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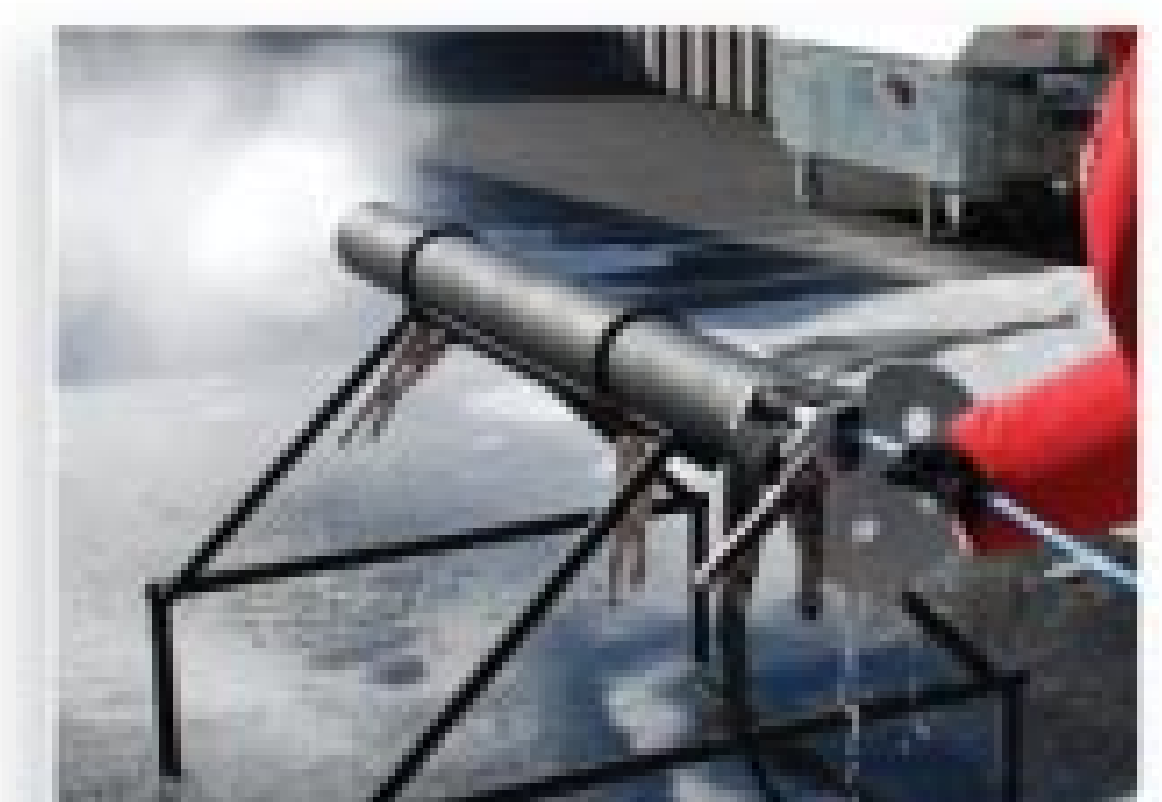
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Field Test: UHMW-PE Plug

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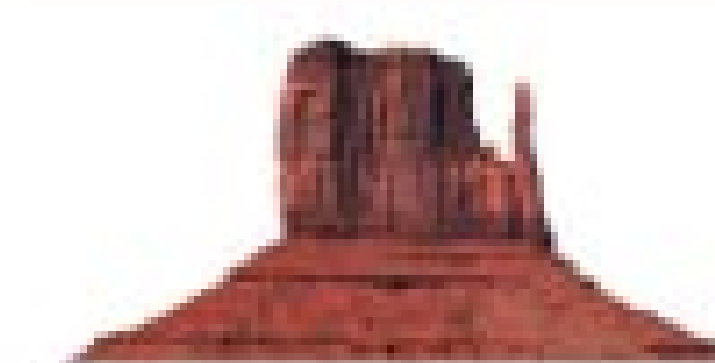
2" UHMW-PE test plug.



A few minutes at pressure.



UHMW-PE plug destroyed.



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By Marian Bond

On the cover: Suncoast Infrastructure in Florence, Miss., combines CCTV inspection, pipe lining, and manhole rehabilitation in an integrated package that helps meet client needs efficiently. Here, company employees Mike Blankenship and Marc Harrington operate a combination truck on a job in Florence. (Photography by Ron Blaylock)

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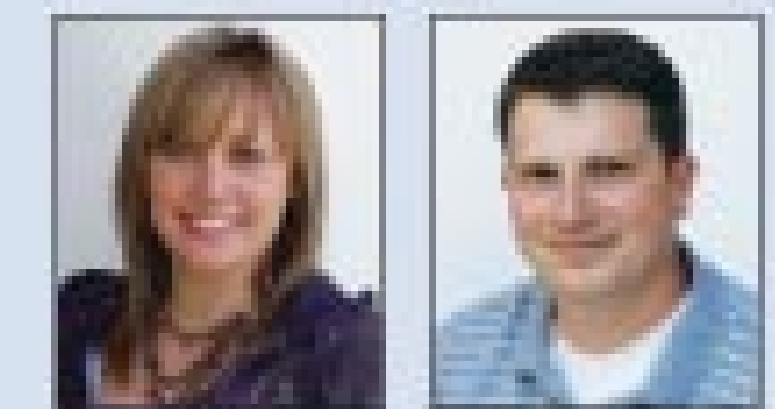
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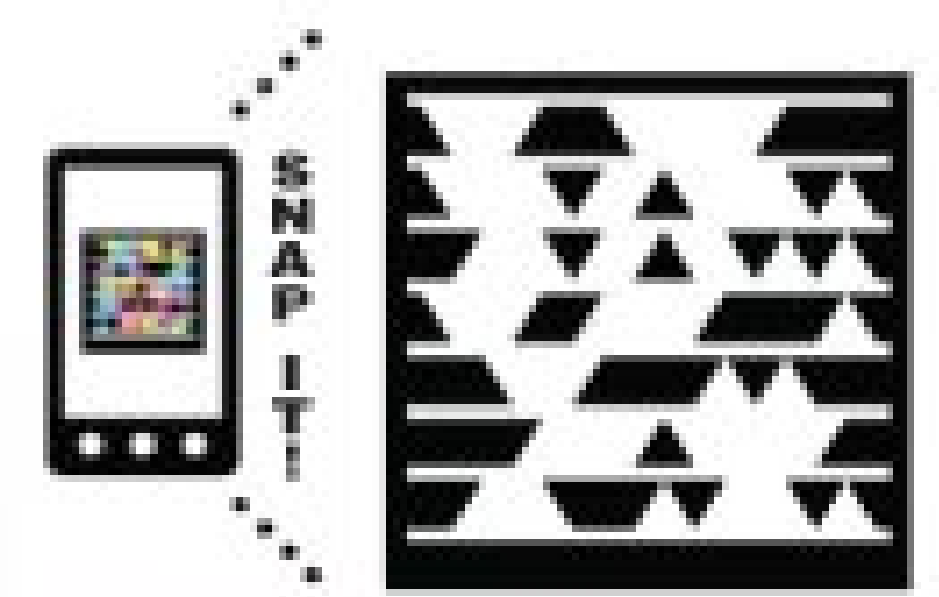
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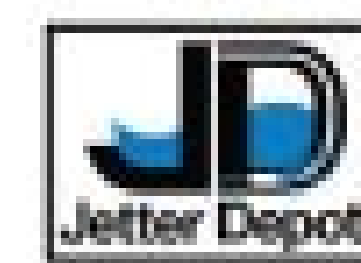
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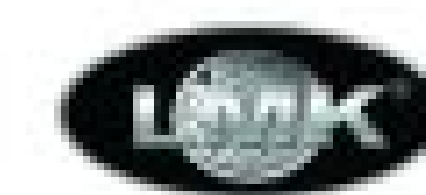
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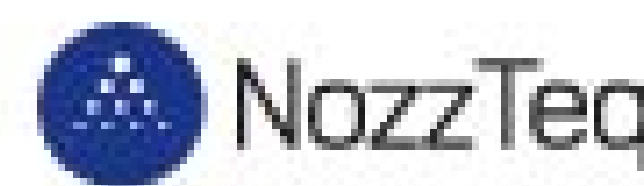


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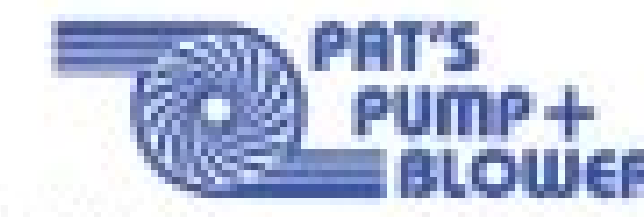


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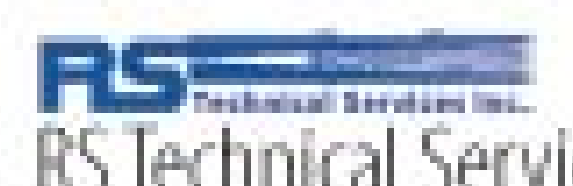
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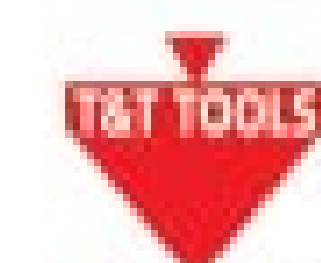


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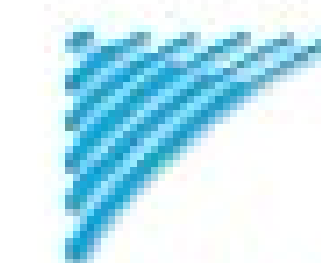
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The (Not Very) Frugal Entrepreneur

There comes a point when spending time searching for the best bargain becomes one of the worst things you can do for your business



Ted J. Rulseh

When I started my own business some years back, I picked up a book called *The Frugal Entrepreneur*. It was full of advice on how to save money and set up a business on a shoestring.

Much of the advice was interesting, but a few chapters in, I just laid it aside, and I never picked it up again. Why? Because in the end my assessment was that much of the advice qualified, for my situation at least, as penny wise and pound foolish.

I learned how to save a few dollars printing up postcards, how to buy used file cabinets and office furniture at auctions, where to find cheap paper goods and office supplies, and so on. But I soon realized that time was money and that my time would pay greater dividends if I devoted it to selling my product instead of hunting for bargains.

It might take me half a day to find an incredible deal on a used fax machine and save myself \$200. In the same four hours, working the phones properly, I might have been

able to sell \$1,000 worth of merchandise.

So my approach from then on was to shop intelligently for what I needed, avoid spending money stupidly, and steer clear of luxuries and extravagance – while devoting as much time as I could to maximizing leads, sales and revenue.

In the earliest stages of a business, watching costs is critical, and as the sole employee, or one of a very small group, the owner often takes on that job, with a vengeance. At some point, though, the owner needs to let it go.

Example: Early in the game, I gave up “saving money” by packing and shipping my own orders, and signed on with an order fulfillment service. I paid them \$15 an hour and used my own time in much more valuable ways.

Watching the outgo

Of course, every business has to watch the expense side of the ledger – keeping costs down is part

of earning a healthy profit. But it's important to recognize the point of diminishing returns on cost-saving efforts.

Items like employee compensation, health insurance, and equipment investments are big-ticket expenses that deserve the owner's attention. Shopping for items like

to help win new customers, sell services and earn more revenue?

And on a smaller scale, wouldn't every extra hour spent scrutinizing costs mean a billable hour foregone? Where's the profit in that?

Considering value

In essence, this issue seems to come down to a concept often mentioned in land use planning: highest and best use. What is the highest and best use of each employee's time? That of course includes the owner's time.

In the earliest stages of a business, watching costs is critical, and as the sole employee, or one of a very small group, the owner often takes on that job, with a vengeance. At some point, though, the owner needs to let it go.

