MUNICIPAL
SEWER & WATER™
FOR SANITARY, STORM AND WATER SYSTEM MAINTENANCE PROFESSIONALS
July 2009
www.mswmag.com

SPANNING THE SWAMPS

HDD plays a major role in water main work for the Green Bay Water Utility

PAGE 16

CHANGE SERVICE REQUESTED

COLE PUBLISHING INC.
1720 MAPLE LAKE DAM RD., PO BOX 220
THREE LAKES WI 54562

PRSTD STD
U.S. POSTAGE
PAID
COLE
PUBLISHING

WinCan™ inspection software is now comprehensively supported in North America by Envirosight's advanced technology team—the largest support, training and sales team ever assembled for such software. *(WinCan America is no longer an authorized distributor of WinCan™ software.)*

WinCan V8 + Envirosight LLC =

- **Same-day support on a subscription or issue basis—scalable to match any organization.**
- **Overnight order fulfillment.**
- **Expert on-site training and integration.**
- **Authorized program customizing.**
- **The most experienced technical and applications team.**
- **Special incentives and recognition of existing service contracts through 2009.**
- **Continued leadership in innovation.**

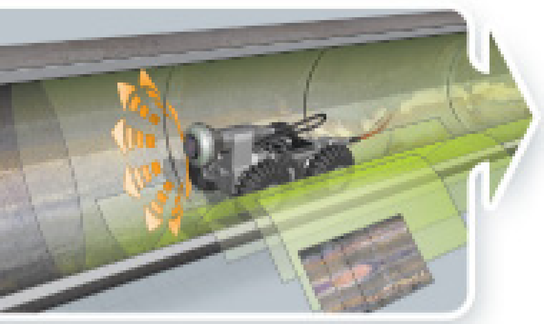
Mapping

- Pre-populate inspections directly from GIS map data.
- Perform color-coded tracking of multiple inspection crews.
- Toggle between a map feature and WinCan™ records.
- Import coordinates wirelessly from any BlueTooth GPS.

Digital Video

- Encode MPEG-4 in real time.
- Pause/restart recording within a single file.
- Convert existing projects from analog to MPEG.
- Review footage efficiently with jog/shuttle hardware.

Side Scanning



- Crawl at up to 70 fps without stopping to pan, tilt or zoom.
- Capture consistent detail from every inch of pipe wall.
- Analyze inspection results in a fraction the time.
- Link directly to WinCan™ observations.

Technology to Connect With Your Infrastructure™

WinCan™ v8 transforms inspection data into actionable intelligence, and gives you advanced tools to analyze and share data, video, scans and maps. Its modular structure allows you to license special functionality you may need—rehab, lateral launch, side-scanning manhole, inclination, PACP—and nothing you don't.

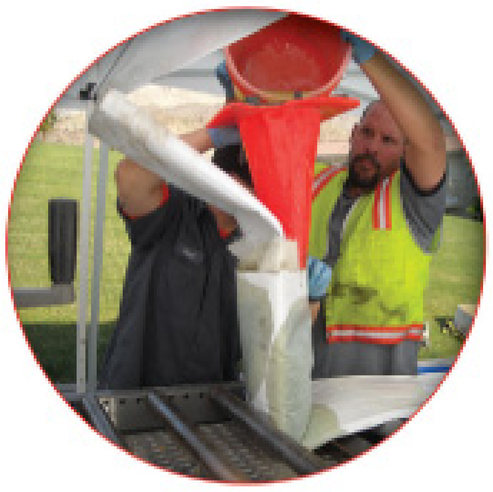
See for Yourself

Schedule a personalized online demo today.

Envirosight LLC
SPECIALISTS IN PIPELINE INSPECTION
(866) 936-8476 • (973) 252-6700 • www.envirosight.com

diy LINER
DO IT YOURSELF CIPP

an innovative approach for municipalities to rehabilitate wastewater collection systems



Gadmon Industries (parent of Easy Liner) is pleased to present the DIY (Do It Yourself) Extended Point Liner or EPL. EPL allows municipalities to conduct almost any type of mainline point repair themselves.

THE diy LINER ADVANTAGE

By taking control and doing it themselves municipalities can:

>>> **keep their crews busy**

>>> **experience uncompromised relability of service and quality**

>>> **limit disruptions and restoration expenses**

>>> **execute rehabilitation projects on a more proactive vs. reactive basis**

>>> **rehabilitate at a manageable cost**

- for repairs in 6" to 24" diameter pipes
- up to 60' repair segments
- multiple sections can be "linked" together if required
- rehabilitation completed within hours
- compact, easy to deploy equipment

To learn more about this innovative approach to maintaining your vital infrastructure assets that is sweeping the globe, call today

866.535.3694

diy LINER
DO IT YOURSELF CIPP

1069 Kingsmill Rd · York, PA 17403
www.diyliner.com | info@diyliner.com

POWERED BY GADMON INDUSTRIES

Designed by Sewer Service Pros for Sewer Service Pros

INSIDE:

PIPE BURSTING / HORIZONTAL DIRECTIONAL DRILLING

COVER:
The Green Bay (Wis.) Water Utility uses horizontal directional drilling as a key component of its water main installation and rehabilitation programs. Here, workers attach a new pipe to the drillhead unit. (Photography by Erik Gunn)

FEATURES

COLUMNS

JULY 2009

MUNICIPAL SEWER & WATER

COMING IN AUGUST 2009

Special Issue: Chemical and mechanical root control

- Sewer: Coordinated attack on roots in Fairfield, Ohio
- Water: Steam-cured main lining in Monroe, Mich.
- Sewer: Foam root herbicides in Mt. Lebanon, Pa.
- Human Side: Conserving water through public education

VACTOR 2100 Plus

THE STRENGTH TO CLEAN. THE SMARTS TO SAVE.

PROOF THAT VACTOR® 2100 PLUS IS THE SMARTER PARTNER.*

MORE FUEL-EFFICIENT	UP TO 34%
QUIETER	UP TO 15%
MORE POWERFUL	UP TO 20%
MORE GROUND CLEARANCE	37%
35% LESS	HYDRAULIC FITTINGS
25% LESS	HYDRAULIC HOSE

More than just a powerful combination sewer cleaner, the new Vactor 2100 Plus is the all-around smart partner you want working for you. Thanks to exclusive industry-leading innovations, **the Vactor 2100 Plus is now quieter, more powerful and more fuel-efficient, saving you up to $13,500 every year in fuel costs.** Add to that a dealer support system that rivals none other and more standard features than ever before, and it's clear that the Vactor 2100 Plus is more than just muscle. It's a smarter, more powerful partner.

To find a Vactor Dealer near you, call **1-815-672-3171**.

VACTOR®

A Powerful Partner

Visit us at vactor.com.

*When compared to Vactor 2100 model. Source: Federal Signal engineering department. Fuel savings assumptions: 3 gallons/hour saved in combination mode (4" orifice at vacuum, 80 gpm @ 2500 psi), 1,500 hours per year at $3.00/gallon.

ADVERTISER INDEX

To receive FREE product or service information

from advertisers in *Municipal Sewer & Water,* write the Reader Reply Number appearing in each advertisement 00 on the attached Reader Reply card in this issue.

MUNICIPAL SEWER & WATER

FOR SANITARY, STORM AND WATER SYSTEM MAINTENANCE PROFESSIONALS

Published monthly by:

COLE publishing

CELEBRATING 30 YEARS OF PUBLISHING
–1979-2009–

1720 Maple Lake Dam Rd., PO Box 220
Three Lakes WI 54562

www.mswmag.com

In U.S. or Canada call toll-free 800-257-7222
Elsewhere call 715-546-3346
E-mail: info@mswmag.com
Web site: www.mswmag.com
Fax: 715-546-3786

Office hours Mon.-Fri., 7:30 a.m.- 5 p.m. CST

SUBSCRIPTION INFORMATION: A one year (12 issue) subscription to *Municipal Sewer & Water* in the United States and Canada is free to qualified subscribers. A qualified subscriber is any individual or company in the United States or Canada that maintains, manages, designs or installs municipal or commercial sewer, water and storm infrastructures. Subscriptions to all other foreign countries cost $80 per year. Non-qualified subscriptions are available at a cost of $60 per year in the United States and $120 per year outside of the United States. To qualify, return the Free Subscription card attached to each issue, visit www.mswmag.com, or call 800-257-7222.

Our subscriber list is occasionally made available to carefully selected companies whose products or services may be of interest to you. Your privacy is important to us. If you prefer not to be a part of these lists, please contact Kayla at kaylaw@colepublishing.com.

CLASSIFIED ADVERTISING: Rate: $1 per word, per month. Minimum of 20 words or $20. All classified advertising must be paid in advance. DEADLINE: Classified ads must be received by the first of the month for insertion in the next month's edition. PHONE-IN ADS ARE NOT ACCEPTED. Ads may be faxed only when charging to MasterCard, VISA or Discover. Please supply all credit card information with faxed ads. Be sure to include your phone number (with area code) in your ad. Make checks payable to COLE Publishing Inc. and mail with classified ad to the address above. CLASSIFIED ADVERTISING APPEARS NATIONWIDE AND ONTHE INTERNET. Not responsible for errors beyond first insertion.

DISPLAY ADVERTISING: Call 800-994-7990 and ask for Kim, Jim, Winnie or Phil. Publisher reserves the right to reject advertising which in its opinion is misleading, unfair or incompatible with the character of the publication.

EDITORIAL CORRESPONDENCE: Address all editorial correspondence to Editor, *Municipal Sewer & Water*, P.O. Box 220, Three Lakes, WI, 54562.

CIRCULATION: 2008 average circulation was 35,769 copies per month (U.S. and international distribution).

PERMA-LINER™ INDUSTRIES, INC.®

INNERSEAL™ CONNECTION SYSTEM

Tee & Wye connections from 6" x 4" to 36" x 12"

Lateral lengths available from 18 inches to 50 + feet

All materials have been third party tested to meet all the requirements of ASTM F-1216-07a

The InnerSeal System is covered by one or more of the following US Patents: Patent Nos. 5,108,533; 5,393,481; 5,624,629; 5,692,543; 5,706,861; 5,915,419; 5,927,341; 5,975,878; 6,001,212; 6,029,726; 6,044,867; 6,068,725; 6,146,491; 6,337,114; 6,520,719; and 6,899,832 and Patent Application No. SN 11/135,792.

InnerSeal Connection System Trailer

2009 U.S. Tour
next stop...
Nashville, Tennessee
August 25th

register online at www.perma-liner.com

PERMA-LINER SECTIONAL POINT REPAIR™ SYSTEM

Repairs 6" to 54" Diameter Pipelines

100% Solids Epoxy

Reinforced Materials With A PU Coated Finish

As Many As 7 Repairs In A Single Day

Exceeds ASTM F1216 Specifications

Manufactured In Kit Form, No Measuring Or Waste

The Perma-Liner Sectional Point Repair™ System is covered under Patent # 5,049,003

1-866-336-2568 TOLL FREE 1-727-507-9749 INTERNATIONAL

WWW.PERMA-LINER.COM®

Strong Enough for All Your Underground Construction Needs:

- Direct-bury construction
- Restrained road bores
- Aerial crossings
- Horizontal Directional Drill applications
- Anywhere you need restrained joint PVC pipe

For a FREE video or inquiries
call 800.621.4404 x6243,
email EagleLoc900@JMEagle.com
or visit
www.JMEagle.com/EagleLoc900

JM Eagle™

Building essentials for a better tomorrow™

EAGLE LOC 900™ INTERNAL JOINT RESTRAINT

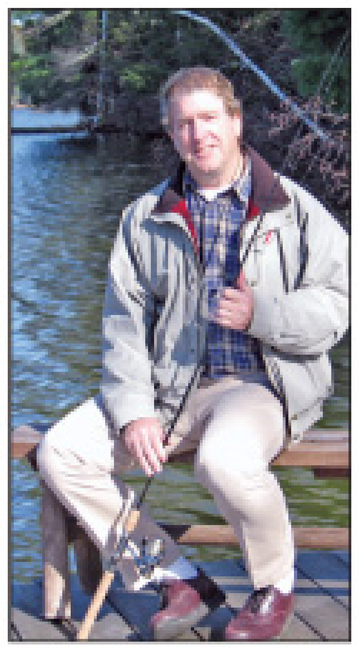
Strong enough to lift this 54,000-pound D7 Dozer!

We're so confident in our new internal joint restraint system, we put it to the test. Eagle Loc 900 easily suspended this bulldozer off the ground, proving it's one of the strongest restraints available. Trust Eagle Loc 900 as the easy-to-install, labor-saving, cost-effective alternative to external joint restraints ... the long-term solution to your infrastructure challenges.

Eagle Loc 900™ installs just like regular C900 and conforms with AWWA C900, ASTM D1784 and UNI-B-13.

HAIL TO THE CHIEF

The City of Eden Prairie, Minn., gives residents a unique perspective on the importance of sewer systems to public health and well-being



FROM THE EDITOR

Ted J. Rulseh

In March, this column asked *Municipal Sewer & Water* readers to share their equivalent of what I called a "fire chief speech" — a short argument to use in a public meeting when someone questions the importance of spending money on the local wastewater infrastructure.

The term "fire chief speech" came from just such a presentation I heard from a town fire chief when residents at a town meeting questioned a large investment in new fire-fighting equipment.

"Now, how would the discussion go if you had to get up in public and defend your department and your budget?" I wrote back then. "Could you talk about it in words as compelling as those the fire chief used?"

In one year alone the lack of sewage disposal, clean water and thus hygiene, accounted for over 1.5 million deaths worldwide from diarrheal-type diseases. ... Think it can't happen here in the U.S.? Think Katrina.

Andrew Sullivan

Andrew Sullivan, utilities operator with the Utilities Division at the City of Eden Prairie, Minn., was quick to respond. What he sent me is not exactly a speech, although it could be used that way. It's actually an article that appears on the city's Web site.

Sullivan and his team, as part of their jobs, make sure that the wastes produced by more than 60,000 homes and business customers makes it to the Blue Lake wastewater treatment plant in Shakopee. As part of that, they clean, inspect and service some 200 hundred miles of sewer lines, 22 lift stations and more than 3,000 manholes.

I think Sullivan is on to something. What he sets down in his article, titled "Zen and the Art of Sewer System Maintenance: Saving the world one manhole at a time," is a line of argument people in the profession know and understand, but may not articulate well, if they use it at all.

So, for the good of the order, I offer excerpts from Sullivan's article, also found on a blog on the city Web site (http://edenprairieweblogs.org/scottneal/post/1600).

> So I am sitting there watching that really smug guy from "Dirty Jobs," Mike Rowe, do a show from the bottom of a sewer lift station. He is scraping big hunks of *(insert colorful metaphor)* off the lift station walls while a giant vacuum truck called a Vactor sucks it all up.
>
> Wow, these Vactor trucks are all business, let me tell you. I mean, they can suck a bowling ball (or your arm) up from depths of 30 feet! ... Anyway, there's Rowe, in his waders and raincoat, sewage pouring in all around him, and he does this kind of slight dry heave, looks to the camera and says, "This is it, this is the worst, the worst thing I have ever done, right here."
>
> In case you missed that, Rowe was talking about cleaning lift stations as the worst job he has ever done. We have 22 sewer lift stations in our town. ... You know, that whole business of celebrating the workers doing the dirty work so the rest of us can lead clean and civilized lives is really a great concept. And I have to admit it is pretty cool, seeing Rowe ... doing the things we do every day in Eden Prairie, on national television, no less!
>
> But there is much more to this sewer business than just stepping in it, wading in it, and saying the word "poo" like your ratings depended on it. For instance:
>
> - Did you know that scientists chose sanitation (sewage disposal and clean water) as the greatest medical breakthrough since 1840? A close second was antibiotics, then came anesthesia, vaccines, and finally the discovery of DNA structure. Really? Sewage disposal, over DNA? Yep. I guess it does make some sense when you think it through. I mean, really, what good is DNA if you are dead?
>
> - In one year alone the lack of sewage disposal, clean water and thus hygiene, accounted for over 1.5 million deaths worldwide from diarrheal-type diseases. ... Think it can't happen here in the U.S.? Think Katrina.
>
> - And finally, for you anthropological folks, let's finish with a quiz: According to experts, what key factor contributed more to the advancement or success of civilizations, both old and new? ... If you answered, "a working sewer system," you are correct. So, while you are out there flying Mars missions, cracking the human genome, or building microscopic nanobots, just remember this: None of it would be possible if your toilet didn't flush!

You might consider trying some of Sullivan's arguments, in your own words, next time you're out in public defending your department's projects or budget. He framed the essence of the value of sewer infrastructure about as well as anyone could. ✦

For more information
call 800.621.4404 x6243,
email EagleCorrPE@JMEagle.com
or visit
www.JMEagle.com/EagleCorrPE

JM Eagle™

Building essentials for a better tomorrow™

EAGLE CORR PE™ DUAL WALL

Maximum Strength, Smoothest Flow

JM Eagle, the leading manufacturer of plastic pipe, is taking drainage by storm with its new Eagle Corr PE (Dual Wall) pipe. Featuring a corrugated exterior for structural strength, a smooth interior for maximum hydraulic efficiency and diameters ranging from 4 inches to 60 inches, Eagle Corr PE pipe is your new first choice in gravity flow applications.

TAKING DRAINAGE BY STORM

Better engineered with the latest innovations for long-term dependability

EAGLE CORR PE VS. COMPETING CORRUGATED PRODUCTS

- Watertight configuration
- Dual gasket technology
- More durable joint
- Lubricant-free gasket available

***JM EAGLE** is the ONLY full-line plastic-pipe supplier*

ONE-STOP SHOPPING!

EAGLE CORR PE VS. REINFORCED CONCRETE PIPE

- Cost savings in materials and installation
- 60% fewer joints
- Watertight joints standard
- Easier and safer to handle
- More resistant to abrasion and corrosion

Eagle Corr PE (Dual Wall) is manufactured and tested in accordance with AASHTO M252, AASHTO M294, ASTM F2306 and ASTM F2648.

Pan/Tilt Lateral Launch

Crawls 300', Extends 100'.

SuperVision™ SAT crawls hundreds of feet down lines 6" and larger, and then pushes its camera 100' into laterals as small as 3.5". Its auto-leveling camera pans /tilts to capture sidewall detail, and is pushed by force-sensing wheels to prevent cable damage. Easy to use and maintain, SAT integrates with any existing SuperVision™, adding only a small reel alongside the primary crawler reel.

Digital Side-Scanner

Images Pipe Walls on the Fly.

DigiSewer™ simply attaches to an existing or new ROVVER™ crawler, making pipe inspection's fastest-growing technology both less expensive and exceptionally versatile. DigiSewer™ captures footage at up to 70 fpm without stopping to pan, tilt or zoom. It generates flat scans that can be reviewed and annotated far quicker than video. And because it leverages ROVVER's™ steerable 6-wheel drive, DigiSewer™ scans even the most difficult lines.

Digital Push Camera

Withstands Harsh Service.

VeriSight™ delivers smart features to make you more efficient, like storage for 45 hours of MPEG4 video, an SD card reader, USB connectivity, tri-frequency SONDE, and a self-leveling head. Even so, VeriSight's™ rugged design ensures dependable performance. Its welded stainless frame, shock absorbers and splash-proof ABS controller withstand everyday punishment, and its Kevlar/epoxy-reinforced push rod maintains 4000-lb break strength.

Hydro-Powered Cutter

Delivers 5X Torque, 3X Productivity.

Do sloppy cuts, stalls, and poor visibility slow down relining? Self-propelled EnviroCut™ mills quickly and cleanly through tough materials. High-pressure water generates 5 times the cutting force, cleans the onboard cameras, and cools the motor and bit.

WinCanV8
Inspection Data Management & Reporting
Factory-Certified Training/Support
Factory-Direct Reseller

Safe, Fast, Detailed Pipeline Survey.

Inspect pipelines, manholes and tanks from street level with the patented QuickView zoom inspection camera. Municipalities use it to identify and prioritize maintenance issues. DOTs use it to assess culvert and storm pipe condition with minimal traffic exposure. Contractors use it to survey pipe before bidding, and to document completed work.

With up to up to 432:1 zoom, advanced software, and focused HID lamps, QuickView sees 50–350' in 6–60" diameter lines. Joystick controls, distance measurement and single-handed lowering make it the simplest to use.

EnVirosight LLC
SPECIALISTS IN PIPELINE INSPECTION
Worldwide Service & Support
(866) 936-8476 • (973) 252-6700 • www.envirosight.com

Avoid costly utility strikes

Dig more safely with Vactor HXX vacuum excavators

Conventional excavation techniques can result in striking and damaging fiber optics, water lines, electrical lines, cable and gas lines. With a Vactor HXX vacuum excavator, you can excavate all around existing utilities—with minimal risk of damage.

