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2CG	2"	2"-4"	1/2", 9/16", 5/8", and 3/4" Cables
2-1/2CG*	2-1/2"	3"-4"	5/8" and 3/4" Cables
3CG	3"	4"-6"	5/8" and 3/4" Cables
4CG	4"	6"-10"	5/8" and 3/4" Cables

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*Most popular model

4" ClogChopper





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Cleaner

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Published monthly by:





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

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In U.S. or Canada call Toll-free 800-257-7222 Elsewhere call 715-546-3346 Email: info@cleaner.com Web: www.cleaner.com Fax: 715-546-3786

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

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REPRINTS AND BACK ISSUES: Visit www.cleaner.com for options and pricing. To order reprints, call Jeff Lane at 800-257-7222 (715-546-3346) or email Jeffl@colepublishing.com. To order back issues, call Nicole at 800-257-7222 (715-546-3346) or email nicolel@colepublishing.com.

CIRCULATION: Circulation averages 27,338 copies per month. This figure includes both U.S. and international distribution.



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Relationships and Technology

THE PUMPER & CLEANER EXPO BROUGHT IT ALL TOGETHER FOR THE GREAT PEOPLE IN THIS INDUSTRY

BY LUKE LAGGIS

he 2013 Pumper & Cleaner Environmental Expo was another great experience filled with new technology, new insights and lots of industry veterans with really great stories to tell.

There were so many new products, many launched right at the Expo, from inflatable shoring to camera systems. It was truly the future of this industry and your business.

The first-ever Demo Day drew people outside the Indiana Convention Center to take a look at some impressive products in action. Despite cold, wet and windy weather, five companies gave Expo attendees an up-close look at their products in action.

Hammelmann and Terydon teamed up to demonstrate a precision ultrahigh pressure (UHP) abrasive cut using the Jack Track Cutting System. The system was powered by a high-efficiency Hammelmann pump with the dynamic plunger seal system, which

eliminates the use of high-pressure packing.

Perma-Liner demonstrated its Top Gun Continuous Inversion System, which allows the

cured-in-place pipe liner tube to invert utilizing low air pressure. The steamcured liner used in the demonstration inverts continuously without the need for above-ground water column towers, tall scaffold or excess water.

GapVax and NozzTeq also teamed up, with GapVax first demonstrating the MC Advanced Series combination sewer cleaning unit, and NozzTeq following with a demonstration of the BL SWIPER Nozzle and the Paikert Impact Cutter for situations where digging isn't necessary.

Beyond the technology, the greatest part of the Expo for me is meeting and talking to you. I speak with many of you from my desk in Northern Wisconsin, but the opportunity to meet face to face, to speak with you directly and hear your stories in person really brings everything together. It's great to hear how the work we're doing at Cleaner is making an impact on your work. That's the goal, and it's also the greatest reward.

I was able to sit down and have lunch with two contractors who have been featured in Cleaner and with whom I've been able to stay in contact, and that's really what this magazine and the Expo are all about: establishing meaningful relationships that help us toward our goals. They talked about their businesses and I talked about mine, and we all see great things ahead.

I also talked to a cleaning contractor from South Dakota. He's been in the industry since age 19 and bought his business from his dad 17 years ago. He is working hard to build more value into his business, which celebrates its 25th anniversary this year, so that when he gets ready to sell the business 10 or 15

It's great to hear how the work we're doing at Cleaner is making an impact on your work. That's the goal, and it's also the greatest reward.

years down the road, it will provide a comfortable future for his family.

There were many contractors on hand who have been involved in the post-Sandy cleanup efforts on the East Coast. The stories they told were incredible - and leant much more perspective to the devastation and work still ahead than any national news story I've come across. You can look forward to seeing some of their stories on these pages as we move forward.

If you couldn't make it to Indy, start planning now so you can be there next year. It's the best thing you can do for your business.

Enjoy this month's issue.



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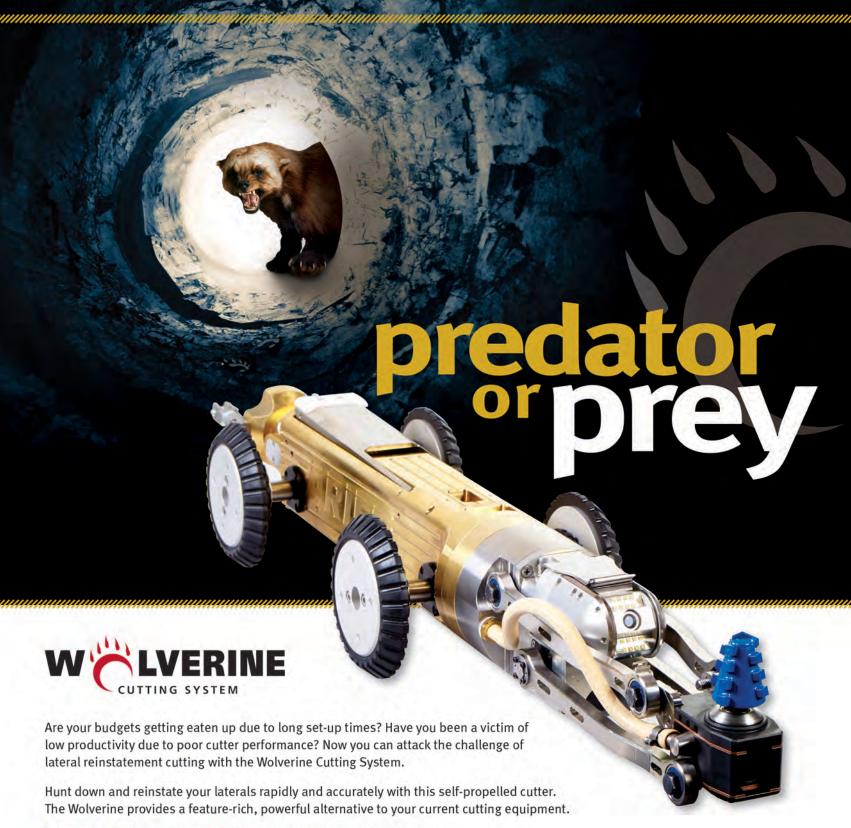
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ABEL RECON HAS GROWN FROM A SMALL STARTUP DIVISION TO ONE OF THE MID-ATLANTIC REGION'S MOST RESPECTED INFRASTRUCTURE REHABILITATION PROVIDERS BY SUZAN MARIE CHIN

Troy Abel, president of The Abel Companies, wanted to diversify his infrastructure construction firm to facilitate growth and hedge against the cyclical nature of infrastructure construction, which had been his bread and butter for over 30 years.

Based in the heart of South Central Pennsylvania's "Amish Country," Abel's firm was successfully and profitably providing infrastructure construction services such as heavy excavation, underground utility installation, curbing and paving to municipalities, utility agencies and property development firms, but it was time to consider venturing into other markets.

"We knew we wanted to enter a field that would be closely related to what

we were already doing so that we could draw upon the experience and knowledge base of our team. It needed to be something where the technical learning curve and capital costs to enter would be manageable," Abel says.

He began his search for the "right fit" by tapping into his existing client base and strategic partners to learn about their experiences with various technologies, and to determine the region's most pressing infrastructure challenges and where the needs were greatest.

This due diligence pointed Abel in the direction of structural rehabilitation. He moved forward with the formation of a new company, ABEL RECON, whose focus would be trenchless technology and rehabilitation services. Abel researched the various technologies that had been recommended, and one in particular stood out as the most sensible first step for his new venture — sprayapplied polyurethanes by Sprayroq, Inc.



"My goal was to be able to offer a wide range of services to the client base we would be working for. It was a natural progression that we would add on services like CCTV inspection, cleaning, grouting and root control."

Troy Abel

ABEL RECON became a Sprayroq Certified Partner, a process that required not just the purchase of specialized plural component spray equipment, preparation tools and multiple vehicles, but also that his newly hired spray and prep crew members undergo an intense factory and field training program with representatives from Sprayroq. Each crew member is certified in the proper preparation of structures, application of the various polyurethane materials, and confined-space-entry safety.

profile

ABEL RECON

CUTTING THEIR TEETH

One of the crew's early projects as a Sprayroq partner was the structural rehabilitation of an underground sewer culvert in the Philadelphia suburb of Ridley Park. The culvert transported 12 million gallons of wastewater per day and was showing signs of age and deterioration. The biggest issue facing the crews and the asset owner was the line's location. Half of the culvert ran directly underneath Interstate 95, a major north-south route through metropolitan Philadelphia.

The culvert was 3 feet high, 7 feet wide and 575 feet long. The decay was exposing aggregate and the goal was to structurally repair the existing damage and provide protection from future deterioration. Since the culvert was rectangular, the flat surfaces needed structural support using a flat wall design calculation. SprayWall, a structural polyurethane, was selected for the project and the crew prepped, applied and returned the line to service in less than four weeks, extending its lifespan by up to 50 years.

This project, along with many others that followed, including a progressive manhole rehabilitation program for Derry Township, Pa., and industrial projects for The Hershey Company and other regional municipal authorities, provided the ABEL RECON team an opportunity to test their abilities and quickly gain a reputation as the area's go-to guys for rehabilitation.

It became obvious to Abel that he needed to add more services to meet the increasing demands of his clients. "My goal was to be able to offer a wide range of services to the client base we would be working for. It was a natural progression



ABEL RECON crew members power wash a manhole in preparation for rehabilitation with Sprayroq spray-applied polymer lining. (Photography by Suzan Marie Chin)

An ABEL RECON crew member applies SprayWall structural lining to a wastewater junction box.

that we would add on services like CCTV inspection, cleaning, grouting and root control," he says.

All of these services made the firm a onestop solutions provider for their client base, but the traditional maintenance services like

"We view marketing as an educational process - a direct, hands-on effort to educate people about who we are, the services we offer, the products we represent, and the advantages and benefits of working with us." Troy Abel

cleaning and CCTV, along with root control or grouting, were temporary fixes for infrastructure issues. Numerous other contractors also

offered these services, and competitive bidding made them less lucrative for the growth potential of the firm as a whole.

With their success as a certified installer for Sprayroq, adding another technology with a similar structure seemed the next logical fit for Abel and his team. CIPP appeared to be a strong candidate and was a rehabilitation method Abel's client base was requesting and specifying frequently. Just as he had done his homework on what trenchless method he wanted to start his business with, he performed similar investigative research on what CIPP method and manufacturer would best fit his business model and goals.



The UV light train rolls through a fiberglass-lined pipe during the curing process.



Similar in approach to Sprayroq, Reline America, Inc. offered a marketing territory for ABEL RECON, which became the first contractor to install the Reline America product in North America. Abel saw great potential in this opportunity and the nature of the technology and opted to invest in his firm again, adding specialized lining rigs and equipment. New crews were hired and trained at the Reline America plant and in the field.

The demand for highly skilled CIPP installers takes ABEL RECON to many interesting locations and communities such as Elizabeth Township, Pa., a region just southeast of Pittsburgh that is a mix of rural and suburban communities. Under consent decree to drastically reduce its wet-weather-related SSOs, trenchless technology - in particular, CIPP - became the predominant solution of choice for the township.

The initial phase of the township's CIPP rehabilitation program began in 2009. Steam-cured felt liners were used, but the consulting engineer, Senate Engineering of Harmar, Pa., began investigating UV-cured CIPP as an alternative. For its next phase, bid solicitations included both fiberglass-UV and felt-hot water curing methods. ABEL RECON was awarded the contract utilizing Blue-Tek technology from Reline America. The crews successfully completed the rehabilitation of 55,000 feet of pipe and the project received news coverage in several publications on a regional and national level for its cost-effectiveness and helping the township move toward its SSO remediation goals.