How much of the owner's time, or any employee's time, is best spent, in the immortal words of George Bailey, “trying to figure out how to save three cents on a length of pipe?”

Perhaps the highest and best use of every employee's time is working on things other than ways to shave pennies off the costs of routine, trivial items.

Time for training a receptionist to answer calls with energy, time for staff to make follow-up calls to check on customer satisfaction, time for technicians to clean up work sites thoroughly, time for managers to devise new approaches to marketing, time for the owner to develop a long-term business-building strategy – the benefits of hours spent in those ways are sure to outweigh, by far, a little excess spending on paper and toner. ■

desks, chairs, work tools, hoses, hardhats and gloves are probably better left to dedicated, cost-conscious managers.

Even when the owner takes a hands-off approach to individual expenditures, it's possible for a company to be excessively cost-conscious. I once worked for a business with 100 employees where the owner personally signed off on every expense item – down to \$6 for a roll of camera film and \$25 for an employee's mileage on a short trip.

Once, in his message at an annual team meeting, the owner stressed the importance of each employee avoiding \$10 mistakes – this in a professional service firm where employees' time was billed out to clients at \$50 to \$150 per hour.

What can such a message do besides put a chill on any activity that might entail the risk of making a mistake that would waste some amount of money? Shouldn't employees be encouraged to be aggressive and take measured risks

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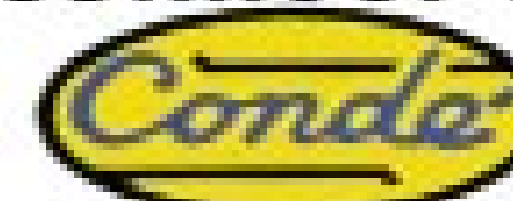
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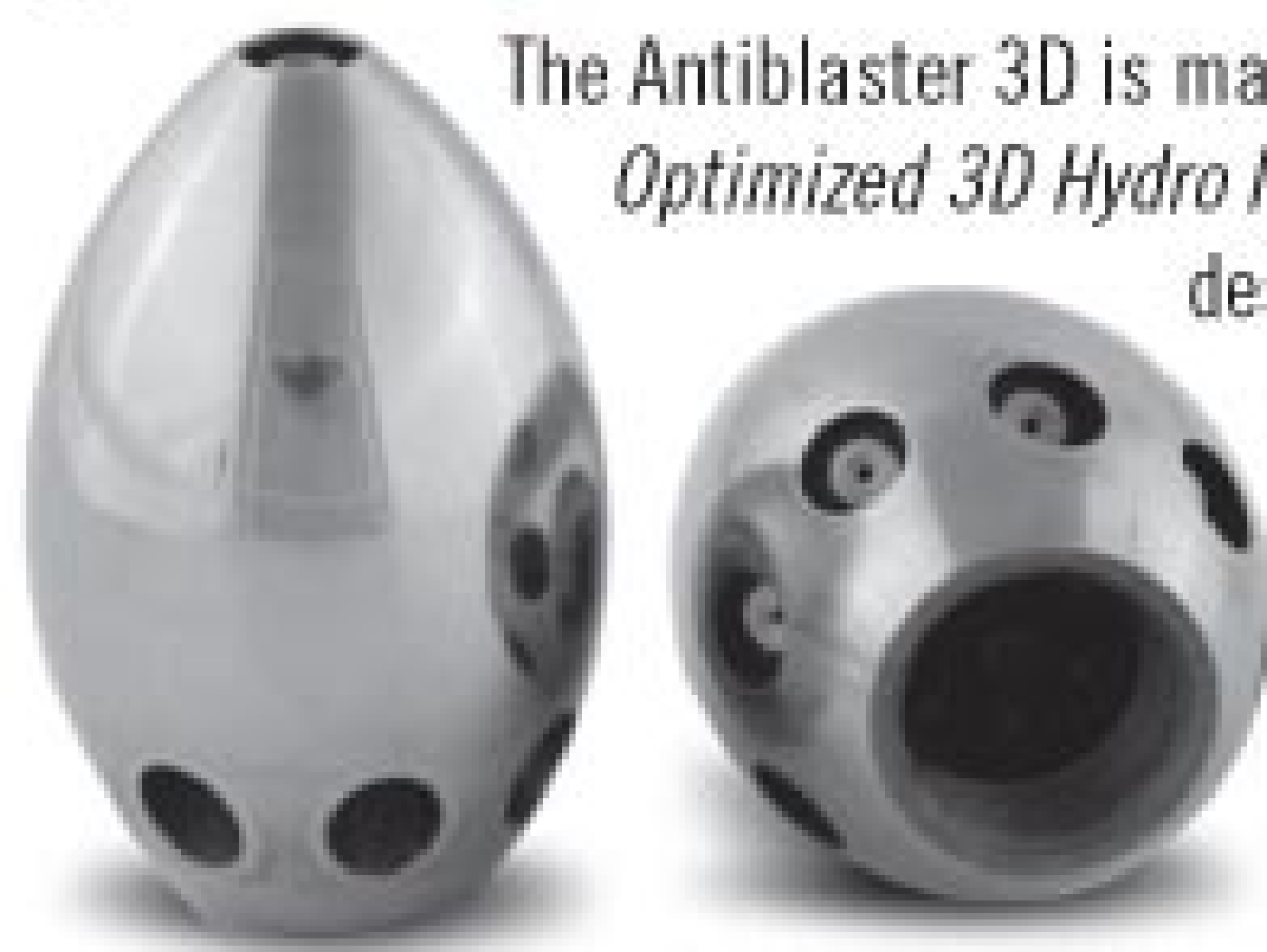


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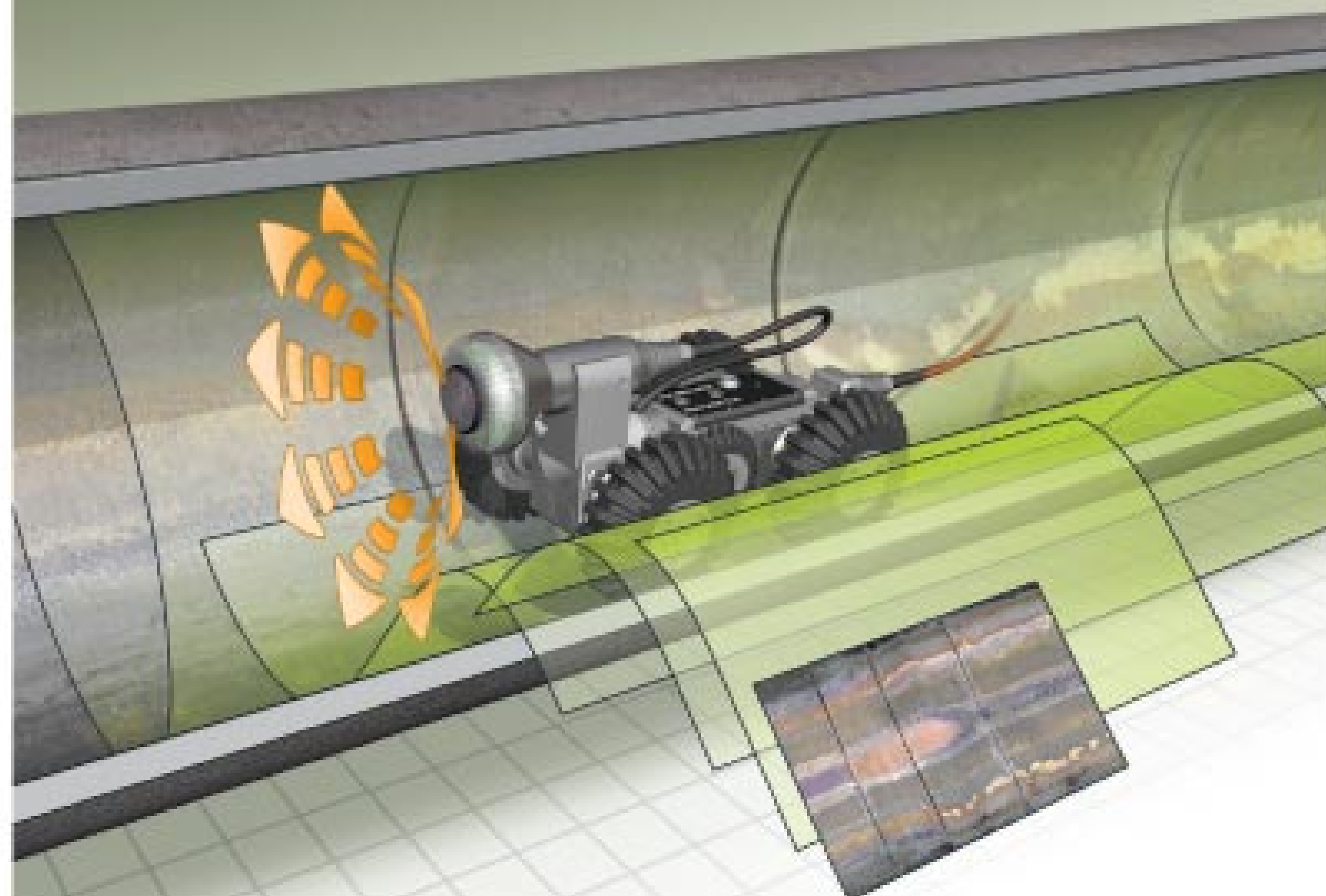
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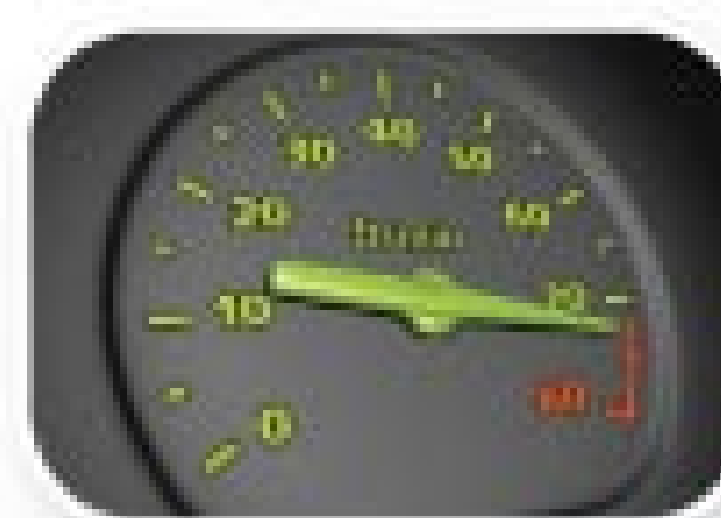
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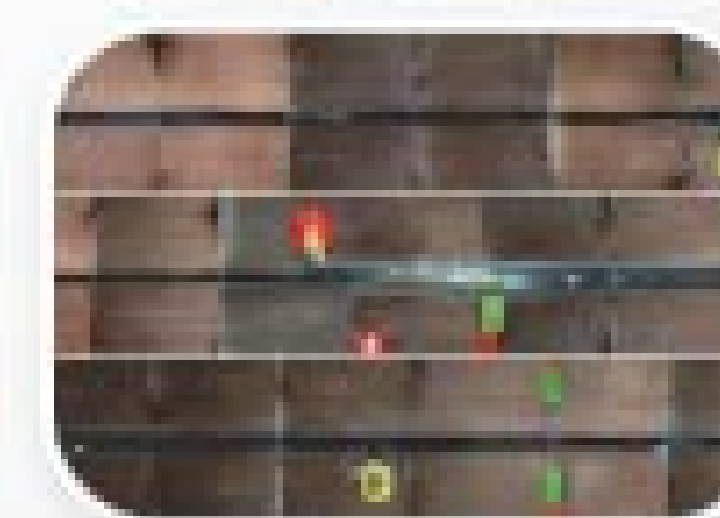
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Five Minutes A Week

The National Safety Council has a good idea for managers who want to talk safety to employee teams

By Ted J. Rulseh

Sometimes short messages are best. That's especially true when you're running a weekly employee meeting and everyone mainly just wants to get to work.

