we layer and blend materials to create an area where there is soil and fines in between,” Miller says. “The natural system can take over and stabilize the entire area.”

Vegetation-based solutions are highly desirable but are best suited



for areas with a relatively healthy, continuous and unobstructed riparian corridor. Although an excellent solution that also offers environmental beautification, some plantings — like large trees or shrubs — cannot be placed too close to wastewater structures, as that could lead to root intrusion. This limits the number of projects where a vegetation-based solution can be used.

“Our approach has truly changed from the way it was in the past,” Witt says. “Before, we just tried to pack everything in hard so it protected us. Now we try to understand the stream. Plus, it’s not very pretty when you use a high-degree, hard-armor solution in a natural setting. This approach has allowed us to look at other options, such as natural stabilization of stream banks or crossings using erosion control mats and native plantings that are more visually pleasing and just as effective, if not more so.”

These new approaches will also offer Johnson County a longer life-cycle and return on investment for its rehabilitation projects. It also helps prevent a shifting of one asset’s issues downstream to another asset. “What can happen quite often is that when you try to armor one stream bank to protect an exposed pipe or manhole, the stream will adjust to the changes imposed by the new barrier you’ve installed,” says Miller. “Then it will transfer the problem you just experienced to another location, possibly affecting other infrastructure either upstream or downstream within a relatively short time.”

GBA has observed that clients who design solutions using the stream morphology approach cre-

ate rehabilitations that last longer with less maintenance costs and with lower impact on property owners.

#### Always vigilant

The utility conducts ongoing observation of repaired stream crossings and rehabilitation measures during its regular inspections. JCW has also launched an asset management program to lower the risk of system failures throughout its sewer system — not just at stream crossings.

By surveying the entire system on a consistent basis, JCW can be confident that nothing has been overlooked. “It is important to get out and be proactive and look in parts of your system that you don’t always get to during regular routine maintenance,” Witt says. “That includes undeveloped areas — those places where we may never get a call and will only discover a problem after it becomes serious.”

With this attitude and methodology, JCW has minimized damage and realized cost savings. But for Witt, the main objectives have always been the same: Protect the system, protect the customers, and protect the environment. That’s an approach that could serve as an excellent model for wastewater utilities around the nation. ♦

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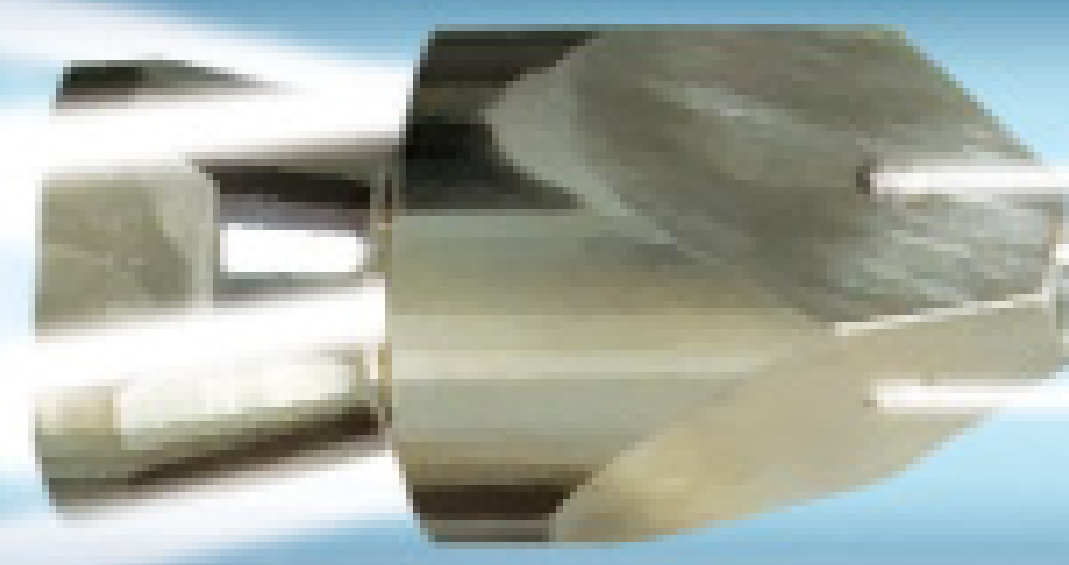
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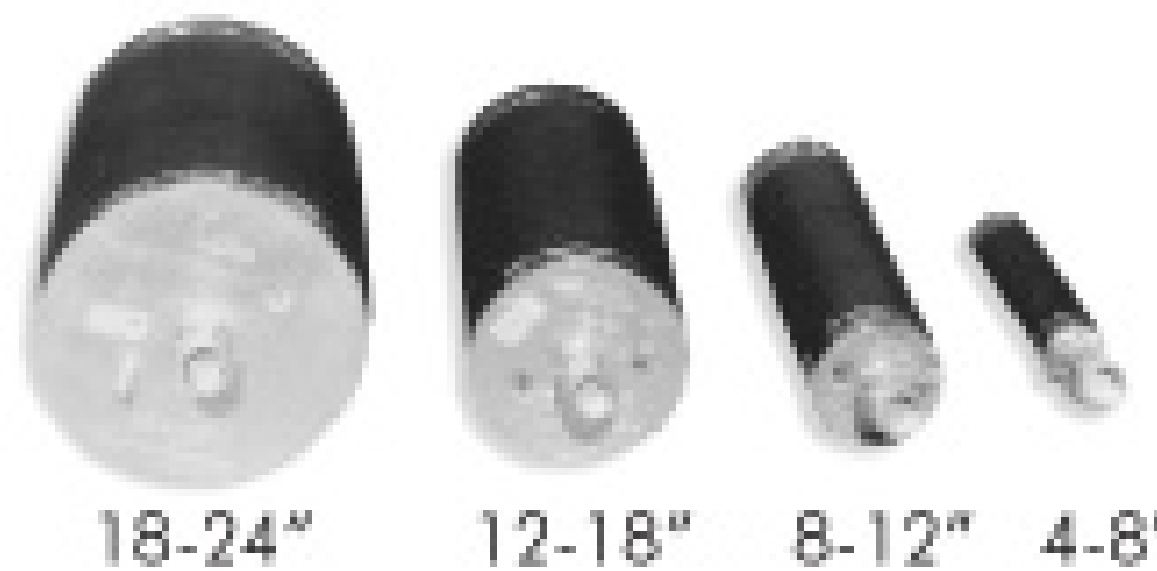
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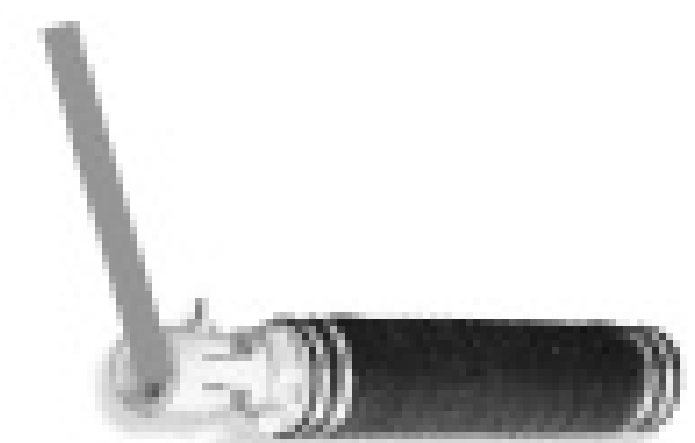
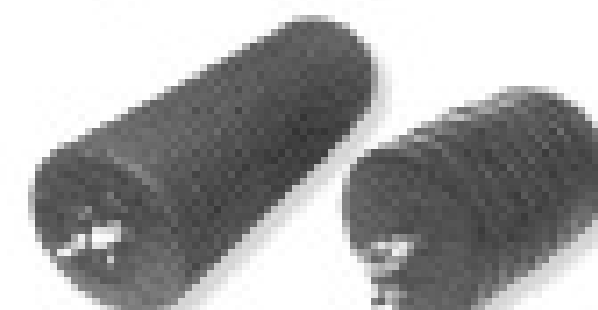
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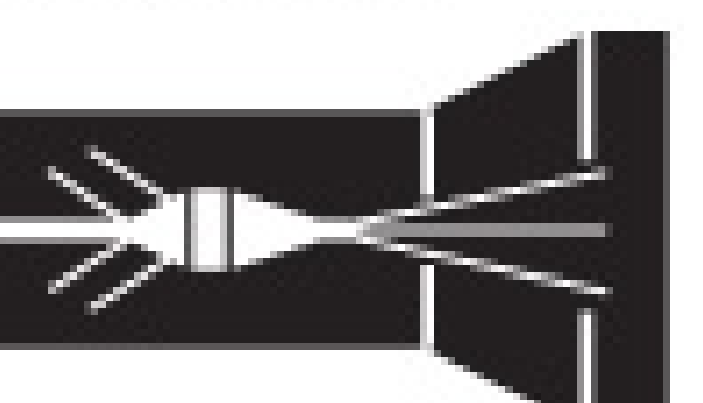
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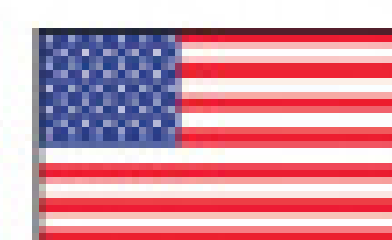
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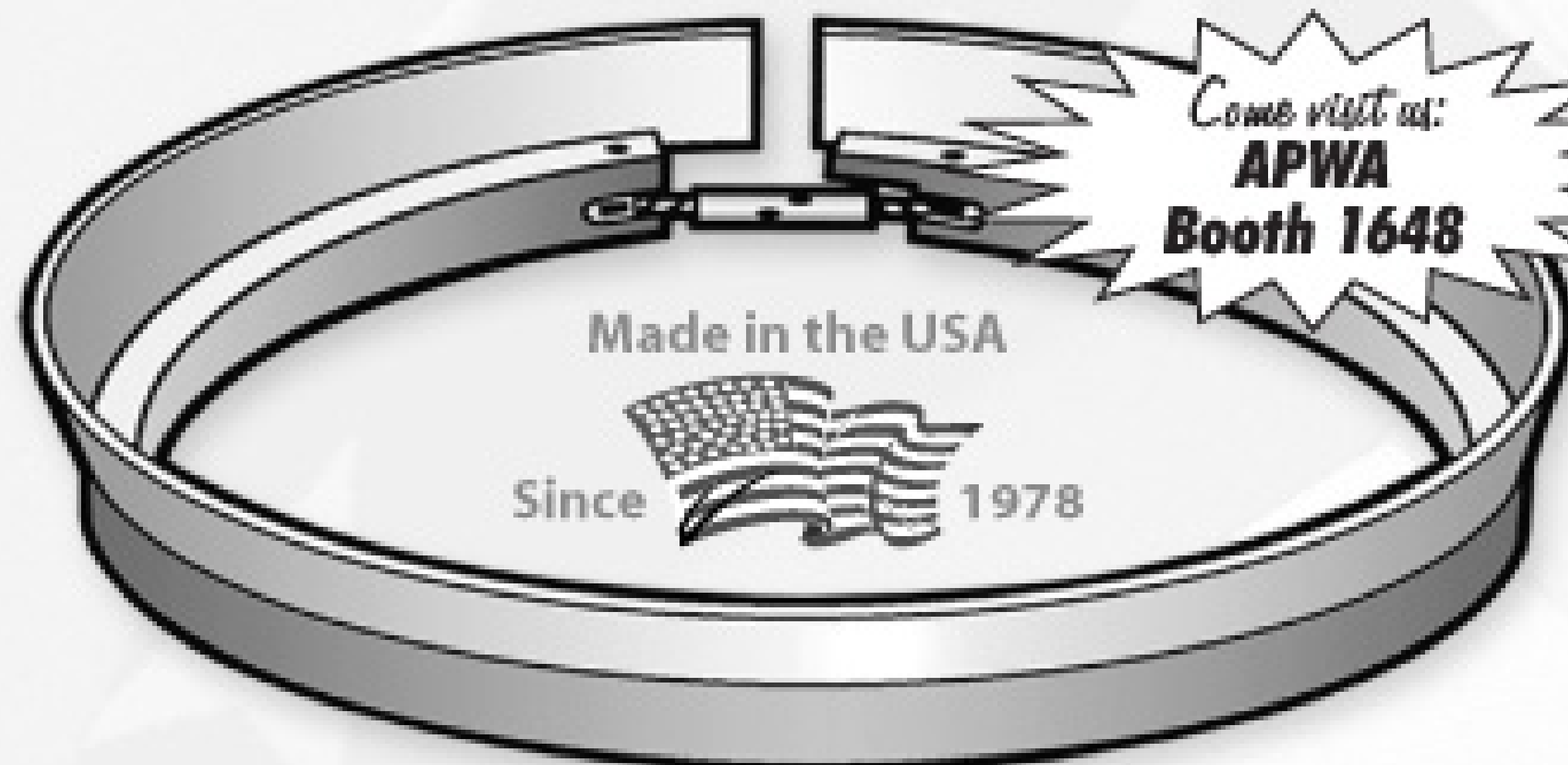


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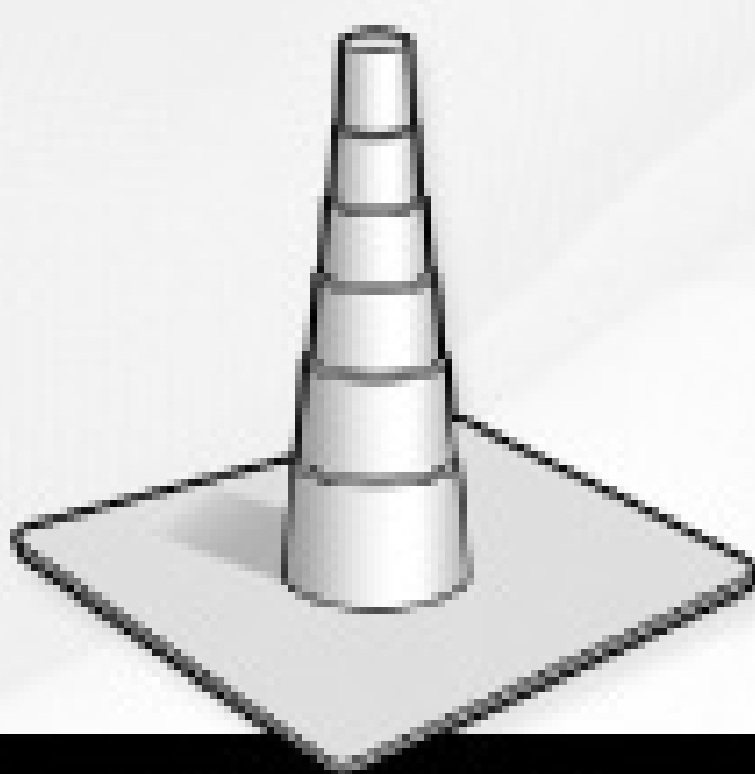


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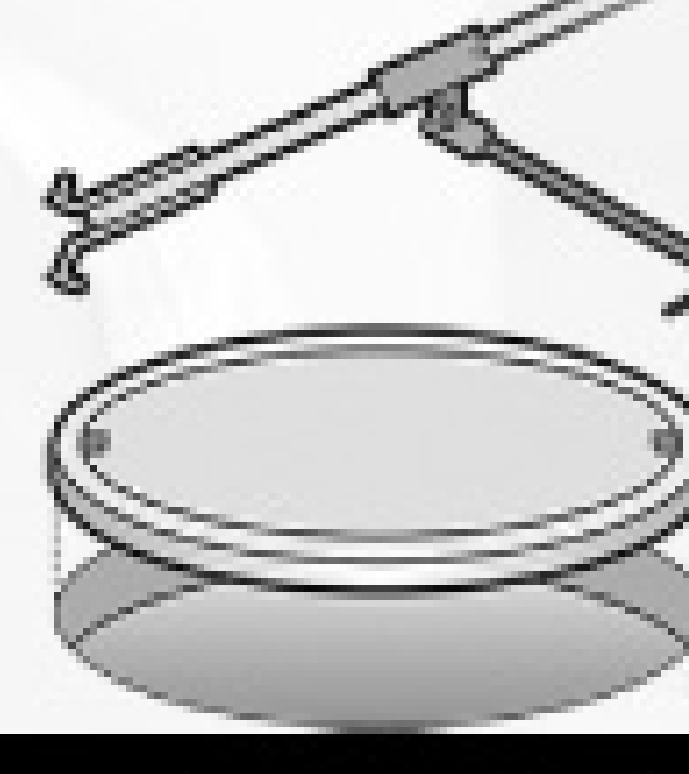
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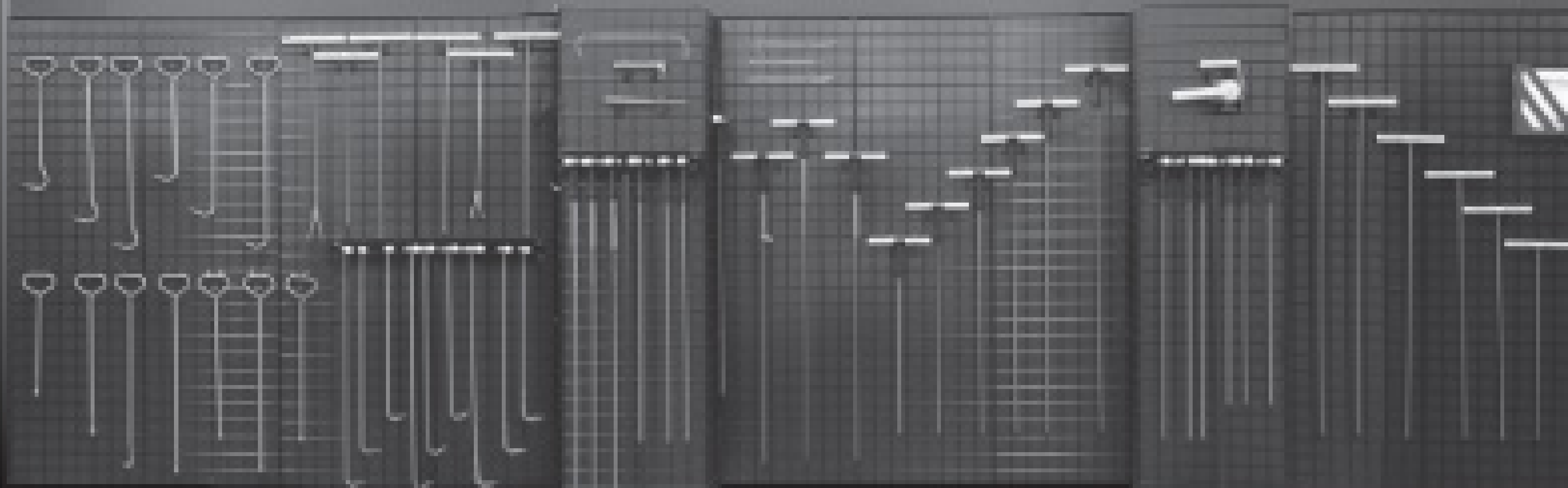
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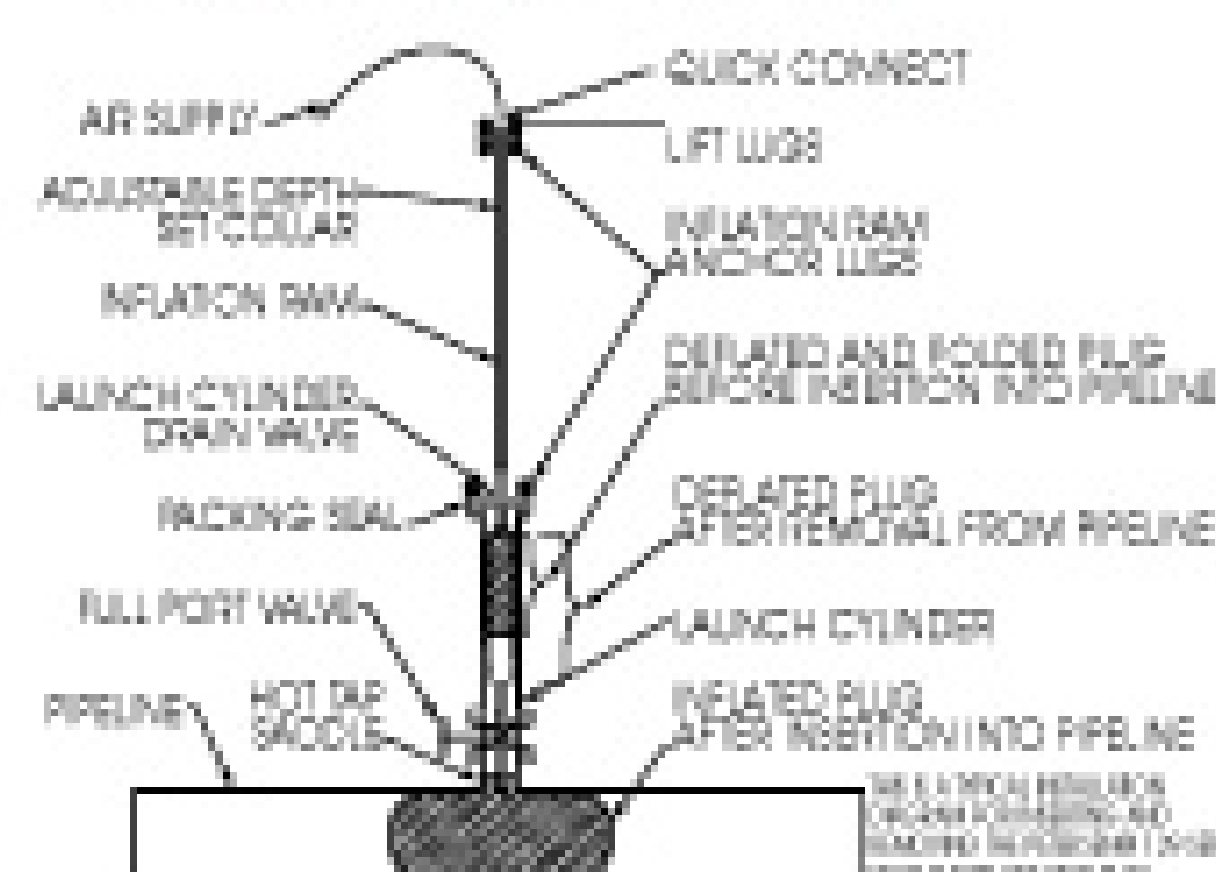
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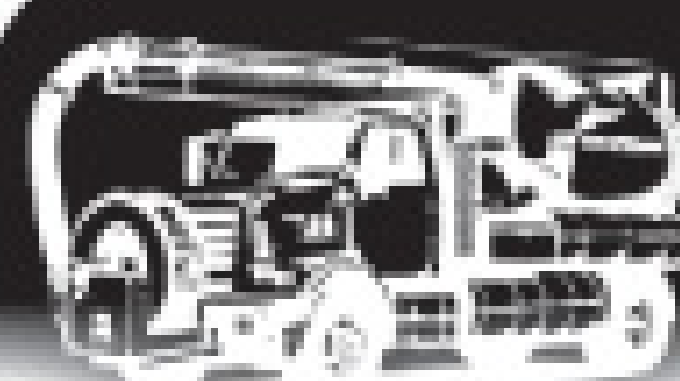
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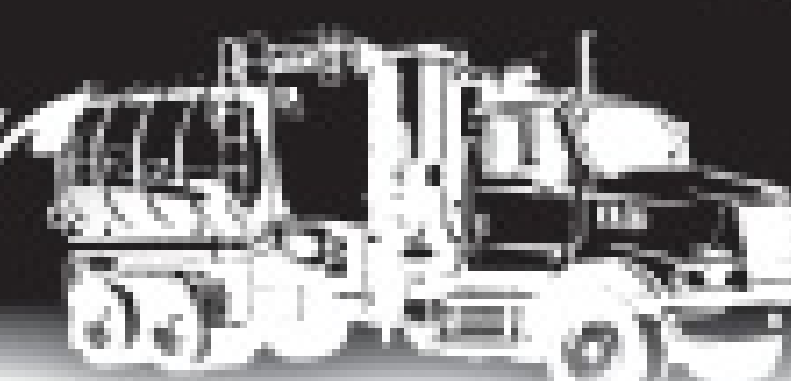
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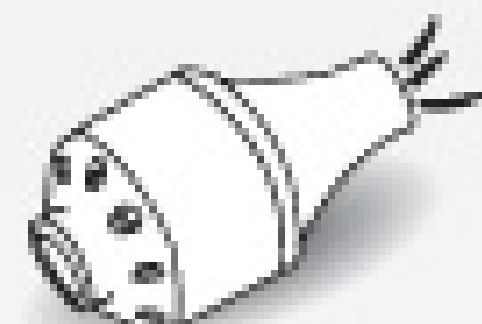