IF YOU BUILD IT, THEY WILL COME

The famous line from "Field of Dreams" is just that - a dream that only happens in the movies. For his business, Abel knew he had to have a plan. Simply finding excellent technology, vendors, good employees and well-built equipment was not enough. Precisely targeted and cost-effective marketing would be the key to the firm's quick success and rapid growth in the rehabilitation sector.

"There's a big difference between advertising and marketing," Abel says. "We view marketing as an educational process - a direct, hands-on effort

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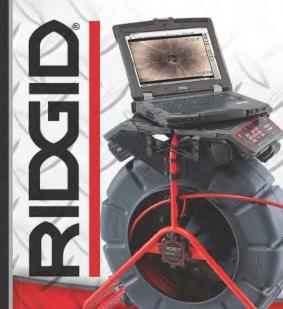
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LET'S DO LUNCH

As part of its marketing strategy, ABEL RECON utilizes live field demonstrations of its various trenchless technology products and solutions on a regular basis.

The firm arranges a location and day with a local municipality or utility agency in a specific geographic area approximately four to six times annually and arranges for a manhole or pipeline in need of rehabilitation to be utilized as a demonstration site. In consideration for the use of the structure(s), the installation and material costs are complementary to the asset owner.

In most cases, ABEL RECON crews will demonstrate both a CIPP lining installation utilizing Blue-Tek UV Cured lining materials by Reline America and the structural rehabilitation of a manhole with the application of a Sprayroq spray-applied polyurethane lining at the same time.

An invitation is sent to local engineers, utilities and municipalities who are interested in learning more about the technology. A brown bag lunch is provided to all attendees during a short presentation about the company. While the presentation is taking place, crews begin performing the rehabilitations, which the attendees then have an opportunity to witness first-hand and see the products' performance in a realworld setting.

The manufacturers cooperatively help ABEL RECON with the costs of the materials for the lunch demonstrations, and the hands-on marketing approach has proven to be one of the firm's best and most cost-effective methods for educating prospects and showcasing their expertise.

to educate people about who we are, the services we offer, the products we represent and the advantages and benefits of working with us. Advertising items like direct mail and ads have their place; it places your name out there, but marketing and continual dialogue with the client or prospect is what really drives the business our way."

ABEL RECON's educational marketing approach plays a key role in securing opportunities to work on many important projects.

"We understand the particular concerns our clients have about protecting themselves as an asset owner or municipality and that they want to make sure that they get the very best service and products or solutions available for



ABEL RECON crew members receive training on safety protocols and confined-space entry requirements.

market about the firm. Case in point, an article showcasing Derry Township gave positive mention of the firm and the great success achieved by the utilization of Sprayroq technology. This created interest from officials in another local authority

"By educating them about the unique characteristics of our products and solutions, when they begin to write their specs, they will be well-informed and have the knowledge to help them procure the best solution for their needs, and know that sometimes, the right solution won't always be the least expensive."

Hap Witmer

their needs," says General Manager Hap Witmer. "By educating them about the unique characteristics of our products and solutions, when they begin to write their specs, they will be well-informed and have the knowledge to help them procure the best solution for their needs, and know that sometimes, the right solution won't always be the least expensive."

Publicity and free press opportunities are another form of "education-style" marketing that Abel takes full advantage of whenever possible. Developing feature articles about key projects and success stories that are published in local, regional and national industry publications on a regular basis helps educate the who knew the gentleman featured in the article and regarded his opinion highly. This opened a dialogue that lead to an eventual working relationship between ABEL RECON and the authority.

Witmer and the company's business development managers, Scot Snyder and Pat Godwin, are constantly in the field, personally delivering the firm's marketing message of new trenchless technologies and how ABEL RECON can assist in solving infrastructure issues. The marketing team participates in approximately 15 regional Water Environment Association and Rural Water Association trade shows annually and finds this an excellent method for meeting

(continued)

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ABEL RECON crew members prepare chemical root control applicator equipment to remove roots from a sewer line.

key contacts and decision makers. Brown bag lunch field demos, targeted email outreach and a media-rich, comprehensive website are some of the other methods ABEL RECON utilizes to continually stay in contact and educate its client base.

A GOOD MODEL

With a solid, time-proven model for marketing, finding, deploying and executing successful rehabilitation projects with multiple technologies, ABEL RECON is now expanding beyond its original core base of wastewater infrastructure into stormwater and DOT drainage, vertical industrial and potable

Since its inception in 2005, ABEL RECON has achieved much to be proud of. They were willing to repeatedly get out of their comfort zone and try new technologies. When asked for the secret to their continual growth and success,

Abel humbly replies, "A good foundation and a focus on the basics certainly, but I think the real strength of our company comes from always trying to take the best possible care of our clients, anticipate what their needs are, and to give them the stable of services that benefit them the most in achieving their goals." c

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Recognize Danger Before There's a Problem

A SAFE PIPE BURSTING OPERATION REQUIRES WELL-TRAINED OPERATORS, CAREFUL PLANNING AND AN UNDERSTANDING OF THE FORCES IN PLAY

BY DOUG DAY

ipe bursting: It is a proven and routine method for pipe replacement, but the name alone conjures up images of danger. Injuries are not common, but like all forms of utility construction, precautions are necessary to make sure you are not creating risks for workers, the general public, or nearby utility lines and structures.

In its pipe bursting guidelines, updated in January 2012, the International Pipe Bursting Association lists three minimum qualifications for contractors doing pipe bursting:

- Training on the equipment from the pipe bursting system manufacturer
- Training by the pipe supplier on the handling, joining and installing of
- Proven installation of at least 50,000 linear feet of pipe

"You simply have to understand that a pipe bursting system is creating stored energy that is being transferred to a bursting head and pipe system and it is essential that personnel know where the energy is in the system at all times."

Matt Timberlake

"Training, training, training," says Matt Timberlake, co-owner and vice president of Ted Berry Company of Livermore, Maine. He says the process of pulling or pushing the bursting head presents the most risk to personal safety. "You simply have to understand that a pipe bursting system is creating stored energy that is being transferred to a bursting head and pipe system and it is essential that personnel know where the energy is in the system at all times. An operator should know that if something does go wrong, where that energy is going to be displaced."

That's why, for instance, you should never get behind the equipment in a static system. In the rare case of a system or mechanical failure, that area could

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pose the highest risk to workers. "As soon as something changes, you have to be able to recognize it before it's a problem," says Timberlake. "A good operator can feel that in a system and can recognize when the energy is changing. It's about awareness of the risks and being able to make changes based on those changes."

Equipment operating manuals and industry sources list several common safety considerations:

- Locating nearby utilities
- · Proper trench preparation and shoring
- · Confined space precautions
- Proper use of hoses
- Inspection of hoses and connections
- · Personal protective gear, such as eye and hearing protection, when necessary
- · Winch safety, including a safety cage
- · Lifting safety and proper use of lifting devices
- · Safe pipe handling practices, including transportation, on-site storage, pulling and cutting/joining
- · Proper equipment use

Timberlake says that, in his experience, the greatest risk is from equipment and from working in a trench or manhole. "You're using the trench shoring or the manhole to brace your equipment," he points out. "So you really need awareness of how the work you're doing may impact the conditions inside the trench."

Like most industrial processes, proper planning and a pre-job brief can ensure that people are safe and the pipe bursting is done in a way that protects nearby structures and equipment. A site safety plan is one of the steps included in the association's task list, along with a safety review for work crews.

Planning must also account for nearby utilities. The IPBA's updated guidelines state, "As a general rule, both horizontal and vertical distance between the pipe to be burst and the existing adjacent pipe should be at least two diameters of the replacement pipe."

The guidelines also list vibration as a possible risk to nearby utilities and structures when using the pneumatic process, but generally only within a few feet: "While ground vibrations may be quite noticeable on the surface close to a bursting operation, the levels of vibrations are very unlikely to be damaging except at very close distances to the bursting operation."

Timberlake agrees that damage from vibrations is something that must be considered, but damage is highly unlikely if the work is planned and executed correctly.

Pipe bursting is a routine function, but there are risks that require proper planning and preparation to make sure the job is completed without causing harm or putting people at risk. Make sure you do your due diligence before digging a pit and starting any bursting job.







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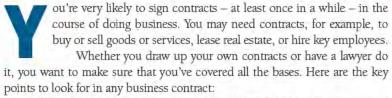


Building Better Contracts

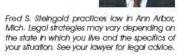
BINDING LEGAL AGREEMENTS DON'T NEED TO BE COMPLICATED.

BUT YOU MUST UNDERSTAND THE KEY ELEMENTS

BY FRED S. STEINGOLD



- · What each party is promising to do. Perhaps it's to pay money, provide a service, or deliver a product. If the contract involves a construction project or a customized machine, it may have a separate attachment labeled "specifications."
- · When the work will be done or the product delivered. If strict compliance with contract deadlines is important, be sure to include the words "Time is of the essence." Otherwise, a judge may allow reasonable leeway in enforcing the deadlines.
- · How long the contract will remain in effect. If it's open-ended, list the conditions under which you or the other party can terminate it without penalty.
- The price or how it will be determined. Avoid saying that the price will be negotiated. This wording can lead to arguments and even a lawsuit. If you use a formula for pricing, include an example for clarity.
- When payment is due. Will there be installments? Will interest be charged? In contracts for consulting and other services, it's common to have a payment schedule tied to interim completion dates.
- · Warranties. If a party guarantees labor and materials for a certain period of time, how will problems be handled? By repair, replacement
- · "Liquidated damages" if performance is delayed or defective. Sometimes actual damages for breach of contract are hard to compute. The parties can agree in advance on a fixed amount (liquidated damages) that a party who breaches the contract must pay.
- · Whether either party can transfer (assign) the contract. Depending on what the contract is about, you may or may not have concerns about dealing with a stranger in the future.
- · How disputes will be resolved. Lawsuits can be costly and slow. Consider stating that disputes about the contract won't go to court. Instead, an arbitrator will settle them.
- · Legal fees. You can say that a party who breaches the contract will pay the other party's legal fees and related costs.
- · Notices. Specify where notice of default and other communications should be sent - and whether email notice is sufficient.
- · Which state's laws will apply. This clause will help avoid problems if the parties operate in separate states, or if the contract is to be performed in more than one state.



GETTING A CONTRACT SIGNED

So much for the contents of a business contract. Let's turn now to how to nail down a binding legal agreement.

Many contracts consist of a single document containing numbered clauses. Both parties sign in duplicate, and each keeps a copy. But some contracts are less formal.

You can have a contract in two or more parts. For example, A sends B an offer, and B accepts in a separate letter, fax or email message. Or A sends B an offer, B sends back a counter-offer, and A accepts the counter-offer. As long as there's a meeting of the minds, a contract involving several documents is valid.

If strict compliance with contract deadlines is important, be sure to include the words "Time is of the essence." Otherwise, a judge may allow reasonable leeway in enforcing the deadlines.

You can also create a contract by writing a letter that contains the details of a proposed deal. If the person you wrote signs an acceptance at the bottom of the letter, you have a valid contract. This technique might work well if you've reached a deal over lunch. You can send your letter to the other person, and ask him or her to confirm at the bottom of the letter that you've correctly stated the terms the two of you have agreed on.

There may be several drafts of a contract before it's final. The computer makes it easy to change the wording. You can also write in changes using a pen, but if you do this, each party should initial the changes.

You can also make changes in an addendum - a page added to the main contract. If you do this, state specifically that the addendum prevails if there's a conflict between it and the main contract.

Make sure that the right person signs on behalf of each party. A partner can sign for a partnership. A corporate officer can sign for a corporation, and a member or manager can sign for an LLC. If you're dealing with a small corporation or LLC, consider asking the owners to guarantee performance of the contract.

Contracts needn't be witnessed or notarized to be legal.