Safety FIRST

Safety is a common topic for workplace meetings – lots of successful businesses have weekly “tailgate talks” or other safety discussions on a regular basis. And certain

topics just bear repeating.

The National Safety Council has come up with a useful tool for delivering key safety messages. For a few years, they've been publishing the “5-Minute Safety Talk” series. With your package (you must be an NSC member to get them), you get a year's worth of 5-minute messages, all fully scripted on laminated cards.

Lots of topics

Now, you may not want to stand in front of a group of people you know well and just read a script, but you can certainly use the printed message as a starting point for conveying the same basic information in

your own words.

The 5-minute talks cover a wide range of important topics: choking and CPR, employee rights and

all at once. If you need to, set a timer to remind yourself to establish a habit of drinking water. Keep a bottle of water with you at all times. If it

Safety is a common topic for workplace meetings – lots of successful businesses have weekly “tailgate talks” or other safety discussions on a regular basis. And certain topics just bear repeating.

responsibilities under OSHA, ergonomics, best practices to improve safety performance, pandemics, smoke-free policies, managing stress at work, work-life balance, the risks of working overtime and others.

If you visit the NSC Web site (www.nsc.org), you'll find a sample “5-Minute Safety Talk” on employee wellness. It emphasizes proper nutrition and regular exercise as vital to a healthy lifestyle. It recommends getting 30 minutes of aerobic exercise a day, eating healthy snacks and meals, reducing or eliminating alcohol and quitting smoking.

Staying hydrated

A timely section of advice for this hot time of year deals with staying hydrated by drinking plenty of water. “Almost two-thirds of your body weight is water weight,” the talk says. “You should drink eight 8-ounce glasses of water each day to stay hydrated.

“Maintaining proper hydration can help you improve your energy, increase your mental and physical performance, remove toxins and waste products from your body, keep your skin healthy, help you lose weight, reduce headaches and dizziness and allow for proper digestion.

“Do not wait until you are thirsty to have a drink – you are already dehydrated if you feel thirsty. It is best to drink throughout the day instead of drinking a lot of water

is hot outside or if you are exercising, you will need to increase your water intake to maintain hydration.”

A worthy concept

The 5-minute talk goes on to describe the virtues of exercise and how to work toward the goal of taking “10,000 steps per day.” It lists three Web sites with good wellness information:

www.mypyramid.gov – The U.S. Department of Agriculture Center for Nutrition Policy and Promotion, with information on nutrition labels, healthy portions and good food choices.

www.cdc.gov – The Centers for Disease Control and Prevention, with advice on nutrition, bone health, stroke prevention, skin cancer prevention and more.

www.mayoclinic.com – The Mayo Clinic, with various tools for healthier living.

If you don't want to subscribe to a service like “5-Minute Safety Talks,” perhaps you can devise something similar on your own. Some health and safety messages can't be talked about often enough. And if you keep stressing them, then perhaps in time they'll take hold with some people. And you'll have a safer, healthier and more productive team. ■

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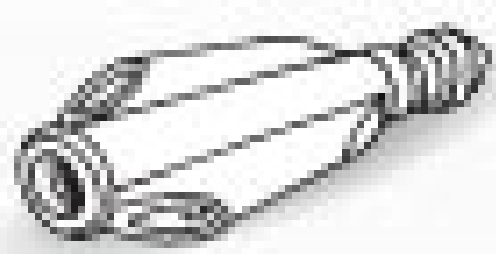
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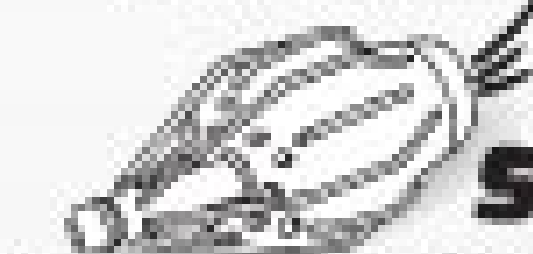
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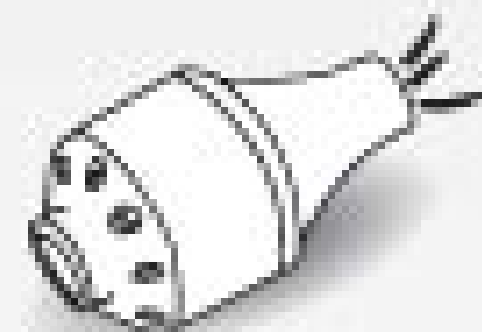
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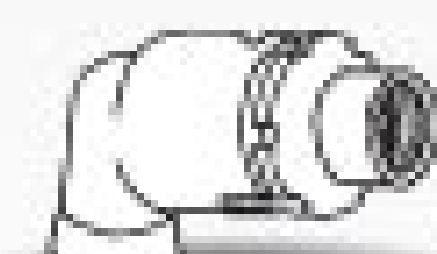


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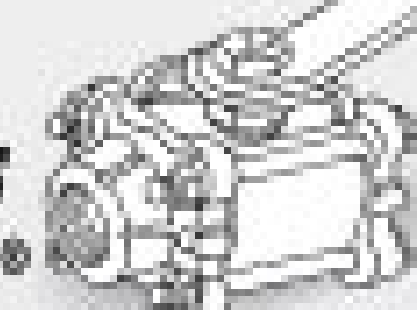


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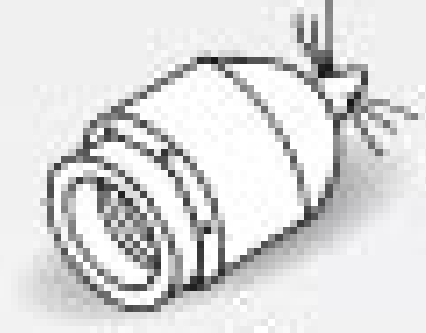
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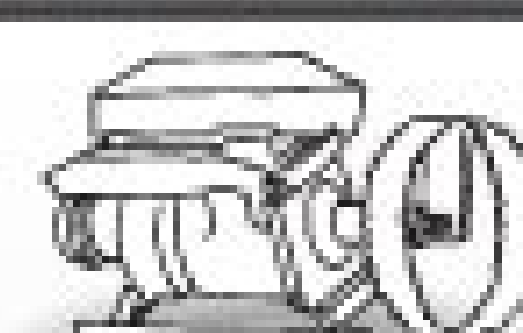
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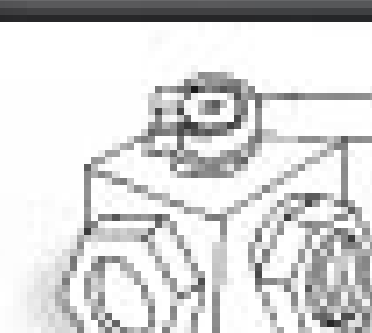
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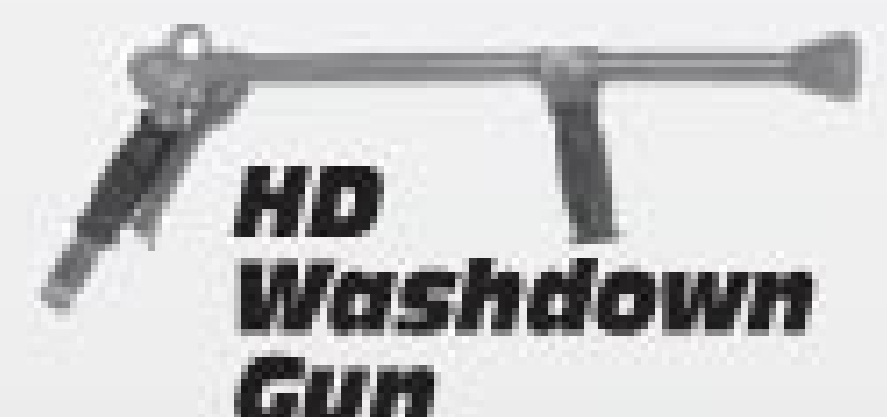
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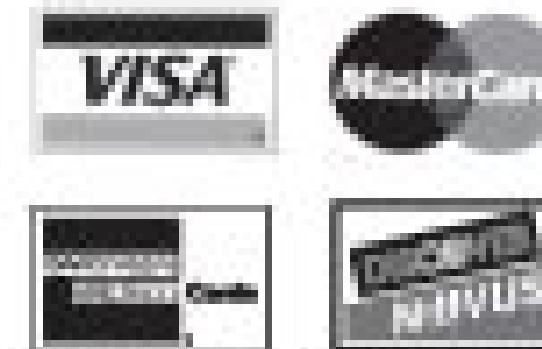
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Foreman Darryl Stephens uses a gas meter to check a manhole for hazardous gases during sewer maintenance. (Photography by Jeff Goldberg)

Full Circle

A business that started in residential drain cleaning evolves into a client base built almost solely on municipal, industrial and commercial accounts

By Peter Kenter

American Inspection Technologies in Trenton, N.J., has its roots in a residential drain cleaning business. But today it is a diverse pipe service company with a well-rounded client base that is mostly outside the residential sector.

At the heart of the business is a vigorous pipe inspection program that opens up further business opportunities in pipe bursting, lining and replacement.

The company began in 1980 as Root-Away Sewer & Drain Cleaning and incorporated in 1994. Owner and president Bob Schroder added the name American Inspection Technologies to the brand in 2003, and a third name, Penn-Jersey Pipe Cleaning, in 2005.

That wasn't indecision at work: The first name attracts a small core of residential clients, the second underscores the company's inspection capability, and the third tells customers that the company can remedy the problems found by the inspections.

The company's array of services includes high-pressure waterjetting, sanitary sewer and storm drain cleaning, industrial vacuuming, pipe bursting, cured-in-place pipe lining, and open trench sewer replacement. Municipal, industrial and commercial accounts now make up 98 percent of the work.

Roots in residential

"When we started out around 1980, we were primarily doing residential drain cleaning under the Root-Away name," says Schroder. "That was great for a while, until every plumber in the area started to offer drain cleaning."

The company's first major acquisition in 1985 was a waterjetting truck outfitted with a 1,200-gallon water tank. Schroder was the first in his service

PROFILE

AMERICAN INSPECTION TECHNOLOGIES, TRENTON, N.J.

OWNER: Robert Schroder
FOUNDED: 1980 (incorporated 1994)
MARKET AREA: New Jersey, western Pennsylvania, Delaware, eastern New York
SERVICES OFFERED: Pipe inspection and a broad spectrum of pipe cleaning and repairs
EMPLOYEES: 5 to 7 (seasonal)
AFFILIATIONS: Utility & Transportation Contractors Association of New Jersey, NASSCO
WEB SITE: www.penn-jerseypipecleaning.com



area to own a jet truck, and that gave him a leg up on the competition. Within a year, he bought a Vac-Con combination truck.

Schroder bought his first inspection system around 1987 – a SeeSnake push camera from RIDGID. His was the first company in the area to offer video inspection services.

“We were televising residential lines, but we soon found that the camera was in demand for new commercial, industrial and municipal clients,” Schroder recalls. “We started our business with a client base that was 98 percent residential, but the balance soon began to shift.”

Mid-sized market

The company found its strongest municipal market niche in townships with populations in the neighborhood of 5,000. Trenton’s location allowed the company to expand to a service area that ranges to about 100 miles, including parts of Pennsylvania, Delaware and New York.

“While the larger municipalities were already buying cameras, vacuum trucks and more sophisticated equipment, there were smaller and mid-sized municipalities that could only take advantage of these services if they subbed them out,” says Schroder.

“We were televising residential lines, but we soon found that the camera was in demand for new commercial, industrial and municipal clients. We started our business with a client base that was 98 percent residential, but the balance soon began to shift.”