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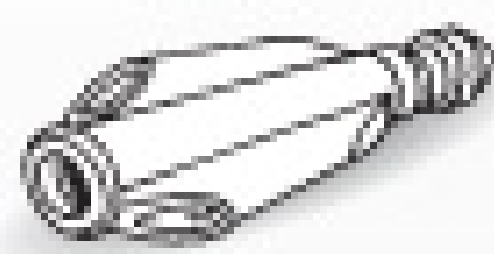
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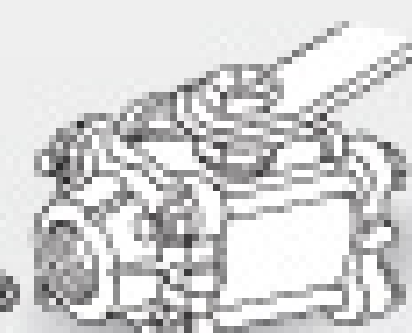
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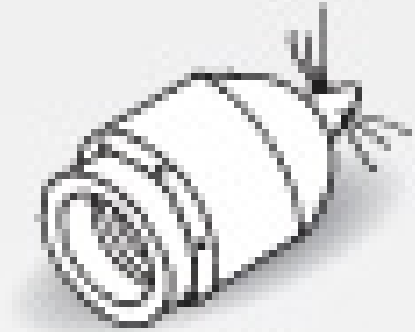
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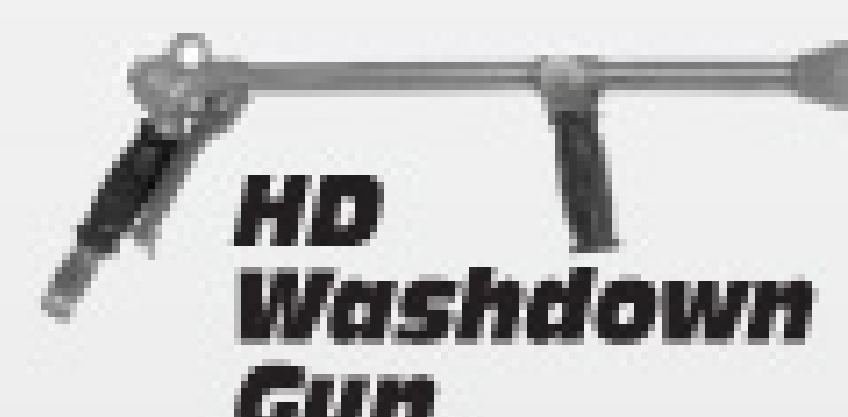
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## FOCUS: WATER

# BRINGING IT BACK

An aggressive program of leak detection and repair helps a small irrigation district gain control of non-revenue water and establish a strong financial footing

By *Darin Burt*

**W**hen maintenance crews popped the lid to inspect one of the 12 pumping stations for the Pasadena Park Irrigation District #17 in Spokane Valley, Wash., the water level was at the top of the valve, and there was a dead mouse floating on the surface.

District manager Kathleen Small knew there were concerns with the aging water system, but no one

knew the depth of issues about to be uncovered.

Formed in 1910 to irrigate local farmland, the district has grown to a 95 percent residential customer base. It is one of 18 water purveyors that serve incorporated and unincorporated areas throughout the Spokane Valley.

By 1999, when Small joined the district, deferred maintenance had wreaked havoc on the entire system. The majority of the water mains had been installed before 1950, and an overworked and underfunded three-person staff had done little to maintain them. In addition, there were no accurate records on more than 1,500 connections established by 1999. The result? Water loss. How much? Nobody was quite sure.

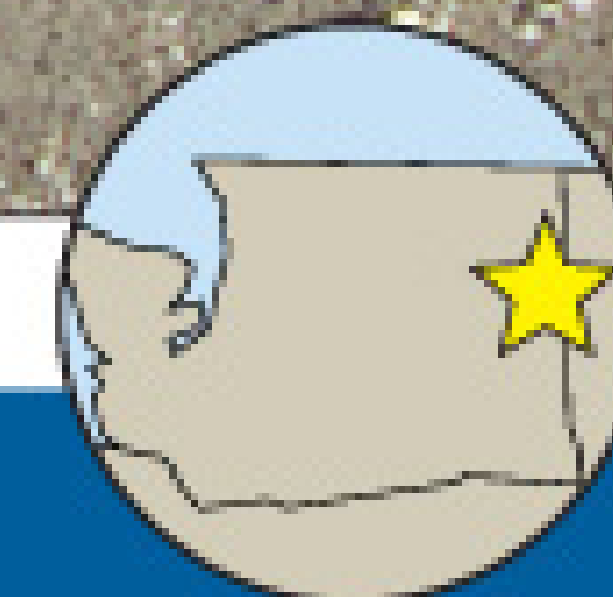
Small responded by leading her team in a long-term initiative to identify the sources of water loss and make comprehensive repairs to the system. As a result, water losses that once exceeded 50 percent have been reduced to less than 10 percent. Expenses are down, revenue has grown, and the district is well positioned for the future.



**Cast iron lead-joint pipe proved to be the biggest culprit in Pasadena Park's leakage problem. The cast iron was intact, but the lead joints had deteriorated.**



Contractors from Eller Corp. replace a cast iron lead-joint pipe with C900 PVC, which resists cathodic corrosion in the area's highly acidic soils. To economize, the new pipe was installed concurrently with a city sewer repair project. (Photography by Darin Burt)



### Small system, big challenge

The Pasadena Park Irrigation District #17 has nearly 5,600 customer connections and 23.7 miles of water main. Its system also includes four wells, eight booster pump stations, six reservoirs, and 4 million gallons of storage.

Before joining the district, Small had worked for the Moab Irrigation District in Newman Lake, Wash., starting in 1979 as a meter reader/installer and working up the ranks to manager. Her first objective at Pasadena Park was to figure out how to increase pumping capacity to supply customer needs. Small found that five of the 12 pumping and booster stations were held together with "baling wire and duct tape" and were either non-operational or functioning inefficiently.

To her surprise, she also discovered that there had been no up-to-

### PROFILE:

**Pasadena Park Irrigation District #17, Spokane Valley, Wash.**

**FOUNDED:**  
1910

**CONNECTIONS:**  
5,600

**SERVICE AREA:**  
10 square miles

**INFRASTRUCTURE:**  
23.7 miles of water main,  
4 wells, 8 booster pump  
stations, 6 reservoirs

**STAFF:**  
5

**ANNUAL BUDGET:**  
\$1.6 million

**WEB SITE:**  
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date water audit — only manual water audits that were highly inaccurate. The billing system was so untrustworthy that the secretary at the time was keeping accounts by hand as well as with the computer software because she didn't trust the technology.

The board ordered Small to get that billing system in order as soon as possible. By the first of the year in 2000, a new billing system was up and running. When the data was collected for 2000, it showed a striking difference between water pumped and water sold. Because that was the first year with

accurate data, Small decided to look at things for one more year before acting.

By the end of 2002, records showed the district had lost nearly 45 percent of water pumped during summer, and lost over 75 gallons for every 100 gallons pumped during winter. Small and her crew had a mystery to solve: Where was the water going? The board wanted physical proof rather than just numbers. Small took it personally.

She went to the office at 11 p.m. in the middle of November, when water use would be minimal, and watched the reservoirs. "I

confirmed 80 percent of what was happening just by watching and recording the reservoirs' levels," she recalls.

"I understood the board's concern, because we were telling them there was a huge water loss and there was going to be a major expenditure associated with it — they needed proof. It put my mind at ease too — I knew exactly where that water was going."

### Step by step

The next step was to look over a map of all the pipes in Tier-One, the service area at the lowest eleva-

tion in the district. Tier-One is also the oldest service area and identified as having the greatest water loss. By determining the age of the pipes from the 1940s to the present, potential problem areas based on age and/or type of main were identified. The map showed that since 1960 the district had put in almost no new pipes.

**"Funding is tight in small water districts.**

**The tendency is that if something isn't broken, you don't fix it ... With this kind of a water loss it had to be done, but it was a horrible shock to the board."**

**Kathleen Small**

Coming from another rural water system, Small understood the situation. "Funding is tight in small water districts," she says. "The tendency is that if something isn't broken, you don't fix it." But fixing it was the only solution, and the price was estimated at \$5 million.

"With this kind of a water loss it had to be done, but it was a horri-

**Team members at Pasadena Park Irrigation District #17 include, from left, Bruce Davidson, Rusty Widman, manager Kathy Small, J.L. Edwards, Rick Hartman and Deb Lambert.**



## TEAMWORK AND COMMUNICATION

The actions of small-system personnel often go unnoticed — unless there is a problem. In 2008, Kathleen Small's successful efforts to rehabilitate the Pasadena Park Irrigation District water system earned her Operator of the Year recognition from the Washington State Department of Health.

In addition, in celebration of Drinking Water Week 2009, the department's Office of Drinking Water recognized the district with its annual Going Above and Beyond Award. Small was thrilled with the accolades, but shared the credit with her staff and the district's water board. "One of the biggest frustrations the board had in the past was that they didn't know what was going on. They just weren't informed," Small says.

"You can't expect the board to make good decisions if they don't have all the information. It's my job to make sure they have all the information they need. I can give my recommendations, and they're going to think about that, but I have to give them all the information, whether I like it or not. Sometimes managers want to just present one side, and that's not fair. The board needs all of it.

"Board members are not experts, and they don't fully understand the system, but if you give them all the information, these people are very intelligent, and they will use you as a resource. They will use their engineer, and they will make their decisions.

"There was gnashing of teeth and rending of clothes for the board and me at times. We were looking at a lot of money, raising rates and figuring out where we were going to start. I was really proud of the progress we were able to make."

A large part of keeping the board informed started in the field with system personnel keeping a daily work log. In turn, system personnel felt more a part of the process. At Monday staff meetings, the crew talks over what they're going to do and how they will interact to accomplish tasks.

"We all have to work together," Small says. "It's more like a family. In a lot of instances, the boss is the boss and the boss has the final say. Here, I'm the team leader. The team brings ideas to me because they know that I value their input. Everyone involved takes tremendous pride in being part of the solution."





Rusty Widman replaces an outdated water meter with a high-tech Dialog 3G-DS PD wireless water meter from Master Meter.



A worker from Eller Corp. finishes installing a service line for a new home using polyethylene pipe and tracer wire. The junction is a galvanized nipple with a brass cap that resists corrosion caused by acid soil. Mike Dschaak (right), an inspector from Simpson Engineering Inc. checks the completed work.

ble shock to the board," Small says. "What you have are people who are very knowledgeable and wise, but very, very conservative. When you present them with that kind of money, the initial reaction is, 'Wow! What? Why? How?' When I came in 1999, their budget was \$600,000. They didn't know how they were going to cover the cost. It was like trying to shove a pig through a snake." The board agreed to a three-step plan.

**Step 1:** Fix the worst first. With the help of the eastern region staff of the state Department of Health, Drinking Water Division, the district received loans with rates as low as 1.5 percent from the Drinking Water State Revolving Fund Program to repair the worst of the system immediately.

**Step 2:** Pay off the loans. The board raised rates to support repayment.

**Step 3:** End deferred maintenance. The rate increases included money for yearly infrastructure upkeep and replacement of old meters.

### Creative leak detection

The first third of the project involved replacing \$2.3 million worth of pipe. To economize and make the most of the funds, new pipe was to be installed concurrently with a city sewer repair project.

Before pipe could be laid, though, the entire district would have to be tested for leaks. The district hired the Spokane branch of American Leak Detection to search for leaks during winter when usage was lower and losses were easier to pinpoint. Winter is also a slower time for the district field maintenance crew, which

**"Leaks were so numerous in some stretches of pipe that we just had to take a leap of faith and get it out of the ground as quickly as possible. In places where we pulled the pipe out, it had been leaking for so long that the soil had rotted. Have you ever smelled a swamp?"**

**Kathleen Small**

Small increased from one worker to four so that they could work with the leak detection specialists.

Locating pipes was a challenge. The mapping was deficient, and much of it consisted of maps hand-drawn by the previous manager. The map filing system was literally a large pile on the floor.

Crews contracted and worked with American Leak Detection Spokane who used Fluid Conservation Systems' correlation gear to search Tier-One for leaks. The majority of the leaks were found using this method, but visual identification was also helpful and that's where Small's "farm girl"

thinking came into play.

"I'm practical and look for signs," she says. "I told the guys that one of the quickest ways to spot a big leak is to look at the trees as you drive down the road. If you see a tree that is disproportionately tall, it's a likely spot for a leak because the tree may have a direct tap into a leak area. In one instance

we found a slow-growing locust tree that was as big around as a Volkswagen."

To make matters worse, river rock on the valley floor was so porous that water leaked for years before it started to surface. One customer reported that he had been hearing running water for 20 years.

Cast iron lead-joint pipe proved to be the biggest culprit. The cast iron was intact, but the lead joints had deteriorated, creating leaks at nearly every connection. "We started referring to it as underground soaker hose," Small says. "Leaks were so numerous in some stretches of pipe that we just had to take a

leap of faith and get it out of the ground as quickly as possible. In places where we pulled the pipe out, it had been leaking for so long that the soil had rotted. Have you ever smelled a swamp?"

### Taking control

Over three years, the district worked with a local contractor, Eller Corp. of Newman Lake, Wash., replacing cast iron lead-joint pipe with C900 PVC, which would resist cathodic corrosion in the district's highly acidic soils. In the process, crews found some service connections that had never been metered. The district had evolved from a rural community, and some properties had both a meter for the home and an irrigation meter.

In addition, the majority of the water meters had not been changed out in the last 40 years, and many were inaccurate or not working. When Small started with the district, there were 240 dead meters. "Basically nobody was keeping an eye on them," she recalls.

The district replaced broken and outdated meters with Dialog 3G-DS PD water meters from Master Meter. Besides being more accurate, the wireless AMR meters allowed field technicians to detect leaks in the homes.

"You can do a graph on water



usage right from the truck," says field technician Rusty Widman. "We even showed one of the board members that he had a leak and was losing seven gallons an hour."

Crews also discovered that the existing system had a lack of valves, as well as valves that they didn't know existed. "The valves that we didn't know about are really

tive feedback, but we expected an onslaught and we didn't get it," Small says. "Most customers didn't even know the problems existed. I can point to one account that got about \$3,500 worth of free water over a 10 year period."

Looking back, district staff estimated the annual value water loss at \$55,000, plus an estimated yearly

**"We only have a certain amount of water rights, and Washington State isn't granting any more. If we hadn't recaptured this, our future for growth would have been minimal."**

**Kathleen Small**

important in order to do efficient shut downs," Small says.

#### **Forward progress**

"What you have to remember is that we had more than one problem," Small observes. "We had facilities in disrepair, leaky pipes, dead meters, and under-performing personnel. You cannot just do it all at once. You have to take it a step at a time. From a management standpoint, I felt like I had a squirt gun at a forest fire."

But by 2004, the district's actions were paying off. That year, leakage was down to 37 percent of the 2002 loss. Continuing efforts have reduced water loss to less than 10 percent. The district has now replaced nine of its 23.7 miles of water mains, and plans to replace about three more miles by the end of 2010.

Rates have been raised enough to help repay the loans and build reserves for future maintenance. But with accurate billing in place, there was little for customers to complain about. "When we started to raise rates, there was some nega-

cost of \$20,000 for pumping. By plugging the leaks and increasing the efficiency of the system, Small estimated the district could save \$75,000 a year.

As the district now sells to some 400 additional homes, they are gaining \$145,000 per year, which is paying for the majority of the loans. And the district still has water in reserve for future growth.

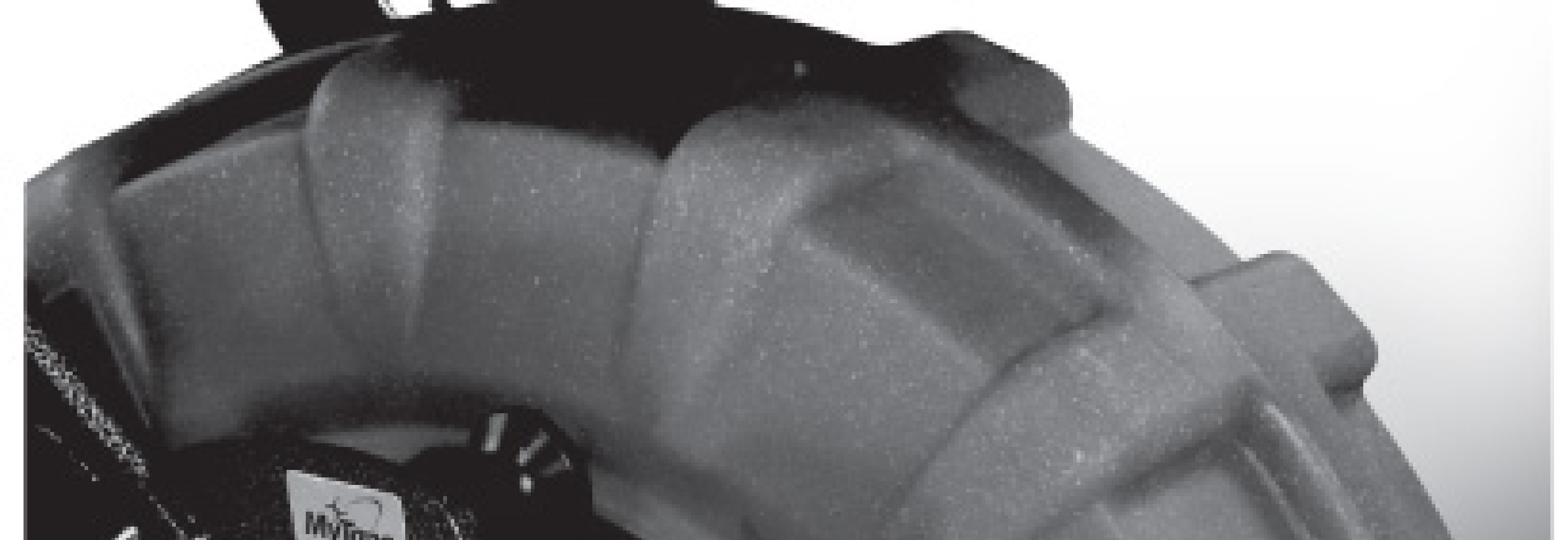
"We only have a certain amount of water rights, and Washington State isn't granting any more," Small says. "If we hadn't recaptured this, our future for growth would have been minimal." As it stands, the district has a healthy distribution system and a sound business foundation as it looks to a new decade of service. ♦

#### **MORE INFO:**

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Professional diver Shaune Rogers approaches a blocked culvert with a HydroSurge nozzle. (Photography by Cooper Hong Inc.)