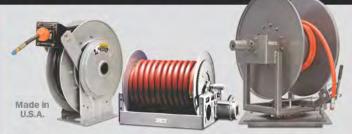


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THE TERRITORY

ROTO-ROOTER FRANCHISE RELIES ON HEAVY EQUIPMENT, DIVERSE SERVICES AND THE EMERGENCE OF PIPE BURSTING TO MEET CUSTOMER DEMANDS BY MARIAN BOND

John Mott benefited greatly from the notoriety of national advertising, along with a proven name and reputation, when he established his Roto-Rooter franchise in 1972. Forty years later, those attributes continue to sustain and benefit the plumbing company in Sciotoville, Ohio.

Over the years, Mott and his son, John Mott II, have tailored the business to suit their three-county service region, sometimes referred to as the Little Smokies because of the heavily wooded and rolling hillsides with clusters of residential and commercial enclaves in the valleys.

The younger Mott worked for his late father while growing up. He became president of the company in 1998, two years after it was established as a corporation. Today, their staff includes three technicians and a helper, one portable restroom operator and one septic truck operator. Mott says the company has been largely successful because of a willingness to diversify and

take advantage of new technology, along with a solid understanding of their market's needs. (continued)

profile

JOHN MOTT ENTERPRISES

THE UMBRELLA CORPORATION FÓR ROTO-ROOTER PLUMBERS, MOTT'S POTTS, AND JOHN MOTT EXCAVATION, SCIOTOVILLE, OHIO,

SERVING THE CITY OF PORTSMOUTH AND ADJOINING AREAS

John Mott

ESTABLISHED: 1968, a Roto-Rooter franchise since 1972

Drain cleaning, plumbing, jetting, CCTV, pipe bursting,

portable restrooms, septic service, excavation

EMPLOYEES:

AROUND THE WORLD NO YEARS?



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John Mott inspects a residential drain system through an outside clean-out using a RIDGID SeeSnake camera.

The company's service area includes Ohio's Scioto and Pike counties and Louis County, Ky., with a total population around 120,000, and they frequently work on older systems with clay, Orangeburg and Cuyahoga pipes in need of repair or replacement. Systems are typically 8 feet or deeper, and because of the terrain, the preferred and most economical solution for the customer on 75 percent of replacement jobs, even today, is to dig and replace.

"We were interested in pipe bursting as opposed to relining because of the capability of increasing the size of the line significantly. We can go from a 4-inch line and increase to a 6-inch line with pipe bursting." John Mott II

MORE HEFT

In 1987, services were enhanced to include portable restrooms and septic service (Mott's Potts Portable Toilets with 150 units), and in 2001, Mott began offering pipe bursting in order to preserve driveways and landscaping in situations where lines require extensive repair or replacement.

"We were interested in pipe bursting as opposed to relining because of the capability of increasing the size of the line significantly," Mott says. "We can go from a 4-inch line and increase to a 6-inch line with pipe bursting. We have that capability with TRIC Tools, Inc., the system we selected. In some cases a customer may want to, for example, change an apartment building to a restaurant, and might need more capacity. We can do that with less expense with pipe bursting."

Mott says they researched several manufacturers at the Pumper & Cleaner Environmental Expo and eventually traveled to California to visit the TRIC Tools facility before deciding on their 30-ton unit.

"We liked the size of the equipment. It felt good to handle and could fit easily into a lot of tight places. We don't need a special trailer, and it can be hauled in a van, pickup or dump truck," Mott says. "We also could network with other Roto-Rooter franchise owners who use the system. Another Roto-Rooter advantage."

Mott, as far as he knows, was the first in the area to offer pipe bursting as an alternative, and he has had to educate the market on the advantages of the process.

"Our customers have been open to the concept, once they fully understand the process," he says. "We will take a sample piece of pipe that shows the fused area and demonstrate that it is seamless. Customers also like the 100-year guarantee from the manufacturer."



Mott says the local inspectors weren't fully up to speed on the pipe bursting process either, but they have been cooperative and supportive of the work.

A typical pipe bursting job in their area is 80 feet, but their longest was 145 feet. Mott keeps about 500 feet of 4- and 6-inch pipe in stock at his shop, in lengths of 40 to 50 feet. He says the length makes for interesting transport, with the sticks strapped on either a flatbed or a dump truck with a rack system. The pipe is flexible and will bend in transport, but it has a memory and will go back to its original shape. The pipe was developed in earthquake-prone California and is designed to retain its form.

Pipe bursting projects are generally completed in one day, but longer lines sometimes take a bit longer. Mott has three technicians who handle this equipment, and several helpers.

Jobs typically start at the clean-out in the house. They will jet the line they are replacing and run the camera and mark the tie-ins so they can be reinstated



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Technician Damian Hale uses a RIDGID cable machine to clear a residential drain line.

when the job is finished. This prep work takes about two hours. If the pipe runs through a footer or concrete and the new pipe will not fit, they dig and chisel out the obstacle. Mott says the camera will not show these problems, but it is rarely an issue.

Roto-Rooter now has a local pipe bursting competitor, but Mott says he has an advantage in that his system leaves a smaller working footprint. "Our system is more efficient, and physically will fit into tighter places," he says.

The company's extensive inventory of excavation equipment is also beneficial for digging entry and exit pits on pipe bursting projects, and they always have one of their excavators on site or available for any other need that arises, whether on a traditional dig or a pipe bursting project.

PULLING THE WEIGHT

The local terrain and the prevalence of dig-andreplace jobs requiring heavy equipment necessitates a fleet of heavy-duty service vehicles. With only eight employees, the company has more vehicles than people, but rough and varied terrain requires an assortment of trucks to efficiently meet the team's needs. Service

calls are primarily handled with Ford and Chevrolet vans and trucks. Most of the company's 18 vehicles, including dump trucks and a flatbed, are dieselpowered in order to muscle heavy equipment over hill and dale.

"Our customers have been open to the concept, once they fully understand the process. We will take a sample piece of pipe that shows the fused area and demonstrate that it is seamless. Customers also like the 100-year guarantee from the manufacturer." John Mott II

The company's extensive stable of excavation equipment includes a 1990 Ditch Witch 5010 trencher, Kubota excavators, a Caterpillar 216 Skid Steer and 416 Backhoe, and bulldozers from Case and Komatsu.

All vehicles and equipment are kept on a 1 1/2-acre site with a 5,000-square-foot garage. Mott says it's important to keep equipment in good condition at all times. "That helps to keep the doors open and the phone ringing," he says.

The company handles basic maintenance such as oil changes and brakes, but they turn to local mechanic shops for more extensive repairs. With other equipment, they depend on the manufacturers and look for a quick turnaround whenever possible. Their extensive fleet and stable of equipment ensures they can respond to any call any time.

JETTING TOWARD SUCCESS

Mott has two Harben 4016 trailer jetters. One is a 1988 model year recently added to the inventory as a backup, and the other a 2007 (both provide 4,000 psi/16 gpm).

"We brought in our first jetter in 1986. They are the workhorses in our



operation," Mott says. "We try to determine or diagnose in the initial phone call if we will be taking out the jetter on the call. We always get the customer's (continued)

LEADING WITH CONVICTION

John Mott II is justifiably proud of the broad menu of services offered by the company his father founded some 44 years ago, and the philosophy and work ethic of "honest work for honest pay." That has been the standard practice.

As president of John Mott Enterprises, which incorporates Roto-Rooter Plumbers, Mott's Potts Portable Toilets and their excavation operation, Mott manages to spread himself in many directions, from the office into the field in support of his crew. He notes that 65 percent of their total business is related to the Roto-Rooter side, including jetting, pipe bursting and drain cleaning.

"On a daily basis, I like to be available if one of the technicians runs into a problem and they need my advice," Mott says, adding that their service area has a small footprint, which makes his involvement more feasible.

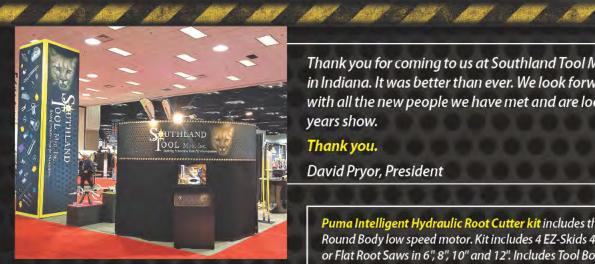
The company sometimes serves as a subcontractor to other plumbing firms in their region who do not always have the equipment to solve a problem.

Sometimes their customer will want an estimate on replacing a line, but more often we will be called on by another plumbing company to use our jetter, or to do some excavation work."

At the start of each day, Mott's first duty is to quickly scan the fax notices that have come in from the answering service and determine what will take top priority.

At the end of each day, Mott likes to look back and see that they have given "an honest day's work for honest pay."





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Technician Thomas Miller uses a RIDGID cable machine to clear a bathroom drainline at a private residence.

approval first, because we charge more if we take out and use the jetter. We know that if the cable machine does not do the job, the jetter will. If we get to the job and the cable machine does work, we don't add on the charge for the jetter. Only if we use it."

He says that while the cable machines remain the tool of choice, the jetter will do a more complete job with significant stoppages and issues like grease.

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"We will carry 110 feet of cable in the van and have backup cable as well, but with the jetter we will have another 500 feet," Mott says.

When the call comes in, the office reviews past issues with the particular line. The cable machine will likely suffice if roots are the problem.

"If there is a hard spot in the line, and if it has stopped up repeatedly, then we will suggest to the customer there is probably something more serious in the pipe. The size of the line determines if we will use a camera. If it is a 4-inch line and we get it open with the cable, then we go right to the camera. We have to be sure the line is open before using the camera."

Mott's crew uses cameras and locators from RIDGID and Radiodetection. He says they generally do not carry a camera on the truck, but they bring it along if there is a specific call for it. Locators, however, are always on the service

"Because of our equipment, including the cameras and jetters, and our heavy vehicles, including excavators, and our ability to perform a wide range of services, including line replacement, our customers have tended to return and stick with us through the tough times," Mott says.

"Sometimes it's difficult to make a decision to add new equipment or services, as we do live in a small area. However, if you want to grow and hold your customers, you have to be able to do different things." John Mott II

TIMING IT RIGHT

"Sometimes it's difficult to make a decision to add new equipment or services, as we do live in a small area," Mott says. "However, if you want to grow and hold your customers, you have to be able to do different things."

Over the years, the company has worked through economic highs and lows, and the challenge in the lows has been maintaining and holding the line while striving for some profit. Mott has also learned to look for opportunities to buy equipment at a lower price.

"In the up cycle, that is when you want to take advantage, take a look at new technology," he says.

FIT AND READY

Mott says even though they are in a limited market, he has not had difficulty finding talented technicians for his service crew.

He says he conducts roughly 15 interviews before selecting a new employee to represent the company. "Then that person would ride with a technician for a while to understand our methods and procedures.

"I think the most important thing is honesty and dependability, and a plus would be a candidate who is mechanically inclined," Mott says. "We find everything else can be taught through training and hands-on experience." c

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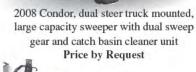
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Time for an Upgrade?

CONSIDER THE ADVANTAGES AND TRADE-OFFS BETWEEN PORTABLE LAPTOPS OR TABLETS AND MORE POWERFUL DESKTOP MODELS

BY DAVID STEINKRAUS

erhaps you've been tempted by ads touting the capabilities of a new computer, or maybe you recently realized your old computer really is old. Whatever the reason, you've decided to buy a new computer (or computers) to run your business. Now comes choosing the computer that best fits your needs.

Which way should you go – familiar desktop models, laptops, ultralight laptops or maybe tablets? The answer isn't always simple and straightforward. In reality, one solution won't work for everyone. Let's explore which options are right for your business.