Bob Schroder

Any equipment the company purchased to support municipal contracts was equally available to serve the area’s large industrial and commercial base. The company’s inspection cameras also stayed busy on a significant number of new housing developments, where developers had to inspect newly installed sewers before turning them over to the municipality.

Of course, chasing larger municipal pipe inspection and service contracts required more up-front investment and a greater startup challenge than most competitors could stomach. “I stick by one rule for investing in new equipment,” says Schroder. “If I can’t use it right away, and pay for it on the first or second job, I don’t buy it.”

Word-of-mouth helped to promote the municipal services. Schroder initially subbed out crawler camera work, but in 1997 he invested in the company’s first robot mini camera from Aries Industries Inc.

“As we expanded our ability to inspect, we usually wound up getting quite a bit of work from those inspections,” says Schroder. The company



Above: Darryl Stephens deploys a color inspection camera during an inspection demonstration in Trenton, N.J. Below: Supervisor Ray Rios observes an inspection from the company’s TV truck.



entered the CIPP lining market in 2000, using a steam-cured system. Schroder now uses the system supplied by Easy Liner LLC. He acquired a pipe bursting system from HammerHead Trenchless Equipment in 2006, enabling the company to burst pipes from 4 to 24 inches.



Supervisor Ray Rios and operator Darryl Stephens operate a combination truck on a sewer maintenance job.

The firm offers industrial vacuuming services with a Liquid Ring truck from Guzzler Mfg. that generates vacuum at 28 inches Hg. The frictionless ring allows the company to handle flammable liquids for clients such as coal-burning electric utilities.

Expanded services

The company also offers manhole rehabilitation, pipe locating using Armada Technology (formally Pro-Tech) locators, and bypass pumping services using pumps rented from Godwin Pumps of America Inc. The company operates three combination trucks, one each from Aquatech (Hi-Vac Corp.), Vac-Con and Vacall, and a SafeJet truck from Vacall.

Inspection capability has expanded to three crawler cameras from Power Equipment Manufacturing Inc., used to televise pipes from 2 to 72 inches. The inspection business continues to shift the focus away from residential work.

Municipal televising contracts lead to substantial additional work. The company recently finished a contract in Princeton, N.J. where televising helped uncover the need for a pipe replacement contract.

"The city was concerned about infiltration from a series of malfunctioning sewer laterals," says Schroder. "They offered the homeowners five-year interest-free loans to have the laterals replaced. We televised and cleaned the lines, then went in with the HammerHead pipe burster, and replaced the damaged lines with HDPE pipe. It was a nice contract and one we wouldn't have gotten without our inspection capabilities."

The company also completed a large contract in Yardley Borough, Pa., in fall 2006 when the town was flooded. "We were working near the bottom end of town, close to the Delaware River, which was rising," says Schroder. "The

road was sinking, so we televised the sewer line and found a major blockage with broken terra cotta pipe about 20 feet down and about 400 feet away from the end of the line, before the pumping station."

Schroder's company acted as general contractor on the job, televising and cleaning the pipe, but subcontracting the replacement of the sewers with ductile iron pipe.

The company also recently camera inspected 3,000 feet of pipe at a hospital in Princeton Borough, N.J., helping the client to discover that the newly minted system was three inches off grade.

Trade shows essential

Schroder keeps abreast of new technology through trade shows, particularly the Pumper & Cleaner Environmental Expo, which he has attended frequently over the past 20 years. "There are a lot of great products out there, but the technology is at a kind of standstill," he says.

"We got tired of clients and their engineers looking over our backs, so we gave them something nice to look at. Watching inspections live on a giant screen makes it a little less monotonous for them."

Bob Schroder

"I'm seeing minor improvements, but nothing that's really changed the industry over the last 10 years. I'm looking for something that will open up new opportunities. I'll eventually buy a laser profiler to keep up with other companies who are buying them, but it's nothing that's going to make me a lot more money."

He did invest in a giant 50-inch plasma monitor for the inspection truck. "We got tired of clients and their engineers looking over our backs, so we gave them something nice to look at," he says. "Watching it live on a giant screen makes it a little less monotonous for them."

SPECIAL MARKETS

American Inspection Technologies has developed a niche market serving landfill sites, such as the GROWS Landfill in Tullytown, Pa. The refuse buried in landfills generates methane and other gases – valuable fuel to drive turbines and generate power.

"The gas is siphoned out of the landfill through 4-inch pipes that probe 800 to 900 feet into the ground," says company owner Bob Schroder. "The pipes are perforated to draw the methane in under vacuum, but when they designed these lines, they never expected them to require servicing."

"The perforations eventually get clogged up with dirt and debris that enter the pipe and impede the flow of gas. We were already cleaning and televising storm drain lines for them, so they asked us to see what we could come up with to clean them."

There was no way to send a robot camera into such a small-diameter pipe. So the company developed a power-driven miniature push camera that can travel as far as 1,000 feet into a line. The camera head is attached to a half-inch fiberglass rod, and the rod is propelled off a 4-foot reel by electrically driven wheels placed at the pipe entry point.

The \$25,000 camera unit was custom designed and built by Richard Stevens, owner of Power Equipment Manufacturing Inc. of Pensacola, Fla.

Once the pipe has been inspected, Schroder uses a Warthog sewer nozzle supplied by StoneAge Inc. to clean the pipes. Camera inspection is essential, because the pipes need to be thoroughly cleaned to restore full gas flow. "We televise, clean and televise again," says Schroder. "We can only guarantee what we can see."

Schroder advertises primarily in The Blue Book of Building and Construction, which has generated about 80 percent of leads over the past decade. He also buys paid links on both the Google and Yahoo search engines under such terms as municipal pipe inspection, pipe cleaning, pipe bursting and pipe lining.

"I can tell this works, when we get people calling for quotes from out of the area," says Schroder. Internet hits have netted the company video inspection contracts with companies as far away as Virginia and North Carolina.

What's in a name? Plenty. American Inspection Technologies receives 60 percent of the calls, and almost 40 percent respond to Penn-Jersey, indicating that inspection services are the biggest draw.

Schroder says there's no magic formula for winning municipal inspection contracts. "We do a good job at reasonable price and that's what keeps the calls coming in from municipalities and townships," he says.

While some municipal contracts offer repeat business, most work is hard-won, through aggressive bidding. "Anything over \$7,000 or \$8,000 has to be placed up for bid, so I pay a lot of attention to the Dodge Reports for project leads," says Schroder.

Keeping good help

Maintaining quality service requires the company to retain its collective expertise. Schroder's wingmen are project supervisor Ray Rios and foreman Darryl Stephens.

"Some of the staff comes and goes, but these guys are the core of the business," Schroder says. "You have to pay your best workers well to keep them, but it's worth it."

The company's biggest challenge this year is collecting on accounts receivable. "It's a tough year for everyone," Schroder says. "I always wind up collecting the money, but instead of 30 days, it takes me 60 or 90 days to get paid. Even some cities and townships are paying slower than normal."

Schroder recently turned 52, but he'd like to stay with the business at least another 10 years before considering retirement. "I like my business," he says.

"Some days everything goes right and some days it's challenging and frustrating.

"Last week we were on one truck and the belt that runs the flywheel went. Five minutes later a water hose broke – a gazillion-to-one chance. But I enjoy what I'm doing, and I want to stick with it until I decide its time to retire." ■

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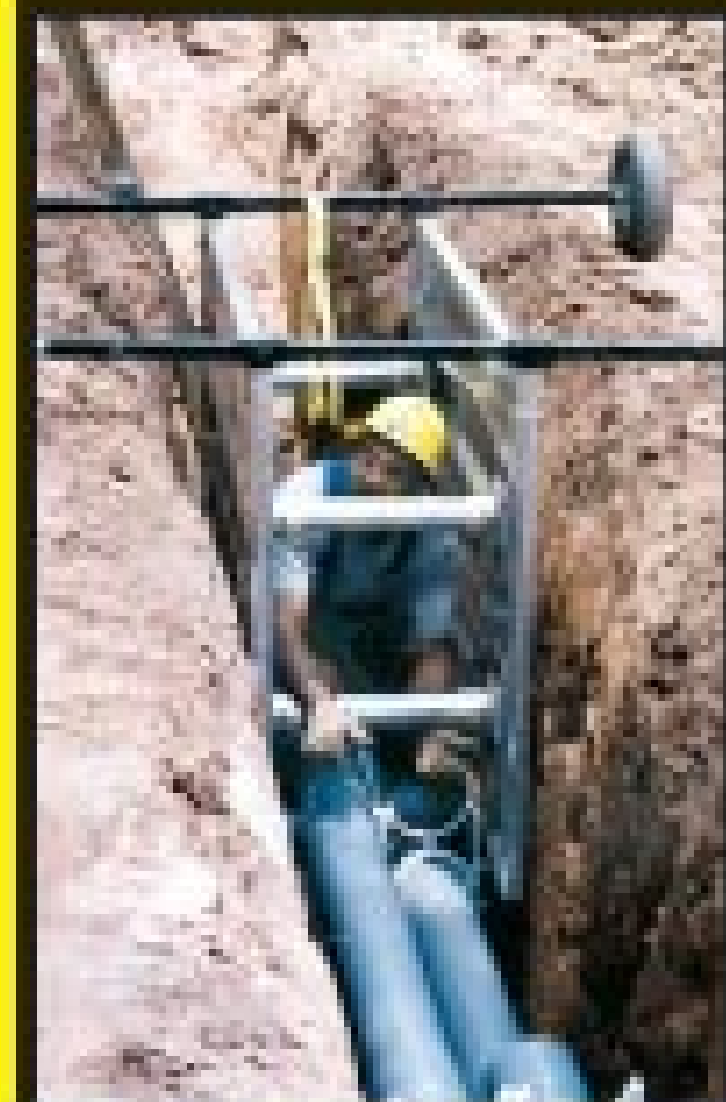


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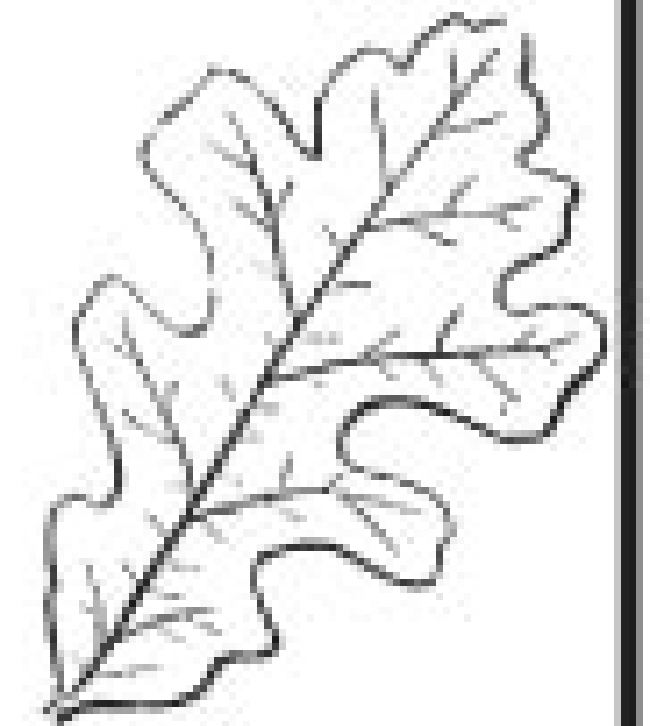


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Technician Gary White positions the CCTV camera in a manhole for a pipe inspection in Florence, Miss., home of Suncoast Infrastructure. (Photography by Ron Blaylock)



The Complete Package

Suncoast Infrastructure combines CCTV inspection, pipe lining and manhole rehabilitation in an integrated package that helps meet client needs efficiently

By Marian Bond

In the late 1990s, Richard Rula took one look at the emerging trenchless technology market and saw an opportunity to expand his business in a complementary sector.