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# DEEP CLEANING

Professional divers, a vacuum truck, and special adjustable cleaning nozzle team up to remove tons of debris from a South Florida city's canal culvert system

*By Frank Ligori*

Clogged with tons of debris accumulated during more than 10 years of inattention, a network of large concrete box culverts posed a threat of flooding for the drainage canals connected throughout the city of Lauderdale Lakes, Fla.

Thanks to an innovative solution that matched up commercial divers with an advanced-technology vacuum truck and a versatile new sewer-cleaning nozzle, the city's culverts are debris-free and the

canals are no longer in danger of overflowing.

Shenandoah Construction of Pompano Beach, specializing in storm and sanitary sewer maintenance and trenchless construction, solved the city's problem with a combination of ingenuity, skill and technology. The company faced daunting conditions — nearly 20 concrete box culverts from 24 inches in diameter to 6 feet tall by 10 feet wide and up to 150 feet long, all mostly clogged with debris

and full of water. The culverts run beneath roads throughout the city, connecting a series of drainage canals that collect and divert surface water.

"Normally, you'd blow debris out of a culvert from one end and pick it up with an excavator at the other end," says Danny DiMura, vice president of Shenandoah Construction. "The problem is moving the excavator and trucks around in locations where you don't have much room to operate.



It's time-consuming and not very productive. This seemed like a good place to use our dive team along with a vacuum truck. We were very pleased with the results."

### Tons of debris

Shenandoah used a new Vactor 2100 Plus fan-driven vacuum truck for the project as part of an extended field test of the truck arranged by Environmental Products of Florida, a local Vactor Manufacturing dealer.

The truck, introduced in early 2009, includes increased vacuum performance, along with improvements in operator comfort and control, air routing and filtration efficiency, and fuel efficiency. Internal monitoring systems enable the operator to monitor and troubleshoot flow and pressure, blower temperature and oil level, drive system idle and open vacuum relief.

For the Lauderdale Lakes job, the truck was equipped with the HydroSurge high-performance cleaning nozzle from Vactor. It uses an adjustable nozzle plate and waterjet inserts with adjustable angles to provide enhanced traction and cleaning performance for handling difficult blockages.

"We talked to Shenandoah about

**"Normally, you'd blow debris out of a culvert from one end and pick it up with an excavator at the other end. The problem is moving the excavator and trucks around in locations where you don't have much room to operate. This seemed like a good place to use our dive team along with a vacuum truck. We were very pleased with the results."**

Danny DiMura

finding a good project as a test for the new Vactor truck and nozzle," says Paul Hart, south Florida territory manager for Environmental Products. "The Lauderdale Lakes project combined some interesting elements and challenges, and the 2100 Plus proved it could easily handle the job. As we expected, the HydroSurge nozzle performed effectively underwater."

Shenandoah's four-man dive team played an integral role in the project, manually guiding the nozzle underwater to clear the culverts. "We entered the culvert at the opposite end from where the vacuum truck was positioned," says Shaune Rogers, diving superintendent.

"I hand-carried the nozzle and took it right underwater into the material in the culverts. I was using a diving helmet with two-way radio

communication to the vacuum truck driver operating the controls. I'd tell him to turn it off or pull it up — basically just give him directions from right inside the culvert. I felt that hand-carrying the nozzle was very safe, and I found it was easy to move the material. It almost felt weightless."

Rogers emphasized that Shenandoah followed all OSHA safety standards for the dive, including using the required number of divers (three in this case) and a tender (or spotter). "We're the only vacuum truck operator in the area that uses divers," says Rogers, who trained for four years as a U.S. Navy diver before starting a commercial diving career 16 years ago.

### Efficient and safe

Rogers explains that the dive crews often use a short, plain PVC pipe attached to a 185-cfm compressor to vacuum material at one end of the pipe and discharge it from the other end. To clean the Lauderdale Lakes culverts, Shenandoah combined the compressor with the power of the vacuum truck.

DiMura and Rogers agree that the combination of the dive team, vacuum truck and improved nozzle was successful with respect to efficiency, productivity, safety and results. "I have to say, this was really a cool, interesting job," Rogers says.

During the six-week project, the crew cleaned nearly 20 culverts, including a 150-foot-long culvert that required seven days. The divers worked with up to 100 feet of vacuum hose. Rogers estimates that the crews removed more than 1,000 tons of material.

DiMura gave the Vactor 2100 Plus high marks. "It's a great all-

around sanitary sewer cleaning machine," he says "It has very good vacuum power, and it's well designed with a side-discharge port and good placement of the vacuum ports. We were very impressed with how quietly the truck operated." The test of the HydroSurge nozzle was so successful that Shenandoah will continue using it for all its heavy-duty sewer cleaning projects.

### Customized approaches

Shenandoah Construction has provided quality service in the trenchless industry for more than 30 years. The company operates a large fleet of cleaning trucks, seven inspection trucks (four with test and seal capability) and a variety of other mobile equipment. From locations in Pompano Beach, Port St. Lucie and Fort Myers, the company serves customers from Jacksonville to Key West.

The company provides a customized approach to each project it manages for clients, which include municipalities, county governments, property management companies and contractors. Its dive team handles underwater projects including dam repair and the placement of riprap in constructing breakwaters and other underwater walls. The Lauderdale Lakes project was the divers' first culvert-cleaning assignment.

"For more than 30 years, our focus has been to use the most up-to-date technologies and methods," says DiMura. "That's why we wanted to try the Vactor 2100 Plus and HydroSurge nozzle on a difficult and unusual project along with our dive team. It was a successful approach, and one that we'll use again in the future." ♦

Frank Ligor is a product manager with Vactor Mfg. based in Streator, Ill.



Vincent Farquharson (left) and Roscoe Graham supervise the feeding of the hose. The Vactor 2100 combination truck is on the left, and the Vactor 2100 Plus fan-driven vacuum truck is on the right.

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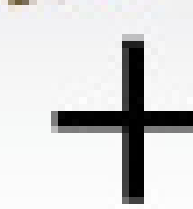
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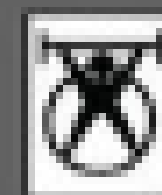
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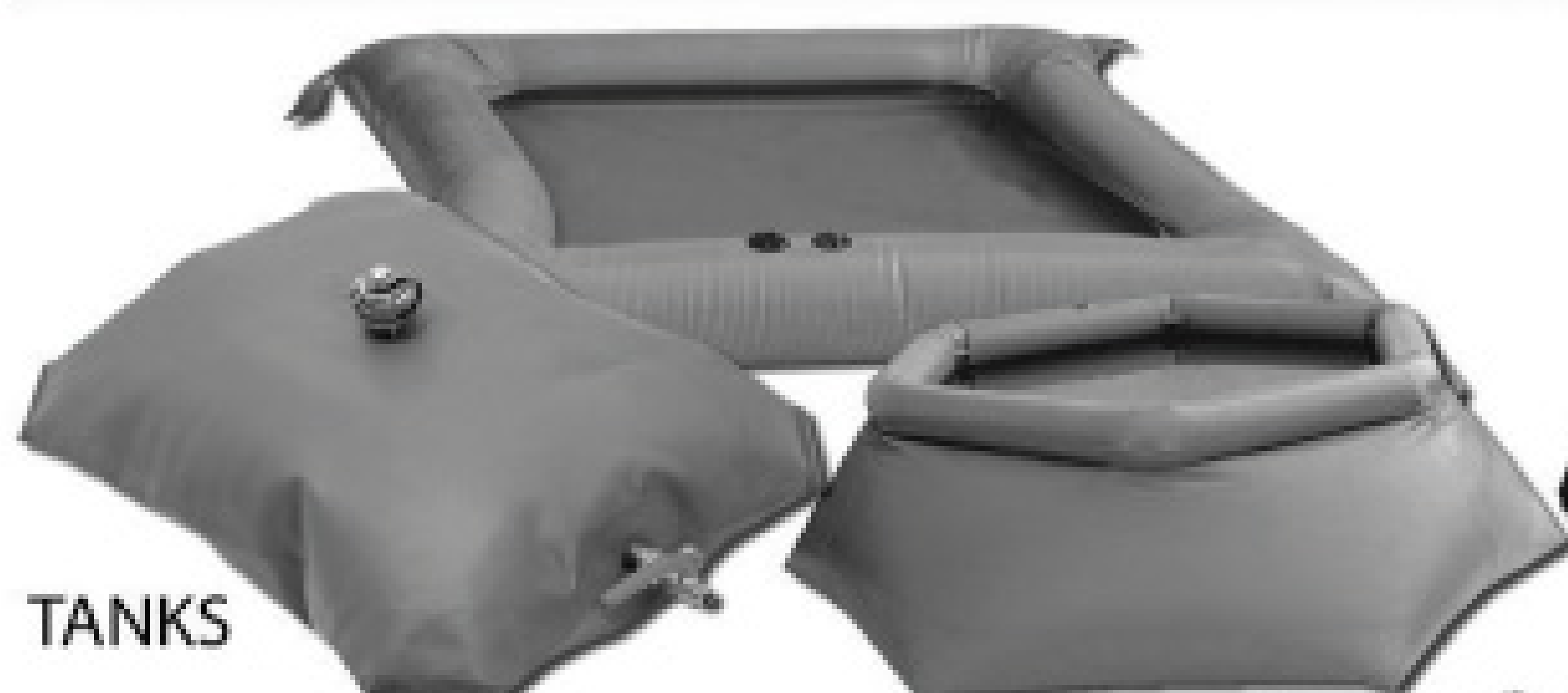
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# CORRALLING GREASE

Darrell Williams, utility worker II and Vactor truck operator, prepares to clean a sewer line in Houston. The city combines public information with aggressive inspection and cleaning to minimize problems caused by FOG. (Photography by John Everett)

The City of Houston taps the cowboy mythology in an information campaign that combines with repair and cleaning to help reduce stoppages

By Angus W. Stocking, L.S.

**I**n a city as “flat as a pancake,” 6,250 miles of sanitary sewer is a recipe for trouble. The main ingredient in that recipe is grease, says Bill Goloby, a project manager in the City of Houston (Texas) Wastewater Operations Branch.

“Grease causes stoppages, and stoppages cause sanitary sewer overflows,” he explains. “And now that SSOs are being regulated, cities all over the country are starting to look at grease buildup and ways to reduce it. We’re looking at it harder than most.”

Houston concentrated on weather-related SSOs because that was a reasonable place to start, according to supervising engineer Steven Gee, P.E. “We started with

the idea that our problems were weather-related, but we noticed that the quality of water wasn’t substantially affected by wet-weather overflows because they are diluted to the point that they’re not noticeable,” Gee adds. “Dry-weather SSOs were actually a bigger problem because of the higher concentration of pollutants.”

Concentrating on dry-weather SSOs led the city to focus on grease, because crews routinely reported that grease and rags caused the majority of stoppages.

Grease is a bigger *percentage* of the overall SSO problem in Houston. That’s because the majority of the sanitary sewer lines are concrete and are laid very flat. It’s also because there is relatively little root intrusion.

To reduce grease buildup and blockages, Houston has been replacing lines with an aggressive pipe bursting program. In addition, it has put significant effort into a public outreach campaign. As a result, SSOs per mile of line have been reduced considerably in recent years — except for problems caused by Hurricane Ike in 2008.

## To the streets

The grease-control initiatives first focused on dining establishments. “When the rules changed and cities all over the nation had to do more about SSOs, restaurants were an obvious place to start,” says Goloby. “We made good progress there with inspections and enforcement, but a lot of stoppages were still being caused by residents.”



**PROFILE:**  
City of  
Houston, Texas

**INCORPORATED:**  
1837

**POPULATION:**  
2.2 million

**EMPLOYEES:**  
651 (wastewater operations)

**INFRASTRUCTURE:**  
6,250 miles of sanitary sewer

**CAPITAL BUDGET:**  
\$213-220 million  
(wastewater operations)

**WEB SITE:**  
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After the restaurant association pointed out the residential issue, Goloby's branch decided to make residences a priority."

In a city the size of Houston, a public outreach program has to be quite large to make an impression, and it was important to make the most of the initial \$275,000 capital investment. The wastewater operations branch started in July 2005

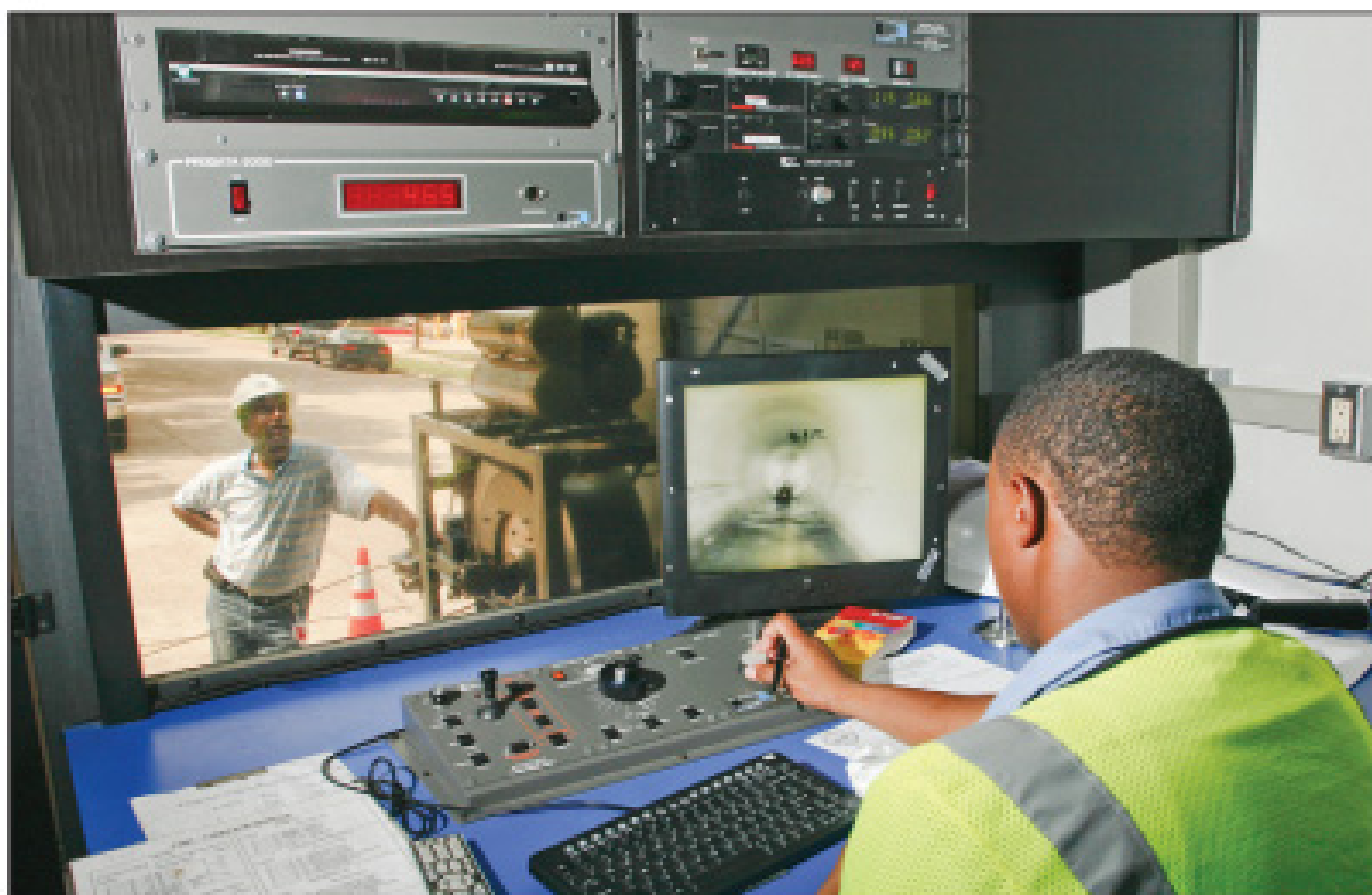
**"The costume is a great draw for kids at the events we go to. Kids don't pay much attention to the brochures, but the mascot gets them to listen. We want to reach the kids because they have an impact on parents, and because they're the future."**

**Bill Goloby**

with an initial printing of one million "Corral the Grease" pamphlets.

To brand the program, Houston consistently uses "Corral the Grease" as a metaphor, encouraging residents to capture grease in containers and dispose of it as solid waste, rather than putting it down drains. To accommodate the local population, the pamphlets are bilingual. Illustrated with graphic photos, they explain the effects of fats, oils and grease on lines, list acceptable containers for grease, and describe the relationship between SSOs and

**Darren Heard, utility worker II, drives a camera from CUES Inc. from inside a city inspection van. Outside the window is Allen Warren, section chief for the preventive maintenance group of the city's wastewater operations branch.**



water quality in local bayous and waterways.

"Luckily for us, the brochure was sized — by accident, not planning — to meet the water division's guidelines, so we were able to include it with one of their mailings," Goloby says. That mailing, in September 2005, distributed 430,000 copies. In 2006, another 460,000 were mailed directly to apartment complex residents, and the rest were distributed in other ways. The brochure distribution is considered effective, and large reprintings have since been ordered.

### **Bang for the buck**

The city targeted apartment complexes for two reasons. First, apartments concentrate grease-producing kitchens and bathrooms. Second, and less obvious, "A lot of people in apartment complexes don't get a water bill and don't care much about wastewater disposal, because they don't know about the consequences of blockages," Gee says. "But now, apartment owners and managers are getting involved."

By working with managers, making presentations to tenants, and distributing fat trapper kits, the department has seen measurable reduction in line blockages near apartment buildings. Other efforts aimed at apartments include newsletters, Web-based information, and special line-cleaning initiatives.

The fat trapper kits consist of a plastic container with custom logo, heatproof bags that fit the container,



**Don Matejek, utility worker I, deploys a crawler-mounted camera from RS Technical Services Inc. for a line inspection job.**

a universal lid for cans, a "Corral the Grease" pamphlet, and a refrigerator magnet. The city initially distributed 15,000 kits, which were effective but costly. "They required assembly and hand distribution," Gee says. "Basically, the logistics were hard, and the city council balked at the expense of the containers. Now we just go with lids."

The universal lids, which also have the "Corral the Grease" logo, fit most cans and turn them into a safe, heatproof storage device for cooking grease. After the grease cools, it can be disposed of in ordinary trash containers as solid waste.

Special efforts also have been made in particular residential neighborhoods. "Certain ethnic cuisines tend to use or produce more grease," Gee says. "Some of these neighborhoods are in areas with older sewer lines, which tend to block more easily." Bilingual mailings to these neighborhoods have been very effective.

## **FLATTEST CITY?**

There doesn't seem to be a definitive answer to the question: What's the flattest city in the United States? That's mainly due to difficulties defining "flat."

Houston is certainly in the running: The city is at sea level, and its highest elevation is just 90 feet. But Dallas, Kansas City, Phoenix, Charleston, New Orleans, and a number of other American cities also make the claim informally, and residents of Florida say the entire state qualifies.

### **Bringing it to life**

About \$5,000 of the original outreach budget went toward design and creation of a mascot costume. To fit the "Corral the Grease" concept, the mascot is a clean, cheerful planet Earth with a cowboy hat and a lasso.

"The costume is a great draw for kids at the events we go to," says Goloby. "Kids don't pay much attention to the brochures, but the



mascot gets them to listen. We want to reach the kids because they have an impact on parents, and because they're the future."

To enhance the costume, the city held a naming contest, and the winning entry was "Greasebuster." To go along with that, students in a high school for the arts produced a "Greasebuster" theme song, which is played when the mascot appears before certain groups.

Goloby says a news spot that ran on a local TV station was "the best thing TV has ever done for us." Billboards may be part of the mix in the future, and the department also hosts booths at fairs and other public events.