HXX Prodigy Mid-sized Vacuum Excavator
Excavates with water or optional air
Perfect for potholing or locating

HXX Full-sized HydroExcavator
Breaks soil apart with pressurized water
Excellent for big digs and deep trenching

To schedule a demonstration of the HXX HydroExcavator or the new HXX Prodigy, call Vactor at **1-800-627-3171** or visit **www.vactor.com.**

VACTOR® HXX VACUUM EXCAVATORS
Safe. Smart. Reliable.

Horizontal directional drilling helps the Green Bay Water Utility install new lines across environmentally sensitive areas. Here, workers attach a new pipe to the drill head unit. (Photography by Erik Gunn)

FOCUS: WATER

SPANNING THE SWAMPS

Horizontal directional drilling is a key tool in the Green Bay (Wis.) Water Utility's water main installation and rehabilitation program

By Erik Gunn

It's been a decade of growth for the Green Bay (Wis.) Water Utility. The economy may have curtailed that some, but even now, the utility maintains an aggressive program of rehabilitating water mains.

Whether installing new lines or repairing old ones, the work usually gets done the old-fashioned way — by digging a trench. In recent years, though, the utility has used trenchless techniques at times. Sometimes it's to avoid disturbing environmentally sensitive areas and the regulatory red tape involved with open digging in such places. Other times it's because nature herself simply gets in the way.

As a result, Green Bay has gained experience with horizontal directional drilling, and with it, the use of various pipeline systems. The technique costs about two to three times that of conventional trenching, says Brian Powell, water utility distribution engineer. But in view of the much more extensive permitting required for open-trench projects in delicate situations, HDD is a reasonable trade-off.

In 2008, the city completed the first project in which it used fusible PVC pipe in an HDD project. The pull crossed a wetland in which open-trench installation would have been impossible.

Decades of growth

Green Bay draws its water from Lake Michigan, taking in up to 42 mgd. Over the last 50 years, the city has tripled in area, to 46.1 square miles. The service area extends beyond the city limits to the neighboring Town of Scott and Village of Ashwaubenon.

Annual water pumpage through the utility's 456 miles of distribution mains hit nearly 7.2 billion gallons in 2007, and the two largest categories of customers, residential and commercial, have been slowly but steadily rising since 1998.

For much of that time, the system grew by up to 10 miles per year. "Five years ago we were putting

PROFILE:
Green Bay (Wis.) Water Utility

CUSTOMERS:
36,084

SERVICE AREA:
City of Green Bay, Town of Scott, Village of Ashwaubenon

WATER VOLUME:
42 mgd capacity; 19.7 mgd daily average

INFRASTRUCTURE:
456 miles of water mains

ANNUAL REVENUE:
$17.6 million

WEB SITE:
www.ci.green-bay.wi.us/water/index.html

Above: The view west across the marshy area under which the boring is to be done. The bore will be completed from the opposite side. Right: Ramco employees Micah Frost (left) and Glen VandeHey track the drill head. VandeHey uses a Subsite 750 Tracker from Ditch Witch to follow a sonde in the drill head.

in close to 40,000 to 50,000 feet a year of brand new water main," says Powell. The economic slowdown has reduced new construction to 5,000 feet or less per year, but rehabilitation continues on 10,000 to 15,000 feet of mains per year.

As a city department, the water utility can coordinate water main repair and replacement closely with the city's street repair program. Green Bay has a street work agenda planned several years in advance, and the water utility follows suit. "They give us a list of streets coming up for repair," Powell says. "We look at the age and conditions of our water mains on those streets, then base our decision on that."

All water main complaint calls and repairs are logged into a GIS-linked city database. The list of streets due for repair is checked against that database. "If a street's being redone and we've had water line maintenance problems in the past, then we'll replace the line in the year the street's going to be redone," says Powell. "But if everything's fine, we'll leave well enough alone."

"PVC won't corrode. It's also cheaper to buy and cheaper to install. … We heard about [fusible PVC] and kind of liked the idea and said, 'Let's give it a shot.'"

Brian Powell

Cast iron to PVC

Green Bay's original water lines, some dating back to the late-1800s, are traditional cast iron. Corrosion from age and especially from exposure to the area's highly acidic soils have led to rot, causing leaks, and the area's cold winter climate produces its share of water main breaks from deep frost.

So about five years ago the city began using PVC pipe almost exclusively when replacing water mains throughout the system. "PVC won't corrode," Powell says. "It's also cheaper to buy and cheaper to install."

For most open-trench replacement projects, the city uses conventional PVC sections connected by slip joints. It buys the product from a variety of manufacturers based on material price quotes.

In summer of 2008, however, the city turned for the first time to fusible PVC provided by Underground Solutions of Poway, Calif., for a project that required HDD.

HDD, widely used in the water industry since the early 1990s, was an established technique for the Green Bay utility when Powell joined six years ago. "It comes in

WORTH THE COST

On paper, horizontal directional drilling is pricier than open-cut water main installation, says Brian Powell, Green Bay Water Utility distribution engineer.

A July 2008 job crossing a marsh illustrates the difference. "The contractors were pulling it for roughly $30 a foot," Powell says. "We can get open cut in a subdivision for anywhere from a third to half that cost." For instance, 8-inch pipe of the sort used for the job described in the main article would typically cost $10 per foot to lay; perhaps $15 when fuel prices are higher.

But the permitting process and other challenges of open-cut installation in a wetland or underneath a stream negate any such cost advantage. For example, steps would have to be taken to prevent release of sediment that could harm fish or wildlife, and the site would have to be restored to its original condition.

handy where you have environmentally sensitive areas, whether you're crossing a wetland or a navigable waterway, whether it's a stream, a creek or a river," he says. "These are areas where you can't really open cut without causing environmental damage."

In some situations, it's not just a matter of damage. About three years ago, the utility needed to cross under the Fox River with a 2,400-foot-long, 36-inch steel pipe. Trenching in that case was out of the question. That HDD project took nearly two weeks. The pipe sections were welded on site into a single pipe while the drillers bored and reamed a hole to the proper diameter to pull the pipe back through.

The drill head penetrates the ground at a low angle.

"[HDD] comes in handy where you have environmentally sensitive areas, whether you're crossing a wetland or a navigable waterway, whether it's a stream, a creek or a river. These are areas where you can't really open cut without causing environmental damage."

Brian Powell

When the time came to pull the pipe, "They started pulling at 7 in the morning and they got done close to midnight," Powell recalls. Such jobs are rare. Smaller installations, replacements and repairs in sensitive areas come up every few years.

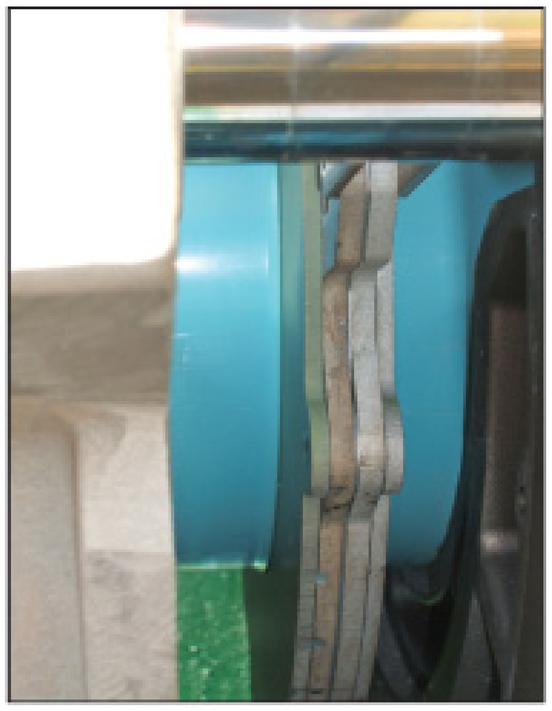
On the scene

The 2008 project was an example. The task was to connect two dead-end water mains on opposite sides of a small, marshy ravine off of Remington Road on the city's east side. "It's a delineated wetland area with a navigable waterway running through it," Powell says.

The city needed fusible pipe to create a single pipe that could be pulled through the opening created by HDD. "You can't really pull regular PVC pipe because it doesn't lock," Powell says.

Green Bay has used locking PVC piping satisfactorily in previous HDD situations, but fusible PVC was something new. "We heard about it and kind of liked the idea and said, 'Let's give it a shot,'" Powell says.

Work on the Remington Road project began on a Wednesday with the arrival of 360 feet of 8-inch PVC pipe. Utility crews dug an entry pit on the east end of the run while employees of Underground Solutions prepared the pipe. Matthew Berenson of Underground Solutions used a diesel-powered TracStar II 500 fusing machine from McElroy Manufacturing Inc. to connect seven lengths of pipe.



Above: The McElroy TracStar II 500 unit was used for fusing the PVC pipe sections. Right: A heated disk is placed between the ends of two lengths of pipe to be fused. The heat causes the ends to flare.

With each length, Berenson carefully trimmed the ends so that they would join without leaving air pockets. Using a heating coil powered by an electric generator, he heated a metal disk to several hundred degrees, slid it into place on the machine and pushed the two pieces of pipe to be fused against it, under pressure, until they melted.

When the heat caused the rims of each pipe end to curl outward into a bead, he whisked the disk out, pressed the softened ends together, and held them in place under pressure until they cooled and formed a solid weld. "When it's cool, it's as strong as the rest of the pipe," says David Silvernail, director of field operations for Underground Solutions.

Drilling the hole

As the Underground Solutions crew finished fusing the pipe on a hot, humid Thursday, on the other side of the marsh a crew from Ramco Services Inc. was preparing to drill the hole. That morning, Powell and Jim Daubner, the utility's construction manager, had walked across the marshy ravine in high boots, marking the desired path of the new main at regular intervals with bright pink spray paint.

Ramco's Andy Vickman maneuvered a DitchWitch 4020 directional drilling unit into place to begin the dig. The drill head bit into the ground at a low angle, spewing a slurry of water and bentonite.

The ratio of water to the pulverized bentonite had been calibrated precisely to provide the necessary support and lubrication for the drilling. No-Sag, a gel product, was added to the mix to help cake the walls of the hole and prevent it from collapsing, explains Ramco Services president Robert Foeller. As Vickman operated the drilling rig, Ramco employees Micah Frost and Glen VandeHey tracked its progress across the ravine, using a locator to follow a sonde in the drill head.

The drilling took about four hours. Ramco and Green Bay crew members then attached a conical pulling head to the plastic pipe. (Copper wire duct-taped to the entire length of pipe would enable crews to detect the pipe in the future.) On the west side of the marsh, Vickman used the drilling

rig to pull the reamer head and the pipe back through the hole to the other side.

Often, HDD requires more passes through the hole to ream it out to the desired diameter — in this case, 12 inches, 1.5 times the pipe diameter. That wasn't required on this project because the sandy clay soil made the hole stable. As the pipe was pulled back, the machine reamed the hole in a single operation.

Once installed, the fusible PVC could be matched up precisely with the existing PVC line at either end using conventional slip joints.

Other options

So far, says Powell, Green Bay's only trenchless technique for water main installation is HDD. The agency remains open to other methods, such as pipe bursting or various pipe-lining technologies. "We're always looking into it," says Powell. "At some point in the future, I would foresee us doing some of those."

As HDD jobs go, the Remington Road extension was relatively easy, recalls Ramco's Foeller. "The ground was really muddy, but it was a typical job, with no problems," he says.

Ramco does about 200 drilling jobs per year, covering nearly all of Wisconsin. The sandy clay soil of Green Bay made this one of the easier jobs. "You can get into some really dense sand," Foeller says. "With smaller rigs, sometimes dense sands pose a problem. And if you get rocky conditions or boulders, those present problems."

Silvernail of Underground Solutions noted that in many projects, the drill is done the day before the pull. The Green Bay project stands out in his mind for "how smoothly it went," he says. "It just pulled a lot easier than everyone expected it to." ✦

MORE INFO:

174 **Ditch Witch**
800/654-6481
www.ditchwitch.com

154 **McElroy Manufacturing, Inc.**
918/836-8611
www.mcelroy.com

Specializing in forgiving, easy-to-use, and safe materials for in-house rehabilitation and protection.

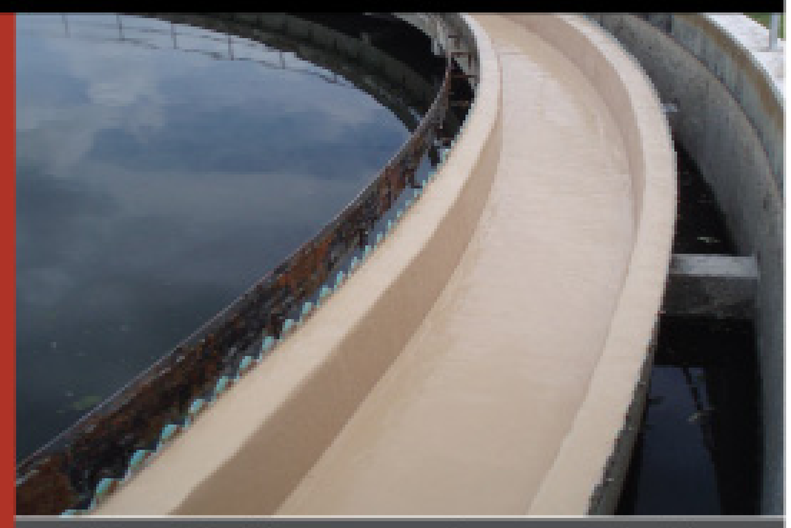
The ultimate and safe, 100% solid (no VOCs), forgiving and easy-to-apply coating for

Wastewater Protection!

Epoxytec Uroflex™

Uroflex™ is an excellent "Do-It-Yourself" (DIY) coating for projects in wastewater environments (protecting against H_2S, and other types of corrosion) in order to extend the life expectancy of sewer infrastructure by top coating steel and concrete.

- **Chemical resistant, including H_2S**
- **Eliminates infiltration/exfiltration** (sealed system, no porosity, no permeability)
- **Easy-to-apply**
- **Environmentally friendly, no VOCs, no solvents, no odor**
- **Self-priming, highly adhesive and forgiving**
- **Repairable, ties back into itself indefinitely**
- **Flexible** (tolerant to movement and vibration)
- **High build** (40 – 60 high build mils)



"Over 2-million square feet coated with Miami-Dade Water & Sewer"

Try our hassle-free **EZ-Spray™ System!**

EPOXYTEC
REPAIR | PROTECT | MAINTAIN

Try it Today!!! 877.GO.EPOXY

info@epoxytec.com · http://epoxytec.com/pdf/Uroflex.pdf

epoxytec.com

"High performance products that work where others fail"

Apply 1-to-1 mix by

353

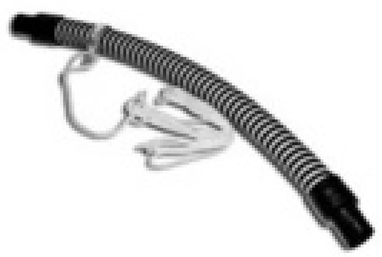
Parker & Piranha Jetter Hose

Myers® Packing & Repair Kits

Washdown Gun $140.00

Root Cutters

Ball Valves



Tiger Tail $35.00

NEED HOSE? VALVE? PUMP? JUST A PART?

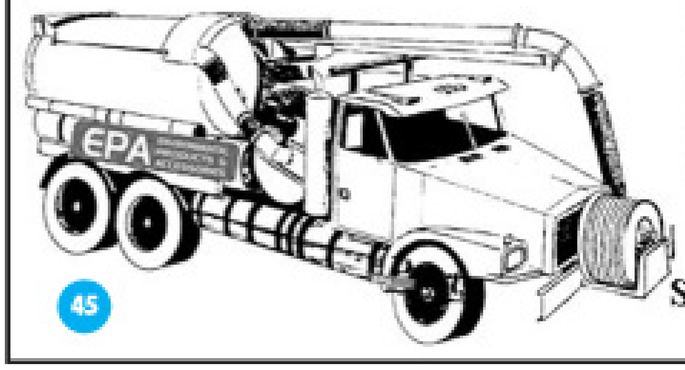
GET OUR CATALOG ..... *FREE*

Over 1,000 Most Frequently needed Items!!

Brass Valves 4", 6", 8"

100's of Nozzles

Reel Swivels



45

Suction Hose

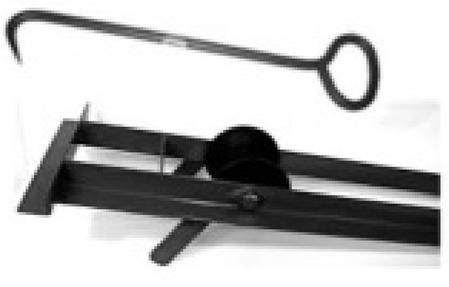
EPA ENVIRONMENTAL PRODUCTS & ACCESSORIES

Toll Free: 866-448-5547
WWW.EPASALES.COM
Tel: 423-876-4366/Fax: 423-876-4389

Jetting and Vacuum Parts

Suction Tubes

Hooks



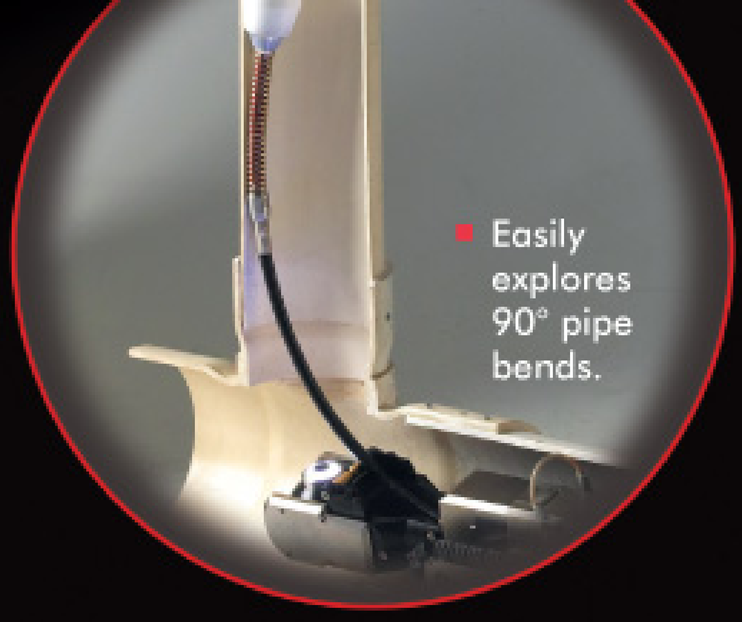
Manhole Roller $132.00

LETS

LATERAL EVALUATION TELEVISION SYSTEM

NOW WITH THE NEW-IMPROVED OPTI-LAUNCH DRIVE SYSTEM

- Low friction drive mechanism virtually eliminates cable wear
- Increased productivity with 50% faster lateral camera launches
- Single "loopless" cable launch design
- Increased safety and convenience with automated self-capturing push cable retrieval
- Easily retrofits to existing systems



- Easily explores 90° pipe bends.

■ CALL 800-234-7205
FOR MORE INFO

10

Proudly Manufactured in The USA

FOCUSED ON THE WORLD'S INFRASTRUCTURE

ARIES®

550 Elizabeth Street • Waukesha, WI 53186 • Phone: 262-896-7205 • Toll Free: 800-234-7205 • www.ariesindustries.com • sales@ariesindustries.com

LOCATE OUR TRANSMITTERS OR THEIRS.

The LF2200 is the newest in our top-of-the-line receivers. It is more sensitive, quiet to the ear and best of all, works with just about **any frequency—even our competitors' transmitters.** It can lock onto any frequency from 16 Hz to over 100 KHz.

Transmit this: Prototek has been making and servicing locating tools since 1990. Our transmitters are tiny, huge, versatile, flushable and they'll transmit through just about any material. They're simply the best performing transmitters and receivers in the industry because we've built our business by listening to our best advisers: our customers.

Visit our web site or give us a call.

You've got questions.
We've got answers.

"Blow your competition away with Prototek!"