Rula, president and owner of Hemphill Construction Co., a utility construction company near Jackson, Miss., saw a need for trenchless services, yet few companies offering them. In 1998, he founded Suncoast Infrastructure Inc., now a full-service company focused on CCTV sewer inspection, pipe lining and manhole rehabilitation.

He started with a large geographic footprint, taking advantage of a mid-state location at a main highway intersection and targeting a market within a radius of 200 to 300 miles. Today, Suncoast reaches out even farther, serving clients from Dallas to Atlanta and from Memphis to New Orleans.

"Every Monday morning, our CCTV vans along with our other equipment head out to their work locations, and often they are not back in our yard until the end of the week," says John Causey, vice president. The company's offerings include SUNCOAST LINER, its own pipe lining technology, trademarked in 2001.

Working with the finest

Suncoast Infrastructure started out in the lining and manhole repair business, but soon added CCTV inspection because customers wanted that capability as an integral part of rehabilitation service. The company has inspected more than 3 million feet of pipeline.

"Our philosophy on equipment, including inspection equipment, is always to buy the best and to replace it every three to six years," says Causey. "For our inspection vans, we

"Every Monday morning, our CCTV vans along with our other equipment head out to their work locations, and often they are not back in our yard until the end of the week."

John Causey

prefer a Ford F-550 with a high-cube box on the back. Our vans are built by RS Technical Services. We want our CCTV operators to perform their jobs at the peak of their ability, and we provide the most comfortable work environment we can. We tend to build them larger than most, with a studio, plus seating for up to three people to observe the same monitor the operator is watching."

The company has five CCTV vans on Ford vehicle chassis, plus an off-road inspection unit built on a 2001 Kubota M900 four-wheel-drive vehicle. The Kubota carries a slide-in box that carries a cable reel and inspection console. A garden-tractor-sized Prowler easement machine from 3T Equipment can be used for manhole cleanup.



Left: Pipe lining material is prepared in a wet out facility at the Suncoast headquarters. Right: Technician Shay Goff unpacks pipe liner to be coated with resin.

Crews deploy crawler-mounted NovaSTAR, OmniEYE II and OmniEYE III cameras and a Mini Model 1545 push camera, all from RS Technical. Cameras can be launched on a float vehicle of the company's own design for inspecting lines with high flow.

For data collection, the company uses Cobra Information Management Software (CIMS), and the CobraTouch CDL 9000 data logger, all from Cobra Technologies. "The software takes a signal from the camera and processes it, and then we download that to our office, where we run CIMS," Causey says.

For pipe cleaning, Suncoast operates a 2009 Vactor 2100 combination truck on a Sterling chassis with a 10-cubic-yard debris body, two 2009 Vactor waterjet trucks on Sterling chassis, and a 2002 Vac-Con combination truck on an International chassis with a 10-cubic-yard tank.

Cross-trained teams

Ten employees handle CCTV inspection, two crews typically do evaluation work, and two inspect in conjunction with CIPP liner installation. Technicians are cross-trained for flexibility to handle variations in workload.

"We are extremely focused on job site safety, and in our opinion as managers it takes three men on an inspection and cleaning crew to be as safe as we want to be," says Causey. "One man operates a jetting or combination truck, another operates the camera from inside the van, and a third is basically there to manage the work and look out for the other two. This is especially important if we're cleaning pipe or doing a confined-space entry – just for staying safe on the streets and roads. Sometimes, we have four men on a project.

"Generally, most CCTV customers are municipalities – cities, towns or utility districts – and we often work directly under their professional

engineers." For lining and manhole projects, the company may also work for refineries, chemical plants and paper mills.

Rehabilitation products in addition to SUNCOAST LINER include a two-component 100 percent solids epoxy lining from Warren Environmental Inc. that is sprayed into pipelines, and a cured-in-place manhole lining system of felt and fiberglass from Terre Hill Composites Inc.

The company uses smoke testing products from Hurco Technologies Inc.

"We have a budget for a project, and if the employees bring it in under budget, each person involved gets a piece of the savings. It really works as a good motivation."

John Causey

Fostering ownership

Training is essential for technicians who handle high-value equipment, and the Suncoast philosophy is to instill the idea of ownership. Under a bonus system, every employee shares in the success of a job and so has an incentive to take care of the equipment.

"We have a budget for a project, and if the employees bring it in under budget, each person involved gets a piece of the savings," says Causey. "It really works as a good motivation. The flip side is that if a television operator throws a camera out of the back of the truck and we get \$500 worth of repairs, that hits in the pocketbook for all.

"I always tell our people that the only time Suncoast can make money is when those in the field do things right. We make them aware that they are a very important part of the whole scene. We want our upper-level managers to act and react whenever there are problems in the field.

"We try to stay relatively simple in the hierarchy. We have an owner who is a hands-on president. He is here every day, and he is involved in the decision-making and aware of what goes on. In upper management, we have project managers responsible for bidding and managing work. Then the superintendents are responsible for getting the work done by the foremen, operators and lead men."

No surprises

Sewer inspections reveal a wide range of pipe conditions. "Generally, we find during our CCTV evaluations that sewer pipe installed before the 1970s is concrete, and the hydrogen sulfide gas produced over the years has degraded it," says Causey. "We see a lot of damage as a result of that chemical process.

PROFILE

SUNCOAST INFRASTRUCTURE INC., FLORENCE, MISS.

OWNER/PRESIDENT: Richard Rula
 FOUNDED: 1998
 SERVICES: CCTV, pipe lining, manhole rehabilitation
 EMPLOYEES: 45
 ANNUAL REVENUE: \$25 million
 FLEET: Four CCTV vans, four combination trucks, two jet trucks
 WEB SITE: www.suncoastinfrastructure.com





Gary White performs an off-road CCTV inspection using the company's Kubota 4x4 vehicle.

"Then we see vitrified clay pipe that was laid in short lengths, and we see problems where the joints may be misaligned, or the pipe has settled with cracks around the joints. Crews have seen some horrible conditions – even places where sections of pipe are missing. Nothing surprises us, Causey says. "We have seen a lot."

The company works mainly with 6- to 15-inch lines, but occasionally lines up to 120 inches must be inspected. Runs from manhole to manhole are

typically 600 to 700 feet, but crews have completed several 1,500-foot runs, and they can inspect runs of 1,800 to 2,000 feet.

"One challenge was to inspect 9,400 feet of 48- to 72-inch gravity sewer, where we had to float the camera down the line on a raft," says Causey. "The line was inaccessible by road, and we used our off-road vehicle to go cross-country through a swampy area. The line was old and was in poor condition. We encountered a lot of grease. There were missing segments of pipe. That project led to a multi-million dollar rehabilitation project for our client."

Suncoast is a licensed general contractor in many states but also functions as a subcontractor on some jobs. "We probably prefer to be the prime contractor because it gives you more control, but there is more work involved," Causey says. "It really doesn't matter to us because we focus on the job at hand. We make money either way."

Most of the work is competitively bid. Before Suncoast bids on a job, a project manager or superintendent performs an on-site inspection. "We bid on what they tell us they want done," says Causey. "In addition to CCTV, we do smoke testing and flow monitoring. We measure the flow in the sewer line both before and after a significant rain event. Each one of these processes gives information to help evaluate the condition of the system.

"We do a lot of projects where we evaluate a neighborhood, or a town, or a city block. We come back with the evaluation and make recommendations on what repairs need to be done."

Keeping up

Suncoast has seen giant strides in CCTV technology and survey software. "We maintain regular contact with our suppliers," Causey says. "The biggest change we've seen is the development of sonar and laser profiling. Technology now lets us record a lot of information. We can collect 100 times more data than a few years ago."

When a job calls for sonar or laser profiling, Suncoast subcontracts those capabilities. "That makes more sense than having a large capital outlay in something that will be out of date in two years," Causey says.

Suncoast is uniquely positioned with its three major services to offer clients a cost-effective program for dealing with infrastructure problems. "The fact that we do multiple things gives us a lot more flexibility and allows us to provide complete rehabilitation of a system," Causey says. "The services complement each other. We have more flexibility than if we were just doing lining, or manhole rehabilitation. We have more opportunity to bid. We are doing what our initial intention was from day one."



MEETING THE CHALLENGES

Getting Suncoast Infrastructure off the ground as a full-service company meant three major challenges, according to vice president John Causey.

"Initially we had to decide on the geographic footprint in order to provide sufficient work and income," says Causey. "Another major challenge, as in any startup business, was finding, hiring and training employees. The third main focus was to find bidding opportunities and to be successful in getting that work. We had a very sustainable business development focus where owner Richard Rula had sales people and business development people taking care of those issues. We were training from day one."

Causey says the success of any company depends on the capability of the employees. "We have always had good, solid employees available in our local area," he says. "We did not want to become a group of satellite businesses.

"We are a hands-on operation. We thought it important to develop an employment base within 60 miles of our location. We are in a highly technical field, and we do a good measure of training to bring our employees to the level they need to perform in our business."

Suncoast shares a 20-acre site with Rula's other business, Hemphill Construction Co. Suncoast has an 8,000-square-foot office; a 20,000-square-foot warehouse; a 10,000-square-foot mechanic shop; and a 20,000-square-foot facility to inject the resin for pipe lining. The storage yard covers several acres. Having an office staff under one roof allows the company to serve clients better.

The company is dedicated to staying abreast of the technical side of trenchless and related services, and to looking for products that fit the business model, profit goals and growth plan.

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PHCC MEMBER

Seeing (Infra) Red

Thermal imaging technology for pipe inspection evolves into multiple applications in sanitary sewer, storm sewer and water system work

By Ted J. Rulseh

Video inspection has advanced the cause of sewer system maintenance and repair: It literally gives contractors a set of eyes under the ground.

But there are times when traditional video images are not enough. For example, in a pipe with a smooth new CIPP liner, it can be hard to spot the exact locations of the sewer laterals that need to be reinstated. And although operators can see the water flowing in a sewer, video provides no real clues to the

ture of a precise point within the frame of an image. These can be used for lateral reinstatement after CIPP lining and also for more sophisticated investigations, like sleuthing improper sewer connections.

Embracing the technique

Aries Industries was the first pipeline inspection equipment provider to bring infrared imaging to the wastewater industry. “We saw the technology and asked, ‘How can our industry benefit from it?’” says George Rada, senior product manager.

“I am sure we don’t know all the potential uses yet. We’re always looking for new ways to solve problems in underground infrastructure. Undoubtedly, more applications will come up.”

George Rada

character or source of that water.

That’s where infrared imaging comes in. These inspection systems enable operators to switch back and forth between traditional video and infrared imaging – and in the latter mode literally see temperature differences. The technology already has a few key applications in wastewater pipe maintenance, and more are likely to emerge as it is deployed more widely in the field.