Portable vs. powerful

Laptops tend to be slightly less powerful than desktops of comparable price because lower-powered processing chips help extend the time between battery charges. But power is a relative term. Laptops or desktops are equally capable these days for all but the most demanding work. If you're editing videos for your website, you will be happier with a more powerful desktop machine. Otherwise make sure whatever you're buying matches the requirements of your business software, and maybe allows a bit more oomph to meet the greater demands of future software releases.

Remember that although PCs and Macs look similar, it will require time and effort to fully learn a different system. If you're not that adventurous or don't like to tinker with computers, stick with what you know. In the end, you'll be happier and will work more efficiently.

What the laptop has on its side is portability. You can mount one in your truck and type information directly into it, saving you and your office staff some time. If you pay for a cellular data plan or know where the free Wi-Fi access spots are in your area, you can transmit information back to the office or answer emails while you're on the road. At the end of the day, the laptop can go home with you. This provides another backup of your crucial business information, and you can sit in your favorite chair with your favorite beverage and catch up on lower-priority chores during the evening.

A desktop machine provides a more comfortable working position for the person sitting in front of it all day, and it allows for a larger screen. Don't discount the value of that. You can work more efficiently on a large screen because you can have several windows open simultaneously and need only shift your eyes instead of pressing keys to flip from one window to another.

The hybrid solution is to buy a laptop capable of connecting to a large external screen, giving you the best of both worlds.

Netbooks and tablets

The newer entries in mobile computing are netbooks, such as Google's Chromebook, and tablets such as Apple's iPad.

Netbooks - the term for small, very portable laptops - are generally underpowered for all but the simplest tasks and are intended for use primarily with an Internet connection. Tablets have the same limitation. But the advantage of both types of computers is the elimination of a spinning hard-disk drive, which makes these machines much less vulnerable to the bumps and bangs of being carried around.

Netbooks and tablets also excel at simple data entry. If you're in the truck and want to update your customer list, check your calendar, or keep a simple log of where you've been, these may be the solutions for you. They're typically cheaper than a laptop and - with an Internet link - allow you to exchange information with your office.

PC operating system issues

If like most people you use Microsoft Windows, you also need to confront the company's new operating system called Windows 8. You've probably seen the television ads already. Gone are the familiar task bar and Start button. Microsoft divides the screen into a series of colorful tiles, which you tap or click to access functions. It is a system designed for computers with touch screens, but users and reviewers have complained mightily. Mostly they have said the new system is confusing and hard to learn and navigate.

There are options if you want a new computer but don't want to jump headfirst into Windows 8.

First, any computer with Windows 8 Pro preinstalled is eligible for a downgrade to the previous system, Windows 7, which still works and looks as Windows always has.

Second, Windows 7 will not disappear instantly. Microsoft tends to support its operating systems for at least a decade. (The third major update to Windows XP - introduced in 2001 and still a mainstay of many businesses will be supported until April 2014.) The first major update to Windows 7 will be supported until at least 2020. Retailers will be selling boxed versions of Windows 7 until at least this fall, and computer manufacturers may continue selling PCs preloaded with Windows 7 until October 2014.

Smooth running

This is a good place to talk about reliability, because everyone wants a computer that will run without bother for as long as possible and can be repaired speedily if it fails.

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According to the December 2012 issue of Consumer Reports, the top four companies for providing technical support, in order of satisfaction, are: Apple, Dell, Lenovo and HP/Compaq.

The top four most reliable desktop computers are, in order: Apple, HP, Dell and Gateway. The top four most reliable laptop computers are, in order: Apple, Acer, Sony and Lenovo.

Speaking of Apple, you may be wondering about those. Comparably equipped PCs and Apples are about equal in price, with Apple tending to be slightly higher. But Apples hold their value very well. Look at the prices on used machines and you'll see. And with some additional software, an Apple machine will run a Windows operating system if that's your preference.

But if you're tempted, remember that although PCs and Macs look similar, it will require time and effort to fully learn a different system. If you're not that adventurous or don't like to tinker with computers, stick with what you know. In the end, you'll be happier and will work more efficiently.

Choices, choices

There are a lot of choices to sort through, no doubt. Technology is complicated and not well understood by many people including, sometimes, those who sell it. But there is one consoling thought to keep in mind: Whatever is out there now will change in a year or so. If you don't like the options, wait. There will be others, and they will probably be better. The only thing you need to be careful of is missing a crucial deadline. If, for example, the thought of using Windows 8 turns your stomach, you may want to consider buying a new computer before Windows 7 disappears.

ABOUT THE AUTHOR David Steinkraus is a freelance business writer in Racine, Wis.



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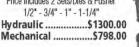
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Tech Perspective looks at technology-related issues and provides information and advice that cleaning professionals can apply to equipment selection and to their daily work in the field. Industry members are welcome to offer ideas for this column. Please direct them to editor Luke Laggis, editor@cleaner.com.

Get the Most From Your Gear

THE PRINCIPLES OF ASSET LIFECYCLE MANAGEMENT CAN REDUCE EQUIPMENT COSTS AND IMPROVE YOUR BOTTOM LINE

BY PETER KENTER

n order to remain competitive, sewer and drain cleaning contractors typically operate and maintain a wide array of equipment that is subjected to daily use and wear. With busy contract schedules, maintenance of machinery only becomes a priority when operators see obvious signs that equipment is malfunctioning or broken. Replacement is often simply a function of whether equipment repair bills exceed the cost of buying new equipment.

By applying the principles of Asset Lifecycle Management (ALM) to your inventory, you can improve safety, reduce downtime, predict breakdowns, minimize the cost of maintenance, and lower overall equipment costs.

Shannon Klabnik is the PeopleSoft Practice Director for MIPRO, a consultancy specializing in the implementation of Oracle's PeopleSoft software applications, including products that assist clients in tracking and maintaining equipment assets.

"Sewer contractors rely on complex, specially-designed machinery that operates in rugged environments across a broad range of climatic conditions," she says. "Working in an industry that relies on the newest technology in a business environment that offers tighter and tighter profit margins, contractors

are increasingly dependent on the reliability and functionality of their physical assets."

Klabnik recommends contractors apply the principles of ALM, also known as enterprise asset management, to their businesses. Using ALM, operators

always maintain a complete inventory and overview of their equipment, its condition, maintenance schedules and logs, and whether it meets all applicable regulations.

"Next-generation ALM requires the use of a software system to deal with the complexities of these challenges," Klabnik says. "The best ALM system employs sophisticated software that enables powerful tracking and controls and an automated maintenance management process. This capability elevates the contractor from someone who simply reacts after equipment breaks down to someone in a proactive position. That increases efficiency, maximizes operational uptime, and improves the bottom line."

Klabnik has worked with a wide range of businesses in applying Oracle software solutions to equipment assets, but notes that the principles of ALM apply to any business, regardless of the software they choose.

She notes, however, that companies who simply declare that they are adopting an ALM software package won't necessarily reap maximum benefits.

"Probably the biggest oversight made by companies when they undertake such a project is to take all of the information from their old system and import it into the new system without starting at square one," Klabnik says. "They look at it as just an information technology project in which existing data is moved around. The old saying, 'garbage in, garbage out,' applies here. If you go about adopting ALM without changing the way you manage your operational assets, you will not likely improve the way you do business."

Given the importance of correctly planning and integrating ALM up front, contractors need to be aware of the best practices associated with implementation and overall asset lifecycle management.

Plan ahead

Before implementing any new maintenance management system, operational priorities need to be clearly established. Once a company identifies its goals and outlines its priorities and expectations, it can move forward with the process of implementing a new software system to support its equipmentrelated business processes.

"Just because the company tells workers they need to do something new, it doesn't make that task valuable to them. You need to get them to buy into it by showing them it can make their lives safer and help to make their jobs more secure." Shannon Klabnik

> "Professional consultants can be an important resource at this stage of the process, where they can assist by refining the details of the maintenance program and strategy," says Klabnik. "There's no sense in enabling sophisticated controls that don't apply to your business."

Details matter

It may not be easy to identify specific maintenance standards and metrics for all equipment, but it needs to be done right the first time. An ALM system is only as powerful as the information it possesses.

"Even the most sophisticated tracking and coordinating software will fall short of expectations if it isn't given the right data to track," Klabnik says. "It takes some upfront effort to incorporate every regulation and required inspection date into the software, but once it's done, life becomes much easier."

At this stage, it's also important to anticipate, evaluate and mitigate any implementation and post-implementation problems that may crop up.

(continued)

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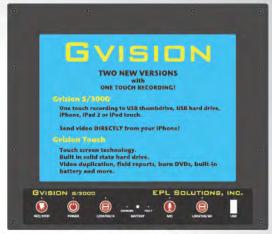


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"For example, consolidating replacement parts in one central location may seem like the best idea when you look at the big picture, but it might also be incompatible with your operation or existing supplier agreements, and may even create new inventory challenges," she says. "Iron out these details before they become a problem."

Taking inventory

ALM also requires a thorough inventory of equipment assets, from vehicles to jetters, trenchers, pipe lining equipment, CCTV units and easement machines. A company needs to maximize the efficiency of the system by deciding on the value of assets that are listed in order to prioritize and classify a maintenance approach and spare parts management.

"That may not always be based on the asset's dollar value alone," Klabnik says. "The tools associated with a jetter would certainly be on that list, but something as simple a fire extinguisher in the right location needs to be in that database as well."

Information should include standard maintenance procedures and schedules, approved replacement parts, costs and other critical information associated with each asset.

"If you're discovering that a particular type of jetter continues to break down over and over, you can begin to apply a root cause analysis to it to build a problem/cause/resolution repository inside your ALM system," says Klabnik. "With enough information, you can move from a corrective to a predictive

REGULATIONS AND ASSET LIFECYCLE MANAGEMENT

The regulatory and compliance framework associated with each piece of a contractor's equipment is an important component of Asset Lifecycle Management (ALM).

"Contractors need to consider and assimilate all regulations to remain ahead of the regulatory curve," says Shannon Klabnik, PeopleSoft Practice Director for MIPRO. "That can include anything from safety regulations to being agile enough to maneuver through federal, state and local environmental regulations. The ability to maintain safety and compliance standards is essential, especially if you operate in several states with different regulatory frameworks. You may be legally required to show when you last touched a piece of equipment, how it was maintained, and where it was at any given time. ALM software can supply that information."

While minimal downtime and a strong safety and compliance track record provide contractors with a competitive advantage, an effective maintenance management program can help avoid safety-related or environmental disasters that will remain with a company for years.

"Just one isolated high-profile event or even a near miss published in a local newspaper and repeated on the Internet can give your company a black eye," Klabnik says. "That not only hurts a company's reputation, but can lead to additional regulations that will make it tougher for all contractors to do business."

mode. Does the equipment typically break down in winter months, or only after you've logged a certain number of hours? Your asset management system can tell you what sort of work and operating conditions result in that breakdown. This sort of thinking can be applied to all equipment."

Maximizing the lifespan and uptime of highly specialized and expensive equipment also requires immediate access to critical information, including manufacturer support hotlines and the source of replacement parts. By including replacement part information and approved suppliers in the ALM software database, the most heavily used replacement parts can be identified and even stocked.

Automatic meters and self-generated equipment reports can also be tailored to provide information that is automatically fed into the ALM system.

"If you program operational parameters for any equipment capable of remote communication — a diesel engine for example — into the system, it can be alerted to kick out a work order every time that equipment is operating outside of predefined parameters," Klabnik says.

Education and training

The grunt work of ALM — inputting new data — still requires human cooperation. Only through sustained training of all personnel can the data be captured in a consistent and meaningful way.