Prototek. 67

800-541-9123
Web: www.prototek.net
Email: prototeksales@prototek.net

U.S.A. MADE

Jaws®
10-Year Limited Warranty

NozzTeq®

Taking Science to the Sewer!®

Equipment Engineered for Long Lasting Performance.™

Rental & Leasing Services Available!
Call For FREE DVD

Phone: **1.866.620.5915** Fax: 603.413.6744

www.nozzteq.com

244

T&T Tools, Inc.
800.521.6893

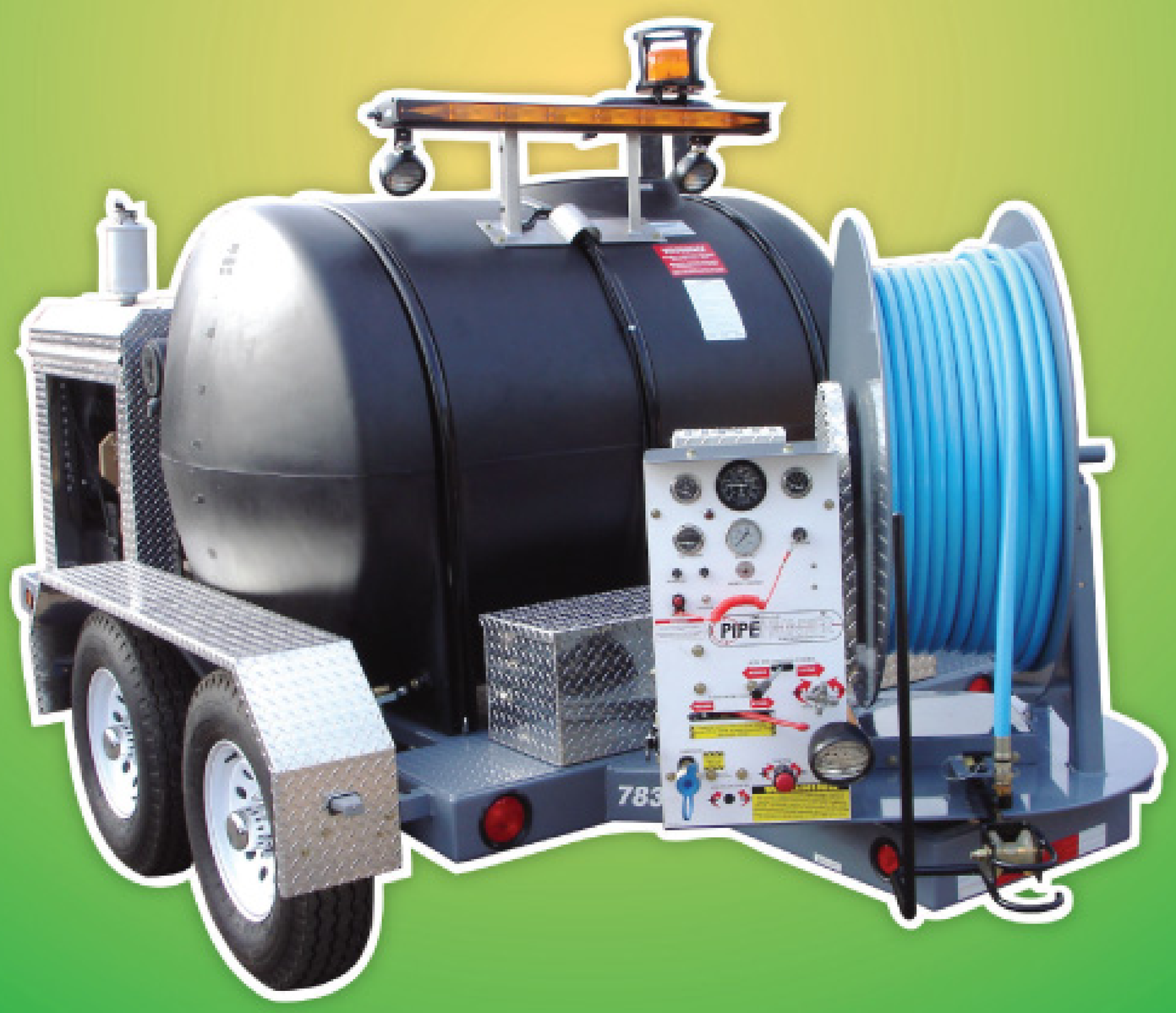
Hooks...
- Heat treated for long life
- Manhole Cover Hooks
- Septic Tank Lid Hooks
- Many styles available
- "T" handles for two hands or compact "D" handles

Probes...
- Insulated, Standard and Specialty
- Metal shafts: 3/8 round or hex
- Replaceable hardened tips
- Optional "slide" available to make your probe a mini-slide hammer

Call for a FREE Catalog 55

Email: sales@tandttools.com Fax: 800.521.3260

BIG IDEAS DON'T ALWAYS SHOW UP IN BIG PACKAGES

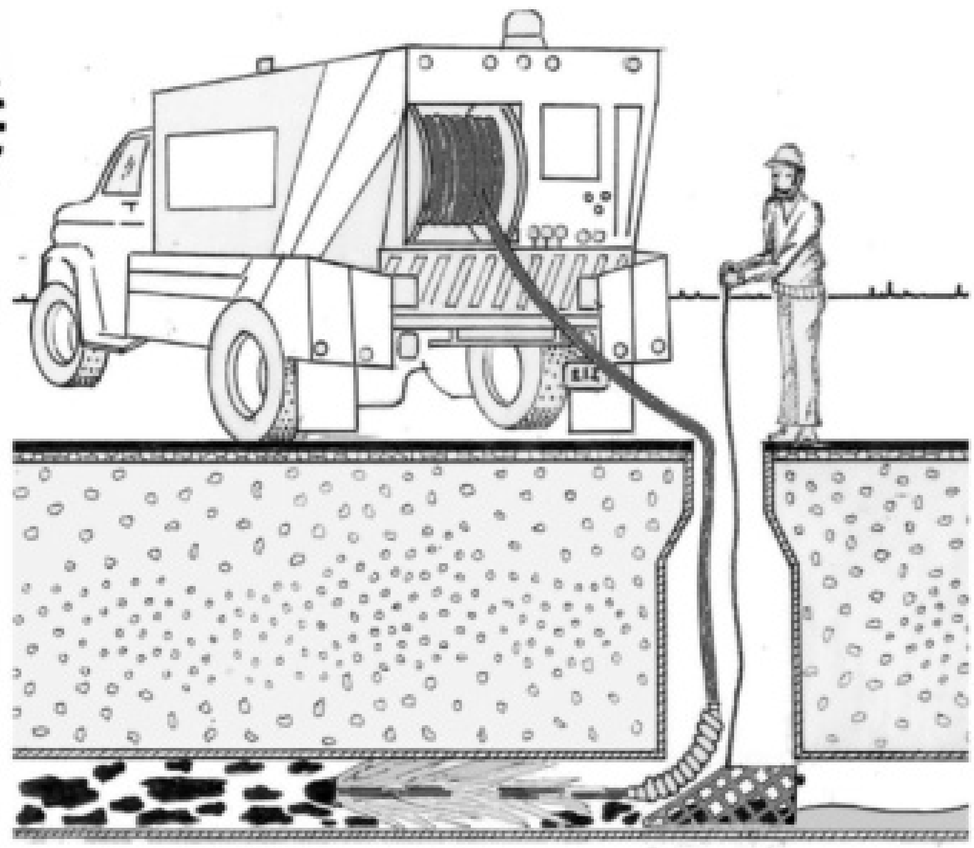


Great Sewer Cleaning Equipment

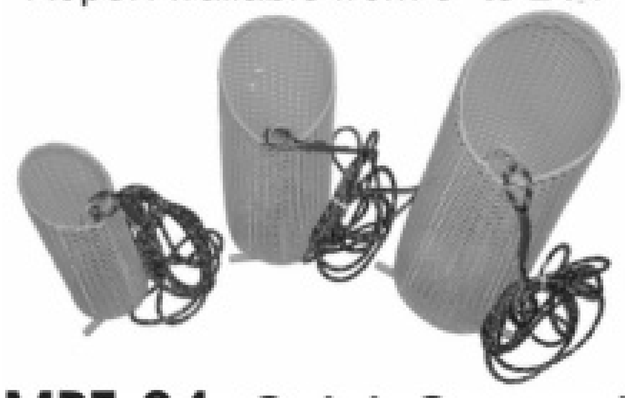
PIPEHUNTER™

www.pipehunter.com

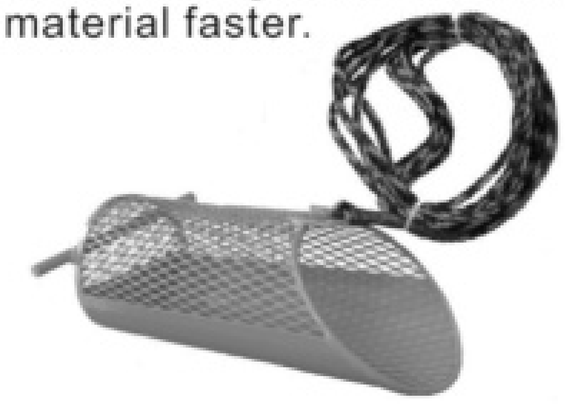
MAX-LIFE
Manhole Tools



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".

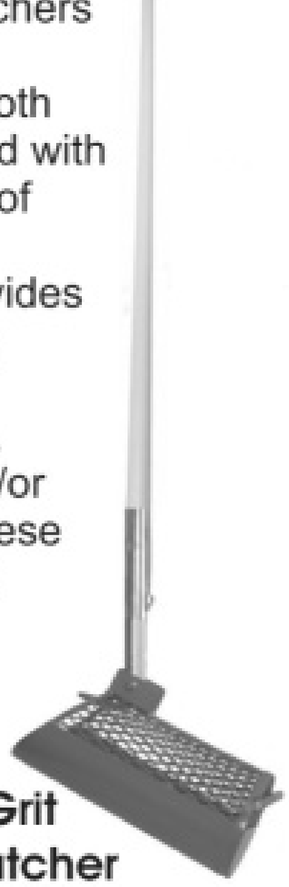


Grit Catchers
MDC-6CW are similar but have half moon bottom around sides and back to stop finer grit and black sand from Flowing thru. Fills with material faster.



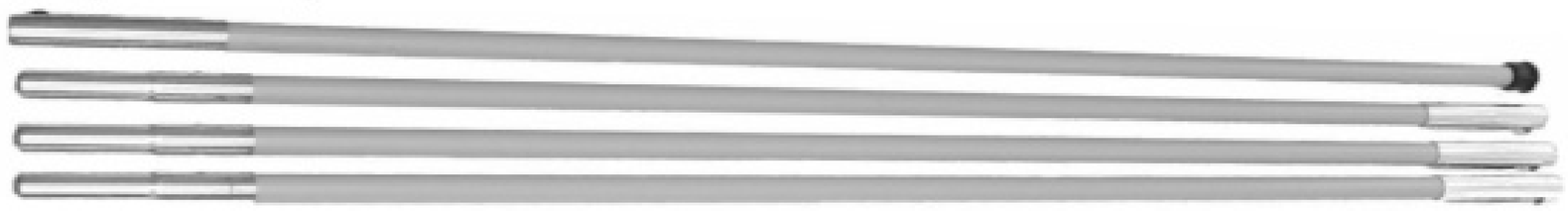
Debris Catchers and Grit Catchers both can be used with any length of Fiberglass Poles. Provides for positive action of positioning, raising and/or lowering these catchers in manholes.

Debris Catcher



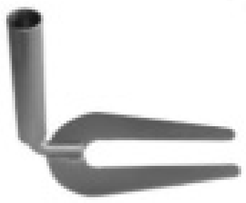
Grit Catcher

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.



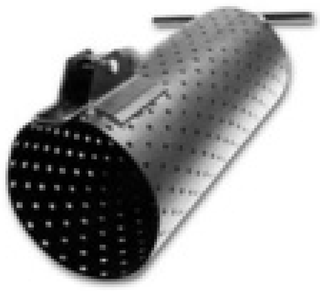
MGLC-1
Grease Log Chopper. Blade cuts thru heavy pieces.

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.

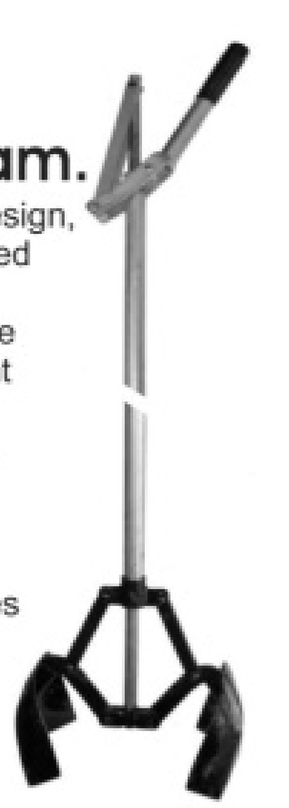


MCG-6
Grit Basket. For use with poles or rope. In sizes from 6" to 24".

MCLAW MAX-CLAW 7' -15' Telescopic Extendable Claw with fiberglass pole extension spring loaded end Claw for Heavy duty retrieval. Jaws stay open and positive rope pull locking systems assure you wont loose your debris.

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.

Versi-Clam.
Knock down design, easily assembled from 6' to 25'. One size can be used in different lengths. Ships via UPS, Now you don't have to pay those high trucking charges



MAX-LIFE MANUFACTURING CORP.

COMPLETE LINE OF SEWER RODDING TOOLS AND EQUIPMENT **888-873-6295 11580 Seaboard Circle, Stanton, California 90680 / FAX: (714) 714-897-2810 www.flexmax.com dhp@flexmax.com**

BLUE RIBBON FOR BLUE WATER

Rogue Valley Sewer Services wins EPA recognition for stormwater management excellence in large part through leveraging of assets and regional collaboration

By Dan Heim

The 2008 EPA First Place Award for Stormwater Management Excellence went to Rogue Valley Sewer Services (RVS) of Central Point, Ore.

Only one first place is awarded nationally, and it's based on three criteria: innovation, cost-effectiveness and environmental benefits. RVS stormwater engineer Maynard Flohaug proudly recounts the successful strategy his team follows.

"A big part of our method involves what I call leveraging — using ideas already out there. So I'm excited to share what we've learned with others in the business, to give back in a way that can help others achieve what we did. Tapping into existing knowledge was a key factor, and so is contributing back to that body of knowledge."

RVS is responsible for stormwater quality in the Bear Creek watershed, just upstream of the Rogue River watershed, a popular recreation area in southwest Oregon. The territory lies about 80 miles from the Pacific coast and 30 miles north of the California border, and is shielded by the Oregon Coastal Range.

West of that range, precipitation can be 30 inches or more annually, but RVS sees only about 18 inches. The temperate climate is ideal for agriculture. Bountiful vineyards dot the area. Soils have a high clay content, and the water table averages 10 feet, but the topography is flat, so erosion is rarely an issue.

A crew from Rogue Valley Sewer Services cleans solids from a stormwater containment water-quality vault with the hose of a vacuum truck. Routine maintenance is handled by two vacuum trucks from Vac-Con Inc. (Photography by Tim Bullard)

Water samples from a stormwater containment water-quality vault to check vault efficiency.

This idyllic setting was, nonetheless, subject to the same NPDES Phase II and MS4 standards that have challenged so many others. How RVS met the challenge is a lesson worth sharing. The EPA award cites several specific accomplishments, including:

- Becoming a Department of Environmental Quality agent for oversight of construction permits
- Designing the Rogue Valley *Stormwater Quality Design Manual*

- Starting a Capital Improvement Program (CIP)
- Creating a 1200C construction stormwater program
- Instituting erosion and sediment control certification classes.

Innovative collaboration

For stormwater purposes, RVS serves the cities of Central Point, Phoenix and Talent, and portions of Jackson County, including White City. For sanitary sewer service, the agency covers Jacksonville, Talent, Phoenix, Central Point and Eagle Point, as well as some unincorporated areas of Jackson County, including White City.

The first EPA stormwater award criterion is innovation, and RVS was recognized here for its success in establishing regional collaboration. RVS took the initiative to invite and integrate surrounding communities into its existing Phase II plan. Rather than having redundant efforts, especially in licensing and other EPA paperwork, RVS sought to combine what was essentially a unified regional effort under a single manager.

Shane Macuk inspects a containment pond where stormwater is collected before overflows enter a creek. The green growth is natural algae and organic materials.

Acting as DEQ agent for the entire Phase II Region has significantly reduced red tape and, in the words of the EPA award announcement, "significantly reduced the amount of pollutants entering the Bear Creek and Rogue River watersheds."

The CIP was created to enable retrofitting of stormwater control measures in existing residential and commercial areas. Three have already been completed, serving some 380 acres. Two more are planned for each year of the five-year plan.

The 1200C construction stormwater program makes RVS responsible for all construction oversight, inspection and enforcement within its Phase II area. It requires every construction project to provide a certified erosion and sediment control (ESC) inspector to ensure compliance before a permit is issued.

Of course, RVS provides the certification training, with 11 seminars to date and more than 200 "graduates." Flohaug notes, "This is where we can be really proactive." Yet another example of innovation, and cost-effectiveness, involves leveraging.

Building on successes

"By leveraging, I'm talking about not spending time and money reinventing the wheel," Flohaug says. "Most any problem we run into, somebody else has already solved it. All we need to do is tweak it to fit our local conditions. Being able to call another engineer, knowing how to search online, and

"A big part of our method involves what I call leveraging — using ideas already out there. So I'm excited to share what we've learned with others in the business, to give back in a way that can help others achieve what we did. Tapping into existing knowledge was a key factor, and so is contributing back to that body of knowledge."

Maynard Flohaug

PROFILE:
Rogue Valley Sewer Services, Central Point, Ore.

CUSTOMERS:
60,000

EQUIPMENT:
Two vacuum trucks, two camera vans

WATERSHED AREA:
400 square miles (for Bear Creek watershed)

ANNUAL PRECIPITATION:
18 inches

INFRASTRUCTURE:
93 miles of sanitary sewer pipe, 4,500 stormwater catch basins, 16 stormwater monitoring stations, unknown miles of open channel

ANNUAL BUDGET:
$370,000 (stormwater quality)

EMPLOYEES:
30

WEB SITE:
www.rvss.us/index.html

ONE BIG POOL OF CLEAR WATER

Crater Lake (first known as Deep Blue Lake, then Blue Lake, and later Lake Majesty) in Oregon lies 40 miles northeast of Central Point. At 1,949 feet, it is the deepest lake in the United States, and ninth deepest in the world. (Lake Baikal, in southern Siberia, is the world's deepest at 5,371 feet.)

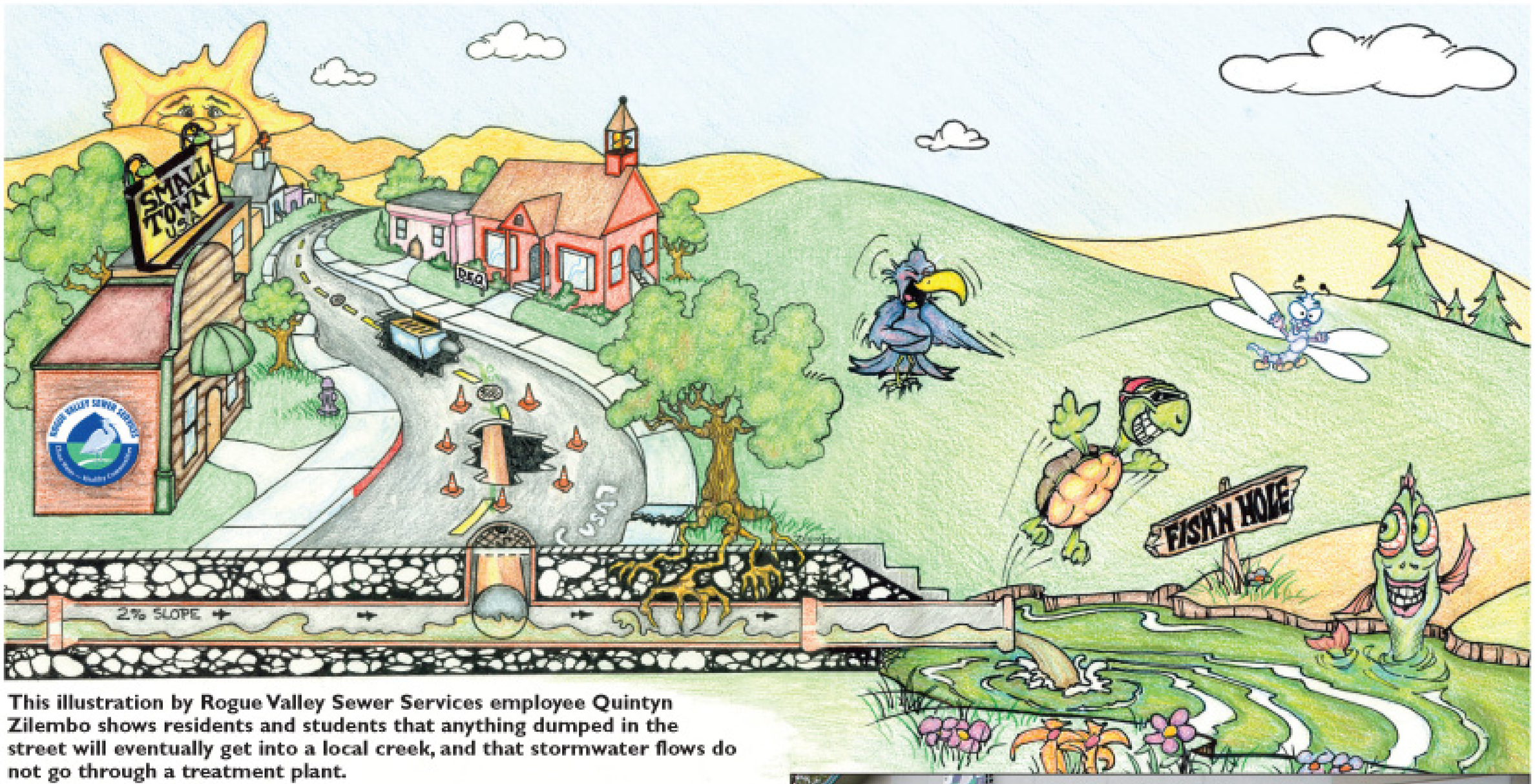
Since Crater Lake has no inlets, its water is some of the cleanest on the planet and is the envy of water-quality engineers. Secchi disk readings range from 80 to 115 feet — highly transparent water. By comparison, typical inland lakes have readings up to 40 feet.