### Saving the pipes

Of course, public information alone won't do the job. Therefore, the city runs an aggressive maintenance program.

"In my experience, concrete pipe is always an issue, especially here," says Gee, "Temperatures in Houston are as high as anywhere, and so we get more sulfide deterioration. We don't have any slope. Our soils are typically high-plasticity clay and expansive, so we have a lot of problems due to our local topography.

"For example," Gee adds, "when there's no grade and a low flow,

**A mascot (played by Cornelius Hackett), is a vital part of the city's "Corral the Grease" program. It's a major draw for kids at public events.**

many of our smaller sewers rarely reach self-cleaning velocity, which means we have a lot of debris settling. I also don't have a feel for how inspections were being done when much of the concrete pipe was being laid. We have a lot of sag issues, which also causes settling and blockages."

Another consequence of flatness is the high number of pump stations; Houston has more than 440.

"I know we have more problems than other cities," Gee says. "When I mention our stoppage issues to other city managers, they're shocked."

Because concrete pipe leads to so many problems, replacement with HDPE is a high priority. Pipe bursting is the preferred technology. "My feeling is that Houston was instrumental in moving pipe bursting from the gas industry to the



sewer industry," says Gee. "I think that happened when sewers stopped being a dirty word and became an environmental issue."

Private sewer service companies perform all sliplining and pipe bursting of city sanitary sewers under annual or multi-year contracts. Some of the systems that have been used to pipe burst sew-

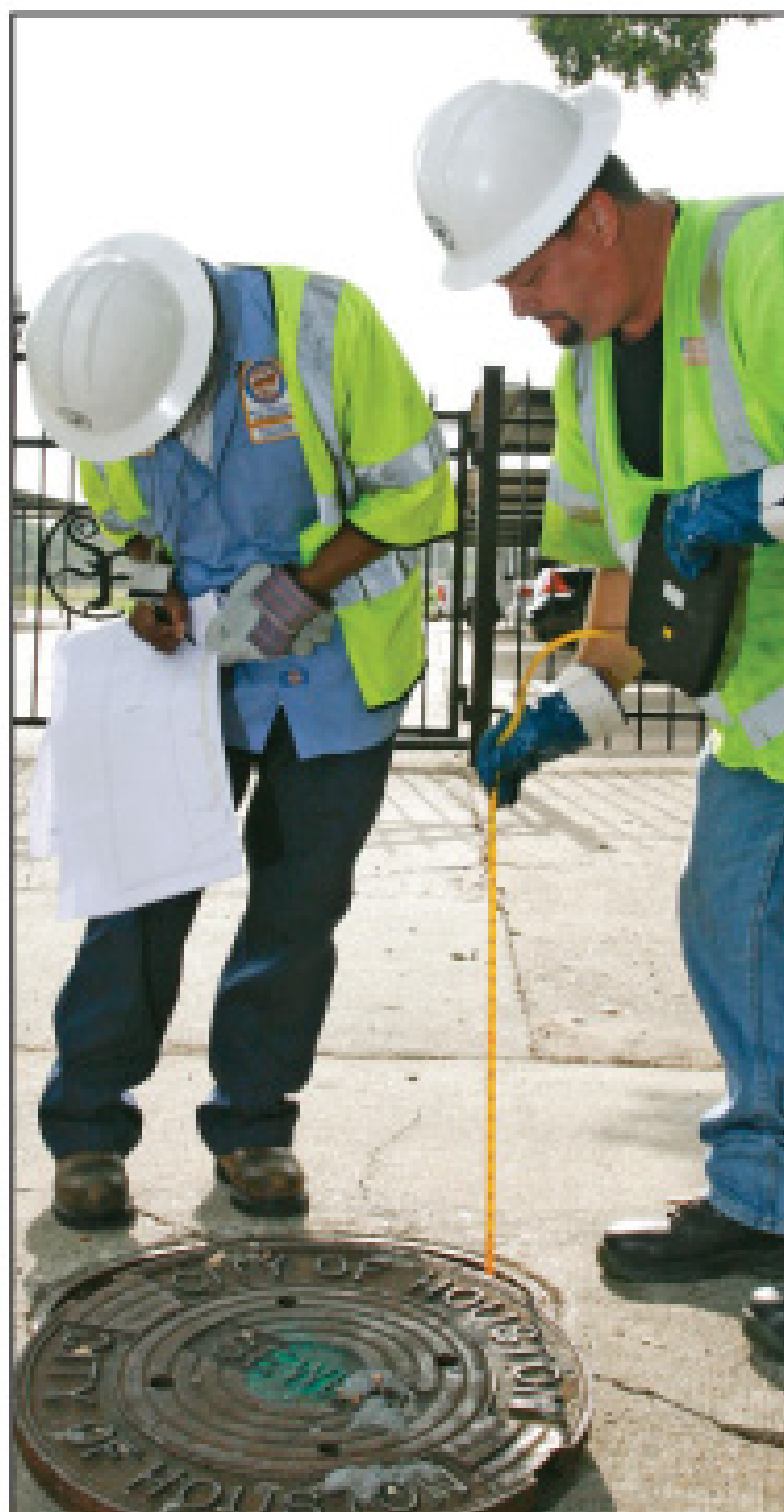
primarily on Volvo chassis.

To reduce future problems, the city has changed design guidelines to require more slope for new lines. Cleaning is still largely reactive. "It seems like we're always catching up with normal maintenance, and responding to customer complaints, but we are now doing preventive maintenance near apartment complexes, and we've also agreed to routinely clean lines adjacent to recurring SSOs," Gee says.

The city isn't using GIS to track and schedule maintenance, but is starting to track and map SSOs for reports, Gee says. "We track SSOs monthly, and we were diminishing the number per mile steadily, right up until Hurricane Ike. We started losing the battle again after that, and we're not sure why. We know a lot of our existing siphons stopped working, and it could also be debris buildup."

**"It seems like we're always catching up with normal maintenance, and responding to customer complaints, but we are now doing preventive maintenance near apartment complexes, and we've also agreed to routinely clean lines adjacent to recurring SSOs."**

Steven Gee, P.E.



**At left, Darren Heard and Don Matejek take measurements and record basic information on a manhole for the header of an inspection report. Right, Heard totes a camera to a manhole for an inspection.**

ers are Grundocrack (pneumatic) and Grundoburst (hydraulic/static) systems from TT Technologies Inc., and systems from HammerHead.

The city has used these systems to burst pipes made of reinforced and unreinforced concrete, clay, cast iron and other materials. The program now includes bursting of some 65,000 feet of 6- to 18-inch sewers each month.

### Keeping it clean

Along with rehabilitating pipe, Houston cleans significant footage annually. "We are committed by an agreement with the state to clean 2 million feet of sanitary sewers annually, but we're exceeding that," says Gee. "In recent years, we've been cleaning 3.5 to 4 million feet annually." That amount of cleaning requires a lot of dedicated equipment, and the wastewater operations branch operates 16 Vector combination trucks,

### Looking carefully

The city inspects systematically and is now archiving more than 100,000 videotapes. "We think we can do better with DVDs," says Gee. "They're easier to access and have better shelf lives." VCR tapes and DVDs receive a barcode, then are indexed in a TV tape database. The TV inspection information for each mainline (manhole to manhole) section, including the actual report, is available in the city's Infrastructure Management System (IMS) database.

The city once had permanent flow monitors installed but removed them when the costs of maintenance and monitoring seemed to outweigh benefits. Now, the city



occasionally hires contractors to gather data as needed.

On a daily basis, the city operates one to four high-cube TV inspection vans. These are equipped with CCTV equipment from CUES Inc. and cameras from RS Technical Services Inc. The cameras are single conductor, low-light units with auto focus and auto iris, pan and tilt, and 360-degree rotating head. The transporter is a motorized mount that is height adjustable for negotiating and inspecting 6- to 30-inch pipes. The video cable reels can hold up to 2,000 feet of armor-clad, single conductor cable. Typical mainline sections are 250 to 300 feet long, but crews can televise up to 900 feet in a single setup.

Houston has experimented with other methods of grease reduction without notable success. "We've experimented with solvents, and we had a contract to use a bacteria system," says Gee. "Something called a Bio-Sock was used to drip bacteria into the system. I think it had some limited success. The branch is now talking to vendors about bacteria, enzymes, and other FOG-removing products."

### Overcoming challenges

When it comes to sewer stoppages, Houston has not been blessed. Flat terrain, predominantly concrete pipe, and high temperatures cause chronic problems, and the occasional hurricane or tropical storm doesn't help. But with steady appeals to the public, consistent cleaning and rehabilitation of lines, and a willingness to consider different technologies, the city is slowly but surely winning the struggle. ♦

#### MORE INFO:

- 18** **CUES Inc.**  
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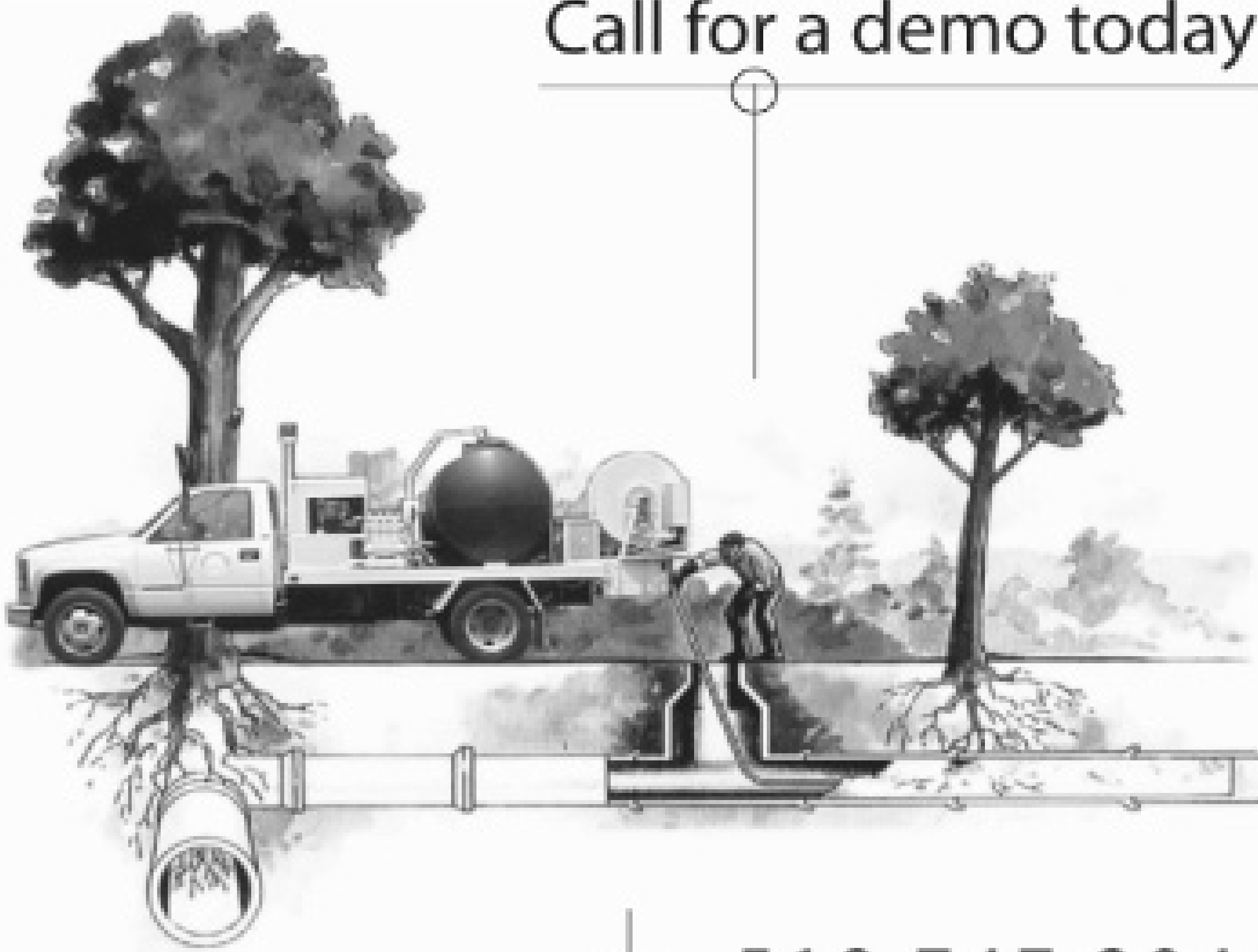




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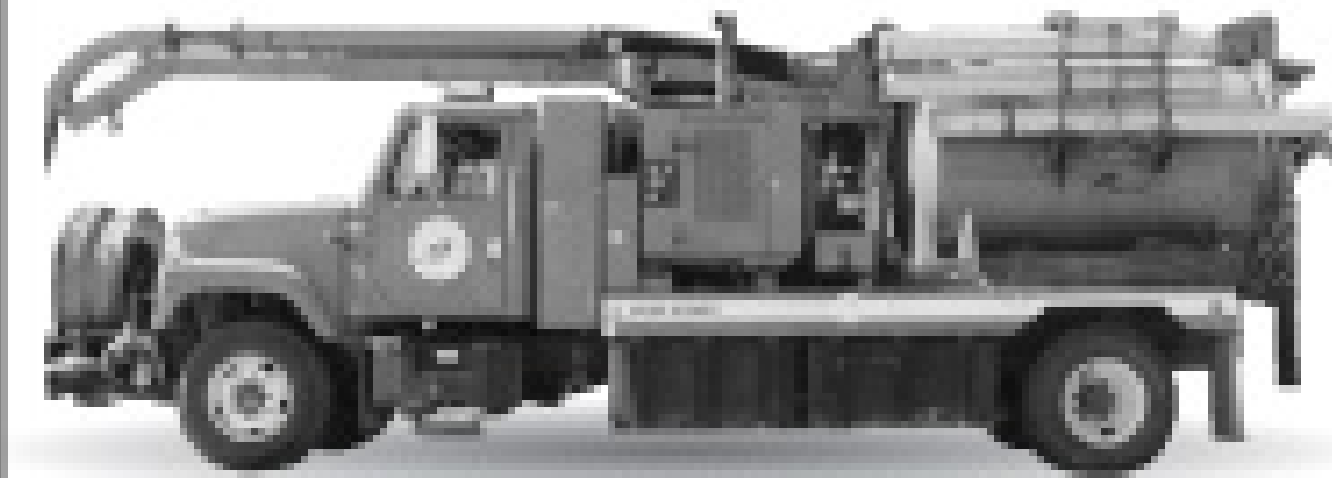
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**1992 Western Star Combo Truck:** 280 hp, 1995 Super Products Camel, 16-yd. debris, 6-24 blower, 1500 gallon water, 65@2000 psi Myers pump. \$60,000 OBO



**1987 Mack Chassis Combo Truck:** 235 hp, 1997 Super Products Camel, 16-yd. debris, Hicks blower, 1500 gallon water, 65@2000 psi Myers pump. \$40,000 OBO



**1993 Ford LNT 8000 Vector Combination:** 80 gpm @ 2000 psi, 1,500 gal. alum. tank, 1" x 600' hose, TigerTail/ MiniMissile. \$50,000 OBO



**1991 Camel Combination Cleaner w/1986 Mack:** 80 gpm @ 2000 psi, 1,500 gal. poly tank, 1" x 600' hose, TigerTail/ MiniMissile. \$17,500 OBO



**2003 Sterling Combo Truck:** 275 hp, 2003 Super Products Camel, 16-yd. debris, 6-24 blower, 1500 gallon water, 65@2000 psi Myers pump. \$90,000 OBO



**2007 Sterling Combo Truck:** 335 hp, 2008 Super Products Camel, 16-yd. debris, 6-24 blower, 1500 gallon water, 80@2000 psi Myers pump. \$240,000 OBO



**1994 Isuzu Step Van:** 2000 Onan 10K diesel generator, 1996 RST TV equipment. Many extra TV components included. \$20,000 OBO



**1994 Ford Cargo Van:** 1994 7.5 Onan gas generator, 1996 RST TV equipment. Many extra TV components included. \$29,500 OBO

**INDUSTRY NEWS**

OCTOBER 2009

**Pat's Pump Named Florida Allianz Sweeper Dealer**

Pat's Pump & Blower LLC has been named Florida dealer for Allianz Sweeper Co./Madvac Inc., producer of mechanical and vacuum litter collection equipment.

**CUES Receives Best of Suwanee Award**

CUES has been chosen for the 2009 Best of Suwanee Award in the electronic equipment repair category by the U.S. Commerce Association. The award recognizes companies that enhance the image of small business through service to their customers and community.

**BayFilter Receives NJDEP Certification**

The BayFilter System from Advanced Drainage Systems Inc. has received interim certification from the New Jersey Department of Environmental Protection for meeting the requirements of stand-alone stormwater quality treatment (removal of 80 percent of TSS).

**Primus Cleaning Nozzle Receives U.S. Patent**

USB-Dusen has been granted a U.S. patent for its Primus cleaning nozzle. The patent covers several configurations and implementations of the nozzle system, ranging from a small version engineered for 0.5-inch hose connections with flow rates of 14 gpm to a large version for 1.25-inch hose connections with flow rates of 120 gpm. ♦

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# BYPASS WITH CARE

Many sewer rehabilitation projects require wastewater bypassing. That in turn requires the proper equipment and careful planning by experienced professionals.

By Jerry Soto

With billions of dollars in federal stimulus money available to rehabilitate aging sewer systems, municipalities will face issues in trying to keep roads and businesses open during the construction. It's important to recognize the challenges of working around existing buildings, roads, and other structures.

Typically, in rehabilitating sewers, the flow cannot simply be diverted. It must be bypassed — temporarily pumped around the pipe being repaired or replaced. This requires pumps capable of moving trash-laden wastewater.

The pumps are deployed upstream from the faulty pipe, and a temporary pipeline is installed from the pumps to a downstream section of the sewer. Temporary plugs set in place between these points allow the pipe to be removed or repaired. Depending on the number of homes or businesses the line

tractor needs to know peak flow, pipe size, pipe depths, the duration of the work, access issues, and any other issues related to a particular project. This information facilitates proper pump and equipment selection.

## Peak flow

The peak flow is the highest flow on the pipeline throughout the day. It usually occurs in the early morning and in the evening, related to people's work schedules. Peaks also can occur during national events, such as halftime during the Super Bowl.

The contractor must know the peak flow to size the bypass pumping system properly. If the peak flow is not known or is inaccurate, serious problems can occur, including costly sewage spills. Once started, some bypasses cannot be stopped, so every measure must be taken to prevent a spill from occurring, including additional pumps if necessary.

## Pipe depth

The depth of the pipe and the acceptable sewage level in it helps determine the pump selection. If the sewer is deeper than about 25 feet, submersible pumps must be used. In this case, the trash pump is lowered into the pipe opening and connected to the temporary discharge pipeline. If the sewer line is shallower than 25 feet, above-ground non-clog or trash pumps may be employed. In this case, a suction pipe or hose is low-



Hydraulic power units/submersible pumps and variable-use vacuum-assisted non-clog pumps are deployed on a bypass project in Phoenix, Ariz. The contractor was asked to provide pumps and backup for what was believed to be peak flow. However, the customer had miscalculated, and additional pumps were necessary. (Photos courtesy of Griffin Dewatering Corp.)

ered into the line, leaving the pump above ground.

Suction lifts greater than 25 feet are not really achievable, since the pump's capacity will be heavily affected by the greater depth. A pump curve may look attractive for flow capacities, but when the pump's net positive suction head requirement (NPSHr) is considered, many pumps are unusable where there is significant suction lift, as on bypasses from manholes.

(NPSHr refers to the head pressure that causes the wastewater to flow into the pump. An experienced bypass contractor will always take this into consideration when sizing a pump, rather than simply using a standard pump curve with its flow-versus-head capacities. Anyone who fails to consider the NPSHr is likely to see a sewage spill when the pump does not keep up with the flow.)

## Sewer pipe size

If the peak flow is not known, then knowing the pipe size along with the downslope gradient of the

pipeline, helps in estimating the maximum flow. While actual flow measurements are desirable, they are not always available, and experienced contractors can help in those instances.

## Duration of work

Some bypasses can last as little as a few minutes; others may go on for months or years. Some bypasses can be shut off at the end of the day, but most need to run 24/7. Projects lasting less than a day are less intense and problematic than those requiring sustained, around-the-clock operation.

Usually, bypasses that last less than a day, or can be shut off at day's end, require minimal equipment or manpower. Generally, a properly trained and equipped pump expert can oversee the pumping and react if there are any problems.

On long-duration and around-the-clock bypasses, the contractor must consider additional personnel to maintain the system, and manage alarms, backup pumps and fittings, 24-hour emergency contacts, city

**While bypassing sounds simple, the task may require advice from experienced bypass companies. These contractors fully understand pumps, pipe and fittings and have experienced field personnel who can ensure proper installation and performance.**

erves, the bypass may range from a few gallons to several thousands of gallons per minute.

While this process sounds simple, advice from an experienced bypass company may be a good idea because of the many factors that must be considered. These contractors fully understand pumps, pipe and fittings and have experienced field personnel on staff to ensure proper installation and performance.