Educating and training the individuals who will be overseeing the new system is important, says Klabnik. However, it's more critical that all employees who will use the system understand how to make it work, and how to make it work for them. While powerful ALM systems can potentially deliver gamechanging efficiencies, those efficiencies will only be unlocked if system users reach a level of technical and operational fluency.

Motivating workers

"Human nature does not tolerate additional responsibilities well," Klabnik says. "Just because the company tells workers they need to do something new, it doesn't make that task valuable to them. You need to get them to buy into it by showing them it can make their lives safer and help to make their jobs more secure."

Systems that can only be accessed through a desktop keyboard may also not encourage workers to use them as often as dynamic systems that allow input using smartphones or tablets, she notes.

Thinking long term

While the initial design and implementation of maintenance-related business processes and a supporting ALM system require a significant investment of time and energy, realizing its full benefits requires long-term oversight. Regular follow-ups and periodic assessments and evaluation ensure that the system is functioning properly, delivering meaningful reports to personnel and delivering anticipated results.

"A coordinated approach to asset management enables a company to realize its maximum return on assets," Klabnik says. "That value is increased with enhanced compliance capabilities and an approach that minimizes downtime, waste and avoidable expenses while providing a safe working environment. In a competitive industry, that edge may be enough to push a company operating on tight margins into the black." \circ

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Pulling Out All the Stops

A SLIPLINING PROJECT OVERCOMES TORRENTIAL CHALLENGES TO KEEP A STONE QUARRY AND ASPHALT PLANT IN OPERATION

BY SCOTTIE DAYTON

collapsing 72-inch corrugated metal pipe jeopardized operations at a stone quarry in Stafford, Va. The 800-foot pipe was the main dewatering system for the pit, and the quarry dewatered every other day. Beginning in a 20-foot-deep swale, the pipe also collected stormwater and carried a continuous flow of groundwater.

Large rocks and 3- to 5-foot-diameter boulders rolling into the sinkhole compressed the downstream pipe, backing up runoff. Workers who discovered the situation cut back 50 feet into an 85-foot-high sand hill to expose and remove the bad section, but the attempt failed. Open-cutting without shoring and frequent rains accelerated erosion.

Fearing erosion would undermine and collapse an asphalt plant 40 feet away on the hill, quarry officials called Aaron Enterprises, a boring, tunneling and directional drilling company in York, Pa. When engineers arrived, they found the downstream invert missing, the badly rusted walls curled up, and the pipe compressed to 2 feet by the weight of soil and debris. They decided to encase and remove the bad section, then slipline the entire pipe.



Quarry workers cut back 50 feet into the 85-foot-high sand hill to expose the bad section of the 72-inch-diameter stormwater pipe. Quarry officials called Aaron Enterprises when they began to fear erosion could undermine and collapse the asphalt plant 40 feet away on the hill.



Looking upstream at the jacking pit with the red hydraulic power unit, the auger boring machine and platform sled, mini excavator, and the opening of the 66-inch casing behind it. Underneath it all are 48-inch steel casings to drain water. (Photos courtesy of Glenn Grove)

tough job

PROJECT: Rehabilitate a stormwater pipe to dewater

a quarry and prevent the collapse of an

asphalt plant

CUSTOMER: Stone quarry, Stafford, Va.

CONTRACTOR: Aaron Enterprises, York, Pa.

EQUIPMENT: 48-900 auger boring machine

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RESULT: Pipe rehabilitated, quarry dewatering on

schedule, asphalt plant secure



ABOVE: The 1600 fusing machine is the largest made by McElroy. RIGHT: The runway for the HDPE pipe begins at the base of the cliff in the background and the fusing machine is 400 feet from the edge. Aaron Enterprises' fabrication engineer Jeffrey Smith designed the pulling assembly for the new 63-inch HDPE pipe.

"Sand shifted down constantly and undermined the occasional pine tree," says Superintendent Glenn Grove. "Furthermore, everything in the pit drained to this area, making working conditions like living in a fish bowl."

Significant rainfalls twice a week, difficult wooded and overgrown terrain, and steep drop-offs challenged the crew, but the asphalt plant continued to operate throughout the two-and-a-half-month rehabilitation.

STAGING STRUCTURES

Before workers arrived, in-house mechanical engineer Robert McDowell, P.E., walked the pipeline, plotting coordinates with a handheld Trimble global navigation satellite system. "The coordinates enabled us to keep the 10-footlong, 96-inch tunneling shield centered and on grade," says Grove. "We hit the good section of CMP dead center."

"Sand shifted down constantly and undermined the occasional pine tree. Furthermore, everything in the pit drained to this area, making working conditions like living in a fish bowl."

Glenn Grove

Controlling water was the team's first challenge. When it rained, runoff in the pipe backed up and filled the swale, which took two to three days to drain. The quarry tried to postpone dewatering until weekends to avoid inundating Grove's workers, but the effort wasn't always successful.

To reach the downstream work site, crews widened the steep road to accommodate the Case 9050B tracked excavator and other full-size equipment. After open-cutting 50 feet back from the compressed pipe, they excavated a 14- by 40-foot-long jacking pit that was overcut several feet and filled in with large stone to allow a constant flow of water.

Behind the jacking pit, workers laid and backfilled 50 feet of 48-inch casing for drainage, and toed in jacking plates backfilled with large stone to support the thrusting forces. "We also sunk two I-beams and set steel resistance plates against them," says Grove. "One plate rested atop the drain casing while the other two reached the bottom of the trench."



The team excavated a pulling pit 150 feet further downstream, then poured a concrete pad reinforced with steel plates to withstand pressures greater than 400,000 pounds from the 48-900 auger boring machine (American Augers) and platform sled (Michael Byrne Mfg.). They parked a Komatsu mini excavator on the slab to handle 15-foot-long DD50 directional drill steels.

Meanwhile, another team built a runway from the base of a 35-foot cliff to the upstream pipe, bulldozing trees along 350 feet of rough, steep terrain through the swale. "We needed 800 feet for the fused 63-inch HDPE pipe, and that's just what we had before reaching the mouth of the pipe," says Grove. They also built a headwall there.

MANUAL LABOR

The crew cleared enough rocks and boulders from the open-cut section to set the tunneling shield over the end of the pipe. To advance the shield, workers welded 20-foot sticks of 66-inch, 750-wall (3/4-inch thick) steel casing to it, then butted a push block against the casing. The boring machine jacked the assembly forward with 200,000 pounds of thrust.

"We welded eight gussets from the first casing to the shield and built a temporary masonry bulkhead between them to fill the annular space," says Grove. Advancing the shield also relieved some pressure on the pipe.

Protected under the shield, workers used pneumatic cutoff saws to slice through the compressed metal, tunneling spades to chip through soil and relieve the edges of the shield as it advanced, and rivet busters to break off pieces of rock in its way. A buggy system removed the material.

To handle boulders, the team bored 1.5-inch holes in them with a pneumatic hammer drill, inserted a hydraulic rock splitter, and broke off a slab. "We'd tap the piece, insert an anchor bolt, and extract it with the winch on the boring machine," says Grove. "Splitting boulders went on relentlessly."

(continued)

After hand-mining 75 feet in four-and-a-half weeks, workers reached the designated good section. "We relied heavily on dayshift foreman Richard Emanuel's construction background and customer relations skills," says Grove. "They were key to the project's success."

FUSING STATION

Quarry personnel helped build a gravel work area for a subcontractor's field technician to fuse the HDPE pipe using a 21,000-pound McElroy 1600 fusing machine with 3,000 psi and a 25 hp motor. "It's the largest butt fusion machine made, and there are only a few of them," says Grove.

"The pipe was at its teetering point and a man could have pulled it. We had restraint precautions in place, but thankfully we didn't need them."

Glenn Grove

His team set the 50-foot sticks of HDPE pipe with the Case excavator. Workers wearing welding gloves used putty knives to cut off the 1-inch-thick exterior fusion beads, enabling the pipe to slip through the 64.5-inch ID casings. Fusing a joint took 60 minutes.

Fabrication engineer Jeffrey Smith designed a metal pulling eye and mechanism that attached to the lead pipe. Fabricators Jed Lucabaugh and Danny "Bud" Witmern turned his sketch into eight equidistant metal straps radiating back from the eye. "We cut eight equidistance slits in one end of the lead pipe, bent down the divisions to form a nose, and slipped on the assembly," says Grove. Four bolts held each strap to the pipe.

After welding a heavy-duty steel line to the eye and fusing the first stick to

the lead pipe, the excavator set it on a support with rollers just before the edge of the cliff. An excavator at the bottom of the cliff used the line to control the pipe's descent, then pulled it downstream.

"We stabilized one steep slope with a large stone bed where we cut trees," says Grove. "To avoid damaging the pipe, we lay 8-inch casing for rollers. We also positioned casings at 50-foot increments through the swale."

At one point, workers believed the steep slope and weight of the pipe would be more than the excavator could handle. "The pipe was at its teetering point and a man could have pulled it," says Grove. "We had restraint precautions in place, but thankfully we didn't need them."

CRANK UP THE POWER

Smith modified the platform sled to accommodate a beetle motor (Gill Rock Drill Co.) to thread the 5-inch directional drill steels as workers strung them from the pulling pit. The platform pushed the steels more than 1,000 feet upstream through the casing and pipe for attachment to the pulling eye. "It took every ton of thrust the platform had to pull in the 208,000-pound pipe 30 inches at a time," says Grove.

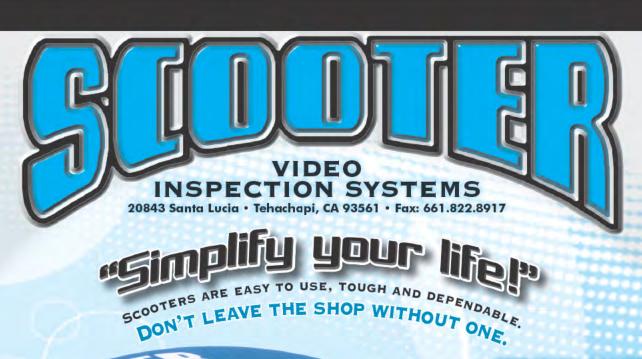
The pull continued nonstop into the night. When the nose emerged from the casing, workers mucked out and bedded the pipe's final resting place where the mini excavator had worked. Then they pulled the pipe into position and backfilled with stone per the quarry's specifications.

After removing the temporary masonry bulkhead, the crew filled the space with a grout mix from Cardinal Concrete Co. To fill the 1.5-inch-wide annular space between the HDPE pipe and casing, workers tapped the pipe, threaded 2-inch couplers on the downstream end, attached the pump to a 2-inch hose, and pumped in the grout.