Crater Lake holds an estimated 4.9 trillion gallons of pristine water. To put that into perspective, all the homes, farms and factories in the United States use about 400 billion gallons each day. Thus, Crater Lake could supply the entire country's water needs for 12 days.

The lake has no outlets, but it does feed some springs. What is lost by evaporation and percolation is balanced by precipitation, the vast majority of which comes as snow. The area enjoys a generous 533 inches of snow each year.

The local Native American Klamath tribe may have witnessed the collapse of Mt. Mazama and the actual formation of Crater Lake. Geologists estimate that the collapse of this 12,000-foot volcano occurred about 7,700 years ago. Its last eruption formed a caldera that later filled with water to become Crater Lake.

Klamath legends tell of a fierce battle between the sky god Skell and the underworld god Llao, resulting in the destruction of Mt. Mazama. The Klamath tribe still regards the site as a spiritual place, and in the past used it for vision quests.



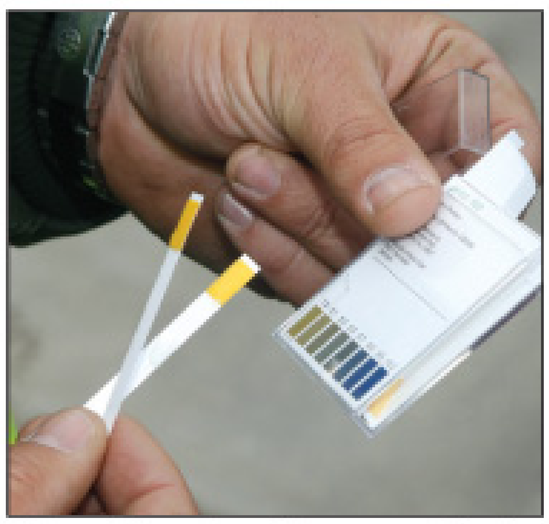
This illustration by Rogue Valley Sewer Services employee Quintyn Zilembo shows residents and students that anything dumped in the street will eventually get into a local creek, and that stormwater flows do not go through a treatment plant.

"The teamwork, attitude and motivation here are amazing. I've been in this business for close to 35 years, and this is the best place I've ever worked."

Maynard Flohaug

reading magazines like *Municipal Sewer & Water* help me tap into all this knowledge."

The Rogue Valley *Stormwater Quality Design Manual,* one of many publications available on the RVS Web site, is an example of leveraging. RVS adapted information from the City of Portland's *Stormwater Management Manual,* that city's *Erosion Prevention and Sediment Control Planning and Design Manual,* and the Oregon Department of Transportation's *Hydraulic Manual.* Some of this material was immediately applicable; the rest was modified as needed. As a result, the RVS manual was completed without spending significant time and money.



Shane Macuk performs a pH test on a citizen's pool that is being drained into the street and storm drainage system.

This also ties into the second EPA criterion: cost-effectiveness. Says Flohaug, "Why spend money re-engineering something when the work's already been done? This isn't plagiarism. It's just using what other people have put out there. We're all in the same business, we have the same goals, and we're proud to share our solutions."

The majority of RVS' $370,000 stormwater quality budget is covered by a $1-per-residence stormwater quality charge, with a small supplement from state permit fees. Getting the most bang for those bucks is crucial. Leveraging makes that happen.

Environmental benefits

The third EPA criterion is benefit to the environment. Whatever the level of innovation and cost-effectiveness, the bottom line must be cleaner water, and RVS has exceeded EPA standards in this arena.

The Rogue Valley Sewer Services team includes (from left) Dave Banks, inspector, Shane Macuk, inspector II, Chuck Root, manager, Carole Balzer, network administrator, and Brenda Baldovino, finance director.

Attacking stormwater pollution at its source is an established, cost-effective strategy. The Oregon Environmental Council (OEC) already had a program in place to provide homeowners information and designs for residential stormwater control. Rain gardens, bioswales, green roofs and pervious paving are all proven solutions. There was no need to allocate local resources for this education. RVS simply points inquiring minds to the appropriate OEC contacts — yet another example of leveraging.

No stormwater treatment plants are foreseeable, as the system is working just fine. RVS installed four water-quality monitoring stations, and has taken over responsibility for 12 existing stations in adjoining municipalities. More are planned.

"Lack of any comprehensive education or enforcement programs was our biggest hurdle," says Flohaug. RVS finally turned that around last year. After extensive R&D, the agency created a series of informational brochures, training manuals, and design guides, all

Rogue Valley Sewer Services combines infrastructure maintenance with regional collaboration to keep area water clear of runoff pollution.

now available on the Web site.

Flohaug continues, "2008 was when we started seeing a difference, like reductions in waste from filters and catch basins, more cooperation from developers, and more public awareness. We could easily see the difference in stormwater quality. It was measurable."

Useful manual

The EPA singles out the *Stormwater Quality Design Manual* as one of the key factors in RVS' award. Created for developers, it provides not only design requirements but also a variety of options for stormwater quality. Written for engineers, it helps to establish annual goals and focuses on the proper design and installation of stormwater quality-control measures.

"These people are smart, but most have no experience in stormwater quality engineering," Flohaug says. "They want to do the right thing, but they need somebody to tell them how. Our design manual and certification classes were the solution." To date, some 230 developers, contractors and inspectors have been trained and certified.

Other educational resources are designed for public consumption. Many people assume that stormwater is treated. "That's just not the case," Flohaug says, "and we needed to change that perception. People need to see that, if you're going to dump antifreeze down a storm drain, you might as well just dump it into the river." The RVS Web site provides several brochures to make that point, including "Creeks and Concrete Don't Mix," "Painting Without Polluting," and "Oil and Stormwater."

Outreach to area schools is another strategy. RVS built a watershed model to take into classrooms. It demonstrates clearly how what goes down the storm drain ultimately ends up in the river. "We can drop a little dye into the system, representing motor oil, and the kids can see where it goes," notes Flohaug.

Reusing the wheel

Flohaug repeatedly emphasizes the importance of not reinventing the wheel and, instead, using existing solutions to solve problems. As with patents, true innovation can involve the creative use or modification of an existing product or process. But doing so requires real problem-solving, and the motivation to try new ideas.

"It just doesn't make sense to spend money doing research about what works, when that research has already been done," Flohaug explains. "We just have to adapt somebody else's solution to our specific needs."

Communication between stormwater personnel in cities sharing the RVS Phase II Permit has been a key factor in their mutual success. Says Flohaug, "It's nice to be able to just call up one of those guys and ask them how they solved the same problem."

A survey of RVS assets would include the usual assortment of stormwater quality systems: filters, traps, catchment basins, rain gardens, permeable paving, maintenance vehicles, GIS and a team of well-trained personnel. Routine maintenance is handled by two vacuum trucks from Vac-Con Inc. on International chassis and two camera vans from RS Technical Services Inc. with OmniEYE zoom cameras. RVS uses Pipe Operating System Management (POSM) software for cataloging, planning and scheduling.

More than hardware

Behind the hardware are management, engineering and maintenance teams skilled in collaborative problem-solving and willing to pitch in wherever needed, regardless of job description. Flohaug notes, "I really have to brag about RVS. The teamwork, attitude and motivation here are amazing. I've been in this business for close to 35 years, and this is the best place I've ever worked."

The good work and planning continue. A recent pilot project involves retrofitting parking lot catch basins with filters to segregate all the pollutants typically exuded by motor vehicles, one of the biggest loads on the system. "We'll be monitoring this closely," says Flohaug, "as we'd like to know exactly what's in that runoff and how to deal with it most cost-effectively."

Innovation, cost-effectiveness and benefit to the environment are the keys to stormwater management. RVS is on track to continue its award-winning performance. Can the agency repeat and earn another EPA first place? If other agencies leverage what they learn from RVS, it could be a much tougher competition. ✦

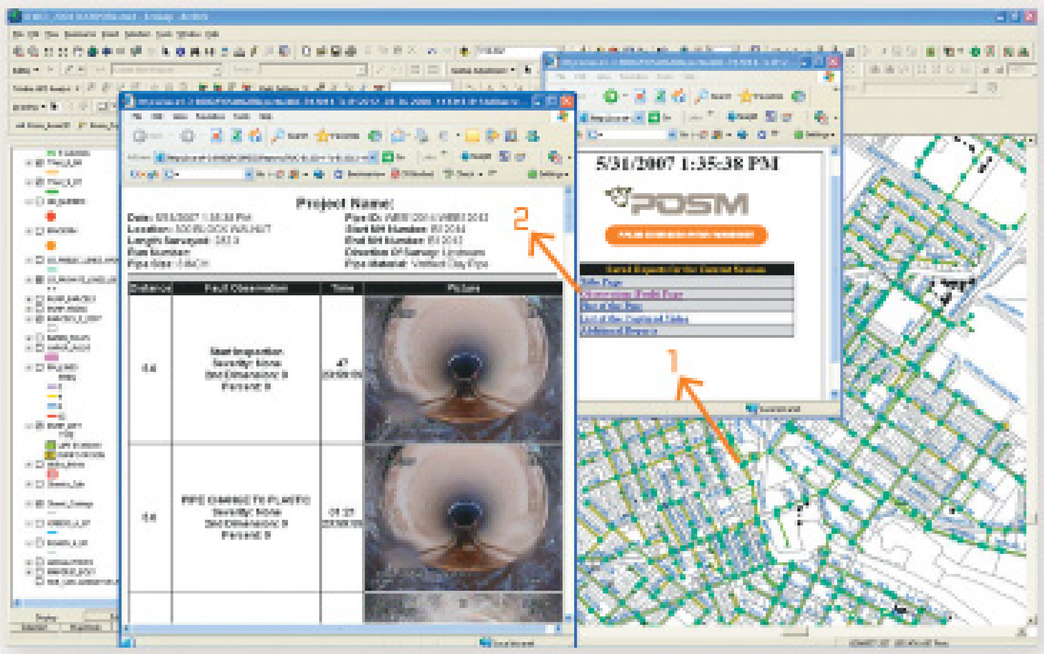
MORE INFO:

427 **POSM**
866/217-9631
www.posm.us

63 **RS Technical Services Inc.**
707/778-1974
www.rstechserv.com

6 **Vac-Con Inc.**
904/284-4200
www.vac-con.com

POSMoffice
server edition



1. Click on a map to visually locate and open a Posm CCTV inspection.
2. View Reports, Images and Videos from a web browser.

POSM's Collaborative, Large Storage Capacity, Asset Management Software Application.

The POSM Office Server Edition is intended for cities to collaborate with existing software programs for better systematized communication and enhanced interpretation of all CCTV data collected in a large database network setting.

2-way GIS connectivity providing indexing and organization of all inspection data imported from POSM Lite, POSM Pro or any NASSCO certified software. Designed to handle the dissemination of immense amounts of inspection data throughout multiple levels of any organization of data and inspections.

- No more searching for tapes or DVD's. Simply search in POSM, or click on a map, to view pipeline inspection reports.
- HTML linking from ArcMap to a POSM report. XY data is shown on the map, and for each observation.
- POSM server stores, organizes, and links all data to GIS.

The Pipeline Inspection Data Cycle Is Completed.

POSM is NASSCO PACP / MACP Certified Software

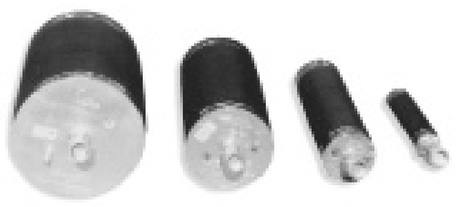
Pipeline Observation System Management \\ Email » info@posm.us \\ Website » www.posm.us \\ Phone » 859-274-0041 \\ Fax » 707-238-1478 427

"Your One-Stop Stopper Shop!"

FOR 31 YEARS – HOME OF THE ORIGINAL

J PIPE PLUG & NB BAG/PILLOW DESIGN STOPPER

[SINGLE SIZE OR MULTI SIZE PIPE STOPPERS 4" & UP]



18-24" 12-18" 8-12" 4-8"

J PLUGS

- Four J-Plugs do the job of 12 plugs
- Field repairable
- Above ground installation

NB MULTI SIZE BAG/PILLOW STOPPERS

- Great for elliptical & other non-round applications
- Natural rubber construction
- Also available with Flow Thru

SINGLE & MULTI SIZE PASS THRU PLUGS

MULTI SIZE PLUGS & MULTI SIZE LEAK LOCATORS

SINGLE & MULTI SIZE TEST PLUGS

COMPLETE LINE OF SEWER & DRAINAGE TOOLS AVAILABLE

disc plugs | high pressure plugs | large inflatable pipe plugs | pipeline testing & acceptance plugs | pneumatic by-pass plugs

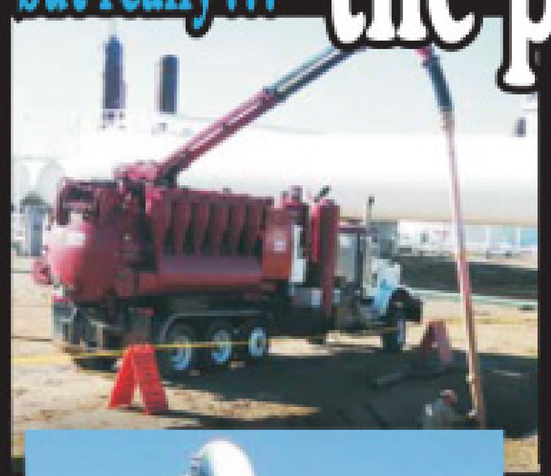
SEWER EQUIPMENT CO. OF FLORIDA, INC. 139

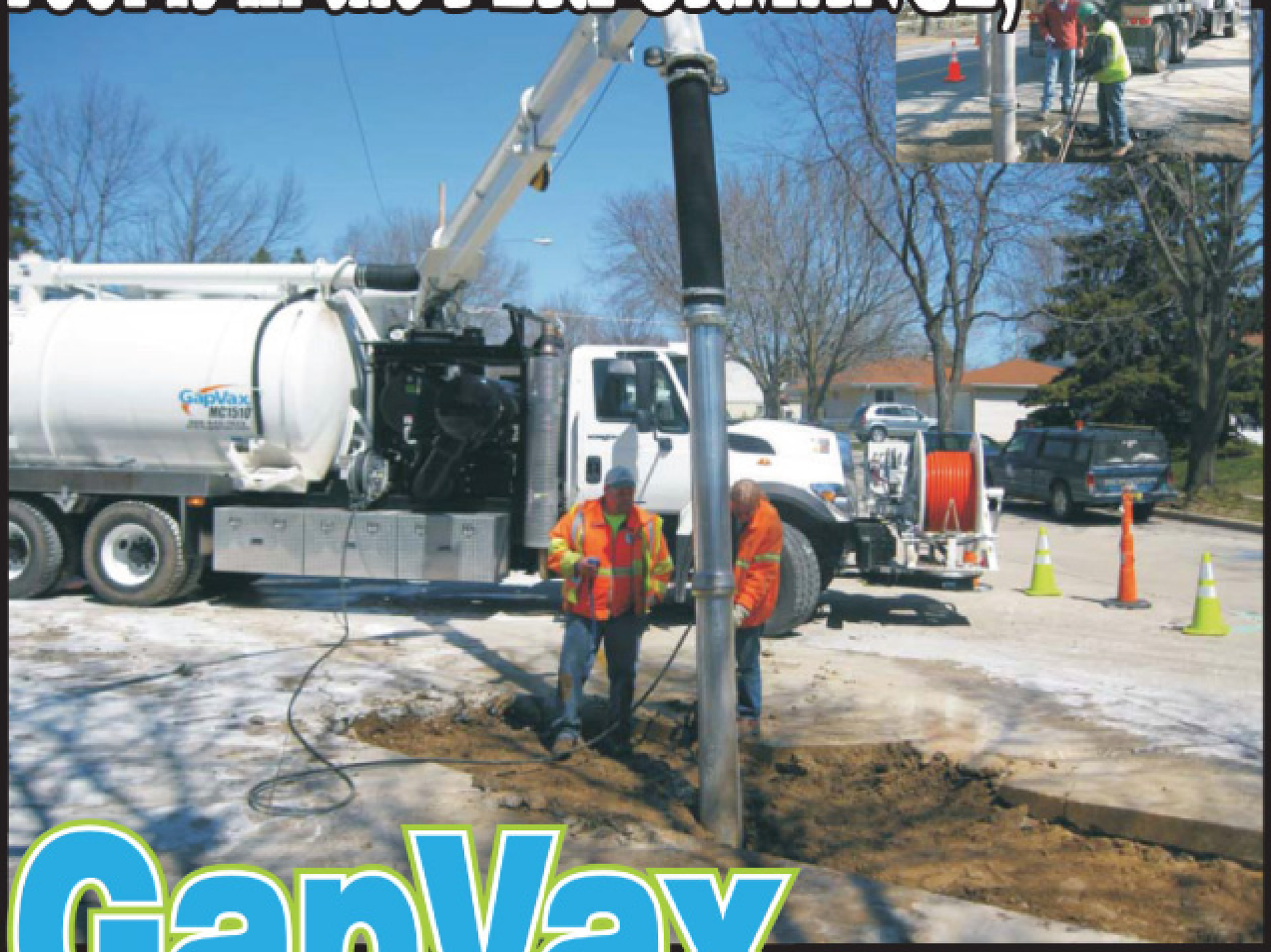
P.O. BOX 186 | 1102 N. DIXIE FREEWAY | NEW SMYRNA BEACH, FL 32170-0186 USA
IN FLORIDA **800.225.2952** | OUT OF FLORIDA **800.635.2323** | IN CANADA **800.328.3318**
FAX **386.427.4552** | E-MAIL **csewerequipment@cfl.rr.com** | WEB SITE **www.sewerequipmentco.com**

COMPLETE LINE OF SEWER MAINTENANCE TOOLS

All the ads out there say "We're the best, most reliable, most fuel efficient..." and all that,

but really... **the proof is in the PERFORMANCE,**





GapVax® PERFORMANCE!

We've been around for the past 20 years
bringing you top quality,
patented superior filtration,
the lowest maintenance costs,
excellent customer service,
versatility, reliability, durability,
a top-notch parts and accessory department
to meet your every need,
and above all else - we custom build
to meet your specs. We use only the best
components to manufacture trucks and
equipment to last a long time, it's user-friendly,
and is designed for the utmost safety in operation.

toll free U.S. & Canada

888-442-7829

GapVax

PARTSEXPRESS

Want to see for yourself?

Call us today to schedule your demonstration!

~Visit www.gapvax.com to check out our videos and testimonials~

The Robert O. Schulz Solar Farm, believed to have the world's first single-axis solar-tracking system using monocrystalline and thin film and photovoltaic cells, provides electricity for the San Joaquin Irrigation District. (Photos courtesy of Conergy Americas)

BETTER MOUSETRAPS

PRODUCT:
Photovoltaic cells and single-axis tracking system

APPLICATION:
Electric power generation

BENEFITS:
Offset energy costs and stabilize power supply

USER:
Nick C. DeGroot Water Treatment Plant, Oakdale, Calif.

WEB SITE:
www.ssjid.com

SUN POWER

Monocrystalline and thin-film solar modules on a single-axis tracking system meet power requirements at a California water treatment plant

By Scottie Dayton

"We have quite a number of green tags and can market them to Oregon, Arizona and the state of Washington. Their economic value is $7 to $24 a megawatt-hour."

Don Battles

Power outages lasting minutes to hours at the Nick C. DeGroot Water Treatment Plant in Oakdale, Calif., were causing treated water storage problems — and the facility has a pair of storage tanks each holding 3 million gallons.

The board of directors of South San Joaquin Irrigation District, which operates the facility, wanted plant personnel to get comfortable with solar energy and eventually apply it across the district. A solar system seemed the ideal solution to DeGroot's problems.

Together with Pacific Gas and Electric (PG&E) and Denver-based Conergy Americas, the district planned the Robert O. Schulz Solar Farm, a solar array estimated to produce 3 million kWh per year to offset energy costs and stabilize the power supply to the water treatment plant. The farm is believed to have the world's first single-axis solar-tracking system using monocrystalline and thin film and photovoltaic cells.