Before going to work, a con-





**A construction company needed to bypass a 30-inch sewer line in southern California. The equipment was sized for a peak flow rate of 24 mgd and included four primary and two standby pumps.**

### Pumps and equipment

A wide variety of bypass equipment and pumps are available. Typically, piping is HDPE, steel, or PVC where allowed. Hoses need to be of rugged construction, and cities typically specify the types allowed. Valves generally must be of a type that prevents trash in the sewage from tangling on obstructions.

The pumps are the most important item in a bypass. All pumps are bound by the laws of physics. At sea level, the theoretical maximum suction lift for water (specific gravity of 1.0) of any pump under a perfect vacuum — whether the pump is self-priming, vacuum-assisted, diaphragm-assisted, or compressor/venturi-assisted — is 33.9 feet.

However, other factors limit the pump to a practical lift of substantially less — on the order of 25 to 28 feet. This is why submersible pumps are needed at deeper settings; they are not limited by suction lift and instead push water up. For bypasses with suction lifts of less than 25 feet, an above-ground self-priming or prime-assisted pump is typically used. The pump NPSHr (not merely the flow-versus-head curve) plays a major role in the proper pump selection.

### Types of pumps

A self-priming pump is one that will prime itself as long as it is full of water. These pumps are generally the easiest to use, as they consist of a pump and its driver (electric motor, gasoline engine, or diesel engine).

A suction hose or pipe is inserted into the manhole or sewer line opening, then connected on the pump's suction side. A discharge hose or pipe is connected on the discharge side. The operator fills the pump chamber, and turns on the pump. Typically, these pumps are used where priming time (the time it takes from startup until the pump starts pumping wastewater after evacuating the air within the suction pipe or hose) is not critical. The priming time depends

on suction lift, but can take several minutes.

A prime-assisted pump will prime itself under dry conditions (with or without water). In general, prime-assisted pumps will prime substantially faster than self-priming pumps. The prime-assisted pump package consists of a pump, driver, and priming device.

The priming device may be a vacuum pump, diaphragm pump, or compressor/venturi. In general, a vacuum-assisted pump has the quickest priming because of the air-handling capability, followed by the diaphragm assist, and then the compressor/venturi set-up. This is worth considering when selecting pumps for projects.

For bypasses with lifts greater than 25 feet, various types of submersible pumps must be used. The most common are electric motor-driven (pump and motor are lowered into the wastewater), and hydraulic-driven (a hydraulic power unit, hydraulic hoses, and hydraulic pump). Application of these will depend on whether an electric unit poses a safety issue. Nearly all submersible pumps require ample space within the pipeline or manhole to install the pump, as most are of substantial size. It may be necessary to modify the sewer line to allow pump installation, and that may mean removing upper manhole cones, cutting the pipe open, or installing at other access points.

### Knowledge is power

When it comes to pumps and equipment, many pump distributors have general knowledge of pumps and applications, but few have experienced the actual set-up, installation and maintenance of bypass systems. As more money flows into repair and rehabilitation of decaying sewer systems, firms that do bypassing routinely are the best suited to perform the work or supply equipment and materials. As is true in any business, experience is often the best qualification. ♦

Jerry Soto is bypass estimation manager with Griffin Dewatering Corp., a dewatering service company based in Houston, Texas. He can be reached at 713/671-8000 or [griffin@griffindewatering.com](mailto:griffin@griffindewatering.com).



**A sewer bypass job in Lake Forest, Calif., handling 7.1 mgd with three bypass pumps.**

noise ordinances, traffic and access control, and many other items.

### Access issues

On occasion, a bypass occurs in a remote area where there is ample space for installation. More often, especially in the case of infrastructure rehabilitation, bypasses occur in public right-of-way, and daily activities must be disrupted as little as possible.

The proper equipment must be installed safely, within minimal space requirements. Installations in roads or near buildings limit access for both installing and operating the equipment. For bypasses in streets, traffic may have to be diverted or a section of the road closed. In some cases, the suction or discharge pipe must be routed to and from the pumps and may need to be buried to keep a road or buildings open. Other items like curtains for sound attenuation and aesthetics may be required.

If the bypass will have a long duration, ample room must be made available for routine equipment maintenance such as engine

fueling and oil changes.

In higher-flow bypasses, multiple pumps may be needed, adding to the equipment footprint. Simply put, you should not assume that a bypass system can be installed or operated without proper planning and permitting from local governing bodies.

### Other issues

Any specific sewage bypass operation may encounter a variety of other issues including:

- Sound-attenuated units to limit noise pollution.
- Accounting for friction losses in the temporary pipeline.
- Backup pumps as required by local jurisdictions (most likely a minimum of 100 percent backup capacity).
- Redundant pipeline.
- Contingency plan for sewage spills.
- Additional discharge pressure on the pump discharge to overcome line pressure when discharging into a force main.
- Provision for replacing or repairing faulty pumps.

## A CLICK AWAY

NASSCO makes Specification Guidelines available to the industry at large by way of the association Web site

By Irvin Gemora

**W**hat began as a NASSCO member benefit nearly two decades ago has become a gift to the entire trenchless technology industry.

Since 1990, NASSCO has published Specification Guidelines for a variety of applications such as CIPP, fold-and-form, smoke testing, CCTV, cleaning, and more. Comprised of specifications submitted by NASSCO members, these guidelines were designed to give members a reference point from which to apply their own engineering judgment to specific sewer rehabilitation projects.

Copies of the SG-12 and earlier

versions were provided to all NASSCO members as part of a membership package. Additionally, the updated guidelines were sold to members, first as a published document with 15 or so specifications, and then, years later, as a CD-ROM with more than 600 pages of specifications. Today, the Specification Guidelines (SG-13) are just a click away on the NASSCO Web site, available to anyone who wants them.

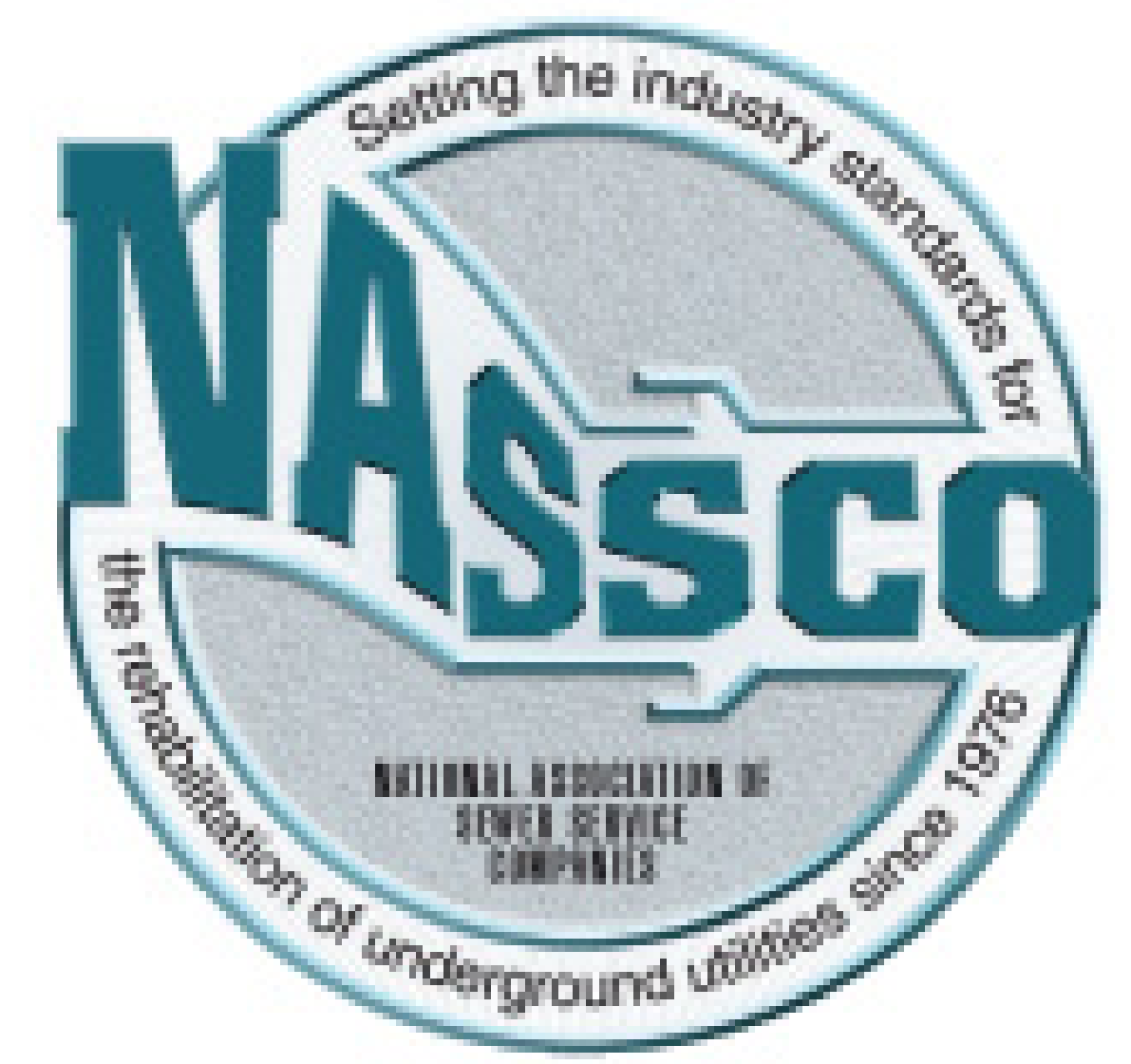
The desire to make the guidelines available to everyone in the industry led to this change. While NASSCO does not endorse or approve any product and directs users to the source of the specification for further information, the Specification Guidelines have an

excellent reputation and have provided a helpful reference guide to many in our industry.

NASSCO intends to complement the input from professional engineers and experienced contractors, while advancing the trenchless technology industry. To see the complete list of Specification Guidelines and get a copy of your area of interest, simply visit [www.nassco.org](http://www.nassco.org). The Web-based format allows for easy updates.

NASSCO members who would like to include their information or update information should contact Heather Myers at [heather@nassco.org](mailto:heather@nassco.org)

In addition to the Specification Guidelines, NASSCO offers a num-



ber of publications for the trenchless technology industry including a *Manual of Practices, Inspector's Handbook*, and *Jetter Code of Practice Manual*. Visit the Web site to see the complete list of publications, many available in CD-ROM format. You can also learn more by visiting our booth at WEFTEC, Oct. 10-14, in Orlando, Fla. ♦

Irvin Gemora is executive director of NASSCO. He can be reached at [director@nassco.org](mailto:director@nassco.org). The NASSCO headquarters is at 11521 Cronridge Dr., Suite J, Owings Mills, MD 21117.

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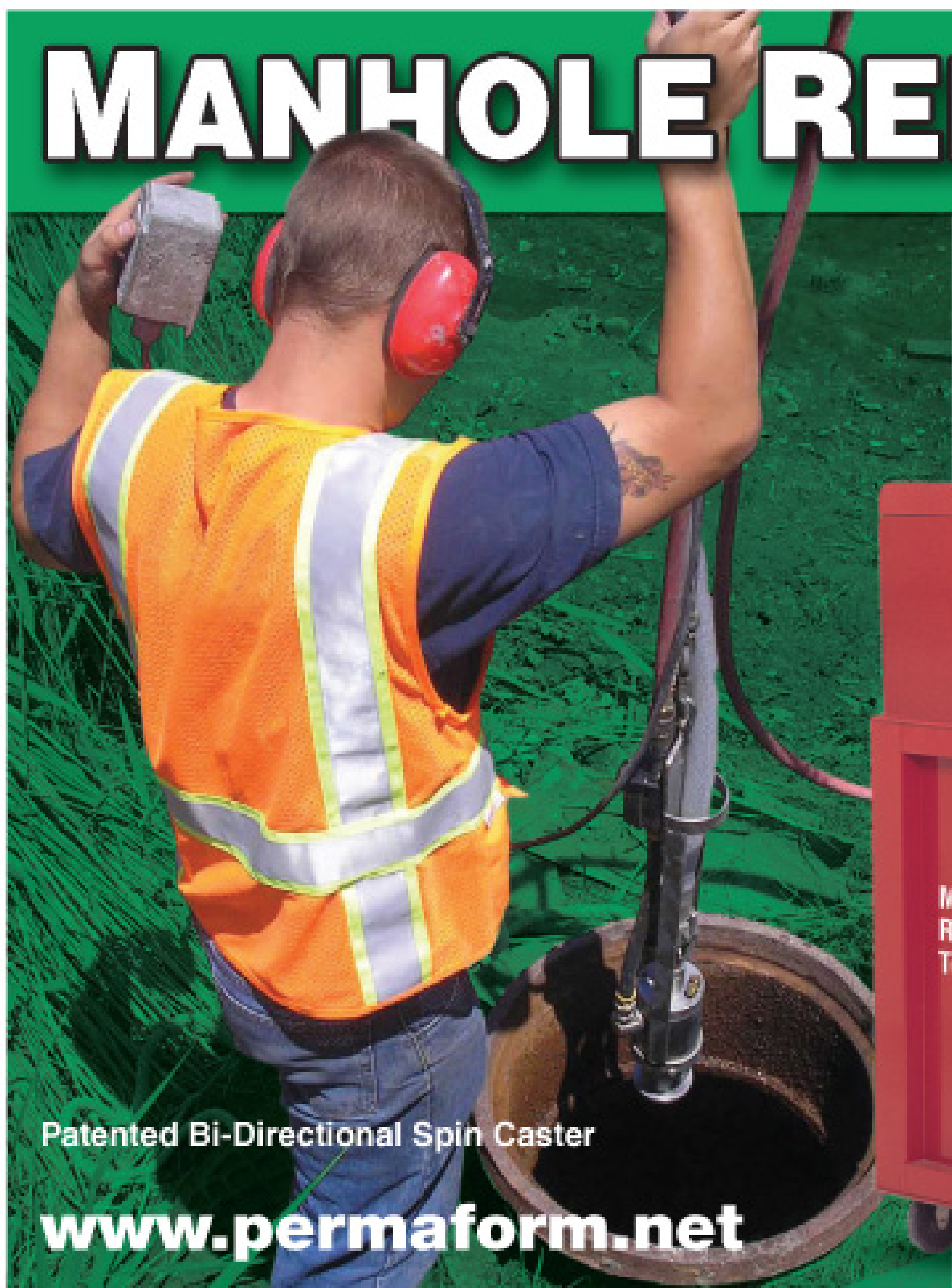


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# ANALYSIS PARALYSIS

Some common sense advice for breaking free of over-thinking and taking affirmative action in pursuit of your personal and department aims

By *Theresa Rose*

**H**ave you ever found yourself endlessly obsessing over an issue, unable to move beyond it? When dealing with a problem or potential opportunity, do you ever have dozens of seemingly unanswerable questions swirling around in your brain?

If so, you may be suffering from one of the most common afflictions known to the modern worker: analysis paralysis. At some point, we have all found ourselves in the crushing grip of this dreaded condition, where we simply can't call a play no matter how much we want to get to the end zone.

We convince ourselves that we don't have all the facts, the timing isn't quite right, something bad will happen if we take action, or we just haven't conjured up the right solution yet. These feelings of

on something new, your ego senses that change is imminent. In its panic, your ego can easily betray you. It will plant all sorts of ridiculous scenarios in your head to keep you from acting. In your quiet moments, it will whisper in your ear that you could lose your job, home, family, and livelihood if you make the "wrong" decision. It's most fervent desire is to have you frozen in fear until the wonderful opportunity — whether it is that completed project, the fantastic promotion, your big move — passes you by.

Even though the ego is a formidable foe, it is not unbeatable. Here are a few steps to help you move off dead center and back into action.

**1. Set the timer.** Give yourself a defined period of time to finish

what you know today.

**2. Listen to your gut.** What does your instinct tell you to do? What option brings you the most satisfaction and joy? What feels right? When your fear is no longer driving the decision-making process, you can trust the guidance you receive from your intuition. It is the most talented analyst you have at your disposal.

**3. Ask for a second opinion.** Now that you have an idea about what you want to do, run your arguments past an impartial judge, such as a trusted friend or colleague. Be sure you don't choose someone who is vested in a particular outcome, or who will tell you only what you want to hear.

Present your case as if you are in front of the Supreme Court; make it clear, succinct and convincing. Encourage your friend to ask you questions in order to solidify his or her understanding. When you are finished, ask for feedback on your arguments, both on content and delivery. Where in your presentation did you have the most energy? Confidence and enthusiasm are always good indicators of the most appropriate solution.

**4. Do a mental dry run.** Once you've decided on which path to take, begin the journey in your mind first. Mentally play out your decision exactly as you wish it to be. Fill in all of the details of the outcome, including your feelings, the environment, the reactions of others, the financial benefit, and any other positive result stemming from your decision. Mentally replay this imaginary outcome over and over again until you feel utterly

**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 Ted Rulseh at 800/257-7222, or e-mail [editor@mswmag.com](mailto:editor@mswmag.com).

confident in moving forward.

**5. Take the leap.** Make a commitment to act by a certain date and follow through without hesitation. Rest assured that you will hear the nagging voice of your own second-guessing ringing in your ears. Expect it. It is nothing more than your ego's final "Hail Mary" attempt to keep you locked in a state of inertia. All great leaders hear that same nagging voice, yet they choose to act anyway. You can, too.

The most important step to bust through analysis paralysis is to adopt a trusting, Zen-like attitude. Remind yourself that whatever happens is supposed to happen. There are no mistakes, wrong turns or missed opportunities. If you remember that, in the larger context, everything occurs exactly as it should, you can cut yourself some slack.

Any outcome is far preferable to the physical, mental, and emotional price you pay when you're mired in fear, doubt, and uncertainty. Isn't it time to take off those cement boots and take the leap?

Theresa Rose is an inspirational speaker and award-winning author of the book, *Opening the Kimono*. As founder of Serious Mojo Publications, she specializes in fresh approaches to energy management, productivity and creative development. Her experience includes owning a healing center and working as a senior manager of a Fortune 100 firm and as vice president of a consulting firm. Visit [www.TheresaRose.net](http://www.TheresaRose.net). ♦

**What does your instinct tell you to do? What option brings you the most satisfaction and joy? What feels right? When your fear is no longer driving the decision-making process, you can trust the guidance you receive from your intuition. It is the most talented analyst you'll ever have at your disposal.**

unreadiness and unsteadiness cause us to squander precious time and destroy our peace of mind.

What is the root cause of this all-too-prevalent mental malaise? Our own ego.

Imagine your ego as a person who is deathly afraid of heights. It would rather remain firmly, safely planted on the ground instead of jumping out of an airplane to experience a thrilling skydive. It simply doesn't like the unknown.

When you are about to embark

the process of data gathering. Chances are you probably already know everything you need to know. If you like, you can bop around in your cerebral spin cycle for a few more days and pick up those last bits of information. However, it is important to accept the fact that there will always be unknown factors — you will never have all the data about a particular subject. When you come to terms with the inevitable unknown, you can then make a decision based on



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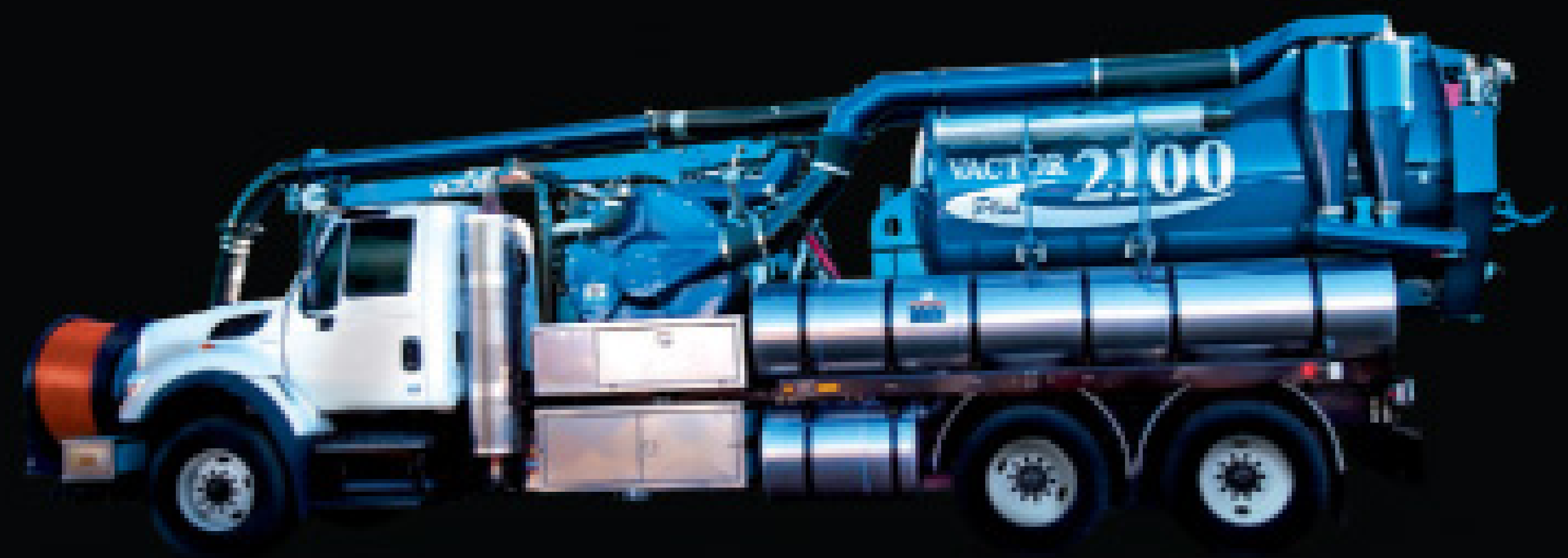
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HOSE PRODUCTS, INC.