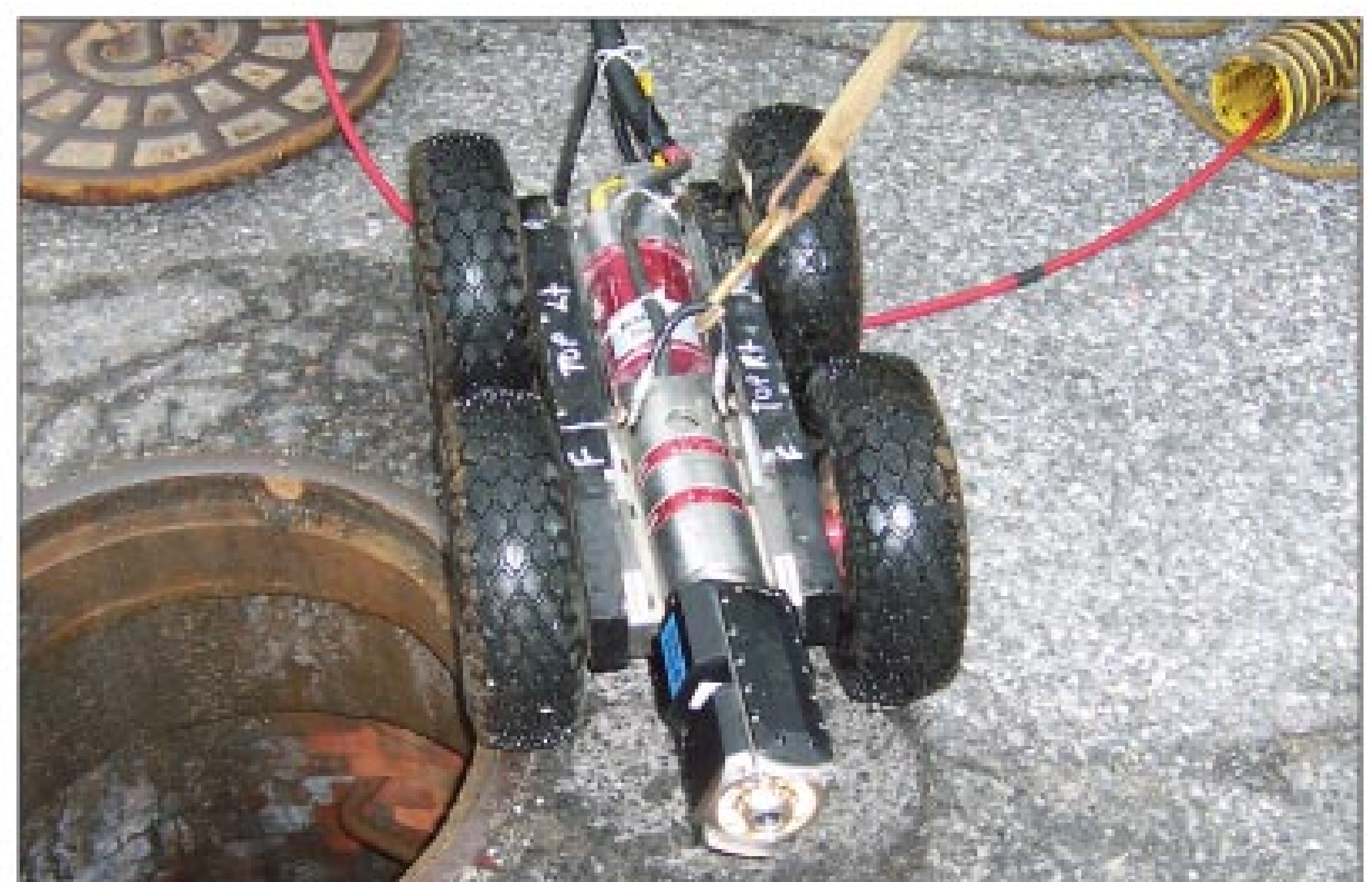
The first infrared imaging systems displayed in black and white – for example, white as warmer, black as cooler. This technology enables operators to see, for instance, the difference in temperature between the wall of a newly lined pipe and the site of a lateral opening.

More advanced systems show relative temperatures in color and also display the absolute tempera-

The first thermal imaging system for pipe inspection, displaying in black-and-white, came on the market in the early 2000s. Its sole application was and remains pinpointing the location of lateral openings behind CIPP pipe lining.

In the lining of smaller-diameter sewers (6 to 10 inches), the lining typically dimples slightly into the laterals, making the locations fairly easy to see with traditional video, Rada says. But when larger pipes are lined, the dimpling may be far less obvious. “In those cases, you can’t rely on observations that the lateral was, say, 32.5 feet from the manhole and in the 2 o’clock position,” Rada says. “You need a positive location.”

Users of the black-and-white thermal imaging system deploy it just after the liner is installed, while it is still warm from curing. At that



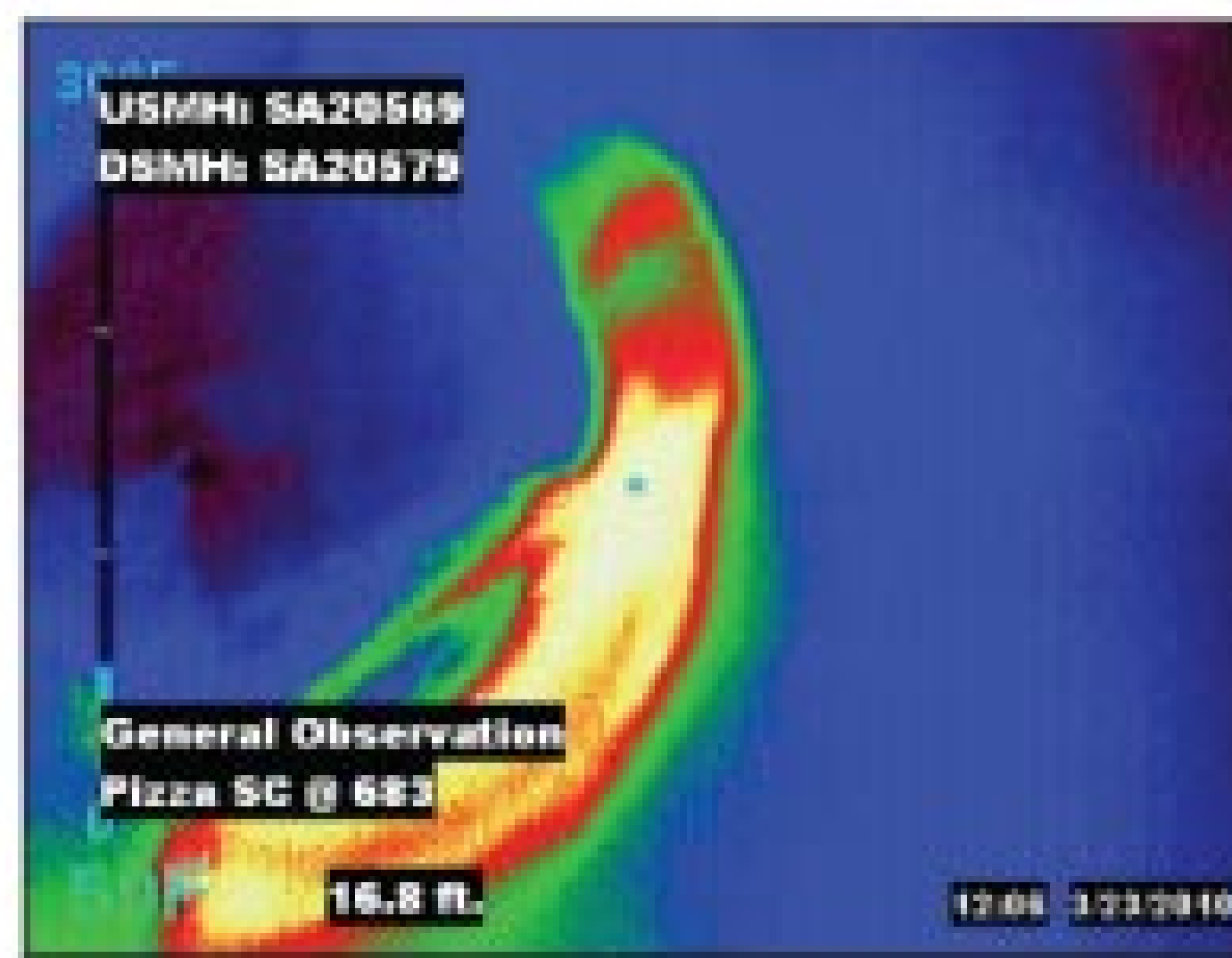
Above, the ThermaView II camera from Aries Industries mounted on a tractor and set up for viewing in the infrared mode. Below, the camera set up for viewing in the visible-light mode.

point, the lateral, having wastewater or ambient-temperature air behind it, is cooler than the rest of the liner, and the difference shows on the thermal imaging display. Operators can navigate to the approximate location of laterals using the video mode, then switch to infrared to

pinpoint the lateral site for reinstatement cutting.

Rada notes that the black-and-white technology was adopted mainly by sophisticated, high-volume CIPP lining contractors. Municipalities did not adopt it simply because the vast majority

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 Ted J. Rulseh, editor@cleaner.com.



Left: The visible-light view from the ThermoView II camera, showing what appears to be rain overflow entering a sewer. Right: The infrared picture shows that the water is actually heated. It was later found to be coming from a restaurant. (Photos courtesy of Aries Industries)

contract for CIPP lining rather than do it in-house.

Living color

The next step in evolution of thermal imaging for pipe inspection made its debut in 2010: It can display infrared images in black-and-white or in color. The camera is about 14 inches long and has a cylindrical rear body. Two arms at the front hold a cube-shaped pan-and-tilt camera and light head.

The camera head has visible-light and infrared lenses on opposite ends. Using a remote control panel, the operator can switch from one mode to the other. A pan function lets the operator pan continuously 360 degrees left to right. The head also rotates clockwise or counter-clockwise in either viewing mode.

Because of the extra space needed in the camera head for the infrared optics, there is no room for zoom components for the visible-light camera. The infrared lens has digital zoom to 2x and 4x.

While the visible-light lens is surrounded by 12 warm-white LEDs, the infrared camera needs no lighting. In the visible-light mode, the control panel displays a distance readout. In the infrared mode, the monitor display includes three additional features:

- A blue dot in the center that pinpoints the temperature target.
- A digital readout that displays the temperature of the blue dot's target – the reading is accurate to ± 0.5 a degree.
- A bar icon that displays temperature on a vertical scale from 0 to 300 degrees F. Readings can be switched to Celsius or turned off.

In the black-and-white infrared mode, the camera can show the

highest temperature as dark and the lowest as white, or the reverse. In the color mode, the system can show temperature variations in regular color or in more intense color. These color differences show relative – not absolute – temperatures.

The system is designed to be controlled by standard camera controller equipment, helping to keep total inspection system cost affordable. A few switches on the control panel are repurposed to accommodate the infrared viewing.

Applications emerging

The most obvious application for the technology is pinpointing sewer lateral locations in lined pipe – but with greater accuracy. “The operator can adjust the color intensity of the display to better show temperature differences,” says Rada. “If the colors are still hard to read, the operator can focus the blue dot on the target area and read the absolute temperature.”

The added temperature measurement precision has opened more applications for infrared imaging in underground piping. One promising application is in restoring water service connections after fabric lining of water mains.

Before lining, services are typically closed with plastic plugs. After lining, these plugs appear as small protrusions in the liner. But in thicker water pipe materials, such as asbestos cement, some plugs may be forced entirely into the pipe wall so that they do not leave any visible markers in the liner. Here again, temperature differences that appear on the infrared display enable technicians to locate the service connections precisely.

A potentially more powerful application emerged in early 2010 when the technology was used by an

engineering firm charged with helping an eastern city identify improper discharges of sanitary wastewater into storm sewers.

Here, the high precision of the full-color thermal imaging can identify locations where warmer sanitary sewer flows meet colder ground-temperature stormwater flows. In one instance, the engineers easily detected a hot-water discharge from a pizza parlor entering a storm sewer.