Zero carbon

The water treatment plant uses membrane technology to process 40 mgd for the district's 155,000 residents. The district also allocates 230,000 acre-feet of water annually to irrigate 55,000 acres for 2,400 customers. The irrigation season is mid-March through mid-October.

Water from the Stanislaus River gravity feeds through five sequential reservoirs with three dams with capacity for 130 MW of hydroelectric power. "Between our solar farm and the dams, we have zero carbon resources," says general manager Jeff Shields. California requires 20 percent of utility power supplies to be renewable by 2010, and 33 percent by 2020.

PG&E allows only 1 MW of energy production through one meter, forcing Conergy to build the solar farm in two stages. Phase I cost $8 million and Phase II, with a completely redundant conduit system, cost $3.5 million.

Phase I has 6,720 175-watt monocrystalline modules projected

to generate 2.232 million kWh of AC power. Phase II, projected to produce 800,000 kWh, has 75.5-watt direct current (DC) thin-film modules from First Solar in Tempe, Ariz. Both arrays are mounted on single-axis tracking systems.

"Monocrystalline technology is the workhorse of the solar industry, and we bid both phases with it," says Shields. "However, the modules generate less power in temperatures above 100 degrees or when there are reductions in irradiance, such as clouds and dust."

Thin-film modules are reportedly less affected by these conditions, but have only a six-year history. Conergy, First Solar and the district saw an ideal situation to compare the two technologies under identical conditions.

Sunflower effect

The single-axis solar-tracking systems added 15 percent to the cost of the project, but produce 15 percent to 18 percent more energy than fixed arrays. The solar farm's I-beam steel structures are cemented in the ground. A timer on the system moves the panels about one degree every four minutes.

The solar array occupies 14 acres of a 40-acre site, 300 feet from the water treatment plant. "As the modules rotate east to west, they cast a shadow on their neighbor if you don't leave space between them," says Shields. "Seven 1-hp motors drive a train serving 200 kW, and we have 1,400 kW out there." The motors are considered parasitic load because solar energy powers them.

Five inverter boxes for Phase I and two for Phase II convert direct-current solar-generated electricity to alternating current. Inverters are rated at 250 kW each. To feed the 480-volt current into PG&E's system, three transformers step it up to 4,160 volts. A 40 kVA transformer handles the house load: motors, lights, security system and miscellaneous equipment.

After energizing the water treatment plant, excess electricity feeds into PG&E's grid. "Once a year, we do a true-up with them," says Don Battles, utility systems director. "Phase I went on-line in May 2008 and Phase II late this March, so we owed some money on June 15, the end of our reconciliation period."

Conergy didn't size the solar farm to meet the energy demand of the water treatment plant. It was sized to offset energy payments to PG&E. When the water treatment plant opened in 2005, power cost $370,000 per year. The model for the solar farm projected electricity to cost $410,000 in 2008. "To balance our bill, we had to know how much energy to put back into the system based on the amount PG&E pays us for excess energy," says Battles.

Coming clean

The district has a 10-year maintenance contract with Conergy. Twice per year, technicians check the motors, electrical connections and module interconnections. During the six months of summer, two district employees drive between the rows of solar arrays with a truck-mounted pressure washer and clean them using 5 gpm/40 psi. Pipes laid under the tracking system transport treated water from the plant.

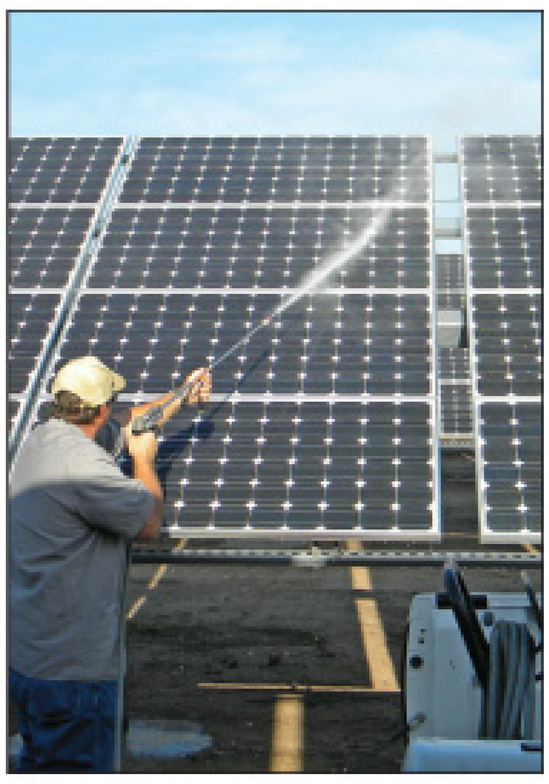
"The men start at daybreak, while the panels are angled so water runs off, and work until 11 a.m.," says Shields. "It takes 10 days to clean the arrays." Because the district's water source is melt water from the Sierra Mountains, there is no streaking or mineral film buildup. Rain does the job the rest of the year.

The district is experimenting with sprinkler technologies to reduce the time and cost of cleaning the modules, and is purchasing a major new thermal detection security system. The solar farm now has a fence and beam security system that sends alarms to the water treatment plant. Employees have responded to one genuine alert and several false alarms.

San Jose-based Fat Spaniel Technologies Inc., the solar farm's qualified monitoring entity, reports net production to PG&E and the Western Renewable Energy Generation Information System for green energy certificates. "We have quite a number of green tags and can market them to Oregon, Arizona and the state of Washington," says Battles. "Their economic value is $7 to $24 per megawatt-hour."

The district originally projected 14 years to pay off the solar farm, but escalating electricity prices, solar rebates and renewable credits have reduced that to 10 years or less for a project that will generate all necessary electricity for 25 years. "The farm is meeting or exceeding our expectations for production," says Shields. ✦

Cleaning of the solar panels takes 10 days of working from daybreak until 11 a.m., when the panels are angled so that water runs off.



MORE INFO:

444 **First Solar Inc.**
602/414-9300
www.firstsolar.com

Your HDPE SPECIALISTS

QUALITY PRODUCTS • QUALITY PEOPLE • QUALITY SERVICE • SINCE 1954

PEOPLE SUPPLYING SOLUTIONS

PROVIDING

- Pipe & Pumping Systems
- Fusion Equipment *(1"to 48" Diameter Capability)*
- Fittings and Valves
- Engineered HDPE Fabrication
- Certified McElroy Service Center
- Certified Fusion Technicians
- Full Service Pump Department
- Complete Fabrication Capabilities
- Largest HDPE Pipeyard in the North East

Providing Products For:

- Horizontal Directional Drilling
- Pipe Bursting & Slip Lining
- Water/River Crossing
- Water Distribution
- Sewage/Waste Water Services

Emergency Services
24/7/365

LEE SUPPLY CO. INC.

1-800-353-3747

www.leesupply.com

We Supply Solutions

148

Insituform Names Vice President and Treasurer

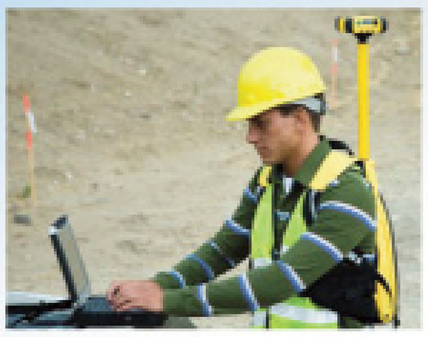
Kenneth L. Young has been named vice president and treasurer for Insituform Technologies Inc. He has 30 years of experience in financial management and a bachelor's degree in finance and banking from the University of Missouri-Columbia.

NLB Updates Waterjet Accessory Catalog

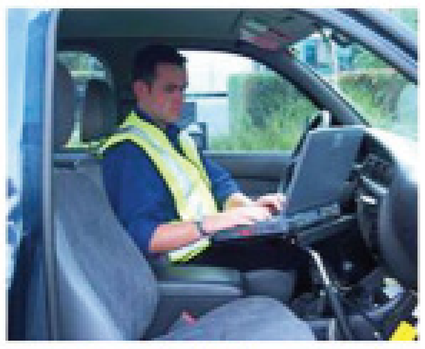
The latest edition of the NLB accessory catalog includes new waterjet tools for pipe cleaning, pavement marking removal and other applications. Copies can be downloaded from www.nlbcorp.com. ✦

Your 1-Stop Shop

Video Pipeline Inspection Equipment & Condition Assessment



Granite XP Manhole Inspections



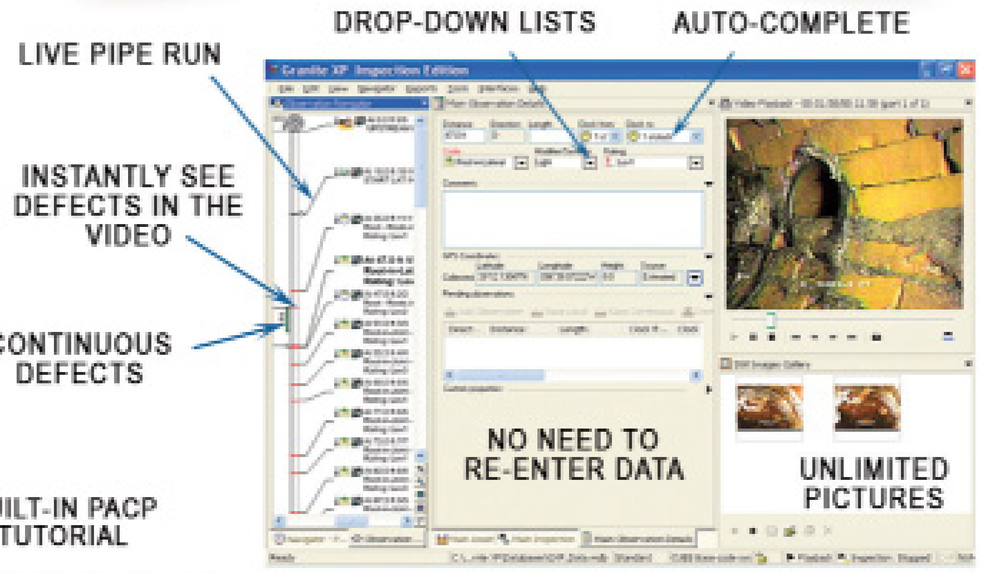
Granite XP Lateral Inspections

Granite XP GPS Inspections

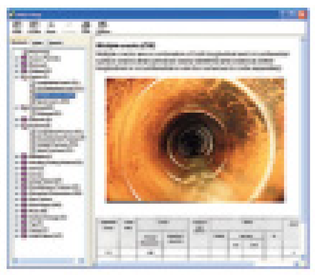
GRANITE XP

Asset Inspection & Decision Support Software for the Water Industry

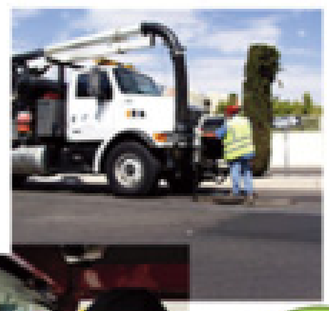
#1 Software on the Market Celebrating 7+ Years



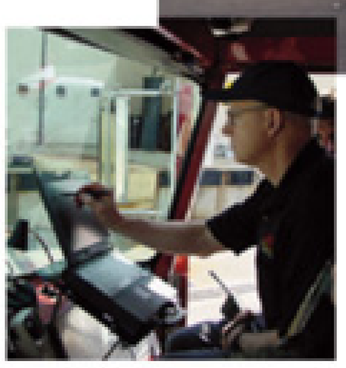
BUILT-IN PACP TUTORIAL



- Easy to use
- Fast data entry
- Sophisticated for advanced customer requirements
- Flexible to add on optional modules in the future
- The best support plan and service in the business
- Thousands of users world-wide



Trucks, vans, ATVs and trailer-mounted systems can be modified to include the equipment you need!



PACP V4.2 Certified Software

MACP Certification planned for release 07/09

Granite XP Cleaning Inspections

"The Standard of the Industry"

CUES

800.327.7791
www.cuesinc.com
salesinfo@cuesinc.com

Lateral & Mainline Inspection Systems

Mini Systems

Laser & Sonar Pipe Profilers

Portable Systems

Cameras & Transporters

Lateral Reinstatement Cutters

Proudly made in the USA

Incorporates patented video access technology licensed under an agreement with Peninsular Technologies (U.S. Patent Nos. 5,742,517 and 6,175,380 B1 Canadian Patent No. 2,227,260; Australian Patent No. 706776).

18

RESTORING FLOW

The Dominator 430 reinstatement cutter from Bowman Tool provides accuracy, productivity and flexibility for a wide variety of lined pipe diameters

By Gil Longwell

Lateral reinstatement is a critical part of cured-in-place pipe lining. The faster new lateral openings can be cut into the newly installed liner, the sooner the sewer can be put back into service, and the less homeowners and businesses are disrupted.

The Dominator 430 cutter, manufactured by Bowman Tool Co. & Systems, is a recent innovation in reinstatement technology. This sled-mounted unit, operated pneumatically and electrically, cuts through the liner at lateral openings and dresses the restored connection for sealing with a grout material.

The machine's weight, a mere eight moving parts, and an extra-wide sled rail combine to dampen vibration from the cutting process. This virtually eliminates tool chatter and flip-overs. Each attribute is designed to reduce downtime and increase profitability.

Employees of Mr. Rehab Inc., a pipe-lining company based in Mechanicsburg, Pa., demonstrated the device in early April in an 8-inch sewer line in East Pennsboro Township, near the state capital of Harrisburg.

The demonstration began after the original vitrified clay pipe had been lined and the curing process was complete. Crew leader Brian Seeger, assistant cutter operator Wesley Logan, and crew member Kyle McCarthy put the cutter to work. Bowman Tool founder Tom Bowman and daughter Jessica Bowman represented their company.

Walk-around

The Dominator cutter resembles a hydraulic cylinder on sled rails. The cylinder's central shaft moves in and out of the larger cylindrical body. The shaft can telescope up to 7.5 inches and can rotate 360 degrees. The cutting bit is secured in the air motor's chuck, which is attached to a sliding shoe. That shoe, in turn, is attached to the shaft.

Wesley Logan (left) and Kyle McCarthy connect an air line (blue) and an electrical control cable (yellow) to the Dominator reinstatement cutter. (Photography by Gil Longwell)

The bit is about two inches long, has a cross-hatched tooth pattern, and is of a non-fluted design. The large number of teeth delivers a smoother cutting action, which means less wear and tear on all of the motors.

Near right: The cutter, lights and camera functions are all checked before deployment. The last step is to clean the camera lens and lights. Far right: A crew member holds a bit and a brush.

TECHNOLOGY TEST DRIVE

EQUIPMENT:
Dominator 430 reinstatement cutter, Generation II Infinite Control system

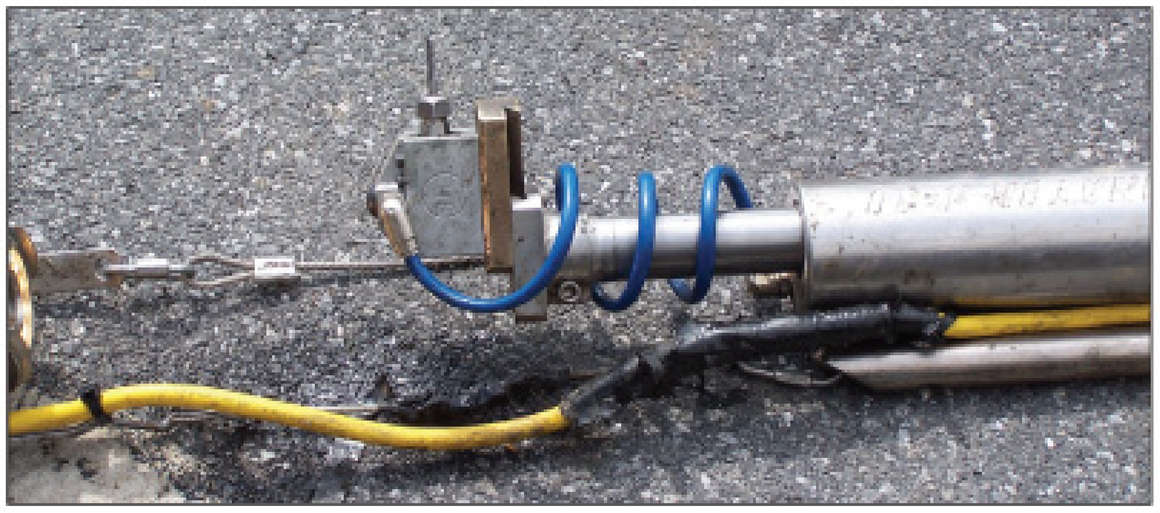
MANUFACTURER:
Bowman Tool Co. & Systems, East Berlin, Pa.
717/432-1403
www.bowmantool.com

LOCATION OF DEMO:
East Pennsboro Township, Enola, Pa.

DEMONSTRATED BY:
Crew leader Brian Seeger, assistant cutter operator Wesley Logan, and crew member Kyle McCarthy, all of Mr. Rehab Inc.

LIST PRICE:
$24,100 as demonstrated

The cutting tool resembles a hydraulic cylinder on sled rails.



Bowman specified the geometry of the valleys between the cross-hatched teeth to prevent gaulding that occurs when, on occasion, a bit encounters partially cured liner material. Gaulding is the clogging of the flutes on a bit or of the interstitial area between teeth. When a bit gaulds, it must be changed out, resulting in lost production time.

The cutter is deployed as part of a train, which is pulled through the lined pipe by a remotely controlled cable and winch system positioned at the next upstream manhole. The lead component in the train is a sled equipped with a CCTV camera.

Gaulded bits are generally discarded.

The bit and shoe are mounted perpendicular to the telescoping shaft's centerline and to the surface of the pipe through which the cutter will be pulled. To bring the bit into contact with the work, the shoe and cutting tool slide outward toward the newly installed liner.

By changing the length of the standoffs (or legs) that connect the sled rails to the body, the cylinder is positioned close to the mainline's center axis. To accommodate pipes of different diameters, either of two interchangeable shoes is used. Pairing the standoff's length and shoe size enables the cutter to work in 6- to 30-inch lined pipes.

When the cutting bit is replaced with a 3-inch-diameter stainless steel wire brush, the cutter is configured to dress the rough edges of the newly cut hole before the joint is grouted to seal the new lateral connection.

The cutter is deployed as part of a train, which is pulled through the lined pipe by a remotely controlled cable and winch system positioned at the next upstream manhole. The lead component in the train is a sled equipped with a CCTV camera.

The camera's real-time images allow the operator to monitor and refine positioning, cutting and dressing operations. All the cutter's actions are controlled at the operator's station in a CCTV inspection van. Using a dedicated, ergonomic joystick, the operator has infinite control of the tools and can make fine adjustments in position, angle of attack, and depth of penetration.

The Dominator 430 requires 24 V DC current to drive the three DC motors and all control systems. At least 38 cfm of compressed air at 100 psi is required to power the air motor. The electrical components are contained in a watertight chamber, eliminating water damage. The motor chamber is also isolated from the feed and rotation mechanism for ease of assembly and disassembly. Complete teardown and reassembly can be completed in less than 30 minutes in the field. The Generation II Infinite Control single joystick system operates all the air motors.

The cutter has only eight internal moving parts and has no clutches, keyways or set screws. All gears and feed mechanisms are manufactured from temper-hardened stainless steel and bronze. The cutter is machined from a solid billet of stainless steel and has an insulated internal air channel instead of an outside air tube. The head uses a pinionless, quick-change design, and only one adjustable gib to reduce adjustment time and maintain high accuracy.

The complete equipment train for reinstatment cutting with the Dominator is shown on the street before deployment.

The cutter is 33 inches long with the ram in and 40.5 inches long with the ram out. It weighs 72 pounds, and has a body diameter of 3.5 inches. It has a ram travel of 4 to 6.5 inches.

Operation

The demonstration began as the crew deployed a CCTV tractor into a freshly lined and cured mainline sewer. Operator Brian Seeger conducted a visual inspection, identifying each lateral connection and checking the locations with measurements recorded before lining.

When the crawler reached the next manhole, a worker implementing confined-space entry protocols entered to attach a wire rope cable. The crew then reversed the crawler to pull the free-wheeling cable of a remote power winch back to the first manhole. Then they retrieved the crawler with the cable still attached.

While the inspection was underway, working on the floor of the CCTV truck's equipment bay, Logan prepared the Dominator 430 cutter. He installed the shoe that corresponded to an 8-inch pipe, then installed the cutting bit in the air motor's chuck. He did not need to change the sled standoffs. He verified that the air-supply hose to the air-powered cutting motor was installed and properly connected.

Logan then placed the cutter on the ground behind a sled-mounted CCTV camera. Using a pair of 18-inch wire rope coupling cables with quick-connectors, Logan and McCarthy joined the camera sled and cutter to form the equipment train. They connected a chain V-yoke to the rails at the front of the CCTV sled, then connected the remote power winch's wire rope cable. Finally, Logan attached a wire rope yoke, connected to a chain, at the back of cutter's sled rails.