# JUST ONE HAND

The Omnibus controller on Vac-Con combination and hydroexcavator trucks lets operators regulate all water and vacuum system functions from one joystick

By Jim Force

Sewer jet-vacuum truck operators often have a number of control points to attend to as they reel water jet hoses in and out, raise and lower vacuum booms, adjust engine speeds, and turn emergency lights on and off, among other tasks.

Vac-Con Inc., manufacturer of Vac-Con combination vehicles, has introduced the Omnibus control system, which consolidates all the separate switches, levers, instruments and other water and vacu-

um system controls into a single joystick.

The control handle is mounted to the top of the truck's hose reel panel. Beneath it, a menu-driven digital monitor displays a full range of operational parameters and replaces the instrument panel found on conventional trucks. A simple wiring system ties the joystick controller and the digital monitor into a "brain box" mini-bus behind the truck cab. All circuits are accessible at that single point, and additional sensors can be added to the box for other operational functions as needed, or to suit a customer's specific application needs. The company says the Omnibus control system is attractively priced compared to

**A simple wiring system ties the joystick controller and the digital monitor into a "brain box" mini-bus behind the truck cab. All circuits are accessible at that single point, and additional sensors can be added to the box for other operational functions as needed, or to suit a customer's specific application needs.**

conventional control systems. It is available on Vac-Con combination and hydroexcavation trucks. Mike Shelton, Vac-Con sales technician, demonstrated the control with help from the Wausau (Wis.) Wastewater Treatment Utility

on Friday, July 17, just a few weeks after the product was introduced. Assisting was Wausau sewer maintainer Mark Sowinski.

## Walk-around

The joystick controller sits atop the hose reel case at the operator control station at the front of the truck. Grip-shaped, the stick features push buttons on its top or thumb area.

These buttons control the position (articulation) of the hose reel, which swings 180 degrees for accurate positioning. They also control starting and stopping the auxiliary engine that drives the water system, raising and lowering the vacuum hose, and throttling the water pressure up and down. A small red pilot light above the buttons indicates whether the auxiliary engine is running.

On the back, or finger side of the stick, another switch toggles in two directions: Pushing it up controls the speed of the hose reel revolutions. Pushing it down activates the boom directional controls.

Below the stick, on the side



The Omnibus controller for Vac-Con combination trucks and hydroexcavators lets operators control all basic water and vacuum system functions with one hand. (Photos by Jim Force)

## TECHNOLOGY TEST DRIVE

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www.vac-con.com

**LOCATION OF DEMO:**  
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**DEMONSTRATED BY:**  
Mike Shelton,  
Vac-Con sales technician

**LIST PRICE:**  
Manufacturer says it's priced comparably to other options





panel of the hose reel case, a clear digital monitor panel about 4 inches wide by 6 inches high displays a menu of functions. A function selector switch and three specific function activation buttons are directly below the panel. Below them, simple directions and illustrations explain the operation of the joystick.

On the front of the hose reel panel, large lever handles enable the operator to start the water flow to the hose reel and control the water pressure. A third valve increases or decreases the water flow to the hose. Shelton explained that nozzle and line sizes may require different water volumes, and it is wasteful to pump more water than needed.

### Operation

Shelton first filled the brand new combination truck's tank with water at a hydrant at the Wausau treatment plant. He then positioned the truck, equipped with the Omnibus control, next to a manhole at Emter and Adrian Streets on Wausau's west side.

After a brief rain shower, Sowinski and Shelton donned safety gear and went to work. Sowinski popped the manhole cover, exposing access to a 7-inch sewer line, and helped Shelton attach the jet nozzle to the end of the hose and position the hose over the manhole.

Shelton positioned himself at the operator control station. Working off the controls on the hose reel case, he turned on the

emergency arrow flashers to warn motorists to pass by carefully on the left or right side of the truck. He explained that the controls include a strobe light switch for night or low-light operation.

Next, Shelton demonstrated how the joystick controller is used to articulate the water hose reel, swinging the reel through a 180-degree arc across the front of the

**Shelton did not have to leave his station at the front of the truck at any time during the demonstration, except for the walk back to the "brain box" mini-bus.**

truck. This capability allows different positioning of the hose in case of tight conditions. Since he had clear access to the manhole, however, he swung the hose reel back to its normal position and activated the hose reel, unrolling the water hose into the manhole and up the sewer line.

Shelton's right hand grasped the joystick, and his index finger depressed the toggle switch in the upward direction, controlling the revolutions of the hose reel as the hose continued into the line. With his left hand, he helped guide the hose through the bail into the manhole. To turn on the water flow, he dropped his hand down to the water flow and pressure controls below the joystick on the face of the hose reel case. The pressure and flow readings appeared on the digital monitor on the end of the case. He did not have to move during the entire operation.

After several minutes, Shelton turned off the water and moved the joystick to begin extracting the hose from the line. When it was recoiled, he switched the controls to the vacuum boom. Again using the joystick and toggling with his index finger, he positioned the boom over the manhole and lowered it into the space.

**Top photo: A digital monitor panel (center of photo) below the joystick displays information about machine functions. Center left, the top of the joystick handle showing the functions controlled. Center right, a function selector switch and three function activation buttons are below the joystick, as are printed operating instructions. Bottom, Mike Shelton of Vac-Con Inc. and City of Wausau sewer maintainer Mike Sowinski prepare to vacuum a line.**



At this point, Shelton allowed me to operate the controls. He showed me how to depress the toggle and move the joystick forward and back to raise and lower the boom, and from side to side to move the boom left or right.

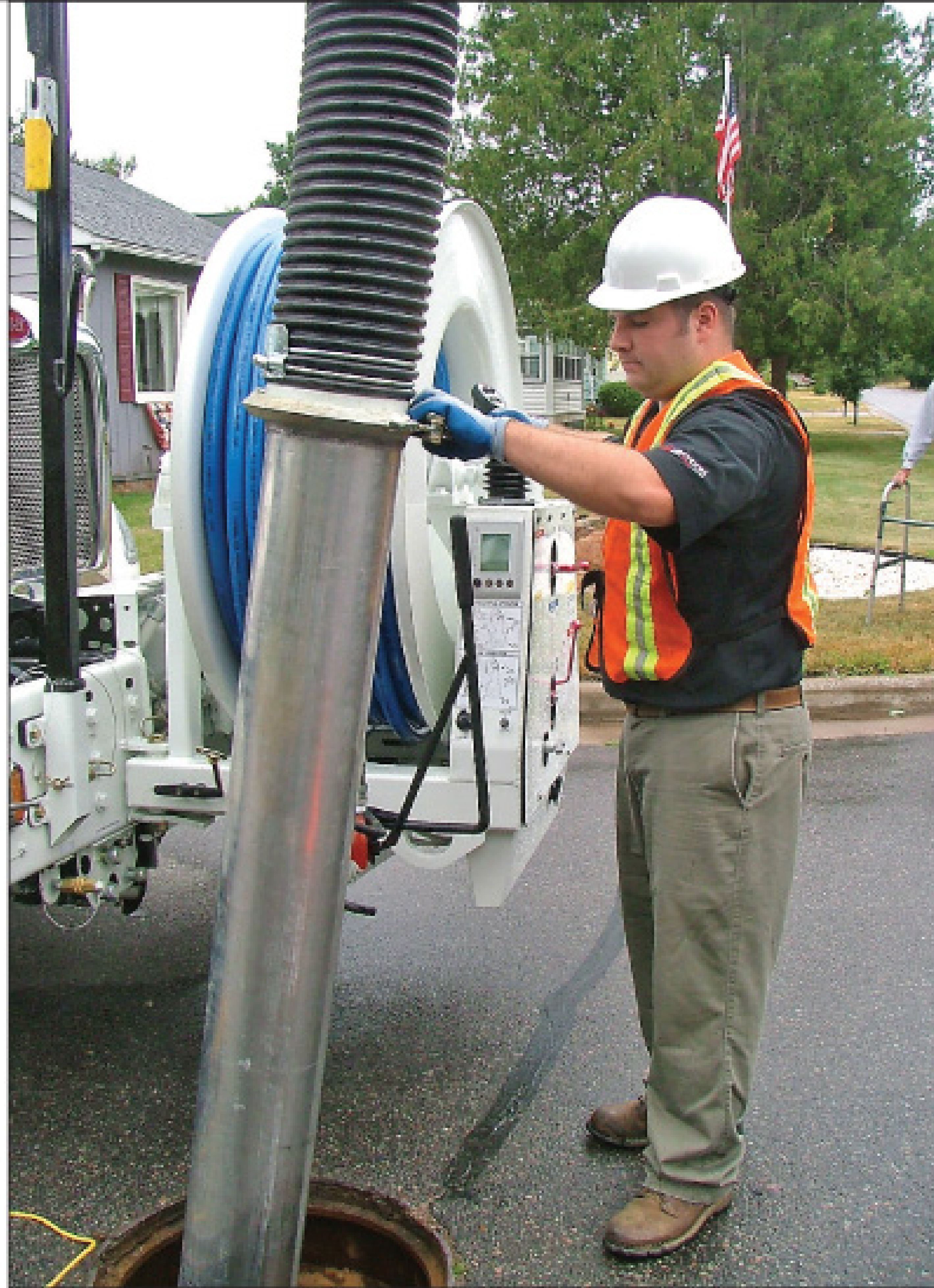
At first, I was too aggressive with the stick and banged the aluminum pipe at the end of the vacuum boom against the side of the manhole. As I repeated the process, I began to get the feel of it, and realized that I needed only a slight movement of my hand to move the boom.

The unit being demonstrated was equipped with an auxiliary engine-driven hydraulic operating system. This means all functional hydraulics — hose reel, boom, dump, and rear door — operate only when the auxiliary engine is running. The auxiliary engine also drives the water pump to create flow and pressure.

The chassis engine drives the hydrostatic system, which operates the vacuum system. In other words, if using only the waterjet system, it is possible to operate with the chassis engine shut down. If the operator wants to use the vacuum system, then the chassis engine and auxiliary engine must be running.

“Our most popular configuration uses the chassis engine to drive the vacuum and functional hydraulic systems, but this unit was equipped with the optional auxiliary-engine-driven hydraulics,” notes Vac-Con marketing manager Tom Jody. “So, if we know that most of the work being done will be waterjet work, then we recommend this optional system because it is much quieter and more fuel efficient to operate with only the auxiliary engine running.”

After the hose reel and vacuum boom were stored, Shelton walked around to the back of the cab to show where the “brain box” was situated. He unfastened and opened the covering to expose the circuitry and explained how the Omnibus system reduced the amount of wiring found in conven-



**The controller is conveniently located on the front-mounted hose reel assembly. Mike Shelton of Vac-Con Inc. shows how this enables the operator to use the control while manipulating the vacuum hose.**

tional control systems, easing troubleshooting and repairs.

To illustrate, he returned to the front of the truck and, dialing up the menu on the digital monitor, showed the control grid. “If there were to be an electrical problem, it would show up on the grid and the operator could immediately identify where and what the problem was,” he said.

#### **Observer comments**

The rig and Shelton’s demonstration were impressive, and Sowinski noted that the Omnibus system provided all the necessary controls at the operator’s fingertips. Shelton did not have to leave his station at the front of the truck

at any time during the demonstration, except for the walk back to the “brain box” mini-bus.

It was apparent that if moving around the rig to activate different controls is an issue, the Omnibus control is a useful solution. The joystick is rugged and solid, and appears able to withstand substantial pushing and pulling. It was also clear that it might take operators a little time to become accustomed to its sensitivity.

Without practice, it was easy at first to push the stick too far or too fast. The picture directions printed on the panel were helpful in understanding how the joystick worked and what functions it controlled. While the digital monitor

brought all the readings to a central location, the characters on the screen seemed small and difficult to read. Any glare coming off the clear screen covering made that issue more pronounced.

#### **Manufacturer comments**

Jody points out that the sensitivity of the joystick control is adjustable. “We think that as we put more machines in the field, we and the operators will gain a better feel for this,” he says. He notes that adjusting the contrast and backlighting controls improves the visibility of information on the monitor. The operator makes these adjustments on site based on conditions (day or night, sun or clouds).

“We have already effected one permanent font change, and again will monitor feedback from our sales technicians and customers to improve function,” Jody says.

On the issue of fuel consumption, Jody notes that when the control hydraulics are operated with the auxiliary engine, that engine may use less fuel than the chassis engine, depending on conditions. He adds that Vac-Con has a larger hydrostatic pump that allows the chassis engine to operate at a much lower rpm, while still achieving full vacuum power. “The resulting fuel savings is as high as 40 percent at full vacuum with a reduction of 5 decibels in noise at the operator’s station,” he says.

Jody notes that the new system is quite powerful, so full vacuum may not be required in many cases. “This allows us to operate the engine at even lower speeds to further reduce fuel consumption and noise,” he says. “We’ve actually documented the fuel consumption rates.” ♦