Looking ahead

Rada believes more applications for the color infrared imaging technology will emerge as engineers, contractors and municipalities put it to work. “I am sure we don't know all the potential uses yet,” he says. “We're always looking for new ways to solve problems in underground infrastructure. Undoubtedly, more applications will come up.” ■

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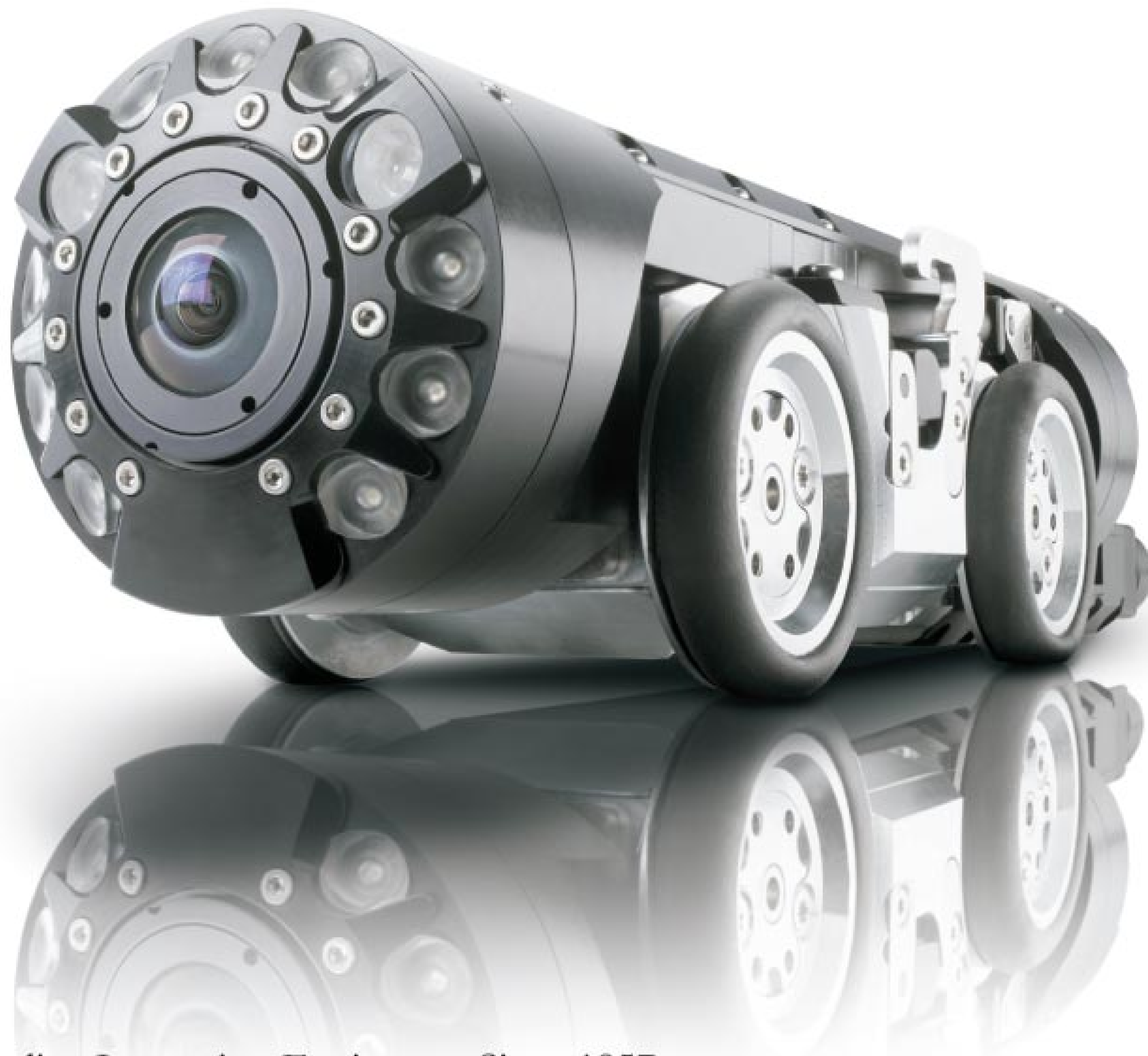
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See ads pages 35, 61	Allan J. Coleman Co. 5725 N Ravenswood Ave. Chicago, IL 60660 773-728-2400 Fax: 773-728-2499 www.allanjcoleman.com info@allanjcoleman.com	RIDGID®/WuTek/ General Wire/Electric Eel/ UEMSI/Spartan	1 1/4" to 12"	30' to 400'	DVD/DVR/ VHS		YES	YES	YES		YES
See ad page 75	Amazing Machinery, Inc. 2288 Gunbarrel Rd. Ste. 154-151 Chattanooga, TN 37421 800-504-7435 Fax: 800-504-7436 www.amazingmachinery.com sales@amazingmachinery.com	Amazing Machinery/ Wohler	1 1/2" to 16"	65' to 400'	CD/DVD/DVR	YES	YES	YES	YES		YES
 See ad page 21	Aries Industries, Inc. 550 Elizabeth St. Waukesha, WI 53186 262-896-7205 Fax: 262-896-7099 www.ariesindustries.com sales@ariesindustries.com	Aries	2" to 200"	100' to 10,000'	CD/DVD/VHS	YES	YES	YES	YES	YES	YES
 See ad page 77	Bright Dyes/Div. of Kingscote Chemicals 3334 S Tech Blvd. Miamisburg, OH 45342 937-886-9100 Fax: 937-886-9100 www.brightdyes.com sales@brightdyes.com	Turbo Fog/Bright Dyes									YES
See ad page 67	Central Oklahoma Winnelson 5037 NW 10th St. Oklahoma City, OK 73127 405-947-876 Fax: 405-947-1934 www.centralwinnelson.com krjones@winnelson.com	RIDGID®/General Wire	1 1/4" to 12"	30' to 325'	DVD/VHS/ Memory Card		YES	YES	YES		YES
See ad page 77	CuaClaws 2376 Maize Rd. Twentynine Palms, CA 92277 714-697-8697 www.cua-claws.com jerry@cuaclaws.com	CuaClaws							YES		
 See ad page 45	CUES 3600 Rio Vista Ave. Orlando, FL 32805 800-327-7791 Fax: 407-425-1569 www.cuesinc.com salesinfo@cuesinc.com.com	CUES	2" to 200"	500' to 4000'	CD/DVD/VHS/ Any Digital Media	YES	YES	YES	YES	YES	YES
See ad page 50	CYCLOPS Electronics, Inc. PO Box 1796 Boerne, TX 78006 830-249-9756 Fax: 830-249-8535 www.cyclopstv.com cyclopstv@beecreek.net	CYCLOPS	6" to 48"	500' to 1000'	DVD/ Computer	YES	YES	YES	YES	YES	
See ad page 70	Draincables Direct 4370 Moline-Martin Rd. Millbury, OH 43447 800-421-4580 Fax: 800-752-8524 www.draincables.com sales@draincables.com	VT Design	2" to 12"	140' to 200'	DVD/ External Devices			YES	YES	YES	YES
 See ad page 12	Duracable Manufacturing 300 Ashworth Rd. West Des Moines, IA 50265 800-247-4081 Fax: 515-223-4220 www.duracable.com sales@duracable.com	RIDGID®/Wohler	2" to 8"	100'	DVD/Scan Disk			YES	YES		YES
See ad page 77	Dynamic Cable Repairs 40 Arnot St. Unit 20 Lodi, NJ 07644 973-478-0893 Fax: 973-478-0895 www.dynamicrepair.net dynamiccablerepair@yahoo.com		2" to 10"	100' to 400'	CD/DVD/VHS		YES				YES

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See ad page 30	ECA-SSI 5358 S. 125th E. Avenue Tulsa, OK 74146 918-810-9131 Fax: 918-240-4502 www.eca-ssi.com rfinney@eca-ssi.com	ECA-SSI	4" to 60"	400' to 1650'	CD/DVD	YES	YES	YES	YES	YES	
 Electric Eel See ad page 66	Electric Eel Mfg. Co. 501 W Leffel Ln. Springfield, OH 45501 800-833-1212 Fax: 937-323-3767 www.electriceel.com info@electriceel.com	Electric Eel Mfg.	1" to 12"	130' to 400'	DVD/ SD Card		YES	YES	YES		YES
See ad page 76	Electronic Repair Co. 8518 1st Ave. N Birmingham, AL 35206 205-836-0454 www.servicewithasmile.com part@servicewithasmile.com	General Wire, Ratech, Vision/RIDGID®			CD/DVD/VHS/ all PC- compatible digital media		YES				
 Envirosight See ad page 15	Envirosight LLC 111 Cantfield Ave. Unit B3 Randolph, NJ 07869 973-252-6700 Fax: 973-252-1176 www.envirosight.com mail@envirosight.com	QuickView/Rover/ SuperVision/ DigiSewer/WinCan	2" to 60"	100' to 1640'		YES	YES	YES	YES	YES	YES
See ad page 78	Forbest Products Co. 315 Harbor Way Ste. B South San Francisco, CA 94080 650-757-4786 www.forbestusa.net forbestusa@gmail.com	Forbest	1" to 50"	1.2' to 2.5'	DVD	YES		YES	YES		YES
 General PIPE CLEANERS See ad page 2	General Pipe Cleaners/General Wire Spring 1101 Thompson Ave. McKees Rocks, PA 15136 800-245-6200 Fax: 412-771-2771 www.drainbrain.com info@drainbrain.com	Gen-Eye GL/Gen-Eye SD/Gen-Eye POD/ Gen-Eye Spectra	1 1/2" to 10"	100' to 400'	DVD/VHS/ SD Card	YES					YES
See ad page 59	Image Inspection Services LTD 4650 50th Ave. SE Calgary, AB T2B 3R4 403-287-1053 Fax: 403-243-4564 www.image-inspect.com sales@image-inspect.com	Image/Prototek/ Spering/Reizler	3/4" to 72"	0' to 2500'	CD/DVD/VHS/ SD/HDD	YES	YES	YES	YES	YES	YES
See ad page 37	Insight Vision/Vutek 600 Dekora Woods Blvd. Saukville, WI 53080 800-488-8177 Fax: 262-268-9952 www.vutekpipe.com		1 1/4" to 18"	100' to 800'	USB/Internal Hard Drive	YES	YES	YES	YES		
 J.M. McKinney Co. See ad page 65	12710 Yukon Ave. Hawthorne, CA 90250 800-821-7275 Fax: 310-978-2795 www.jmmckinney.com jmco4u@hotmail.com	RIDGID®	1 1/4" to 12"	100' to 325'	DVD/VHS/ DVR		YES	YES	YES		YES
See ad page 28	KEG Technologies, Inc. 644 Church Rd., Ste. 3 Madison, MS 39110 866-595-0515 Fax: 866-595-0517 www.kegtechnologies.net info@kegtechnologies.net	KLEEN-VUE	12" to 60"	NA - Wireless	CD/DVD/ VHS/DVR				YES	YES	YES
See ad page 27	LMK Technologies 1779 Chessie Ln. Ottawa, IL 61350 815-433-1275 Fax: 815-433-0107 www.performanceliner.com sales@lmkenterprises.com	Kummert	4" to 6"	150' to 180'	USB/Internal Hard Drive	YES	YES	YES	YES		
See ad page 77	M Tech Company 7401 First Place Cleveland, OH 44146 440-646-0996 Fax: 440-646-9953 www.mtechcompany.com bcohen@mtechcompany.com	M Tech/CUES	2" to 96"	100' to 1500'	DVR	YES	YES	YES	YES	YES	YES