A custom-spliced, Y-shaped electrical control cable connected the CCTV camera and cutter to the Red Maxx control cable that would stretch back to the CCTV vehicle. To prevent strain on the Y-cable connectors, this cable was secured

to the standoffs of the camera and cutter.

In this configuration, the entire train is connected at the front by a wire rope cable and at the back by the control cable, both strong enough to retrieve the entire train. The final assembly step was to quick-connect the air supply to a fitting on the rear of the cutter.

Before inserting the train into the manhole, as Seeger activated each of the machine's movements, Logan checked for proper operation. He then cleaned the camera lens and LED lights. Seeger, sitting at the inspection truck console, controlled three systems.

The remotely controlled distant winch and the truck-mounted winch system pulled the train forward and backward to position the cutter or camera for optimum efficiency. The second control system operated the CCTV array. The third controlled the cutter. Without getting up, Seeger easily moved from camera to winch to cutter controls, as needed, to advance the work.

The CCTV camera captures the action as the wire brush dresses the recently reinstated lateral opening. This is the image seen by the operator sitting at the control console.

As the train approached the first lateral, the CCTV display showed an irregular circular ridge in the liner. This was the cast iron lateral's jagged end protruding into the mainline. Seeger made a plunge cut into the liner where it covered the lateral connection. After piercing the liner, he moved the bit toward the lateral's outer perimeter by moving the shoe as it advanced and retracting the bit.

As he saw and heard the bit engaging the cast iron pipe's inner wall, Seeger manipulated the cutter so that the bit followed the curvature of the lateral. The process continued until the obstructing piece of liner material fell away in pieces. The 0.8-hp air motor's exhaust blew the saw debris out of the way and assured a clear view of the work area.

To inspect the work, Seeger engaged the retrieval cable and withdrew the train until the camera enabled him to look into the lateral interior and inspect the newly opened connection. If further cutting is necessary, the distant cable winch can be engaged and the cutter repositioned to finish the job. When the lateral-to-mainline hole is completely cut, the crew pulls the train forward to the next lateral and repeats the process as needed.

After the holes were cleared, Seeger pulled the train forward to the distant manhole. There, Logan removed the cutting bit and installed the wire brush. The train then returned through the lined pipe to the last lateral that had been cut. With the cutter positioned as before, the wire brush, rotating at 30,000 rpm, dressed the connections. The dressing process eliminates burrs and rough spots on the lateral and on the liner's freshly cut edges. When complete, the dressed cast iron pipe gleamed and the liner was uniformly smooth.

Observer comments

The Dominator cutter performs two tasks and does them well. It is a specialized tool that is part of a team of tools, all essential for successful CIPP lining. Using two winches assures that neither machine can become stranded should one winch or one cable fail.

The inward/outward motion of the cylinder's shaft, and its ability to rotate and to move into the work afforded the operator optimum tool positioning flexibility. All of these motions were controlled by Bowman Tool's Generation II joystick and its infinite control capability.

Kyle McCarthy (left) and Wesley Logan lower the second part of the inspection train, the cutter, into a manhole. After both components are lowered, Logan will descend to help insert the train into the newly lined sewer.

"Training at our manufacturing facility is included in the price of the tool. If the customer has a complete turnover of personnel, the new employees can come in and be trained without charge as well."

Tom Bowman

Manufacturer comments

Minimizing the number of moving parts reduces the "play" between those parts, Tom Bowman observes. This eliminates most vibration and wear. Isolation of the motors from the feed and rotation mechanisms in a watertight housing preserves the dry operating environment. It also eases disassembly and reassembly. The unit can be disassembled and reassembled in about 30 minutes, in part because there are no clutches, keyways or set screws.

These machines can be assembled for four-, five- or six-wire control systems, allowing compatibility with other manufacturers' equipment. "Training at our manufacturing facility is included in the price of the tool," Bowman says. "If the customer has a complete turnover of personnel, the new employees can come in and be trained without charge as well.

"We have constructed a machine that requires minimal maintenance, and when maintenance is required, it can be performed by the customer in the field." ✦

MORE INFO:

87 **Bowman Tool Co. and Systems**
717/432-1403
www.bowmantool.com

First we took a cyclone.
Then we mounted it on a trailer.
And the rest is history.

McLaughlin vacuums were the first to eliminate the baghouse and use a three-stage filtration process that includes a cyclone separator and two-micron filter. But that was just the beginning of our innovations.

Since then we've developed the first fully external hydraulic door with a mechanical cam-over locking system, eliminating the need for door latches. We've also made it possible to clean the tank without getting dirty, and installed vacuum blowers that operate at 1025 cfm, the industry's highest air flow rate on a trailer-mounted unit. Many of our industry-leading innovations are still McLaughlin exclusives, so when you want to put our superior vacuum to work for you, remember to ***"Make it a Mac."***

McLaughlin vacuums are available at your local Vermeer dealer.

GSA

U.S. General Services Administration Contract GS-07F-0166

270

McLAUGHLIN®

800-435-9340 • mightymole.com/vacuums

Product Spotlight

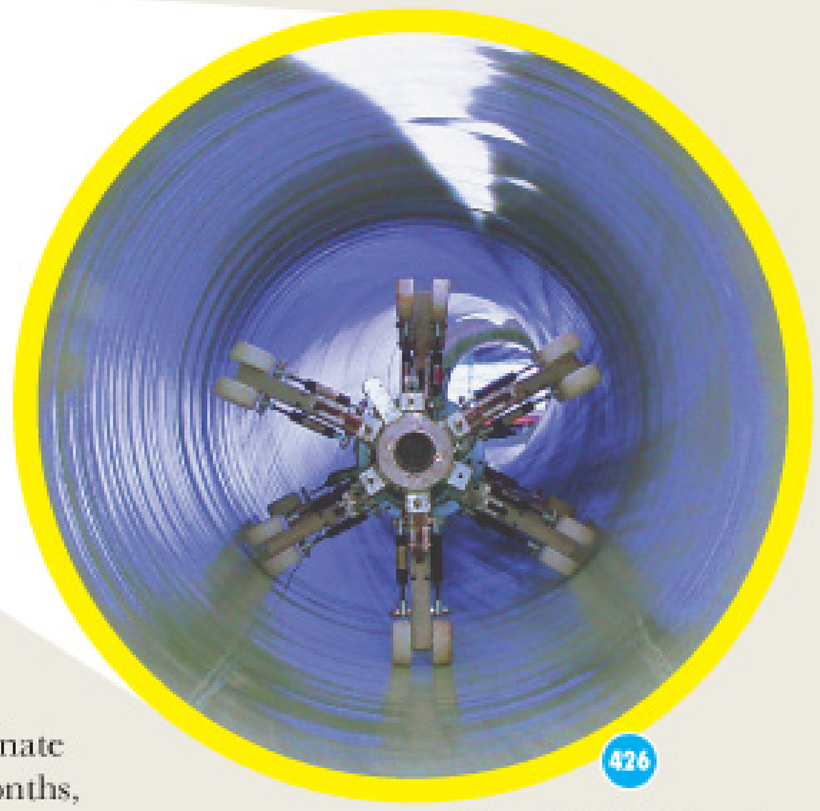
Liner System Includes Data and Verification

By Ken Wysocky

The Blue-Tek CIPP system from Reline America Inc. is designed to offer municipalities a cost-effective, verifiable and environmentally safe method of trenchless pipe rehabilitation.

"This system uses an ultraviolet-wavelength curing system to cure pipes from 4 to 14 feet per minute, depending on the pipe diameter and thickness of the liner," says Mike Burkhard, president. "A computerized monitoring system tracks every critical step in the curing process and provides customers with a database printout that proves the liner was properly installed and cured."

The glass-reinforced liner is manufactured to each customer's dimensions and specifications. It requires no resins, accelerators or refrigeration, reducing installation time. It is spirally wound to eliminate seams. In its uncured state, the liner has a shelf life of at least six months, providing flexibility in case of project delays.



Blue-Tek CIPP system from Reline America Inc.

After the liner is pulled into a pipe, it is inflated with a blower, not an air compressor. That enables customers to use it in larger pipes. The system can accommodate pipes from 4 to 48 inches.

Once the liner is in place, it is cured by a mobile ultraviolet-wavelength system. The light train is composed of three small, wheeled cars, each carrying three UV lights. As the chain moves through the pipe, the light cures the liner.

"The light train travels on a clear inner film that allows heat to penetrate and prevents the wheels from touching the uncured liner," Burkhard says. As the liner cures, a computerized monitoring system logs all critical data, such as the liner's initial calibration, the time curing begins and ends, the lamps' intensity and the number of lighted lamps, the air pressure inside the liner, and the curing speed per minute.

When installation is complete, camera-equipped robotic cutters reinstate all connections, leaving a structurally secure pipe lining. The liner completely contains any styrene in its thermoset resin, making it environmentally safe. **For information, call 866/998-0808 or visit www.relineamerica.com.**

Electric Eel Offers EC-5 Economy Camera

The EC-5 Economy Cam Camera Drain Line Inspection System from Electric Eel is designed for 2- to 8-inch lines and weighs 25 pounds. It features a black-and-white monitor with 1.2-inch black-and-white camera and includes 100 feet of push cable. A 512-Hz in-line transmitter is housed in the lightweight and portable reel. Jacks are provided for an external recording device. A color system with 5-inch color LCD monitor and self-leveling color camera is available. **800/833-1212; www.electriceel.com.**

CUES Introduces WTR Transporter

The WTR wheeled-tracked transformer transporter from CUES Inc. can be set up with wheels or tracks to accommodate varying pipe conditions. The transporter is designed to inspect 6-inch relined through 30-inch pipe and works with CUES OZIII pan-tilt-zoom or CUES OZIII Nite Lite pan-tilt cameras. Various wheel sets and tracks are available. **800/327-7791; www.cuesinc.com.**

Hannay Offers Equipment Grounding Reel

The SGCR spring rewind grounding reel from Hannay is designed to provide a secure and efficient means for grounding vehicles and equipment when working near power lines. Constructed of heavy-duty steel, the reel's bolt-down design allows for easy removal and reinstallation. Independently tested to 15kA for 30 cycles, the reel helps meet OSHA requirements for vehicle grounding. **877/467-3357; www.hannay.com.**

Cobra Introduces Universal Portable Control Console

The Universal Portable Control Console from Cobra Technologies includes a rack-mounted, solid-state computer and 10.4-inch sunlight-readable touch screen. The controller can be used with a Cobra Inspection System or any U.S.-made mainline inspection system controller, multi or single conductor. The controller is available with the PACP/WRc-certified Cobra Touch Data Logger. **800/443-3761; www.cobratec.com.**

General Pipe Offers Drain-Rooter Cable Cleaner

The Drain-Rooter PH cable cleaner from General Pipe Cleaners features a variable-speed power cable that feeds and retrieves cable at 16 feet per minute. A 4-foot guide hose prevents cable whipping, dirty fixtures and messy floors. The cleaner can be operated in both horizontal and vertical positions. Drum speed can be controlled by the foot pedal. Powered by a 3.2-amp variable-speed motor, the cleaner carries up to 50 feet of 1/4-inch and 5/16-inch Flexicore cable or 35 feet of 3/8-inch cable and weighs 22 pounds. **800/245-6200; www.drainbrain.com.**

RIDGID Introduces LCDPak and MiniPak Monitors

LCDPak

MiniPak

The SeeSnake LCDPak and MiniPak inspection camera monitors from RIDGID are designed for performance and durability. The battery-powered LCDPak has a 10.4-inch color LCD screen, while the MiniPak has a 5.7-inch daylight-readable color LCD display and push-button interface. Both monitors include integrated line trace, enabling users to follow the entire length of the push cable. **800/769-7743; www.ridgid.com.** ✦

FOCUS: SEWER

NEW WAYS OF SEEING

Laser and sonar technologies give the King County Wastewater Treatment Division two more effective tools for assessing sewer pipe condition

By Erik Gunn

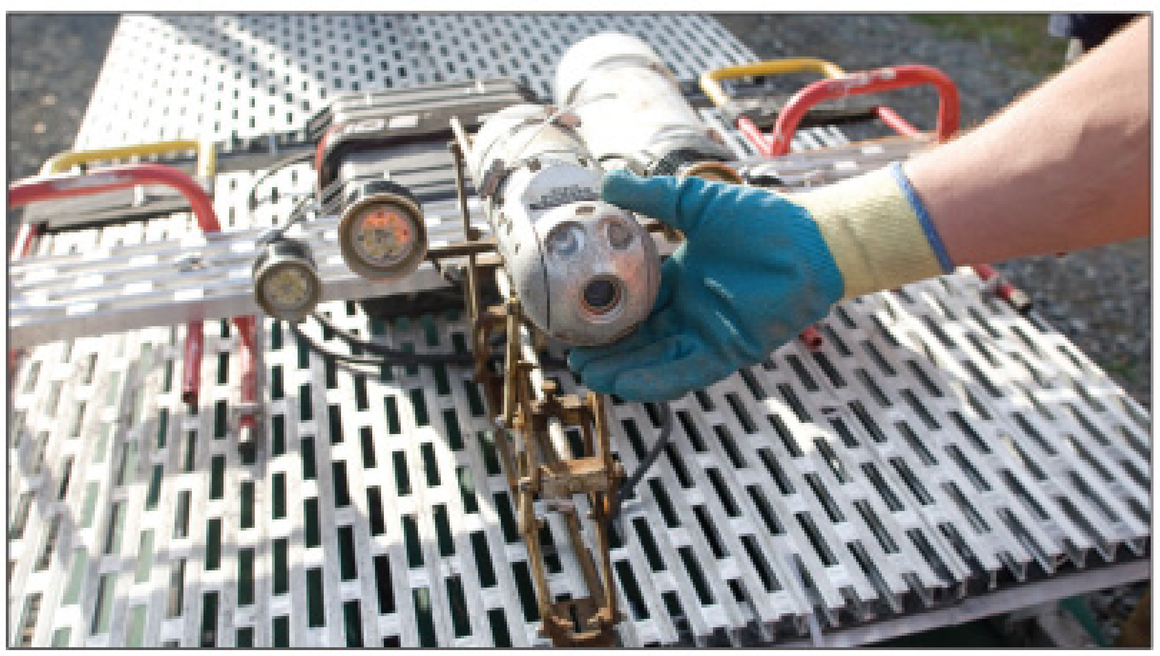
Bryce James of Pipe Experts Inc. monitors progress as CCTV and sonar check out a 96-inch interceptor in King County, Wash. (Photography by Ned Ahrens, King County)

A few years ago, a sewer inspection contractor approached the King County Wastewater Treatment Division in Seattle, Wash., with an offer. The contractor had expanded its capabilities to include sonar inspection in tough situations and wanted to show off its new technology.

"They wanted to do a demonstration for us," recalls Lee Miller, lead facilities inspector for the division, part of the King County Department of Natural Resources and Parks. Officials knew just the place: a century-old siphon.

Sonar made the difference. That first inspection uncovered a debris blockage that was the source of the problem in the siphon, and that led to a sonar contract for King County. And it didn't stop there. Having learned about sonar, the division has tried out another high-tech inspection tool — laser profiling — with comparable success.

It's all part of a strong, proactive inspection program. While sonar and laser are the two most advanced technologies the division uses, its practices reflect a progressive outlook in other ways. The division was an early adopter of CCTV inspection and in the last decade has brought much of that inspection in-house.



A crew member adjusts a CCTV camera rig. To the left are the LED lights, which are powered by the cylindrical battery pack seen behind the camera.

Attacking pollution

The King County Wastewater Treatment Division (METRO) was created after a citizen vote in 1958 to create a regional wastewater conveyance and treatment system. The move responded to worsening pollution in Lake Washington and the Puget Sound.

Small wastewater treatment plants throughout the county were shut down, and two large ones were built, with trunk lines and interceptors to convey waste to them. The county's 34 wholesale customers are the cities and water and sewer districts within the county — a population of about 1.6 million.

PROFILE:
King County (Wash.) Wastewater Treatment Division

POPULATION SERVED:
1.6 million

SERVICE AREA:
King County and portions of Snohomish and Pierce counties

WASTEWATER VOLUME:
200 mgd

INFRASTRUCTURE:
350 miles of sewer mains

WEB SITE:
www.kingcounty.gov/environment/wtd.aspx

WOODEN PIPE

One of the more unusual sonar inspections the King County Wastewater Treatment Division has conducted involved the Ballard Siphon, says Lee Miller, lead facilities inspector. What made the siphon so unusual was its composition. Installed in 1935, it consists of wood stave pipe.

Old wooden pipes are a unique feature of the King County sewer system.

"Seattle has a lot of wood stave water pipes," Miller explains, "and this system belonged to the City of Seattle, which we took over" when METRO was formed in 1961. The county hired a contractor to conduct a sonar inspection of the Ballard Siphon in 2005, and it raised concern. "We put that on a list to sonar every couple of years just to make sure, because we did find what we thought were problems with it."

Because sonar can't give a complete visual image, it wasn't clear exactly what the problems were. The sonar information appeared to indicate that the pipe had collapsed. For a closer look, the county shut down the pipe and dewatered for a CCTV inspection. It turned out the diagnosis of a collapse wasn't quite right. "What we found it to be was grease," Miller says.

Still, numerous other problems with the pipe have led the county to schedule it for eventual replacement with an 8-foot-diameter tunnel that will run parallel to it. The wood stave pipes in the system are slated for renovation as well. HDPE lining will take their diameters to 30 inches, down from 36 inches.

"We started video-inspecting our lines in 1974," Miller says. At the beginning and until 2002, the CCTV work was contracted. "In 2002, we purchased our own CCTV truck, and we started doing our own CCTV work in 2003."

Today the county owns an inspection van with three OZ III cameras from CUES Inc., mounted on various crawlers, the largest a Mud Master. "We also use this same camera equipment on boats we float through our bigger sewers," Miller says.

The county has an established inspection schedule to ensure that all 350 miles of lines for which it is responsible get inspected on a seven- to 10-year cycle. The vast majority of lines, from 18 inches to 144 inches, are concrete pipes, but about 10 percent are newer materials, such as HDPE, glass fiber-reinforced polymer mortar, and PVC.

Trying out sonar

When Sonar Solutions International Inc. (now Pipe Experts LLC) offered King County WTD a chance to see what sonar inspection could do, the Montlake Siphon was an obvious demonstration site.

The siphon, built in 1909 and running under the Lake Washington Ship Canal, had become the site of recurring combined sewer overflows. "Generally it would overflow two or three times a year," Miller says. "Between 2002 and 2003 it had overflowed 11 times."

The problem was obvious, but the cause was not, and conventional CCTV inspection wasn't much help. The siphon is 500 feet long with two shafts 100 feet deep. "It's completely full of sewage all the time," says Miller. "We could get a CCTV camera in there, but we couldn't see anything."

An initial sonar inspection of one shaft found a blockage at the bottom. A crew cleaned it out, and Sonar Solutions then did a thorough sonar inspection of the whole siphon. The inspection used a 2.2-MHz rotating-head sonar system, accompanied by a low-light underwater CCTV camera.

Both transmitted their information via a fiber-optic cable as they were pulled through the siphon by a tag line attached to a winch at the downstream end. For the vertical shafts, the sonar head's cable was directed from the top downward using a mounted sheave wheel.

The sonar, positioned underwater, sends out an acoustic pulse in a narrow cone. Software then interprets the sound's echo, and the data is converted into X-Y-Z coordinates. The result can produce a variety of images. None of them look like a conventional video or photograph, but all can be useful once operators are trained to read them properly.

Immediate results

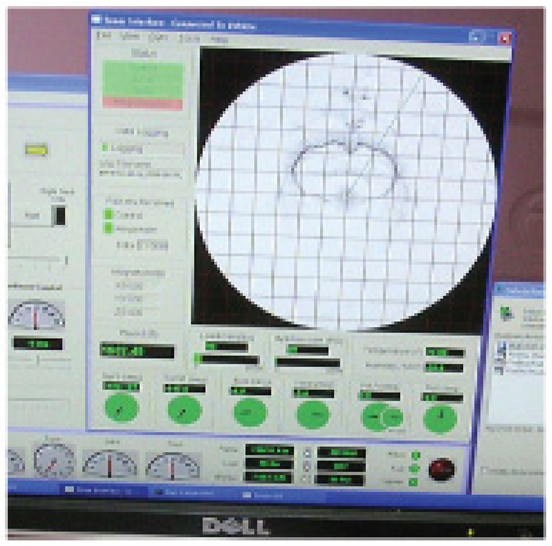
In real-time inspection, personnel can see a silhouette-like outline of the pipe's cross section showing obstructions where they are present. Software can also create three-dimensional images looking ahead into the pipe, with a grid imposed on the image to help more clearly show even small irregularities in the pipe surface. Data can even be used to construct angle or side view drawings that might include color coding for various pipe conditions and contour lines to show sediment buildup.