#### **MORE INFO:**

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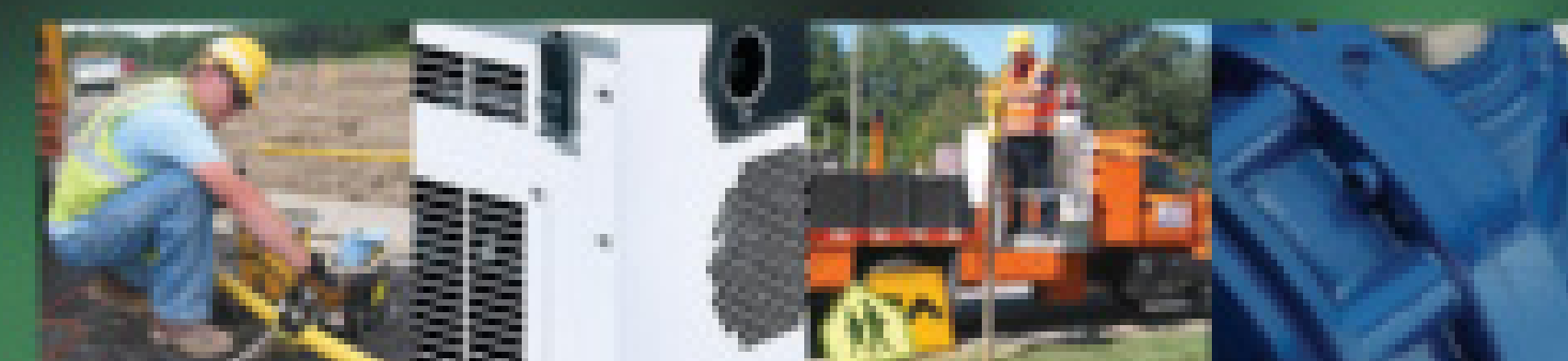
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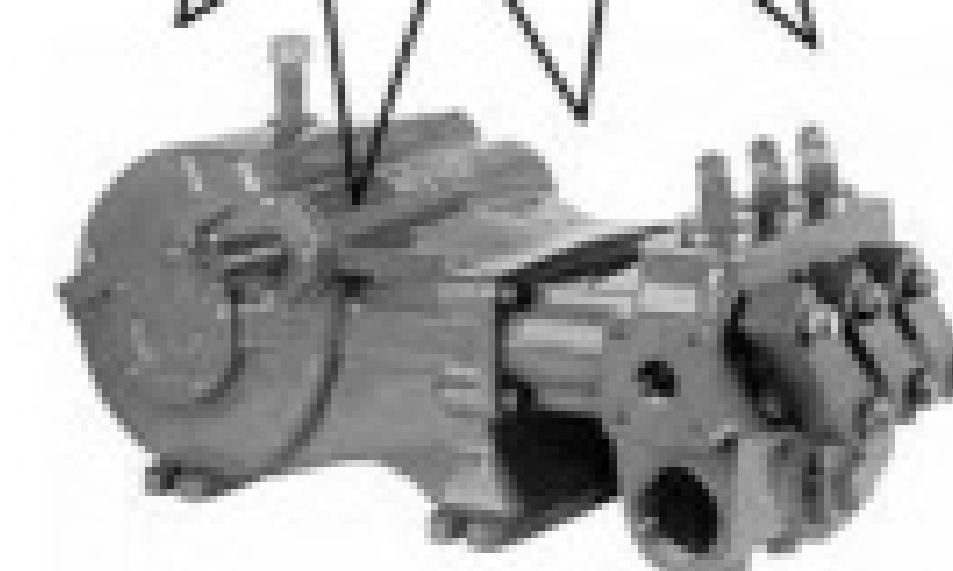
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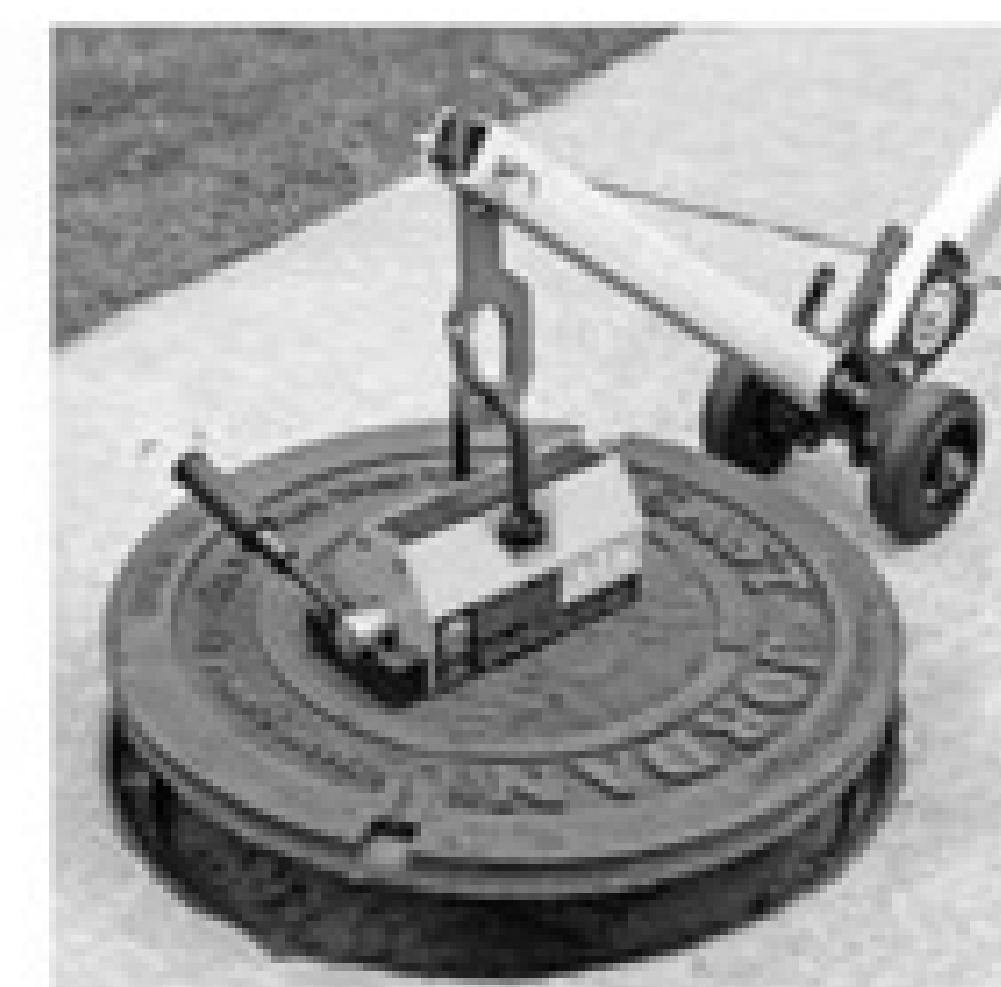
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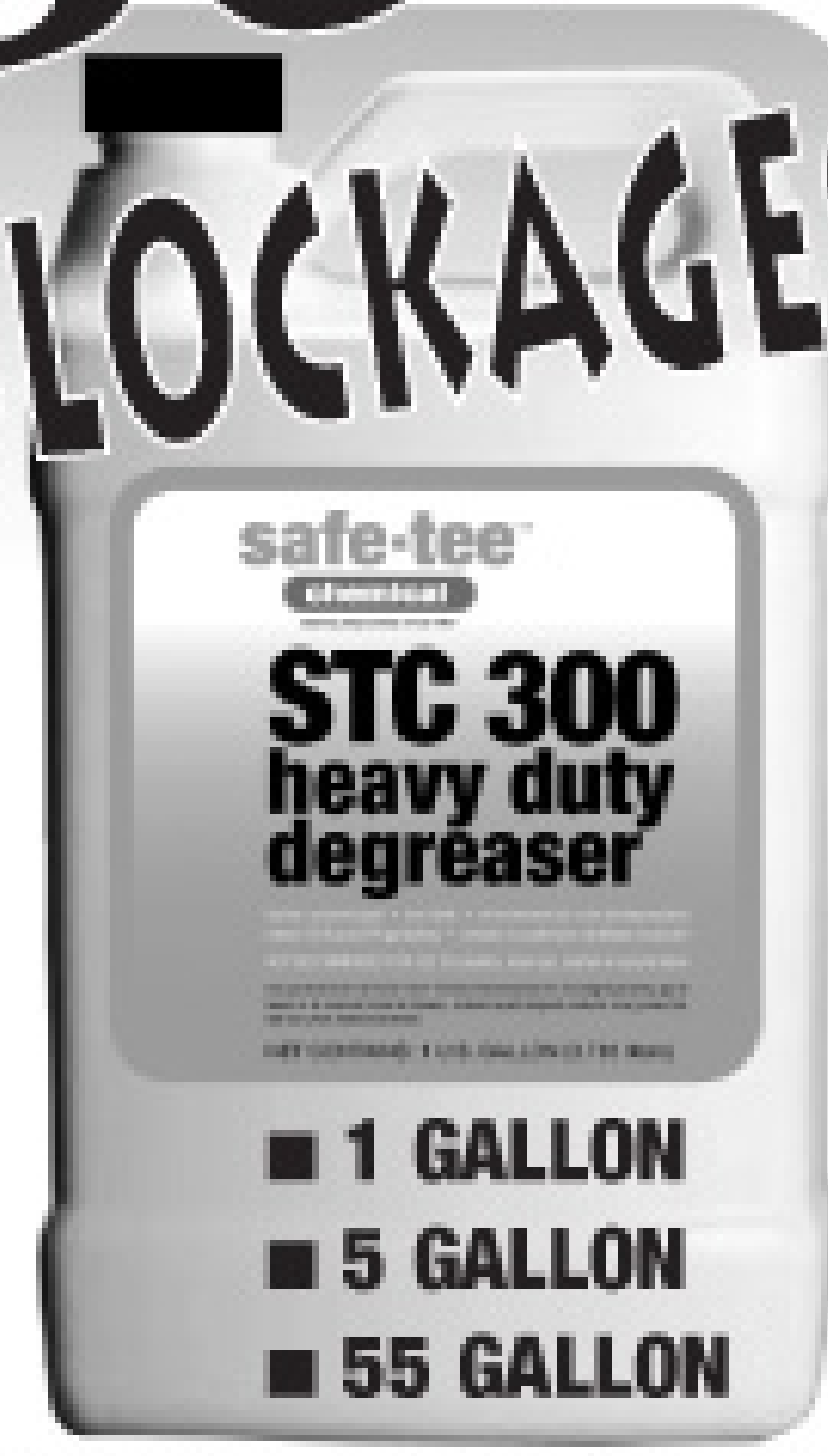
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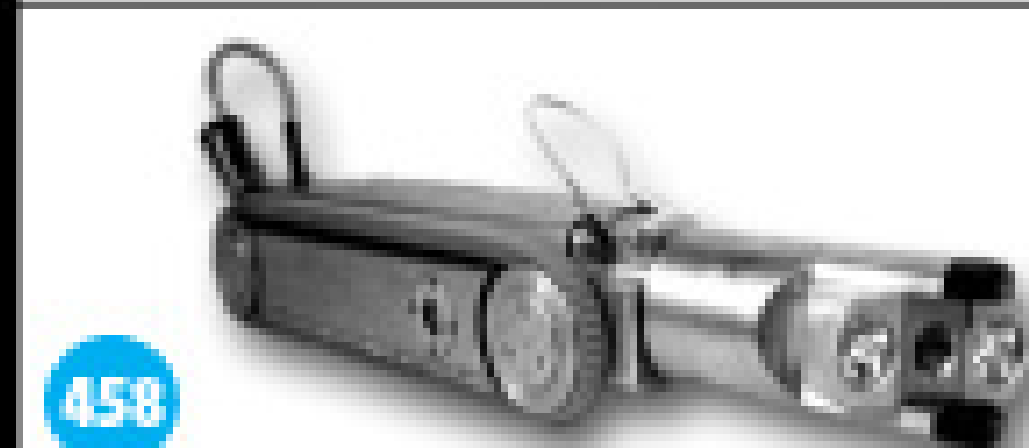
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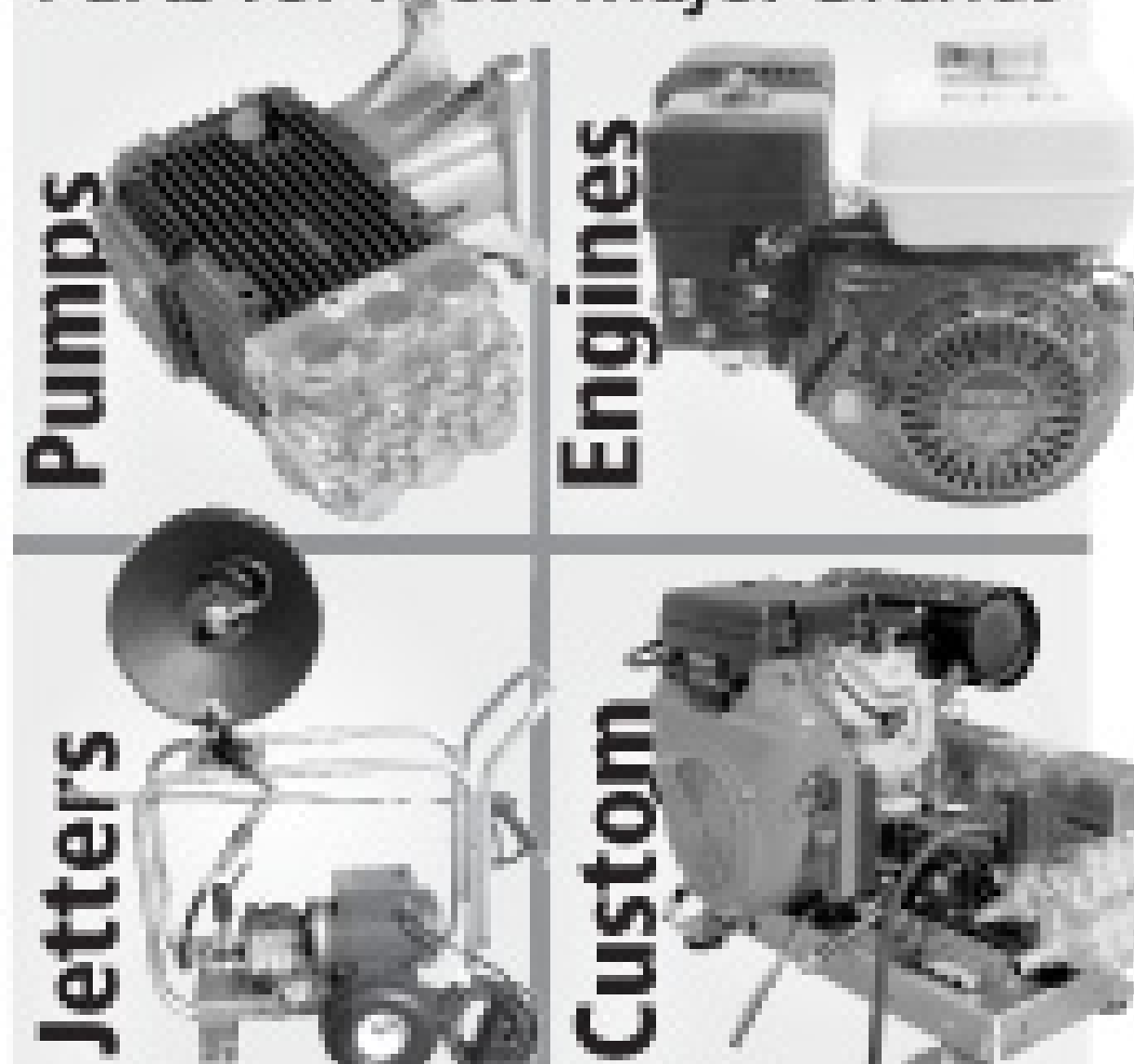
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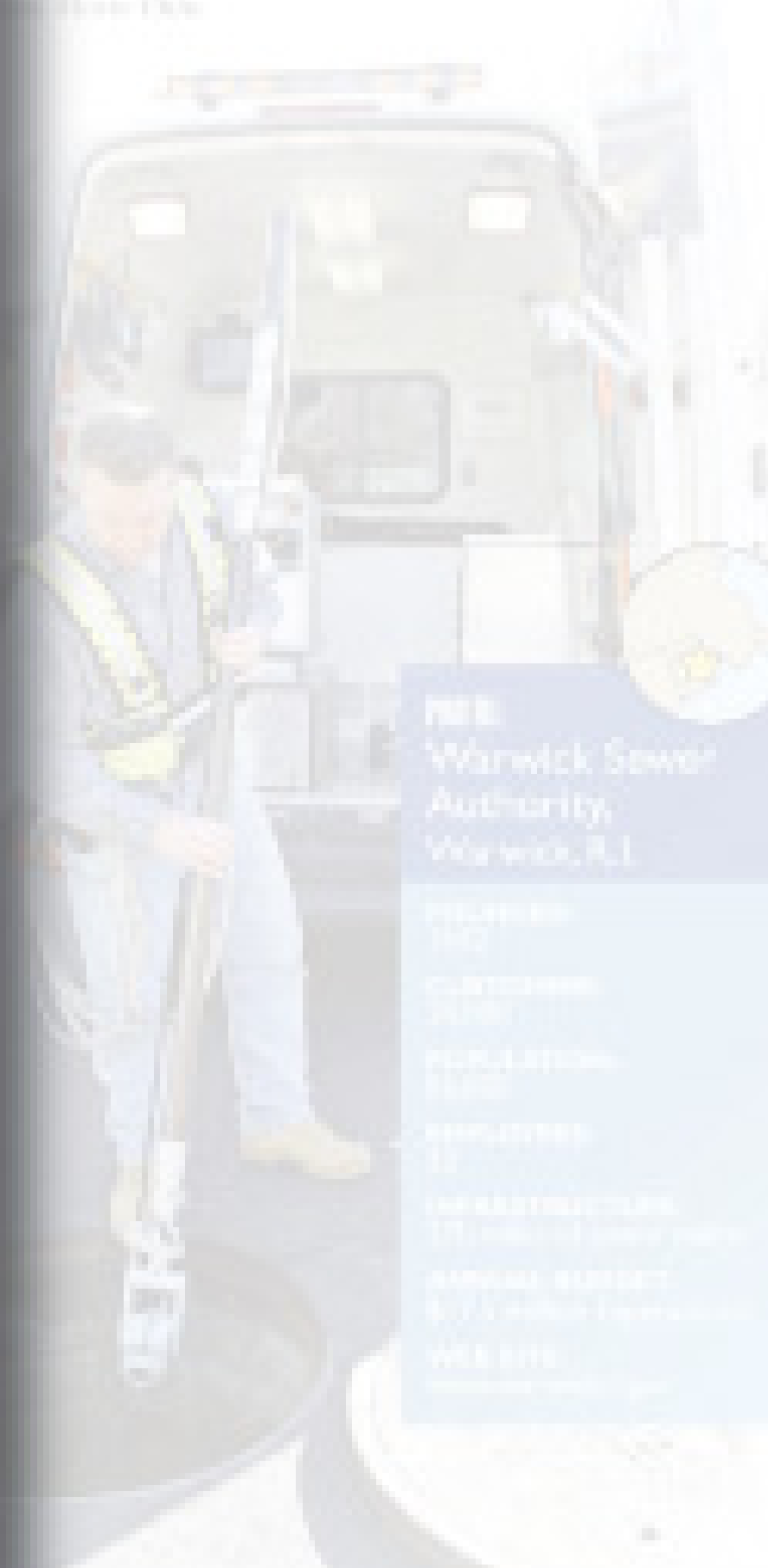
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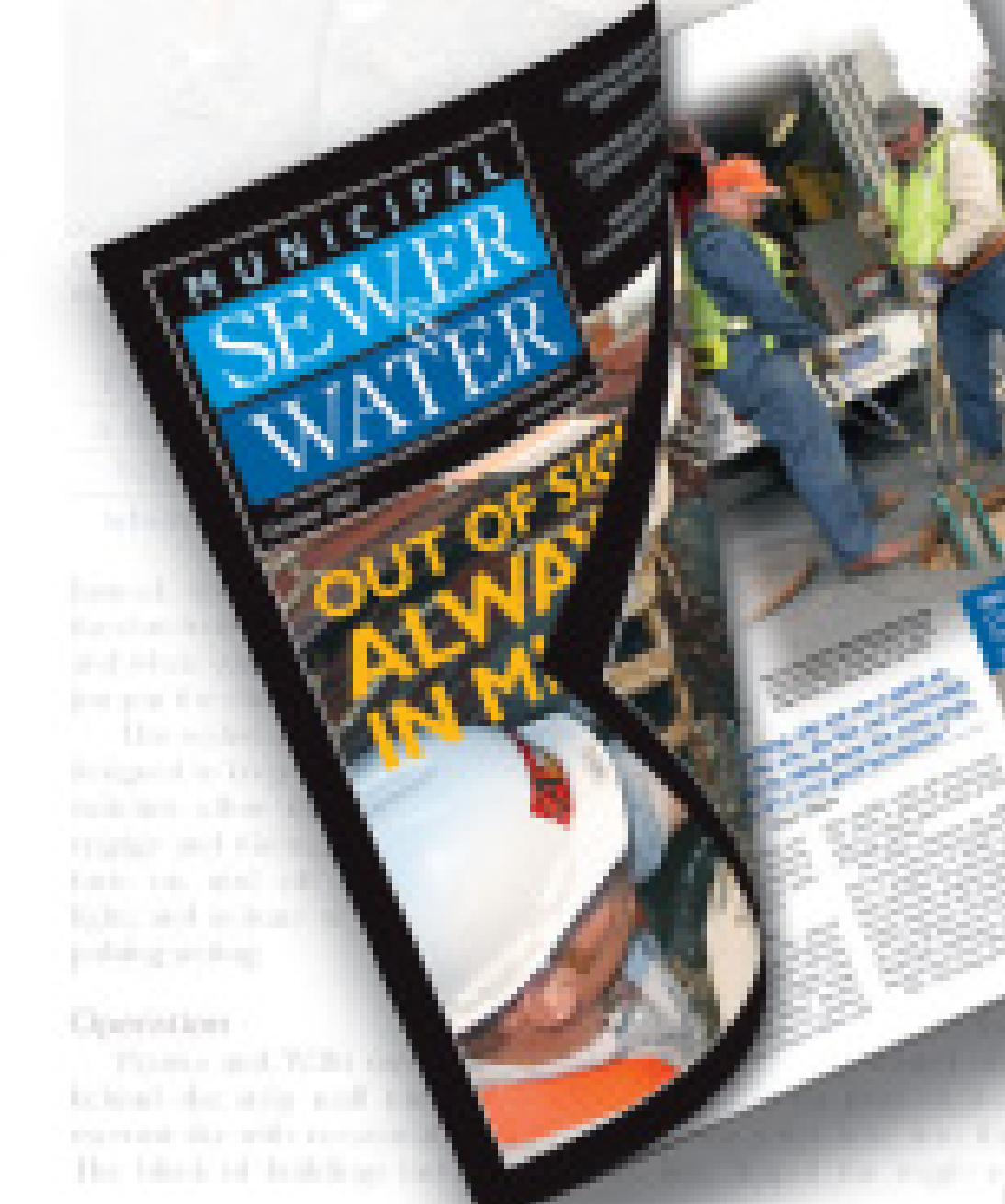
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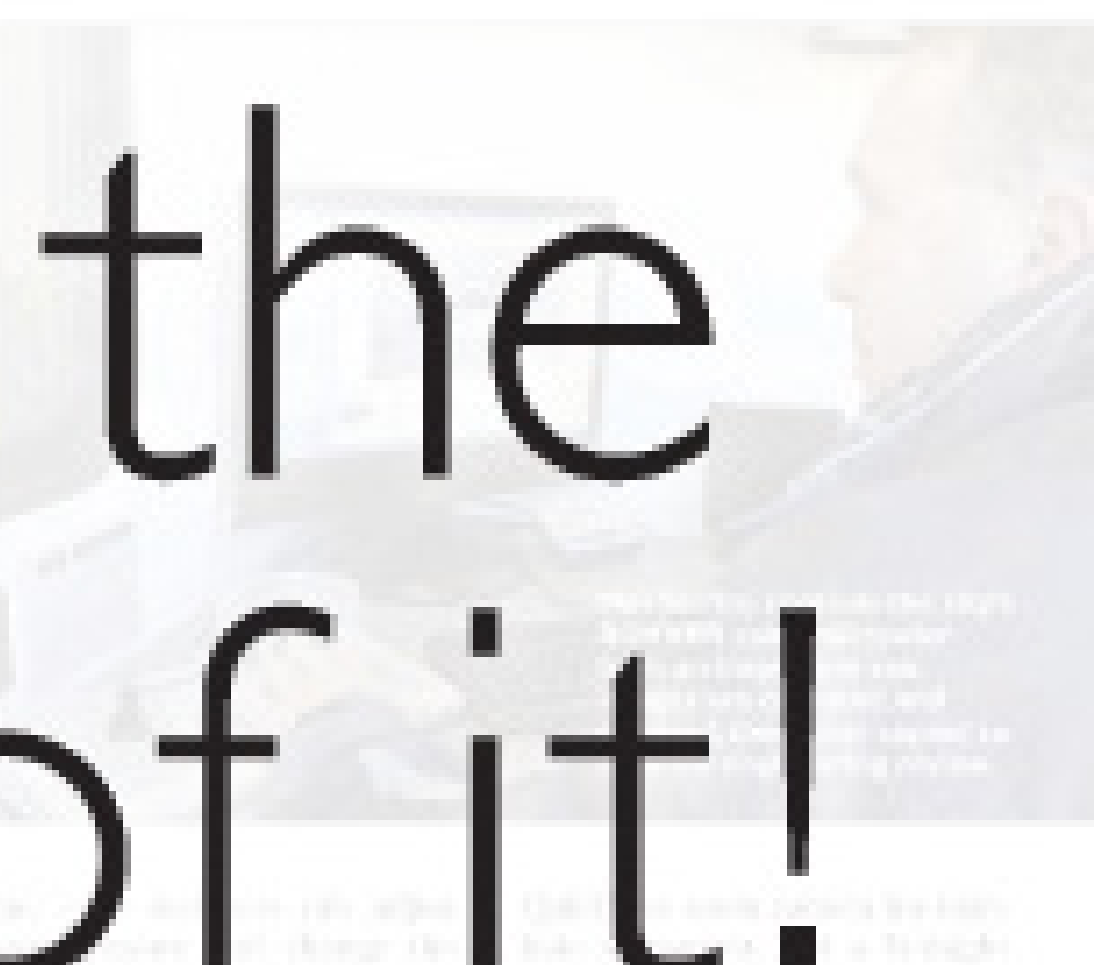