"The entire job took 100 cubic yards of product," Grove says. "It was the last step in restoring the pipe's structural integrity." ${\ }^{\circ}$







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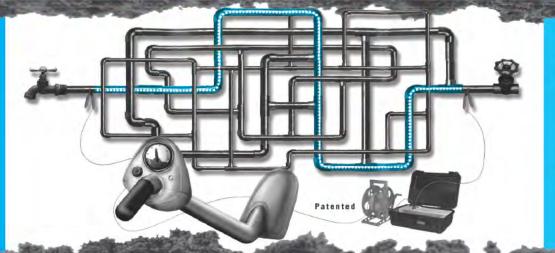
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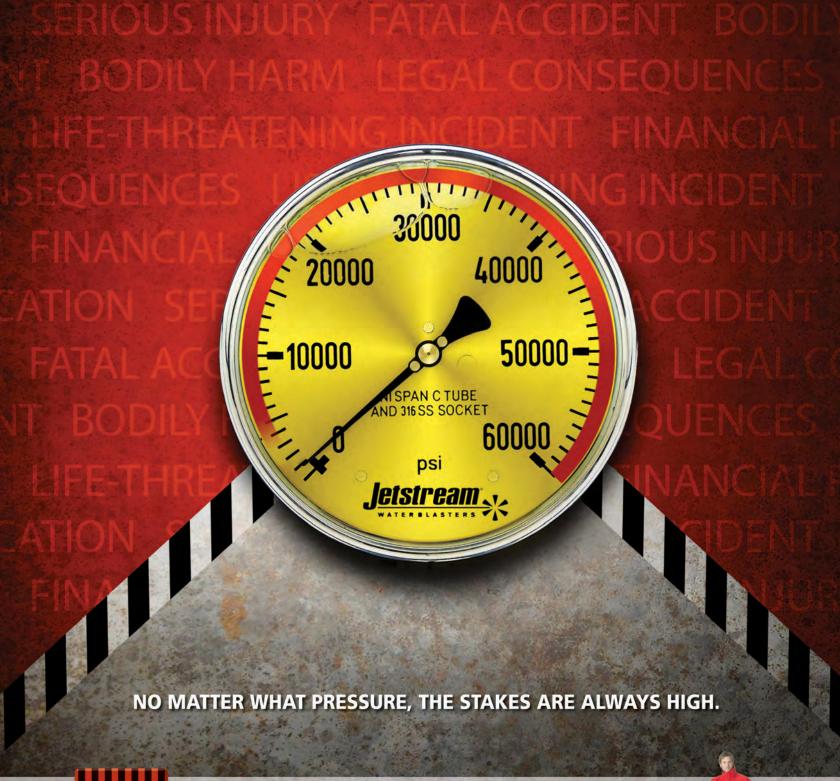
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Rapid Inspection

CAMERA SYSTEM DOCUMENTS MANHOLE CONDITIONS FASTER THAN TRADITIONAL METHODS AND WITHOUT CONFINED-SPACE ENTRY

BY KEN WYSOCKY

ntrigued by the prospect of dramatic gains in productivity, the quality of data collected, and on-the-job safety, PipeTek Infrastructure Services Inc. decided to buy a RapidView IBAK PANORAMO SI manhole inspection

With a price tag of \$175,000, it was a significant purchase. But based on customer response and the impact on the company's bottom line, the unit represents a sound investment, says Robert Lodge, president of the company, located in Hamilton, Ontario.

"What we can do in a manhole and the top-quality digital data we can accumulate far exceeds what we could gather previously," Lodge says. "And we don't have to send a guy into the chamber to do it, which makes it much safer and faster. We just lower the PANORAMO into the chamber with a winch, and it performs the inspection on the way back up.

"We can do a manhole inspection in about four minutes," he continues, and that includes about two minutes to open and close the manhole cover. "To set everything up and put a man down there, it would take at least a half hour. As such, we can average about 70 inspections a day, or more than double what we could do with a conventional pole-camera inspection. And the inspections aren't more expensive for customers because we can do so many more per day."

"The unit's portability gives us a great deal of flexibility and enables us to do work we couldn't do before. The only limit to how far away or how deep we can do an inspection is the length of the cable."

Robert Lodge

The unit is made by RapidView LLC and utilizes a 3D Optoscanner - essentially two high-resolution digital cameras with specially designed, distortion-free, wide-angle lenses - to scan an entire manhole interior during just one vertical run. The scan provides a high-resolution, 360-degree view of the manhole via fiber-optic cable, making structural defects easy to see.

After the scan is completed, software allows inspectors to view image data as if it were a live video feed. An inspector can stop at any position in the manhole or do a 360-degree pan and zoom in for

snapshots of specific areas either on a job site or back in an office.

"You get complete freedom of view after the fact," Lodge notes. "You don't have to worry about the operator missing a section of a chamber you really want to look at. You can point and click and view any angle of any spot you want."

In addition, an inspector can generate an "unfolded" panoramic view of the entire manhole, which provides an easy-to-see overview of the manhole's



The RapidView IBAK PANORAMO SI manhole inspection camera enables crews to inspect manholes without confined-space entry. (Photos courtesy of PipeTek Infrastructure Services Inc.)

money machines

OWNER: PipeTek Infrastructure Services Inc., Hamilton, Ontario MACHINE: RapidView IBAK PANORAMO SI manhole Inspection

system, manufactured by IBAK and sold in North America by RapidView LLC 800/656-4225

www.rapidview.com

FUNCTION: Digital, high-resolution manhole inspections

FEATURES: 360-degree scans, fiber-optic cable, zoom capability

About \$175,000

structural condition and enables the user to accurately measure objects on manhole walls.

Moreover, because the unit enables crews to do manhole inspections without confined-space entry, the PANORAMO SI is classified under Canadian traffic laws as a mobile unit. The upshot? Greatly reduced setup time compared to jobs that require confined-space entry, which are classified as



Sean Bittles, an operator at PipeTek Infrastructure Services Inc., begins a manhole inspection without the need for confined-space entry or other timeconsuming preparations.

short-term operations and, as such, require time-consuming setups to close off traffic lanes.

"As long as we have an arrow board and strobe lights, we can basically jump out, do a job and move on," Lodge explains. "We can get in and off a road in a few minutes, and then finish the rest of the inspection later in an office in a controlled environment. Or we can send the raw files to the client and let them do the defect coding themselves."

The unit's portability enables PipeTek crews to inspect manholes in previously inaccessible locations. The unit is permanently mounted on a 4-by-4-foot skid that can be placed on an ATV and transported to a remote manhole. Even if a site is inaccessible via ATV, a crew can remove the entire unit from the skid and break it down into three easy-to-carry components: a drum reel, controller and generator.

"We've gone out in the middle of the woods to inspect remote manholes," Lodge notes. "The unit's portability gives us a great deal of flexibility and enables us to do work we couldn't do before. The only limit to how far away or how deep we can do an inspection is the length of the cable. We have at least 200 feet of cable and can go farther than that if we need to."

Lodge says the PANORAMO SI opens up another market segment for PipeTek, which previously focused mostly on pipeline inspections and locating for municipal and industrial companies in Ontario and Manitoba.

"Manholes are one piece of underground infrastructure that's mostly ignored," Lodge points out. "There's much more emphasis on inspections of mainlines and laterals. The PANORAMO SI provides customers with a permanent digital record of baseline inspection data that can be easily transported into infrastructure management systems. That, in turn, makes it much easier to compare baseline results against data collected from future inspections." @

SHOW US THE MONEY (MACHINE)

Money Machines, a feature in Cleaner, reports on innovative work vehicles that help contractors operate more efficiently, satisfy customers and earn more profit. We'd like to know about your Money Machine be it a service van, camera truck, jetting rig, vacuum unit or any vehicle that really helps drive your business. To nominate your vehicle for a feature in this column, send an email to editor@cleaner.com. Tell us briefly but specifically what features make it a great producer. And send a picture because appearance counts. We look forward to seeing your Money Machine.













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Pipe Bursting Methods and Projects by CRAIG MANDLI













1. HDD REAMER

The Ground Hawg HDD reamer from Condux International can be used in a broad range of soil conditions, and features an array of conical carbide teeth brazed into machined alloy steel mounting blocks for durability and economical factory rebuilding when necessary. For aggressive cutting action and reduced torque requirements, the carbide teeth are set at a 20-degree positive lead angle on the 40-degree tapered blades. Curved backup blades for easier pushbacks are standard. Standard cutting diameter sizes are from 6 to 24 inches. 507/387-6576; www.condux.com.

2. VACUUM EXCAVATOR

The FX50 vacuum excavator from Ditch Witch is designed for a wide range of cleanup and soft excavation tasks. It can be customized to a customer's specifications, with choices of tank sizes, trailer configurations, and options such as hydraulic booms, water heaters and hydraulic valve exercisers. It comes with a choice of four spoils tank sizes (from 300- to 1,200-gallon capacity) and four water tank sizes (80- to 500-gallon). It can be configured with an optional reverse flow feature that enables the operator to offload fluid spoils from the tanks quickly and easily. A hydraulic tank door opens fully for easier spoils removal. 800/654-6481; www. ditchwitch.com.

3. PIPE BURSTING SYSTEM

HYDROBURST static pipe bursting systems from HammerHead Trenchless Equipment feature pullback of up to 175 tons, providing the power needed to replace even non-fracturable water, gas and sewer lines up to 24 inches. 800/331-6653; www.hammerheadtrenchless.com.

4. CCFRPM PIPE

Centrifugally cast, fiberglass-reinforced, polymer mortar (CCFRPM) pipe from HOBAS Pipe USA is manufactured in diameters from 18 to 126 inches, with capabilities to produce even larger diameters. The pipe is corrosion resistant and lasts 100 years or more. Applications include storm and sanitary sewers, potable water, force mains, outfalls, industrial effluents and other corrosive environments. The pipe is ISO 9001 and 14001 certified, and exceeds product standards for sanitary sewer pipe. 800/856-7473; www. hobaspipe.com.

MINI-EXCAVATOR

TMX mini-excavators from Innovative Equipment feature a quick hitch system that can be hooked behind a standard 1/2-ton pickup, van or lightduty tow vehicle. They eliminate tracks by utilizing zero-turn technology for access to tight locations and lawns. Weighing only 2,941 pounds, it features an 8-foot digging depth and 6,600-pound digging force. The unit features a 7-foot, 2-inch loading height with a swing radius of 140 degrees, allowing access next to walls and other obstructions. An auxiliary hydraulic tool circuit has the ability to power hydraulic tools including jackhammers, pumps and saws. 888/359-3002; www.iequipt.com.

6. FUSION MACHINE

The TracStar 500 Series 3 fusion machine from McElroy Manufacturing features an indexer-mounted heater and facer, economy engine throttle setting and hydraulic clamping. With the heater attached to the machine, users no longer have to manually place it in the carriage during the fusion process. Hydraulic clamping helps reduce operator fatigue and saves time by clamping pipe into the carriage's jaws with the push of a lever. It is capable of fusing thermoplastic pipes from 6-inch IPS to 20-inch outer diameter. The fusion carriage can be removed and lowered into tight spaces. An onboard generator supplies heating power, while an engine-driven hydraulic pump system provides power for the facer, dual-speed track system and more. Dual hydraulic pipe lifts help to load and unload the pipe into the carriage. 918/836-8611; www.mcelroy.com/fusion.















7. PIPE BURSTING SYSTEM

The Pow-r Mole PD-7 static pipe bursting system is designed to replace 3- to 12-inch sewer, water and gas mains. The system features 56 tons of force at a rate of up to 7 feet per minute. It uses a 2-inch-diameter torqued joint rod with a tapered quick-connect thread in lengths of 2.5 feet, and operates from a pit as small as 3 by 6 feet. It has a single lever control and only requires a single operator. It is a low-pressure system (3,000 psi at 32 gpm) and can be operated with the company's 62 hp diesel hydraulic power unit or from an auxiliary circuit on a backhoe. 800/344-6653; www.powrmole.com.

8. PNEUMATIC SHORING DEVICE

The pneumatic shoring device from Prospan Manufacturing is OSHA compliant and provides tabulated engineering data as required. It can bear directly against the trench wall without the use of plywood in most circumstances, is made primarily of anodized aluminum, and telescopes into position by compressed air from either an onboard air compressor or a compressed air cylinder (115 psi minimum required). As it expands and makes contact with the trench wall, soil compaction occurs in all directions around the point of contact. A large selection of end attachments and extensions is available. 888/413-8100; www.prospanshoring.com.

9. PIPE BURSTING MACHINE

The pipe bursting machine from RODDIE features a cable release system on the bursting head and a quick-lock articulating head that allows smaller entry pit excavations. A lever system to release and lock the cable is located in the hydraulic ram to reduce weight. The system quickly slides apart into two 65-pound components for easy setup and removal. It can be powered and operated from a mini excavator or bobcat. 408/224-7777; www. roddieunderground.com.