In one segment of the horizontal siphon tunnel, the inspection found an obstruction measured at 32.1 percent of the pipe. After the contractor cleaned and reinspected the siphon, the obstruction was reduced to less than 8 percent.

"The pipe was cleaned as well as possible," Miller reports. "There was still some debris that we were unable to remove. We felt that what was left in the pipe would not cause us any more problems."

CSOs returned to their usual frequency of two or three per year. Additionally, the rock box at the siphon's entrance was put on a

An example of a sonar image of a pipe interior.



"We figured [sonar] would be a good technology to expand our inspection toolbox. We have a list of 85 sites that we haven't been able to inspect. It's a really big to-do list."

Lee Miller

A crew from Pipe Experts Inc. of Tumwater, Wash., prepares a CCTV camera and sonar platform for the inspection of a 96-inch interceptor.

"Like everybody else in the U.S., we're dealing with an aging infrastructure. This helps us keep on top of that before we have one of those catastrophic failures."

Lee Miller

cleaning schedule of every two years.

The county was sold on sonar. "We figured this would be a good technology to expand our inspection toolbox," says Miller. "We have a list of 85 sites that we haven't been able to inspect. It's a really big to-do list." It includes 20 siphons, five pressure sewers, and 51 force mains.

The county is working down the list at about three sites per year. Sometimes the findings are good news, as with some recent pressure-sewer inspections that found the lines to be in good shape. "We wouldn't have known that because we wouldn't have been able to do it with our regular CCTV inspection," Miller says.

Laser profiling

The county's use of laser inspection tools grew out of another project that at first was a standard TV job, but was too big for the in-house CCTV team. "Our TV truck has only a limited length — 2,200 feet of cable," Miller says. "The tunnels we needed to inspect were all 4,000 feet or longer, up to a little bit over 16,000 feet."

The county's CCTV equipment still uses wire cable, which further limits how far the camera transporter can go. For the longer runs, fiber optics was the way to go, and that meant the county had to issue an RFP for the work.

"Two proposals came back," says Miller. "The proposal we took had an interesting twist to it. They said they could do CCTV, sonar, and laser profiling of our pipes at the same time. It ended up being a much lower cost than the other proposal for just doing CCTV."

The county accepted the proposal and in 2006 conducted a laser inspection on sewage tunnels with significant pipe deterioration from hydrogen sulfide exposure. The laser view allowed a detailed view of the pipe profiles. "You could see all the defects," Miller says. "It gave more of a 3-D depiction of the pipe."

The vendor, RedZone Robotics Inc. of Pittsburgh, Pa., used a sonar unit first to give a reading below the surface of the liquid flowing in

The Pipe Experts performs a confined-space entry to place a CCTV camera and sonar float into a King County interceptor.

the pipe. "We were able to see if there was any sediment in the pipe," Miller says. Laser and CCTV inspections followed. The CCTV camera was mounted on a tracked transporter backed by 6,000 feet of cable.

Cutting edge

As with sonar, the laser inspection doesn't produce a photo-like image, but more of an abstract diagram that indicates the shape of the pipe and the condition of the inside surface. Some of the images almost look like a photo that has been subjected to special effects to change the coloration.

The laser inspection is useful in two ways, Miller says. First, it can uncover eccentricity in the pipe that changes its profile from perfectly circular to slightly egg-shaped. The district uses it in that way to inspect new lines to make sure they are true and don't have bellies.

Second, it can report pipe conditions in far more detail than a simple visual inspection via CCTV. Of specific interest, laser profiling uncovers the pitting in concrete characteristic of hydrogen sulfide exposure.

The district used laser inspection again in 2007, when it inspected two tunnels totaling about 30,000 feet, and in 2008, when another 12,000 feet was up for profiling. Certain lines where there has been chronic hydrogen sulfide erosion are designated for inspection every three years to monitor their condition.

As technologically advanced as sonar and laser may be, in the end it's not about just having the latest gadgetry. "I'd like to think we're on the cutting edge with our inspection," Miller says. But there's a bigger reason for that: "Like everybody else in the U.S., we're dealing with an aging infrastructure. This helps us keep on top of that before we have one of those catastrophic failures." ✦

MORE INFO:

18 **CUES Inc.**
407/894-0190
www.cuesinc.com

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.

AFTER FURTHER REVIEW

Employee performance reviews are nothing to fear. Effective reviews are regular, frequent, well-organized, and focused on specific behaviors.

By Ken Wysocky

Few things make supervisors and managers as squeamish as performance reviews. But like them or not, organizations that don't take them seriously miss out on a valuable tool that can enhance employee development, achieve organizational goals and boost morale, not to mention avoid lawsuits.

"Organizations that don't do performance reviews are overlooking the cheapest and most effective way to develop employees," says Linda Henman, consultant in strategic planning, talent development and succession planning. "Boss-to-direct-report mentoring is the steadiest and most effective method of employee development."

> **"It's insufficient to tell an employee that you think their attitude is bad. You need to tell your direct reports what you want them to stop doing, start doing or do differently. And if you concentrate on that which can be observed by everybody, you're on solid ground."**
>
> **Linda Henman**

By mapping out achievable and measurable goals with employees that dovetail with bigger-picture goals, managers can get all their team members on the same page, and achieve better results. In addition, giving everyone thorough evaluations boosts morale, because employees have the sense that raises and promotions are based on merit, not favoritism. "Reviews build in a sense of fair play," Henman notes.

Organizations that provide reviews also reduce their legal exposure: It's hard for an employee to sue for wrongful termination if a paper trail clearly shows how an employee's performance dropped off or lagged behind that of other team members.

What not to do

After years of consulting and observing how organizations handle reviews, Henman cites four common mistakes:

1. Doing no reviews at all. "I'm always astonished at the number of people, even at the upper echelons of organizations, who say they haven't had a performance review for years," Henman notes. "This happens at all levels. Most people don't like to do them, or no one makes them do it."

2. Making reviews too complicated. Too many job review forms are so long and complex that a manager charged with reviewing each of 10 direct reports, for example, finds it daunting. Badly designed forms are "instruments of the devil," Henman says.

"If it's 10 pages long and you have 10 reviews to do, that's 100 pages to fill out and write comments on," she says. "The forms should never be more than two pages long. Filling out forms doesn't change performance or behavior; it just tests whether managers can fill out forms. It's not a constructive use of their time."

3. Once-a-year mentality. Too many organizations do reviews only once per year, and so the review is nothing more than a postmortem on mistakes an employee may have made six months ago. "If an employee's productivity fell off in August, it should have been dealt with at that time, not at the end of the year," Henman says. "Ideally, performance reviews should contain no surprises."

4. Lack of planning. In many organizations, managers aren't trained to perform effective reviews. Knowing the process makes reviews much less intimidating.

Constructing a good review

So you realize your department doesn't place much value on reviews, and you want to change that. Where do you start? By developing job descriptions for every position. "You need to determine each position's behavioral competencies," Henman says. "In other words, what does it take to succeed at this particular job?"

To figure it out, break down each job into four categories. First, determine how to measure the job's critical tasks. Then examine what kind of relationship building the position requires — either external with vendors or internal with colleagues, or both.

Next, develop a way to measure the employee's decision-making skills. "At the most basic level, this could include things such as learning from mistakes or learning skills quickly," Henman says. "For a department head, it might be how he or she sets strategy for the team."

Last, examine the job's leadership requirements. That's not necessary for entry-level positions with no direct reports, but those jobs still require skills such as self-regulation and meeting deadlines, Henman.

Establish criteria

The next move is setting criteria for grading performance. Some organizations use just three ratings: doesn't meet expectations, meets expectations, and exceeds expectations. Henman prefers five more specific rankings:

1. At risk of losing job.
2. Often doesn't meet expectations.
3. Meets expectations.

4. Frequently exceeds expectations.
5. Consistently exceeds expectations.

"A more finite measurement gives a supervisor more opportunities to show adjustments in improvement or deterioration of performance," Henman says.

It's essential for supervisors to provide honest, objective feedback. "One problem in many organizations is inflated reviews," Henman says. "If everyone is great, how can you ever justify firing someone? Someone's lawyer is going to eat your lunch in court."

Organizations also must decide how often to review employees. Henman recommends four reviews per year, providing ample opportunities to correct problems. At the beginning of the year, supervisors should sit down with each employee and set out expectations and goals. The next two reviews should focus on performance and how the employee is meeting those goals.

"Then the fourth meeting becomes a job review, and a money discussion linked to whether or not the employee met expectations," Henman says. "But by the third review, the employee should know what's coming."

Goals are critical

After a review system is established, managers must hold that all-important first meeting and set goals with each employee. "This becomes your working document that you'll use for each of the next three discussions," Henman says. "It's a fluid document that you can adjust with each subsequent conversation. Managers need to ask themselves what's important to them."

To make constructive suggestions for improving an employee's performance, supervisors should stick to observable behavior. They should be very specific about what they observe and should remain calm and unemotional.

"It's insufficient to tell an employee that you think their attitude is bad," Henman says. "You need to tell your direct reports what you want them to stop doing, start doing or do differently. And if you concentrate on that which can be observed by everybody, you're on solid ground."

Motivating employees to make even small changes can yield big improvements. "It's the rule of 70: If you improve just 1 percent every day, you'll be twice as good in 70 days," Henman says. "In an organizational sense, small, incremental changes can yield big results."

By following these basic steps, managers will find reviews are not to be feared. "It's not science, exactly, but it's pretty predictable," Henman says. "If you follow all of these steps, it's the closest guarantee there is to improving employees' performance and the performance appraisals." ✦

Linda Henman runs Henman Performance Group and is the author of *The Magnetic Boss: How to Become the Leader No One Wants to Leave*. More information is at www.henmanperformancegroup.com.

BEING PROFESSIONAL

NASSCO training and certification programs in trenchless technologies have benefits for all participants in the industry

By Irvin Gemora

There is no better time than now to invest in training and certifications in the trenchless technology industry. While our new administration has made infrastructure a priority, the out-of-sight, out-of-mind underground that is our focus remains to be inadequately funded.

That's why it's more important than ever that we make sure rehabilitation projects are completed using the most effective methods and according to industry standards that ensure long-lasting quality. Since we're working with a deficit already, we surely don't have the money or time to fix rehabilitation projects gone wrong.

While we often see the low bidder winning the job in our industry, I predict that one day the person/company with the most skills, qualifications and certifications will be awarded the most projects. I say this with much thought and experience, and especially in the past year since NASSCO introduced its Inspector Training and Certification Program (ITCP) for CIPP.

Sewer pipes will continue to decay, but our minds shouldn't. Whether you're a contractor, inspector or engineer, it is vital to pursue ongoing professional development and training.

This two-day course provides comprehensive education and tools for professionals to better understand and inspect trenchless pipeline renewal technologies. The program consists of classroom learning in five areas:

- Existing pipe defects and how they affect CIPP installations
- Overview of the CIPP technology
- Field installation of CIPP
- Specifications: the inspector's instructions and guidelines
- Pipeline renewal technologies and applications, including TAG-R renewal technology selection software.

Since we launched ITCP for CIPP, we have trained more than 200 inspectors, and they are finding the certification helpful to their careers and businesses. Training programs are in development for other technologies, such as pipe bursting and manhole rehabilitation.

I believe trained inspectors are beneficial to everyone in our industry. A NASSCO trained and certified inspector can be an asset to a CIPP contractor, bringing a comprehensive understanding of the difference between a cosmetic defect and a structurally significant defect. A certified inspector can use the ITCP manual to support a position by referring to many photos of typical defects and their causes and required repairs, if any.

The system owner also benefits by having a certified inspector on site during a CIPP installation. The inspector fully documents all aspects of the installation, and that information becomes part of the project file upon completion. The inspector also observes good practices by the contractor that can save time and money while helping to ensure a successful installation. Trained inspectors help support long-term quality CIPP installations to the benefit of everyone in our industry.

Sewer pipes will continue to decay, but our minds shouldn't. Whether you're a contractor, inspector or engineer, it is vital to pursue ongoing professional development and training. Contact NASSCO to learn more about training and certification programs in the trenchless technology industry. ✦

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

Marketplace Advertising

Compact Saddle Tap!

3/4" to 2" Tapping Capacity

- Compact and Lightweight: ***Only 7 1/2 lbs!***
- Uses ***High Alloy, Non-Corrosive*** Components.
- Independent Feed and Rotation.
- Taps ***CI/DI***, ***PE*** and ***PVC*** Pipe.

For Details on Specials Call
1-888-737-3668
For Full Product Line Visit
www.footagetools.com
Footage TOOLS Inc

Simple Solutions

DISTRIBUTING LLC

MAKERS OF

Wolverine Brand™

ODOR CONTROL PRODUCTS

16

We Stop The Stink GUARANTEED!

In New Jersey
973-846-7817
Outside New Jersey
866-667-8465

www.IndustrialOdorControl.com
www.StopSepticOdor.com

PayPal

Sequentially Numbered Hydrant Tags

RoDon CORPORATION
761 N. 17th Street, Unit 3
St. Charles, IL 60174
800.858.5516
www.rodoncorp.com

Outdoor life expectancy
15-20 years

110

$2,999
Confined Space Entry System

42

- 7' Tripod
- 3-Way Fall Winch
- Work Winch
- Full Body Harness
- MSA Altair 4 Gas Monitor

Call for Catalog & Prices
Cloverleaf TOOL CO. 800.365.6583
www.cloverleaftool.com

DYE TRACERS

Solutions for:
- Infiltration
- Septic Systems
- Cross Connection
- Leaks and more...

BRIGHT DYES
Division of Ringoscope Chemicals

www.brightdyes.com
FAX: 937-886-9300

95

FREE SAMPLE 1-800-394-0678

Add a **Blower** with 15' of duct for only **$300!**
Add a 5 Minute **Escape Respirator** for only **$500.**

Ask About Our
- Harben Jetters
- GapVax Combination Trucks
- Vac Replacement Parts
- Camera Systems
- Nozzles & Hoses
- Blowers & Ventilators
- Magnetic Lid Lifters
- Aluminum Folding Ladders
- Repairs & Service

MTECH 800.362.0240
www.mtechcompany.com

SEWERLOCK.COM™
MANHOLE SECURITY COVER
(888) 781-5882

- SEWER
- STORM
- UTILITY
- GREASE
- HOMELAND SECURITY

430

Installs below & independent of frame in new & existing manholes, & prior to street overlay for safety, to catch debris, deter dumping & theft.

SEE "HOW TO GET STARTED" www.sewerlock.com

DYNAMIC CABLE REPAIR

We Repair:
Gen-Eye I, II, III, GL, Ratech, RIDGID, Insight Vision, Electric Eel, Gator-Cams, Pearpoint, Vision Intruders, Inspection Cameras, Locators, Command Modules and Cables

48-Hr. Turn Around Time

INSPECTION CAMERAS ARE OUR ONLY BUSINESS!

973-478-0893

DYNAMIC REPAIRS
40 Arnot St., Unit 20 • Lodi, NJ 07644
www.dynamicrepairs.net

330

Jetter Hose

Parker/Dayco-Piranha-Aeroquip
- 1/8" – 3000, 4000, 4800 psi
- 1/4" – 4400, 5000 psi
- 3/8" – 4000, 5000 psi
- 1/2" – 3000, 4000, 5000 psi
- 5/8" – 4000 psi
- 3/4" – 2500, 3000 psi
- 1"–1-1/4" – 2500, 3000 psi

42

Call for Price & Delivery

Nozzles, Root Cutters, Clamps, Swivel Joints, Ball Valves, Hose Guides, etc.

Call for Catalog & Prices
Cloverleaf TOOL CO. 800.365.6583
www.cloverleaftool.com

1-800-538-8464

Nozzles, Hoses & Parts for *ALL* Jetting Units.

213

www.usjetting.com

JOIN THE DISCUSSION!

Municipal Sewer & Water Discussion Forum is an online based forum for industry professionals to swap information and ideas on topics related to the sewer, water & stormwater infrastructure.

Sign up today at www.mswmag.com

MUNICIPAL SEWER & WATER

TRUCK STOP

see photos in COLOR at www.mswmag.com

JULY 2009

1996 Vac-Con V350THA/850 3-Stage Combo Mounted on Ford LN8000: 250 hp, MD3060 trans., A/C, 50 gpm, 3000 psi, JD 4039T diesel aux. New paint. 31,740 orig. miles.....$60,000 OBO

Frank or Nancy 916-922-1101 CM7

Several Vacuum and Sludge Tank Trailers: For sale or lease.

Bulk Tek Sales & Leasing
Arcola, IL
217-268-4917 P6M7

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

Call Bryan @ 515-681-6321 M7

2008 Guzzler CL Model XXS4118TC: 28', 5300 cfm Hibon blower, 18 cu. yd. on 2007 IN 7600 chassis w/Cat C13 380 hp, 10-spd. man., chassis miles 8906, chassis hrs. 539, chassis trip hrs. 193.3, Vac system hrs. 186. LIKE NEW.....$175,000

1-888-635-9854, 812-423-6616 CMP7

Combo Truck, 1987 Mack Chassis: 235 hp, 1997 Super Products Camel, 16-yd. debris, Hicks blower, 1500 gallon water, 65@2000 psi Myers pump...$30,000 OBO

Call Bryan @ 515-681-6321 M7

2002 International 4300: DT466E diesel, auto, A/C, PTO, under CDL, SRECO Sewer Rodder, Model HS-375TM-PTO, 800' of .375" continuous rod, rotating drive head, ex-city truck, only 36,900 miles, great shape.$32,500

Call Big Truck & Equipment Sales
877-926-5015 C7

2001 IHC 2600 Tandem Axle Pump Truck: Masport pump, 1100 gal. tilt tank, jetter, 200 gallon fresh water tank, DT 530 300 hp engine, 69,500 miles, 7-speed, removable Reese hitch.

352-323-6284 X 201 C7

1994 Isuzu Step Van: 2000 Onan 10K diesel generator, 1996 RST TV equipment. Many extra TV components included.
.....$32,500 OBO

515-681-6321
bryanr@munipipe.com M7

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

Call Bryan @ 515-681-6321 M7

1992 Freightliner Vac-Con w/Cummins N14: Rear Cummins 3.9L, 2000 psi, 100 gpm pump, 3-stage fan, 1500 gal. water tank, extra storage bins, rear camera, extenda-boom, 12-yd. debris tank, 1301 hrs. on rear motor, 1077 hrs. on front motor, rotate/extenda hose reel, auto trans., ex-municipality.....$39,600

503-969-9557 or 503-682-2723 CP7

1994 Ford Cargo Van: 1994 7.5 Onan gas generator, 1996 RST TV equipment. Many extra TV components included.
.....$32,500 OBO

515-681-6321
bryanr@munipipe.com M7

2006 Safevacs - Five (5) To Choose From: Sterling LT9511 chassis, MBE 460 engines, 27" Wispair blowers, OMSI transfer cases. .....Special Price $149,950 Each

Call 1-888-739-0838 C7

1993 Ford LNT 8000 Vactor Combination: 80 gpm @ 2000 psi, 1,500 gal. alum. tank, 1" x 600' hose, TigerTail/MiniMissile. Purchase or rental program. $50,000

515-681-6321
bryanr@munipipe.com M7

2003 Sterling LT7501 Vac-Con Combo: 10,923 miles, 2,254 hours, 50 gpm @ 3000 psi, 1,000 gal., 9-yd., Cat engine, Allison transmission, 3/4" x 500' hose. Municipal truck.....Asking $75,000

630-620-5755 CMP7

1991 Camel Combination Cleaner w/1986 Mack: 65 gpm @ 2000 psi, 1,500 gal. poly tank, 1" x 600' hose, TigerTail/MiniMissile. Purchase or rental program.

515-681-6321
bryanr@munipipe.com M7

1997 Vac-Con V311THA/1300: 80 gpm, 2000 psi, 3-stage fan, hydrostatic blower drive, 6' telescopic boom, unnit mounted on IH 2554, MD3060 auto trans., 25,000 miles, ex-city unit. Well maintained. Reduced price!

Mike 800-294-0149 C7

MUNICIPAL SEWER & WATER

TRUCK STOP

see photos in COLOR at www.mswmag.com

JULY 2009

1996 Ford L8000 Vactor Combination: 87,500 miles, 80 gpm @ 2000 psi, 1,500 gal. alum. tank, 1" x 600' hose, TigerTail/MiniMissile. Purchase or rental program. $75,000

515-681-6321
bryanr@munipipe.com M7

Vactor Line Cleaner: 1986 Ford 8000, Cat diesel, Allison auto trans., fan drive with Ford gas pony motor. Runs and operates well. Located on West Coast. Can deliver.