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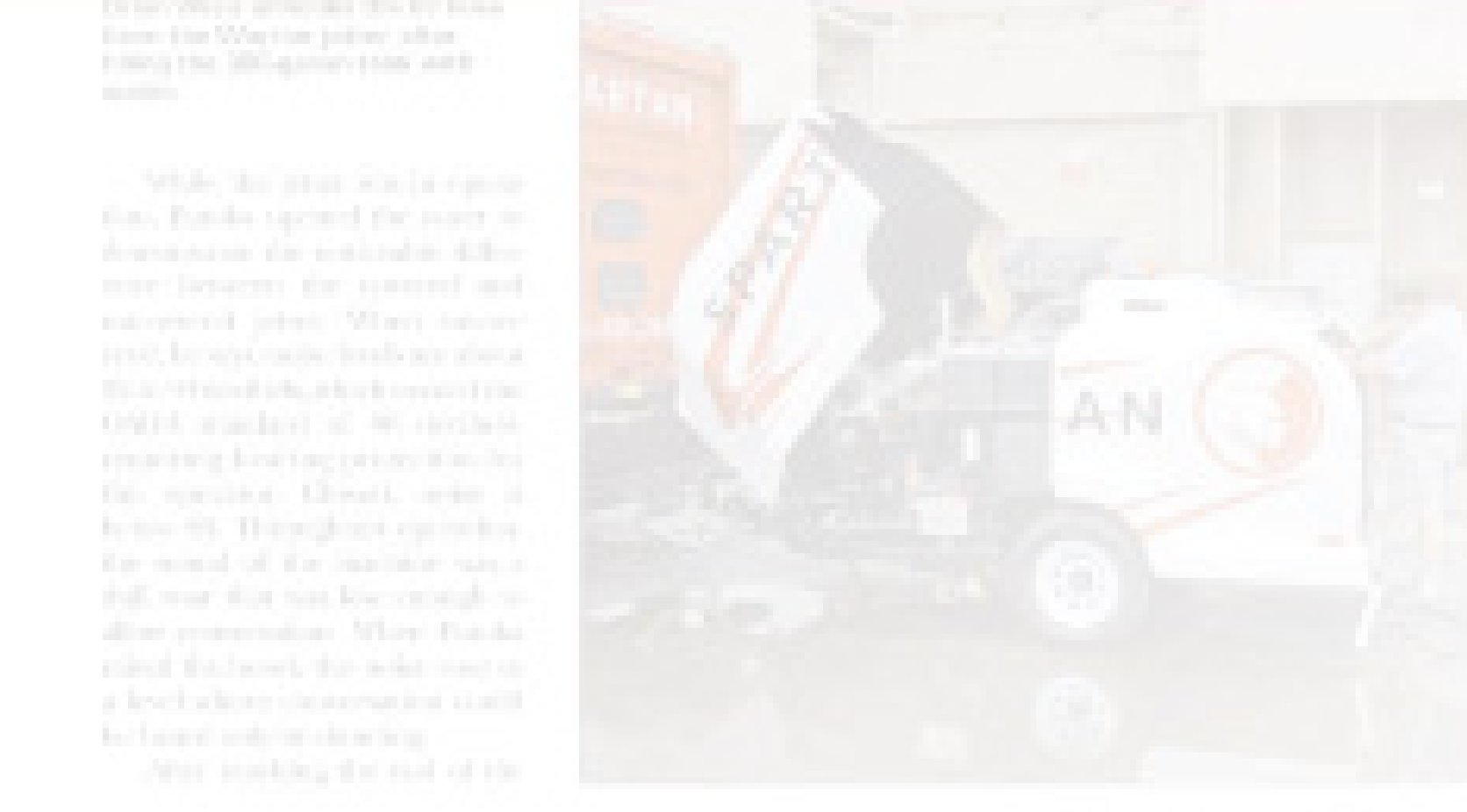
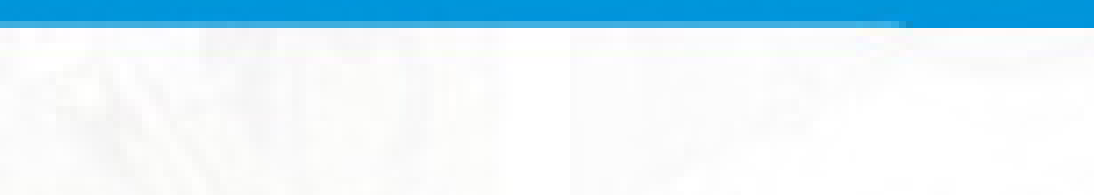
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## BLOWERS

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Very successful established Midwest based full service Trenchless Sewer Company with municipal and industrial experience and contacts available for acquisition. Serious confidential inquiries only. Please respond to P.O. Box 154283, Irving, TX 75015-4283 or email: [cippcompany@yahoo.com](mailto:cippcompany@yahoo.com). (CM11)

## DEWATERING

Septic Receiving Station, 10 gauge double wall stainless steel tank, w/4" flanged inlet. Wash assembly, 12" outlet, flow meter/plug valve rock trap stainless auger/brush and roll pins, stainless steel spray wash grinder, 12" cutting chamber, 7 tooth cam 4130 alloy steel, 5hp, 3.7kw 29:1 reducer controller, pc2450-100503, operator interface, panel heaters, billing card reader, receipt printer.emerg.stop button, connection to scada system, 2hp, 1.5kw, serial# 100503. Total flow meter. Contact Tim 832-473-7222. (CMP11)

Netsch Plate Filter Press no. 1200/LP/III for sale. Excellent working condition with controls and documents. Automated plate open/close. New filter fabric, ready to install. Asking \$70,000. Call 717-587-1917 for details. (M11)

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Used and rebuilt cable machines in stock. Ridgid K-7500, K-3800, K-380, K39. General, Speed-rooter, Metro Rooter, T-3 Mini Rooter. Spartan #1065, #300, #200, #100, Electric Eel #C and #D. Coast TM-25, TM-38, TM-30. The Cable Center. 1-800-257-7209. (CBM)

## JETTERS-TRAILER

Sewer Equipment Co. of America 747 FR2000 Jetter, FMC 40 gal. @ 2000 psi, John Deere 4 cyl. 80 hp 700 gal. water tank, rotating hose reel, 3/4" x 500' cap. **888-564-0202, www.kmhequip.com.** (M10)

New 2007 Harben 4018 DTD E45 Series Trailer, 4000 psi up to 18 gpm, 300 gal. water tank, Deutz F4L2011 4-cyl. diesel with 10 hours. **888-564-0202, www.kmhequip.com.** (M10)

New O'Brien Model 3518-SC jetting unit, trailer mounted unit, w/350 poly water tank, 4000 psi @ 18 gpm, 400' hose and attachments. In stock!!! (Stock #3024V) **www.VacuumSalesInc.com, (888) VAC-UNIT (822-8648).** (M10)

## JET VACS

2002 Vactor 2110-j4 combo unit, 2500 psi, 80 gpm, mounted on Int. 2554. Allison a/t. John Deere aux. engine. 732 fan hours, 5700 engine and 34,500 truck. Pristine cond. 540-921-3542 Chuck. (P9CM10)

1992 International 2554 cab and chassis with a Vac-Con model V211TR combination vacuum loader and high pressure sewer cleaning system. (Stock #5045C) **www.VacuumSalesInc.com, (888) VAC-UNIT (822-8648).** (M10)

## LEASE/FINANCE

**VSI Equipment Finance:** New and used equipment financing available with competitive rates. Access to quality pre-owned and new vacuum tankers. **Call JR @ 609-868-7634.** (M10)

## PADLOCKS

**PADLOCKS:** Your lock number, your key number, your quantity. Low prices. Quick shipments. Fast quotes. Master American. Wilson Bohannon. Catalog with prices. 800-461-0620. Lock-Masters USA Inc. (MBM)

## PARTS & COMPONENTS

AQUATECH CUFFED RUBBER DEBRIS HOSE #176620: 8" x 19' 8". Many in stock. \$1,374 + freight. Call 800-365-6583. Cloverleaf Tool Co. (CM12)

## PIPE REHABILITATION

Cues TV/Cutter Trailer: 2007 Evolution package, with or without camera, cutter or compressor. Call or go to our web site for photos and specs. [www.mccannunderground.com](http://www.mccannunderground.com). Financing available. Kelly 608-279-2299. (MBM)

## POSITIONS AVAILABLE

**GapVax, Inc.**, a nationally recognized manufacturer of industrial and municipal vacuum units and hydro-excavation units, is seeking highly motivated individuals to fill **three full time Sales Positions** in the Southeast, West, and Gulf Coast regions. **A detailed listing can be viewed at [www.gapvax.com](http://www.gapvax.com).** Send resumes to [betty@gapvax.com](mailto:betty@gapvax.com) or 575 Central Avenue, Johnstown, PA 15902. (CMP10)

**CCTV/GROUTING OPERATOR:** Mr. Rehab, Inc., a trenchless sewer rehabilitation company, is seeking well qualified individuals to join our highly reputable and winning team. Candidates must have a minimum of 3 years experience in chemical grouting of sewers including air-testing and sealing of mainline joints, lateral connections, and manholes. Expertise in additional industry disciplines is a plus. Must have HSD or GED; valid class B driver's license and good driving record. Must pass drug screen and background check. Must have good references from previous employer(s). Must work out-of-town (expenses paid). Top benefits and pay based upon experience. Send resume to: Mr. Rehab, Inc., 3 Long Lane, Mechanicsburg, PA 17050; Or email: [info@mrrehab.com](mailto:info@mrrehab.com); Fax: 717-697-1028. (C10)

## RENTAL EQUIPMENT

Liquid vacs, wet/dry industrial vacs, combination jetter/vacs, vacuum street sweeper & catch basin cleaner, truck & trailer mounted jetters. All available for daily, weekly, monthly, and yearly rentals. **VSI Rentals, LLC, (888) VAC-UNIT (822-8648) www.vsi-rentalsllc.com.** (M10)

**KMH Equipment company** has a full range of late model combo units and industrial vacuum loaders for sale, rent or lease. Call us at **888-564-0202.** (CMP10)

## SEPTIC TRUCKS

2009 Peterbilt 340 with a Presvac 3600 gal. (US), aluminum vacuum tank unit and Masport pump package. **Available!!! 4 in stock.** (Stock #13337 B,C,D) **www.VacuumSalesInc.com, (888) VAC-UNIT (822-8648).** (M10)

## SERVICE/REPAIR

**Sewer Cam Reel, Camera and Locator Repair:** 48-hr. turn-around time. General Wire, Ratech, Ridgid, Pearpoint, Electric Eel, Gator Cams, Insight Vision, Vision Intruders. Quality service on all brands. For more info. give Jack a call. Dynamic Cable Repairs, Lodi, NJ 07644. 973-478-0893. (MBM)

## TV INSPECTION

**Pads and Chain Assemblies:** Silicon carbide filled for maximum traction and long life. Single and double hole pads for all makes of tractors. Money back guarantee. Contact **Pipe Tool Specialties** (503) 1-888-390-6794 or fax 1-888-390-6670. Samples sent upon request. Same day shipping. We are a 6/12 company. (CMBM)

## VACUUM LOADERS

1999 International with a Guzzler Ace 16" HG wet/dry industrial vacuum tank loader. **In stock. Available for purchase or rental.** (Stock #7390) **www.VacuumSalesInc.com, (888) VAC-UNIT (822-8648).** (M10)

2009 Sterling LT9500 triaxle with a new Presvac, Powervac 3800, 3,250 gallon (US), DOT, wet/dry industrial, vacuum tank loader. **In stock!!!** (Stock #13336) **www.VacuumSalesInc.com, (888) VAC-UNIT (822-8648).** (M10)

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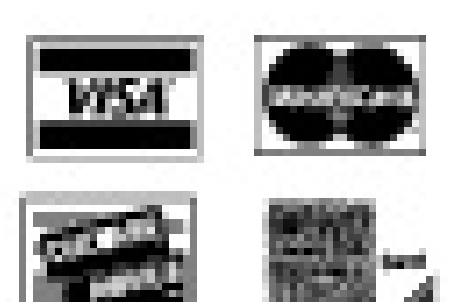
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# Product Spotlight

## Trailer Jetter for Small Communities

By Ken Wysocky

The trailer-mounted Hi-Flow Ultimate Warrior jetter from Spartan Tool LLC is designed for small municipalities and use in large sewers.

"This jetter cleans pipes from 4 to 30 inches, but its sweet spot is 8- to 18-inch pipes, making it perfect for small municipalities and industrial customers," says Tom Pranka, president of Spartan Tool. "It enables smaller municipalities to aggressively promote a cleaning schedule without investing in a combination truck."

The dual-axle jetter is fully enclosed to protect it from the elements. The enclosure's streamlined design easily accommodates a vinyl wrap, and its low profile makes it maneuverable in tight quarters.

A lock on the engine shroud deters vandalism, and the shroud pivots vertically on gas struts for easy access to the pump and 83-hp turbo diesel engine, which meets U.S. emission standards through 2012. Furthermore, the sound-dampened engine cover meets OSHA requirements for operation without ear protection.

A 600-gallon water tank includes integrated baffles, enabling operators to tow the unit even when full. A triplex ceramic plunger pump delivers 3,000 psi at 35 gpm. The hose reel and reel arm pivot 180 degrees, then lock into position.

"Aligning the hose with the pipe being jetted decreases friction on the hose and allows it to feed quicker," Pranka says. "It also reduces wear and tear on the hose over time. The dual-swivel action gives operators flexibility in tight quarters."

The jetter, which weighs 4,955 pounds empty and 9,935 pounds full, also has Dial-a-Pressure settings at 1,000, 2,000, 2,500, and 3,000 psi. Electronically controlled pump pulsation vibrates the hose to reduce friction, and an onboard antifreeze system eliminates the need to blow out moisture with air. "Operators just throw a valve to divert any water in the system into the tank and replace it with antifreeze," Pranka says.

The standard unit comes with 500 feet of 1/2-inch high-pressure cleaning hose, 100 feet of 5/8-inch rubber supply hose, 75 feet of 1/4-inch trap-cleaning hose, and 15 feet of color-coded leader hose. A six-function remote control is available. **For information: 800/435-3866; www.spartantool.com.**



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Hi-Flow Ultimate Warrior jetter from Spartan Tool LLC

## ADS Introduces Water Loss Control Product Line

The Water Loss Control leak detection and flow measurement product line from ADS LLC includes leak locators, flow measurement tools and data logging systems. The line includes the ADS Enigma digital logging correlation system, which combines noise logging and noise correlation into one operation. **800/633-7246; www.adsenv.com/leakdetection.**



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## E.H. Wachs Introduces Valve Maintenance Trailer

The custom-built VMT-2 valve maintenance trailer from E.H. Wachs is built on an all-welded steel chassis with heavy-duty axle. It includes a powerful vacuum unit and rear-facing, power-tilt, high-capacity spoils tank. Configurations

feature the ERV-750 extended reach valve operator and Recon handheld controller. Intelligent Automation and Wachs VITALS software conform to AWWA exercising standards and enable data synchronization between handheld and desktop computer. Optional GPS and Sub Meter GPS are available. **800/323-8185; www.ehwachs.com.**



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## Electric Eel Introduces EC-8SD Inspection System

The EC-8SD camera inspection system from Electric Eel features a digital recorder that captures data on a secure digital flash card. Housed in a rugged carrying case, the 10.4-pound control unit includes controls for microphone, lights, camera test port and secondary video and audio outs. Date, distance and time are displayed on screen. A keyboard for adding text is included. A 1.3-inch diameter color camera with 512 Hz sonde is standard, along with 200 feet of Gel Rod push cable. A self-leveling color camera is available. **800/833-1212; www.electriceel.com.** ♦



## PEOPLE / AWARDS

The American Society of Agricultural and Biological Engineers announced the following award recipients:

- **Robert O. Evans Jr.**, Hancor Soil and Water Engineering Award.
- **Courtney A. (Timmons) Cowley**, Yoerger Preprofessional Engineer of the Year.
- **Matt Darr**, Gale A. Holloway Professional Development Award.
- **Dale Zimmerman**, PEI Professional Engineer of the Year Award.
- **Kasiviswanathan Muthukumarappan**, Evelyn E. Rosentreter Standards Award.
- **Guruprasad Madhavan**, Robert E. Stewart Engineering-Humanities Award.
- **Charles V. Schwab**, NAMIC Engineering Safety Award.
- **J. Kelley Green**, Mayfield Cotton Engineering Award.
- **Wayne Clyma**, Kishida International Award.
- **Robert T. Burns**, G.B. Gunlogson Countryside Engineering Award.
- **Jesse Orsborn**, Rain Bird Engineering Concept of the Year Award.
- **Daren Harmel**, New Holland Young Researcher Award.
- **Percival Zhang**, Sunkist Young Designer Award.

## LEARNING OPPORTUNITIES

### University of Wisconsin

The University of Wisconsin Department of Engineering-Professional Development is offering the following courses in Madison:

- Oct. 19-21 – Modeling Unsteady Flow
  - Oct. 19-23 – Cross-Connection Control and Backflow Prevention
  - Oct. 22-23 – Advanced Steady Flow Modeling
  - Oct. 27-28 – Essentials of Hydraulics for Civil Engineers and Designers
  - Oct. 29-30 – Pumping Equipment and Systems: Selecting, Operating, Maintaining and Troubleshooting
  - Nov. 16-17 – Storm Sewer System Design
  - Nov. 18-19 – Designing Stormwater Detention Basin Facilities
- Call 608/262-2061 or visit <http://epdweb.engr.wisc.edu>. ♦

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## CALENDAR

### Oct. 10-14

WEFTEC, Orange County Convention Center, Orlando, Fla. Visit [www.weftec.org](http://www.weftec.org).

### Oct. 18-20

Atlantic Canada W&WA, Marriott Halifax Harbour Front, Halifax, N.S. Visit [www.wef.org](http://www.wef.org).

### Oct. 19-21

North Dakota Water Environment Association Annual Meeting, International Inn, Minot. Visit [www.wef.org](http://www.wef.org).

### Oct. 20-23

National Association of Flood & Stormwater Management Agencies, Broadmoor Resort, Colorado Springs, Colo. Call 719/634-7711 or visit [www.nafmsa.org](http://www.nafmsa.org).

### Nov. 5-7

Nebraska Water Environment Association Annual Joint Conference, Holiday Inn, Kearney. Visit [www.wef.org](http://www.wef.org).

### Nov. 9-12

American Water Resources Association, Red Lion Hotel, Seattle, Wash. Call [www.awra.org](http://www.awra.org).

### Nov. 15-18

North Carolina Water Environment Association Annual Conference, Raleigh Marriott Downtown/Raleigh Convention Center. Visit [www.wef.org](http://www.wef.org).

### Nov. 17-19

Indiana Water Environment Association Annual Conference, Indianapolis Marriott East Hotel. Visit [www.wef.org](http://www.wef.org).

### Dec. 2

National Utility Contractors Association Safety Directors Forum, New York New York Hotel, Las Vegas, Nev. Call 518/885-2560 or visit [www.nuca.com](http://www.nuca.com).

### Dec. 2-4

Florida Stormwater Association Winter Conference, Hyatt Regency, Tampa. Visit [www.florida-stormwater.org](http://www.florida-stormwater.org).

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

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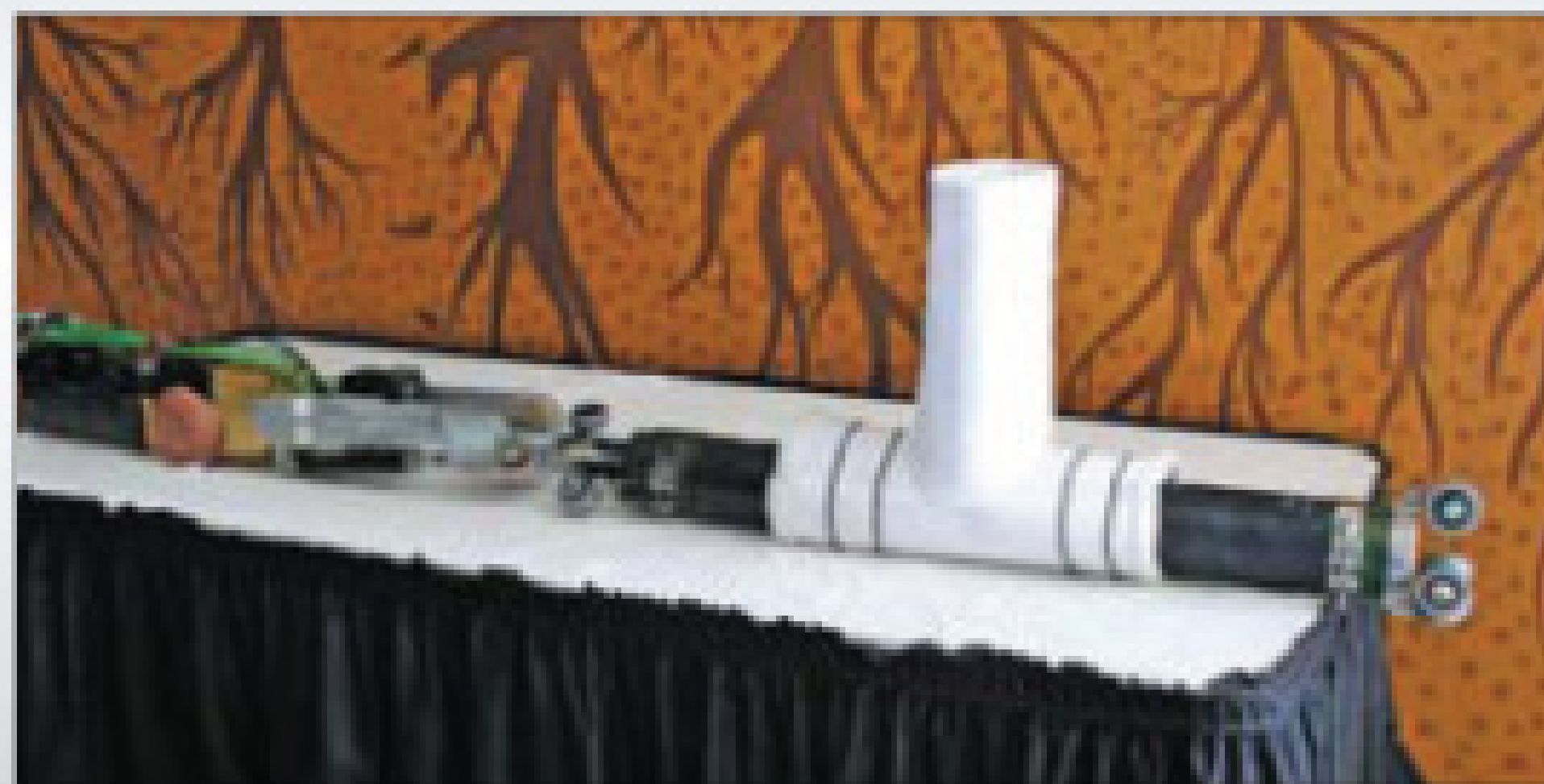


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