10. TRENCH SHORING SYSTEM

The corrugated aluminum ultraSHORE trench shoring system from

Safety Corporation of America features stackable panels that can be used horizontally or vertically for bury depths to 12 feet in Class C soils. Extra features include leg and wheel kits for OSHA regulations. Easily transported in a pickup, the system can be closed off on one or both ends with quick-release, spring-loaded end-closure panels. 800/746-7464; www.shoring.com.

11. PIPE BURSTING SYSTEM

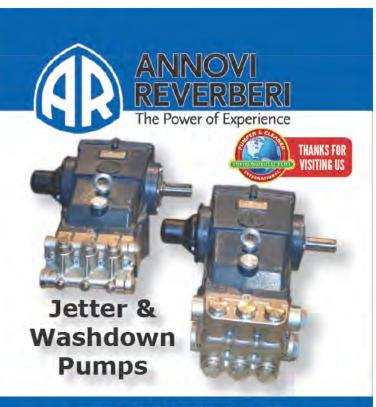
Spartan Tool's UnderTaker is designed to burst and replace sewer laterals of any material with new, seamless, high-flow, high-density polyethylene pipe from 2 to 6 inches in diameter. It sets up quickly without any tools. With burst speeds to 5 feet per minute, the unit will replace any sewer lateral, handling up to three 45-degree bends in the existing pipe. The system comes complete with everything needed to fuse and burst pipe. 800/435-3866; www.spartantool.com.

12. HYDROEXCAVATING TOOL

The Soil Surgeon hydroexcavating tool from The Soil Surgeon Inc. is designed to fit any sewer combination truck equipped with a telescopic 6or 8-inch boom. The tool has a 1-inch water connection, and the operator controls pressure and power with truck controls. Features include a 6-foot Tuff Tube with handles fabricated to the tube to guide the unit down for potholing or side-to-side for trenching. Six jets boring inward cut the soil, while six jets boring outward bring the tube down. Bumpers on the bottom protect the jets and lines the tool might contact. 949/363-1401; www.soilsurgeoninc.com.

13. HYDROVAC TRUCK

The F4 hydrovac truck from Tornado Hydrovacs is capable of carrying 13 cubic yards of mud and more than 2,000 gallons of freshwater. The units consist of a water tank, a mud tank where the excavated spoils are held, a water pump, a boiler and a positive displacement vacuum blower to pull the spoils to the tank via a boom. The unit is engineered to efficiently pull dirt, and is easy to operate. 877/340-8141; www.tornadotrucks.com.



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August 28-29, 2013 - (TBA), Arizona Univ. Of AZ, Janine Lane at (928) 782-5882 or janinel@cals.arizona.edu

November 14-15, 2013 - Lakewood, CO **CHURCH Onsite Wastewarer Consultants** Kim Seip at (303) 622-4126 or highplains@tds.net

Operation and Maintenance Training Certification:

October 2-3, 2013 - Napa, CA COWA & NAWT - Evelyn Rosefield at (530) 513-6658 or evelyn@cowa.org

Other CEU's for Recertification:

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COWA Soils, Hydrogeology, and Site Eval. Contact: Evelyn Rosefield at (530) 513-6658 or evelyn@cowa.org

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14. SMALL LATERAL BURSTING UNIT

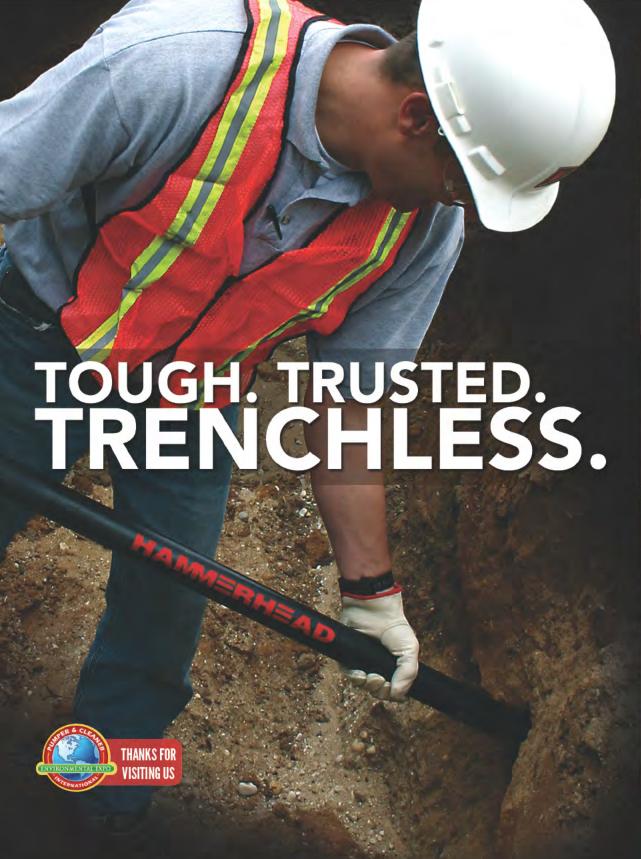
The X20 pipe bursting unit from TRIC Tools is designed for home sewer bursting of 4-inch lines and smaller. It weighs less than 60 pounds. Small cylinders cycle quickly with matching high-pressure hydraulic power packs, resulting in fast job completion. Complete down-hole assembly consists of puller (8 inches wide by 27 inches long by 5.25 inches in diameter retracted), pulley base (12 inches wide by 13 inches long by 14 inches high), and resistance plate (24 by 24 inches and 1 inch thick). The unit features a monolithic, gun-drilled hard aluminum cylinder body for simplicity and easy maintenance, and a steel pulling bridge for reliability and longevity. 888/883-8742; www.trictools.com.

15. TENSION WINCH

The TT Technologies' 3-ton Grundowinch hydrostatic constant-tension winch is suited for underground utility applications including pipe bursting, underground cable pulling, sliplining, pipe pulling and swage lining. It features protective cable storage, and is available with an air-cooled diesel or gas engine, as well as an adjustable boom system. The constant-tension design feature means any cable slack is immediately sensed and quickly taken up automatically. Features include single-lever tension control (no gears to engage), power-assisted winch line feed and winch controls located at the rear of the unit to provide a safe view of the job while operating. It can pull up to 3,280 feet of 3/8-inch cable at speeds of up to 160 feet per minute. 630/851-8200; www.tttechnologies.com.

16. DIRECTIONAL DRILLING PIPE

Directional drilling pipe from Underground Tools, Inc. fits all drill rig sizes from mini through maxi. It is made from top-quality materials, with consideration given to precise threaded connections. Integral forged drill pipe, as well as forged/inertia-welded pipe are available. In addition, HIWS drill stems Versions I and II are available through manufacturer-direct distribution. All products come with DirtSmart technical service. 866/488-3478; www.undergroundtools.com. c





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PRODUCT SPOTUGHT

Inspection system offers one-touch operation and USB recording

BY ED WODALSKI

The eCAM ACE 2 pipeline inspection system from Electric Eel Mfg. Co., designed with simplicity in mind, is an upgrade from the basic ACE system that has been on the market for several years. New features include one-touch USB recording, on-screen footage counter and a wheel kit for easy transportation and maneuverability.

"Part of the idea was to keep it at an affordable price range," says Mark Speranza, vice president of sales. "There are a lot of \$10,000 and \$12,000 cameras out there, but this is priced under \$7,000. And we still have our standard ACE without those options. It's whatever fits your budget."

The AC-powered system, weighing 42 pounds, has a stainless steel-housed 1.68-inch-diameter color camera with 20 LED light ring and high-resolution CCD element. The auto iris automatically adjusts to lighting. Other features include impact-resistant polycarbonate light ring cover, 200 feet of Kevlar-braided 1/2-inch-diameter push cable, 512 Hz sonde, 5.4-inch LCD monitor with AR film and anti-glare monitor shield, reel brake and centering skid. A self-leveling camera head is available.

"What's really nice is it's compact and easy to use," Speranza says. "You have all the features you need without lugging around extra pieces and components."

The system is made for inspecting 3- to 10-inch pipe and can negotiate a 3-inch P-trap. Video can be transmitted to a laptop or downloaded to a PC via the USB drive. The system comes with a 2G memory stick.



"It's very simple to operate," Speranza adds. "Put a USB stick in the drive alongside the monitor, press one button and you're recording. There are a lot of cameras out there that have so many bells and whistles that you have to take a class to learn how to use them. This system is very simple in the way it operates: Plug it in, turn it on, put your camera in the line. You want to record, press the record button." 800/833-1212; www. electriceel.com.

GUARDAIR WORKER CLEANING STATION

The Personnel Cleaning Station vacuum from Guardair Corp. cleans dust, powders and debris off worker clothing, eliminating self-cleaning with compressed air, and providing compliance with OSHA directive STD 01-13-001 that prohibits the use of a gun, pipe or cleaning lance for self-cleaning.



The unit weighs 13 pounds and includes a 5.5-gallon container, pre-drilled mounting bracket, 10-foot hose and air-agitator brush. 800/482-7324; www.guardaircorp.com.

DITCH WITCH SK750, SK755 TOOL CARRIERS

SK750 and SK755 tool carriers from Ditch Witch feature 25-hp or 32.8-hp Kubota diesel engines and accept 70 attachments. The carriers provide 800 pounds of lift capacity, 81-inch lift height and high-drive track system with bolt-on sprockets, wide-track rollers and



replaceable spindles. The carrier has an optional single-level joystick control and two-way auxiliary control foot pedal for attachments. 800/654-6481; www.ditchwitch.com.

LARSON ELECTRONICS RAIL-MOUNT LED WORK LIGHT

The Magnalight WAL-JH-2XWP400 rail-mount LED work light from Larson Electronics features dual LED light heads and mounting options with adjustable J-hook ladder-mount bracket. The light produces 2,924 lumens of white light, distributed in a flood pattern, illuminating 15,000 square feet of work space. 800/369-6671; www.magnalight.com.

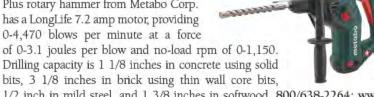
GENERAL PIPE HANDHELD INSPECTION TOOL

The Gen-Eye Micro-Scope handheld inspection tool from General Pipe Cleaners has a 39-inch probe rod for hard-to-reach areas. The monitor attaches to the reel with an adjustable mount. The reel carries up to 100 feet of micro pushrod with color camera for inspecting 1 1/2- to 3-inch drain lines. Other features include 3.5-inch LCD screen, built-in SD card reader with one-touch record button, digital zoom, rotatable picture, voice-over recording, LED brightness control, USB port and onscreen status indicators. 800/245-6200; www.drainbrain.com.



METABO ROTARY HAMMER

The KHE 3250 1 1/8-inch SDS-Plus rotary hammer from Metabo Corp. has a LongLife 7.2 amp motor, providing 0-4,470 blows per minute at a force



1/2 inch in mild steel, and 1 3/8 inches in softwood. 800/638-2264; www. metabousa.com.

COXREELS HIGH-PRESSURE HOSE REEL

The HP1125 high-pressure hose reel from Coxreels has an operating pressure of up to 5,000 psi. The external fluid path features an electroless nickel-plated steel 90-degree, fullflow NPT swivel inlet and chemical-resistant AFLAS seals. Other features include one-piece, all-welded A-frame base, low-profile outlet riser



and open drum slot design for non-crimping, smooth hose wrap. The highpressure option is available for 1/2- and 3/4-inch model reels. 800/269-7335; www.coxreels.com.

CONSHIELD CONCRETE WATERPROOFING

Crystal-X concrete waterproofing additive from ConShield Technologies is designed to protect new and existing concrete sewer pipe and manholes, as well as dams, reservoirs, bridge decks, foundations, and sewage and water treatment plants. 877/543-2094; www.conshield.com.