209-339-1601;
209-810-8049 Mike C7

1993 Vactor 2103: Rear decant, rear mounted hose reel, extendible boom, 500 gallon water capacity, 30 gpm @ 3000 psi water pump, 1993 Ford chassis, 175 hp engine, 5-spd. manual trans., low hrs. and miles, ex-municipal truck. (Stk. 1590)

Call Joe 312-208-6373 C7

1999 Vac-Con HS-1000A Hot Shot Jetter on IH 4700: 175 hp, AT545 trans., A/C, 50 gpm, 3000 psi, 4-cyl. diesel aux. New paint. 29,260 orig. miles. ....$35,000 OBO

Frank or Nancy 916-922-1101 CM7

2006 Volvo VHD 64F, AquaTech B-12 Combo w/Hydro-Excavation Kit: 980,000 BTU boiler, 2500 psi @ 18 gpm, Jetter 2500 psi @ 65 gpm, 1000 gal. water, Hibon TS56 blower, 12 CY debris.

888-564-0202, kmhequip.com C7

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

Call Bryan @ 515-681-6321 M7

2005 Vac-Con/Sterling Vac Truck: 80 gpm @ 2000 psi, brand new 3-stage fan, brand new Myers pump, low miles. .....Right price $123,500 OBO

813-751-5652 C7

1998 International Vac-Con Combination Cleaner: 69,700 miles, 65 gpm @ 2000 psi, 1,000 gal. poly tank, 1" x 600' hose, TigerTail/MiniMissile. Purchase or rental program. $70,000

515-681-6321
bryanr@munipipe.com M7

PLACE YOUR AD ONLINE AT www.mswmag.com or fill out this form

MUNICIPAL SEWER & WATER **Cleaner** **Pumper/Pumper Trader**

TRUCK STOP Advertising

BE ONLINE & IN *CLEANER, PUMPER/Pumper Trader* or *MUNICIPAL SEWER & WATER* FOR ONLY $125!

Please print ad legibly with correct punctuation and PHONE NUMBER. Don't forget to send photo!

RATE $125 PER AD, PER MONTH, PER PUBLICATION WITH A 30 WORD MAXIMUM – **PLEASE NOTE:** You can only advertise **ONE TRUCK** for sale per ad.

DEADLINES MSW: 1ST OF THE MONTH • CLEANER: 1ST OF THE MONTH • PUMPER: 10TH OF THE MONTH – *For example: July 1st would be the deadline for August MSW.*

ADVANCE PAYMENT **NO BILLING FOR TRUCK STOP ADS**. Payment must be received in **ADVANCE** before publishing in Cleaner, Pumper or MSW.

Enclosed is $ _____ for _____ ad(s) to run _____ month(s) in

❍ **CLEANER** ❍ **MSW** ❍ **PUMPER/Pumper Trader** ❍ **ALL 3 PUBLICATIONS** (Triple dollar amount)

Company Name _____

Address _____ Phone _____

City _____ State _____ Zip _____

- **MAIL** this completed form with payment and photo to: COLE Publishing Inc., P.O. Box 220, Three Lakes, WI 54562 (Make check/money order payable to: COLE Publishing Inc.)
- **ONLINE** ad form at: **www.pumper.com**, **www.pumpertrader.com, www.mswmag.com, www.cleaner.com**
- **FAX** this completed form to: **715.546.3786** and **E-MAIL** photo to: **truckstop@pumper.com**, **truckstop@cleaner.com, truckstop@mswmag.com**

PLEASE FILL OUT CREDIT CARD INFORMATION COMPLETELY:

CREDIT CARD NO. _____ V-CODE _____ EXP. DATE _____

CARDHOLDER NAME _____ PHONE _____

MUNICIPAL SEWER & WATER

CLASSIFIEDS

JULY 2009

- Bucket Machines
- Businesses
- Business Opportunities
- Cable Machines
- Computer Software/Billing
- Consulting/Engineering
- Dewatering
- Drain/Sewer Cleaning Equipment
- Easement Sewer Flusher
- Excavating Equipment
- Gas Indicators & Detectors
- Hydroexcavating Equipment
- Jetters - Trailer
- Jetters - Truck
- Jet Vacs
- Leasing/Financing
- Locators
- Miscellaneous
- Padlocks
- Parts & Components
- Pipe Bursting Equipment
- Pipeline Rehabilitation
- Positions Available
- Pressure Washers
- Pumps - Submersible
- Pumps - Vacuum
- Safety Equipment
- Street Sweepers
- TV Inspection
- Septic Trucks
- Vacuum Loaders
- Wanted

BLOWERS

VFC200P-5T, FUJI Pumps, Regenerative Blowers, Ring Compressors. All models, accessories. Authorized distributor. Authorized parts and repair center. Call 888-227-9822. www.carymfg.com (MBM)

JETTERS-TRAILER

New PipeHunter Model 38T44 jetting unit, trailer mounted, w/335 Poly water tank, 4,000 psi @ 25 gpm, 600' of hose and attachments. **In stock!!!** (Stock #13317) **www.VacuumSalesInc.com, (888) VAC-UNIT (822-8648).** (M7)

JETTERS-TRAILER

Pre-owned PipeHunter model 38T44 jetting unit, trailer mounted unit w/335 poly water tank, 4000 psi @ 25 gpm, 600' hose and attachments. In stock!!! (Stock #4313V) **www.VacuumSalesInc.com, (888) VAC-UNIT (822-8648).** (M7)

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).** (M7)

JETTERS-TRUCK

2006 GMC TC6500 cab & chassis truck mounted jetting unit w/Jet Eye camera system, 3000 psi @ 50 gpm, 1000 gallons water, 600' hose, 500 cfm blower, debris tank and attachments. **In stock. Available for purchase or rental.** (Stock #13234) **www.VacuumSalesInc.com, (888) VAC-UNIT (822-8648).** (M7)

JET VACS

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).** (M7)

For Sale: 2001 Vactor Combination Trucks, 1990 Guzzler, 1998 TV Inspection Truck with current technology equipment, 2002 Jetstream Waterblaster, very low hours. For more information contact Ken at 800-495-6036. (M7)

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.** (M7)

PADLOCKS

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

PIPE REHABILITATION

Max Liner lining equipment, ready to work. Max Cutter 10-12 Mini complete set also available, two 95-gal. over-pack drums, an air operated open drum mixer, one 18" width x 24' length gravity conveyor and a pull behind Ingersoll Rand 175 diesel air compressor. Will sell together or separately. Call Harry 843-556-4320. (CMP8)

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.mccannsunderground.com. Financing available. Kelly 608-279-2299. (MBM)

POSITIONS AVAILABLE

City of Alliance, NE (8,600) is accepting applications for Water Quality Technician. Position will remain open until filled. Performs maintenance, repair and servicing of a wide variety of conventional and specialized electrical and/or mechanical equipment in a treatment plant, wells and lift stations. Along with a variety of unskilled or semi-skilled maintenance work, and operates a variety of equipment in the construction, operation, repair, maintenance, and replacement of city water, and sewer facilities and systems. The pay range is $16.49 to $18.15. hourly with excellent fringe benefit package. For application and job description information contact: Personnel Office, P.O Box D, 324 Laramie Ave., Alliance, NE 69301. 308-762-5400 or email jobs@cityofalliance.net. EOE (M7)

POSITIONS AVAILABLE

PROTECTIVE COATING FOREMAN (WORKING) supervises crew (prepman, operator, applicator) during application of high performance coatings/linings for underground infrastructure. 2+ years supervising same/similar crews. Sandblasting and high pressure water blasting experience and ability to run/maintain plural component spray/pumping system. Valid drivers license. Position in Tampa, Florida spends 40 weeks a year overnight in Florida. Rehabilitation Division (D1RS) information our company, history and culture, at www.dallas1corporation.com. Dallas 1 Corporation is a drug free workplace/EEO employer. Send resume ken.blythe@d1cd.com or fax 813-986-4250. (C8)

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.vsirentalsllc.com.** (M7)

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).** (M7)

SERVICE/REPAIR

Sewer Cam Reel, Camera and Locator Repair: 48-hr. turnaround 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)

SWEEPERS

2008 American La France Condor with a Vac/All Model VS10DC 3-in-1 machine (sweeper, catch basin, leaf collector), 350 water comp, 10-yd. debris body; vacuum system: 16,500 cfm belt drive with silencer, driven by Cummins turbo charged 6 cyl. diesel. **In stock. Available for purchase or rental.** (Stock #1791) **www.VacuumSalesInc.com, (888) VAC-UNIT (822-8648).** (M7)

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

2009 Sterling LT9500 triaxle with a new Presvac, Powervac 3800, 3,250 gallon (US), DOT, wet/dry industrial, vacuum tank loader. **In stock!!!** (Stock #13354) **www.VacuumSalesInc.com, (888) VAC-UNIT (822-8648).** (M7)

(2) 2008 International 7600s cab & chassis, with a Guzzler Ace model 4118TC 18-yard debris body, 4100 cfm wet/dry industrial vacuum loaders. (Stock #4400 & 4401) **www.VacuumSalesInc.com, (888) VAC-UNIT (822-8648).** (M7)

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).** (M7)

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).** (M7)

PLACE YOUR AD ONLINE AT **www.mswmag.com** – IT'S ALWAYS THERE TO MEET YOUR BUSY SCHEDULE

MUNICIPAL SEWER & WATER | Cleaner | Pumper

CLASSIFIED AD FORM

PRO | ONSITE installer

Please print ad legibly below with ***correct punctuation*** and ***phone number.*** Circle each word to be bolded, if any. ($1.00 extra per word)

CHOOSE THE CATEGORY:

- ❑ Aerators
- ❑ Blowers
- ❑ Bucket Machines
- ❑ Businesses
- ❑ Business Opportunities
- ❑ Cable Machines
- ❑ Computer Software
- ❑ Dewatering
- ❑ Drainfield Restoration
- ❑ Drain/Sewer Cleaning Equip.
- ❑ Dredges
- ❑ Excavating Attachments
- ❑ Excavating Equipment
- ❑ Hand Tools
- ❑ Hazardous Waste Units
- ❑ Hydroexcavation
- ❑ Jetters-Trailer
- ❑ Jetters-Truck
- ❑ Jet Vacs
- ❑ Lease Financing
- ❑ Levels & Transits
- ❑ Locators
- ❑ Miscellaneous
- ❑ Parts & Components
- ❑ Pipeline Rehabilitation
- ❑ Portable Toilets
- ❑ Portable Toilet Tanks
- ❑ Portable Toilet Trailers
- ❑ Portable Toilet Trucks
- ❑ Positions Available
- ❑ Positions Wanted
- ❑ Pressure Washers
- ❑ Pumps-Dredge
- ❑ Pumps-High Pressure
- ❑ Pumps-Submersible
- ❑ Pumps-Vacuum
- ❑ Pumps - Washdown
- ❑ Pumps-Water
- ❑ Rodding Machines
- ❑ Roll-Off Containers
- ❑ Root Control
- ❑ Safety Equipment
- ❑ Septic System Components
- ❑ Septic Tanks
- ❑ Septic Trucks
- ❑ Service/Repair
- ❑ Slide-In Units
- ❑ Sludge Applicators
- ❑ Tanks
- ❑ Tools
- ❑ Trailers-Vacuum/Tanker
- ❑ Trucks (dump/septic/misc.)
- ❑ TV Inspection
- ❑ Vacuum Loaders
- ❑ Vanes
- ❑ Vehicle Tracking
- ❑ Wanted
- ❑ Wastewater Transfer
- ❑ Waterblasting

CHOOSE THE PUBLICATION(S):

(Deadlines are for the month preceding issue)

❑ ***CLEANER*** — Deadline: 1st of the Month

❑ ***PUMPER*** — Deadline: 10th of the Month

❑ ***PRO*** — Deadline: 17th of the Month

❑ ***MUNICIPAL SEWER & WATER*** — Deadline: 1st of the Month

❑ ***ONSITE INSTALLER*** — Deadline: 17th of the Month

CLASSIFIED AD RATE:

$1.00 per word, per month, with a 20-word minimum or $20.
[$1.00 extra per bold word (key words only)]

ADVANCE PAYMENT REQUIRED:

No billing for classified ads. Payment must be received in advance before publishing.

CALCULATE THE AMOUNT DUE:

_____ **words X $1.00 =** _____ **X** _____ **Publications X** _____ **Months = $** _____

($20 minimum) | # of publications checked above | # of months to run the ad | **Total Amount Due**

(Example: 25-wd. ad x $1.00 per word = $25.00;
$25.00 x 2 publications [Pumper & Pro] = $50.00;
$50.00 x 2 months to run the ad = $100.00 Total)

FILL IN COMPANY AND PAYMENT INFO:

COMPANY NAME: _____

ADDRESS: _____ PHONE: _____

CITY: _____ STATE: _____ ZIP: _____

MAIL this completed form with payment to:
COLE Publishing Inc., PO Box 220, Three Lakes, WI 54562

FAX this completed form to: **715-546-3786**

ONLINE forms at: **www.cleaner.com**
www.pumper.com
www.promonthly.com
www.onsiteinstaller.com
www.mswmag.com

QUESTIONS: CALL 1-800-257-7222

PLEASE FILL OUT CREDIT CARD INFORMATION COMPLETELY INCLUDING V-CODE (3-DIGIT NUMBER FOUND BY YOUR SIGNATURE)

CREDIT CARD NO.: _____ V-CODE: _____ EXP. DATE: _____

CARDHOLDER NAME: _____ PHONE: _____

WE ACCEPT:

ASSOCIATION NEWS

PEOPLE

Sen. Herb Kohl (Wis.) received the Rural Water Star Award from the National Rural Water Association. **Sen. Robert Byrd (W.Va.)** received the organization's Lifetime Achievement Award.

The **Orange County (Calif.) Groundwater Replenishment System** received the Outstanding Civil Engineering Achievement Award from the American Society of Civil Engineers.

New officers for the American Society of Agricultural and Biological Engineers are **Ronald L. McAllister,** vice president-elect, and board members **Shannon R. Brockmann, John R. Fisher, Carolyn M. Jones** and **Maury Salz.**

Frederic Shmurak was named water resources engineering department manager for Dewberry, a professional services firm in Fairfax, Va.

Mark Soucy, superintendent of the Water and Wastewater departments in Fort Kent, Maine, was named Maine Operator of the Year by the New England Water Environment Association.

LEARNING OPPORTUNITIES

University of Wisconsin-Madison Courses

The University of Wisconsin-Madison Department of Engineering Professional Development is offering the following classes at the Madison campus:

- July 21-22 – Water Reuse in the United States: Strategies, Trends and Onsite Applications
- July 23-24 – Improving Your Energy Efficiencies in Water and Wastewater Treatment, Collection and Distribution.

Call 608/262-2061 or visit http://epdweb.engr.wisc.edu.

American Public Works Association

APWA is offering a July 23 course on Greening the Fleet: It's More Than a Color Change. Call Carrie Merker at 800/848-2792, ext. 5213, or visit www.apwa.net.

American Society of Civil Engineers

ASCE is offering these courses:

- July 9-10 – Pumping Systems Design for Civil Engineers, Radisson Hotel Sacramento, Sacramento, Calif. Call 916/922-2020.
- July 16-17 – Introduction to Detention Pond Design: Parking Lots and Urban Drainage, Doubletree Guest Suites Nashville, Nashville, Tenn. Call 615/324-3410.
- July 30-31 – Low-Impact Development Applications for Water Resource Management, Doubletree Hotel San Diego Downtown, San Diego, Calif. Call 619/239-6800.
- Aug. 4-5 – Pumping Systems Design for Civil Engineers, Radisson Hotel Hyannis, Hyannis, Mass. Call 508/771-1700.
- Aug. 13-14 – Storm Sewer Design Using SWMM, The Heathman Hotel, Portland, Ore. Call 503/790-7123.

For information, visit www.asce.org

CALENDAR

July 13-16
American Membrane Technology Association/American Water Works Association 2009 Conference and Exposition: Membranes – Kickin' It Up Texas Style!, Austin, Texas. Call 772/463-0820 or visit www.amtaorg.com.

Aug. 4-6
International Society of Automation Water/Wastewater Automatic Controls Division Symposium, Orlando, Fla. Visit www.isa.org/wwac.

Aug. 9-12
Total Maximum Daily Load (TMDL) 2009: Combining Science and Management to Restore Impaired Waters, Hilton Minneapolis, Minneapolis, Minn. Call 703/684-2441 or visit www.wef.org.

Aug. 9-14
International Association of Hydraulic Engineering & Research Congress, Hyatt Regency Vancouver, Vancouver, British Columbia. Visit www.iahr2009.org.

Aug. 16-20
StormCon, the North American Surface Water Quality Conference and Exposition, Anaheim Marriott, Anaheim, Calif. Call 805/682-1300, ext. 131, or www.stormcon.com.

Aug. 26-29
Association of Water Technologies Annual Convention and Exposition, Hollywood, Fla. Visit www.awt.org.

Aug. 30-Sept. 2
Distribution Systems Symposium and Exposition, Reno, Nev. Visit www.awwa.org.

Sept. 13-16
WateReuse Symposium, Sheraton Seattle Hotel, Seattle, Wash. Visit www.wef.org.

Sept. 13-16
American Public Works Association Congress – The Best Show in Public Works, Columbus Convention Center, Columbus, Ohio. Call 816/595-5241 or visit www.apwa.net.

Sept. 14-16
International Conference on Forest and Water in a Changing Environment, Raleigh, N.C. Visit www.awra.org.

Sept. 20-23
National Rural Water Association Leadership Forum and Technology Exhibit, New Orleans, La. Call 580/252-0629 or visit www.nrwa.org.

Maine Rural Water Association

MRWA is offering a Maine Water Agency Response Network exercise in Augusta on July 22. For information, call 207/729-6569 or visit www.mainerwa.org.

Water Environment Federation

The Water Environment Federation announced the launch of an online library of papers presented at WEFTEC and WEF specialty conferences. The papers, accessible on the WEF Web site, are not peer-reviewed and range from the year 2000 to present. ✦

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.


BOB K.
30 YEARS
TIM K.
22 YEARS
JEFF B.
11 YEARS
KAREN S.
17 YEARS
KIM M.
14 YEARS
JULIE G.
9 YEARS
JIM F.
8 YEARS
MATT V.
6 YEARS
SHERRY D.
9 YEARS
WINNIE M.
4 YEARS
DEBBIE L.
5 YEARS
PAUL T.
3 YEARS
KAYLA W.
3 YEARS
JEFF L.
2 YEARS
MIKE L.
2 YEARS
BRAD B.
2 YEARS
JARED D.
1 YEAR
NOEL K.
1 YEAR
KERI H.
1 YEAR
PHIL H.
1 YEAR
JIM K.
< 1 YEAR
HOLLY G.
< 1 YEAR
COLEpublishing
thanks you for
30 years
1979 – 2009

ALL THE TOOLS OF THE TRADE. FROM ONE SOURCE.

AQUATECH

COMBINATION MACHINES ENGINEERED & BUILT AROUND THE OPERATOR.

O'BRIEN®

JETTERS THAT PAY FOR THEMSELVES. AGAIN, AND AGAIN, AND AGAIN.

ultraVac®

THE NEW POWER IN HIGH VACUUM LOADERS.

X-vac®

VACUUM EXCAVATORS. THINK OF THEM AS SURGICAL INSTRUMENTS.

When you invest in any of the Hi-Vac Corporation Brands, you are getting "The most value for your money". They are designed to be the easiest to operate. Cost less to maintain. And, are built tough to withstand the test of time.

Hi-Vac®

HI-VAC® CORPORATION

740-374-2306
USA 800-752-2400
FAX: 740-374-5447
hi-vac.com

Are Budget Constraints Reducing Your Pipe Flow Capacity?

ROOTX®

Let RootX help save your budget during these uncertain economic times.

The Problem...

It's simple and fast.
It's effective and EPA accepted.
It is a proven solution.
It is guaranteed!

RootX turns your existing equipment into a root killing machine without negative impacts to the treatment plant or the surrounding environment.

The Solution...

Registered with the EPA to kill roots in Sanitary and Storm sewers (EPA Registration #68464), RootX can be applied with your sewer cleaning equipment or direct from the package. You can attack roots with a targeted foam spray from the RootX applicator or simply fill the pipe with a root killing foam. RootX packaging allows a city or contractor to treat both mainline sewers and residential service laterals for a complete root control program.

RootX provides generic Chemical Root Control specifications to cities that have root control contracts.

The Result.

Simple.
Effective.
Proven.

ROOTX®

GET RID OF GREASE IN PIPELINES!
Call or email us to find out how you can get FREE grease removal today!

GREASE-X

800-844-4974
www.rootx.com
rootx@rootx.com

Looking for the Ultimate Power Tool?

You can find it at
www.vac-con.com/omnibus

VAC·CON
MORE POWER TO YOU

A HOLDEN INDUSTRIES Company

969 Hall Park Drive • Green Cove Springs, FL 32043 • Tel: 904-284-4200 • Fax: 904-284-3305 • vns@vac-con.com