TROJAN BATTERY IPAD APP

The iPad app from Trojan Battery Co. provides access to market brochures, technical spec sheets, user guides, white papers, glossary of battery terms and tutorials. The app is available from the Apple App Store. 800/423-6569; www.trojanbattery.com.





OPTRONICS STOP. TAIL, TURN LAMPS

The GloLight series of LED stop, tail and turn lamps from Optronics International features a smoothly illuminated outer band surrounding a central LED array that remains unlit during standard operation. Available in 4-inch round and 6-inch oval sizes, the lamps

meet FMVSS 108 and SAE photometric requirements for visibility and safety. Lens and housings are made of sonically welded polycarbonate material. The lamps have a solid-state, surface-mount device that protects the electronics against moisture, shock and vibration. 800/796-8909; www.optronics.com.

REELCRAFT WASHDOWN REELS

Designed to be centrally mounted, washdown reels from Reelcraft Industries are spring-retractable and equipped with garden hose fittings. Made from industrial-grade steel, the reels feature ribs for added stability and an adjustable guide arm. Parts are individually powder coated for an abrasion- and corrosionresistant finish. 800/444-3134; www.reelcraft.com.



NPC WELLPOINT PUMP

The NPC PT-90 wellpoint pump from National Pump & Compressor, available for rent or sale, has 6-inch connections, with a flow rating of 396 gpm and 65 feet of TDH. The fuel-efficient pump is powered by a



Hatz engine, offering 500 to 1,500 hours of use between service. Available in open diesel, stackable frame, compact or economy canopy, enclosed units emit 49 dBa at 30 feet. 888/840-5886; www.npcrents.com.

REED MANUFACTURING **ROTARY CUTTERS**

Rotary cutters from Reed Manufacturing Co. are available for large and small pipe diameters. The RC42S cutter is designed for manual cuts on 40- to 42-inch steel pipe. An included wrench tightens the cutter, which operates in 11.8 inches of clearance.



The LCRC4 Low Clearance Rotary Cutter is made for 2- to 4-inch steel, cast iron and ductile iron pipe, and operates in a 4-inch clearance. 800/666-3691; www.reedmfgco.com.

ROM COMPACT JETTING SYSTEM

The COMPACT PRO skid-mounted sewer jetting system from ROM is designed for light- to medium-weight vehicles. Powered by a Kubota diesel engine, the jetter has an approximately 171-gallon water tank. Features include water-filling hose reel and hydraulically driven high-pressure reel. www.rombv.com. c





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WEBASTO, ESW FORM EMISSIONS PARTNERSHIP

Webasto Product North America, designer of engine idle reduction technologies, and ESW Group, provider of emission control products, formed a partnership that will enable fleets and municipalities to obtain DERA (Diesel Emission Reduction Act) funding for emission control and idle reduction equipment. Webasto manufactures fuel-operated heaters that eliminate the need to idle for engine pre-heat and cab comfort. ESW's DPF (diesel particulate filter) removes diesel particulate matter from diesel engine exhaust.

LANZO TRENCHLESS EXPANDS SERVICES

Lanzo Trenchless Technologies, formerly Lanzo Lining Services, expanded to provide services throughout North, Central and South America. Established in 1993, the company has installed more than 9 million lineal feet of sanitary sewer, force main, sewer drain, NSF 61 potable water transmission, and largediameter and non-circular cured-in-place pipe lining in North America.

WJTA-IMCA ADOPT COLOR-CODING SCHEME

The WaterJet Technology Association-Industrial & Municipal Cleaning Association adopted a color-coding scheme for pressure hoses. Intended to ensure on-the-job safety by making various hoses easier to identify, the colorcoding scheme appears in the Recommended Practices for the Use of High Pressure Waterjetting Equipment, published by WJTA-IMCA. The color code indicates maximum working pressure: yellow, 10,000 psi; green, 15,000; blue, 20,000; silver, 30,000; orange, 40,000; and red, 55,000.



WOHLER PARTNERS WITH ROI MARKETING

Wohler USA partnered with ROI Marketing, enabling contractors to experience equipment in action at ROI's training facility.

QUADEX NAMES REGIONAL SALES MANAGER

Quadex/InterfitUSA named James Dugger western regional sales manager. He will handle sales and marketing for the company's line of rehabilitation cements and coatings, as well as the Interfit lateral connection sealing system. Dugger has seven years of experience in the underground infrastructure corrosion protection, rehabilitation and trenchless industry.

USB-SEWER EQUIPMENT NAMES SALES MANAGER

USB-Sewer Equipment Corp. named Leighton White sales manager for the West Coast. He has 23 years of sales, marketing and management experience within the sewer industry. White will be responsible for sales, service and customer support in California.



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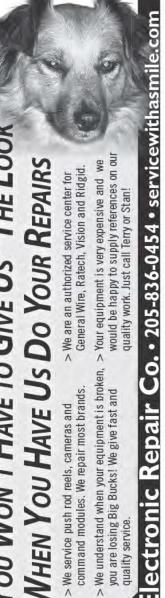






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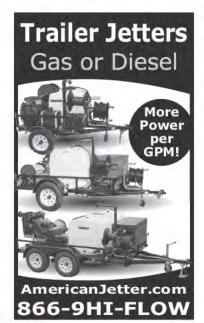
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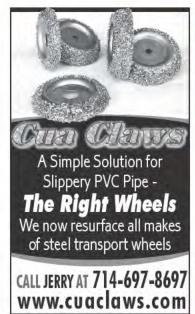


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General Wire models J-3055, J-3080, and J-2000; Spartan #717; Electric Eel gas jetters. The Cable Center: 800-257-7209.

HAZARDOUS **WASTE UNITS**

1995 International 4900 with a 2,300 U.S. gallon Presvac, carbon steel, DOT certified 412, vacuum pressure tank. (Stock #6004C) www.VacuumSalesInc.com, (888) VAC-UNIT (822-8648).

Presvac 2,300 U.S. gallon, carbon steel with a Masport H15W vacuum pump installed on a 1993 GMC Kodiak cab and chassis. (Stock www.VacuumSalesInc.com, (888) VAC-UNIT (822-8648). (CBM)

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СРВМ

1993 Sewer Company of America: Jetter trailer 40 gallons per minute at 2,000 psi. The unit has been tested and is in perfect working order. \$6,700. 561-676-7600 or tipsycherryproductions@amail.com for pics.

JETTERS-TRUCK

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Peabody Myers: 1987 Ford F-800 diesel jetter truck, 56,000 actual miles, 1,500-gallon, 36 gpm @ 3,000 psi, new tires, arrow board, extras. \$9,000 or best reasonable offer, retiring, clean title, pipes to 24 inches, photos available. Buddy, 951-227-5623. (C06)

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1989 Ford with Camel water jet, 1.500gallon stainless steel water tank, Myers 80 gpm, 2,000 psi water pump. Truck and jet in good working condition. \$12,500. Pictures at www.empireequip.com. Call Greg, 714-639-

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2006 International Vac-Con: 80 gpm. 3-stage fan, 12-yard debris tank, 73,000\$145,000

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2007 International 7400, Vactor 2112 with 16" Roots blower and 80 gpm pump. Excellent condition, only has 27,000 miles and 3,600 hours worked, one owner. Asking...... \$179,000/OBO Call Javier at 786-402-3092 C04

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2002 Safe Jet Vac with C-12 CAT engine, 395 hp URACA, 120 gpm water pump, Roots 827 blower on 2002 Sterling chassis, runs good, operates very nicely, 12-yard debris tank, 1,500 water tank. \$62,000/OBO. 813-677-7655 or email amberbaes@aol.com, FL.



2003 Sterling L7500 Vac Truck: CAT 3125 @ 315 hp, A/T, 55k miles, spring suspension, 2003 Vac-Con V390LHAD, 3 compressor fans, 10' telescopic boom, HS drive, articulating hose reel, hi-dump debris tank..... .\$79,500

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1994 Vac-Con, 16-yard debris tank, 1,250gallon water tanks. Telescoping boom with articulating hose reel, 3-stage vacuum. L8000 Ford chassis, 127,545 miles. \$45,000. Call 601-373-3736. (CPBM)



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TV INSPECTION

PA Contractor selling CIPP lining equipment, 2012 F-550 CUES camera cutter truck (2 cutters and 2 cameras) with Granite software. 2004 Workhorse CUES camera/cutter truck with grout system (2 cutters, 2 cameras, mainline and lateral packer with 4" and 6" bladders) with Granite Software. 2005 Freightliner boiler truck with 125 hp, Cleaver-Brooks firetube boiler, 28 kvw generator and 385 cfm compressor. Trailer mounted Kewanee 45 hp steam boiler. 2006 Freightliner with Thermo King. Refer please, contact dzehring@jmfunderground.com for questions and full equipment listing. All offers will be considered.



1994 Chevy van with 54,000 miles, updated with POSM software and RST Omni2 camera equipment with two crawlers two years ago. Has 1,000' cable, Onan generator, washdown system, and multiple wheel sets.\$19,500

Call Jim 412-670-0697



RST Inspection Equipment: 3x OEIII cameras, 2x tractor transporters, storm drain tractor, crawler transporter, mainline reel 1000', portable reel 1000', much, much more. Located in Noblesville, Indiana.\$11,000/OBO

2004 Ford E450 Aries inspection camera truck. Equipment is ready to be put to work. The truck was manufactured on 5/4/04: order #60859, system # sys 144, there is over 700' of cable on the unit. There is dual viewing station equipped with WinCAM software and is NASSCO certified. We have two tractors, one is a Badger TR3000 wheel camera transporter tractor, two is a TR2000, the camera head is a illuminator pan tilt camera, model #Pe-2700. The truck also comes with air compressor tools, tool box and various wheel spacers and tracks to change height and width of unit for multiple applications. \$89,000. I have a ton of pictures I can email you. 203-494-6525, CT.

TV INSPECTION

1998 CUES Mainline TV System: GMC Savanna 3500, CUES with Pro-Data on-screen titler, Honda generator, Sony combo DVD/ VHS, 1,700' of M/C cable, pan & tilt camera with shorty transporter. \$29,500. 608-835-7767, WI. (CBM)

Envirosight Rovver 125 Camera System: Rovver 125 steerable crawler upgraded with back up camera, additional light, and 512 locator. Complete wheel sets, camera control unit, desktop and remote pendant, and was recently serviced. See pictures at www. empireequip.com. \$34,500. Call Craig at 714-639-8352.



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VACUUM LOADERS

2012 Western Star cab and chassis, Power Vac 5300, 3,250 U.S. gallon, carbon steel DOT 407/412 regulations vacuum tanker with a Hibon PD blower, 5300 SCFM with vacuum to 28" mercury, dump type with full open rear door, and a Presvac PVB 750 vacuum-pressure pump. (Stock #13518V www.VacuumSalesInc.com, (888) VAC-UNIT (822-8648). (CBM)



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VACUUM LOADERS



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WATER JETTING EQUIPMENT: We sell, repair and retrofit water blasters. Visit us at: www.waterjettingequipment.com or phone 714-259-7700. (CPBM)











I remember a call I got a little while back. This customer had an UnderTaker and had it on a pipe replacement job, and his client happened to be holding an outdoor event the day he was there to do the job. On top of that, it wound up he needed help with a part unexpectedly or else he was going to have to go ahead and dig up the lawn.

But I was close enough that I was able to get there and get him what he needed without ever disrupting his client's event.

Tough Customer Preferred Product: The UnderTaker."

Lets you replace 4" – 6" pipes with minimal disturbance to trees, landscaping, streets and sidewalks. A compatible water-line slitter for replacing galvanized or copper water lines is also available.