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See ad page 26	Oceanquip, LLC 9904 Martha Ln. River Ridge, LA 70123 504-738-7833 Fax: 504-738-7833 www.oceanquipllc.com Jfowler307@aol.com	Seacon Assemblies & Pigtails + Turck Assemblies & Pigtails					YES	YES	YES		
See ad page 26	Pearpoint 72055 Corporate Way Thousand Palms, CA 92276 800-688-8094 Fax: 760-343-7351 www.radiodetection.com pearpoint.sales.us@spx.com	Pearpoint	1" to 200"	100' to 500'	CD/DVD/VHS/ Compact Flash/ Digital Media	YES	YES	YES	YES	YES	YES
 See ad page 60	Peterson Products Co. PO Box 340 Fredonia, WI 53021 800-926-1926 Fax: 262-692-2418 www.pipeplug.com sales@petersen.cc		3/4" to 144"								YES
 See ad page 5	Pipeline Analytics PO Box 15513 Pittsburgh, PA 15244 877-626-8386 www.pipelineanalytics.com wincan@pipelineanalytics.com	WinCan	any	any	CD/DVD/VHS/ all PC-compatible digital media	YES	YES	YES	YES		
 See ad page 59	PipeLogix, Inc. PO Box 14014 Palm Desert, CA 92255 866-299-3150 Fax: 760-406-6023 www.flexi-data.com joan.stone@pipelogix.com				CAD/DVD/ VHS/Computer Hard Drive	YES					
 See ad page 28	POSM Soft LLC PO Box 1037 Mount Sterling, KY 40353 859-274-0041 Fax: 707-238-1478 www.posm.us info@posm.us	POSM Lite/POSM Pro/ POSM Office Server Edition			CD/DVD/VHS USB/Network	YES					
 See ad page 47	Prototek PO Box 1700 Poulsbo, WA 98370 800-541-9123 Fax: 360-779-1510 www.prototek.net prototeksales@prototek.net	Prototek				YES					YES
See ad page 66	Pulsar 2000 4131 S Buckner Blvd. Dallas, TX 75227 214-388-8838 Fax: 214-388-3004 www.pulsar2000.com jsml@aol.com	Pulsar 2000			CD/DVD		YES				YES
 See ad page 39	RapidView IBAK North America 1828 W Olson Rd. Rochester, IN 46975 800-656-4225 Fax: 574-223-7953 www.rapidview.com info@rapidview.com	RapidView IBAK North America	2" to 156"	100' to 1640'	CD/DVD/ VHS/Digital/ PANORAMO	YES	YES	YES	YES	YES	YES
 See ad page 56	Ratech Electronics Ltd. 260 Spinnaker Way, Ste. 7 Concord, ON L4K 4P9 800-461-9200 Fax: 905-660-1519 www.ratech-electronics.com sales@ratech-electronics.com	Ratech	1" to 48"	100' to 1000'	CD/DVD/VHS/ Hard Drive/ Memory Card/ SD Card	YES	YES	YES	YES	YES	YES
 See ad page 70	Rausch Electronics USA, LLC 370 New York Ave. Chambersburg, PA 17201 717-709-1005 Fax: 717-709-1009 www.rauschtv-usa.com REUSA@rauschtv.com	Rausch	4" to 64"	500' to 1700'	DVD/ Hard Drive	YES	YES	YES	YES	YES	YES
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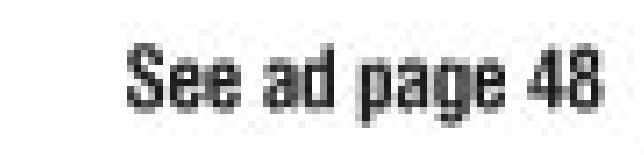
RS Technical Services, Inc.
1327 Clegg St. Petaluma, CA 94954
800-767-1974 Fax: 707-778-1981
www.rstechserv.com sales.info@rstechserv.com

RS Technical/POSM	1 1/2" to 200"	100' to 3000'	CD/DVD/VHS/DVR/Scan Disk	YES	YES	YES	YES	YES	YES	YES
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Scooter Video Inspection Systems
20873 Santa Lucia St. Tehachapi, CA 93561
800-772-6165 Fax: 661-822-8917
www.tvinspection.com scooter1@lightspeed.net

Scooter/Prototek	2" to 12"	100' to 200'	DVD/VHS/SD Card/USB		YES	YES	YES			YES
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Probuilt/Titan	1" to 36"	25' to 1000'	CD/DVD/VHS/Laptops/Media Players	YES	YES	YES	YES	YES	YES	YES
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www.spartantool.com customerservice@spartantool.com

Spartan Tool	1" to 6"	100' to 200'	DVR		YES	YES	YES			YES
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800-521-6893 Fax: 800-521-3260
www.mightyprobe.com sales@tandttools.com

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1460 Opdyke Rd. Auburn Hills, MI 48326
800-929-4399 Fax: 248-377-2250
www.telespector.com info@telespector.com

Telespector	6" to 120"	500' to 1500'	CD/DVD/VHS	YES	YES	YES	YES	YES	YES	
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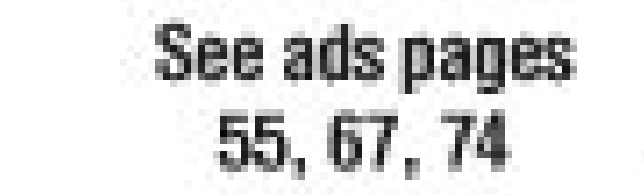
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RIDGID®/General Wire	1 1/2" to 12"	100' to 400'	CD/DVD/VHS/SD Card	YES	YES	YES	YES			YES
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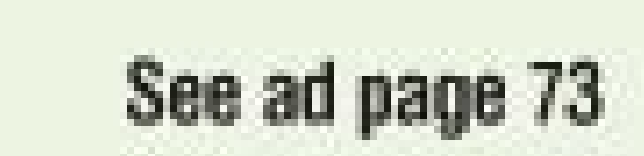
TV Ferret Inc.
840 State Rte. 50 Burnt Hills, NY 12027
518-399-2211 Fax: 518-399-3118
www.tvferret.com info@tvferret.com

TV Ferret	2" to 120"	200' to 1200'	CD/DVD/DVR	YES	YES	YES	YES	YES	YES	YES
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1621 S Illinois St. Streator, IL 61364
815-672-3171 Fax: 815-672-2779
www.vactor.com sales@vactor.com

Flow-Cate/Armor Belt Beacon/Sonde Porter	4" to 48"	8' to 1000'	DVD/VHS	YES	YES	YES	YES			YES
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Vision Technology Design & Mfg., Inc.
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877-754-3435 Fax: 209-668-5847
www.vtdesign.com info@vtdesign.com

Intruder/VT2000	1 1/2" to 12"	100' to 400'	DVD/DVR/USB	YES	YES	YES	YES			YES
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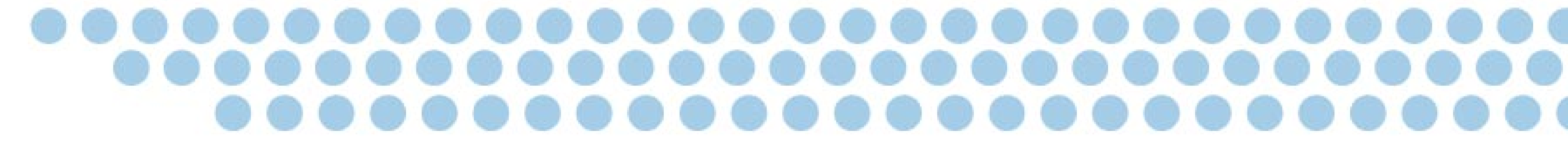
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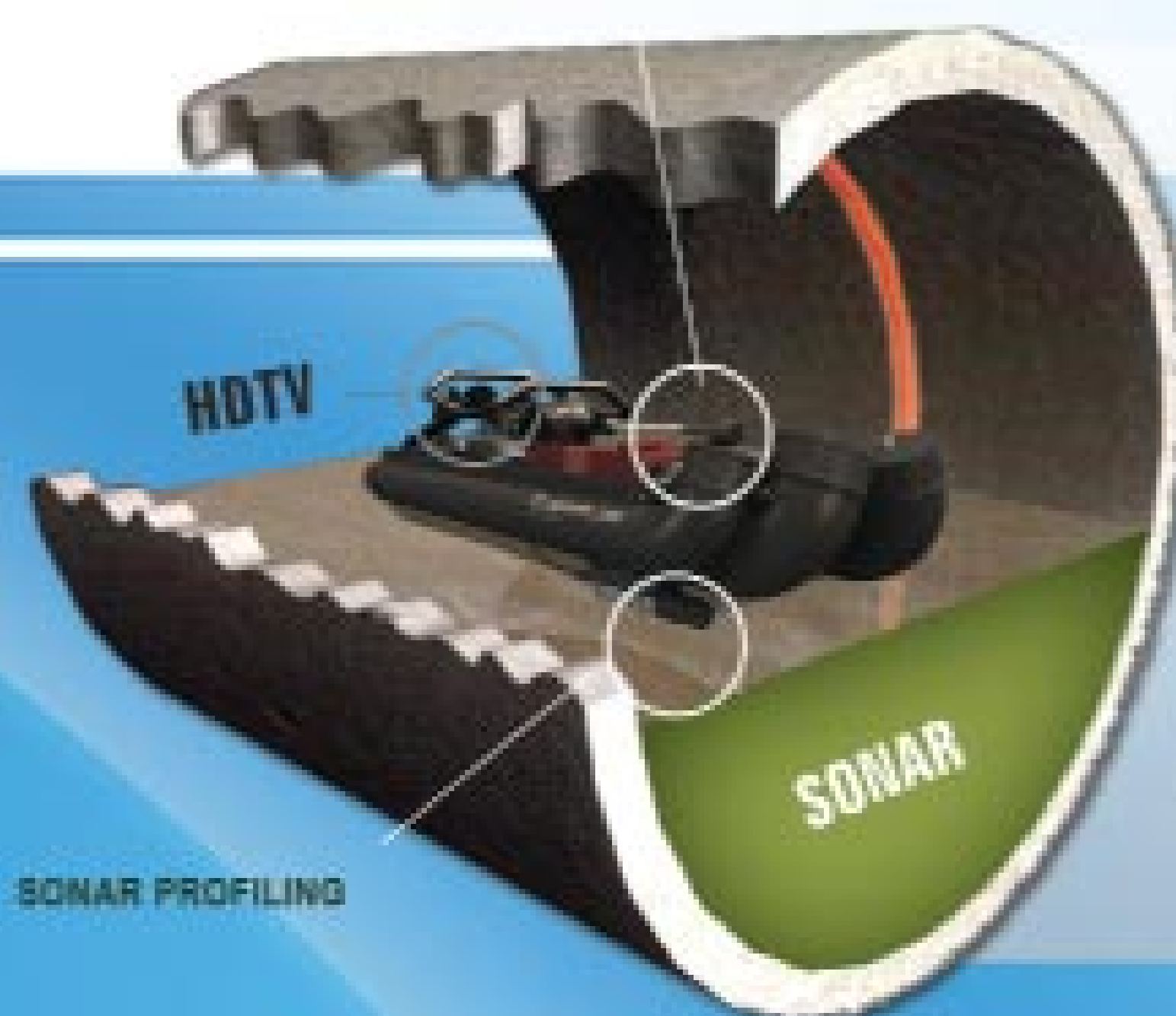
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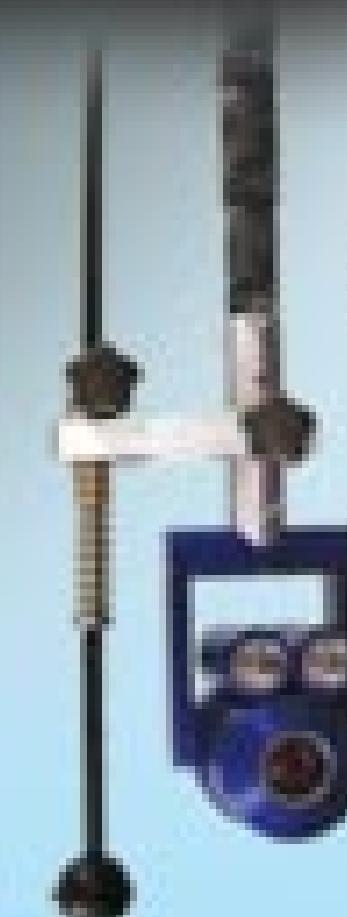
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Getting to the Site

Camera transporters do the bull work of delivering inspection technology to the pipe defects that need assessment and correction

By Benjamin Wideman

In pipeline inspection technology, most of the credit goes to the cameras that enable viewing of the pipe wall, the vans that house the video equipment, and the software that enables complete survey reporting. But none of it would be possible without quality camera transporters. Here is a look at some of the newest and most capable carriers offered by industry manufacturers.

Six-wheel drive

The Prowler from UEMSI is a six-wheel-drive transporter with a two-speed transmission designed for use in 8-inch lined pipes up to 48-inch pipes with heavy debris and sand. Standard are three sizes of wheels and tires for maximum traction, and a lift to center the camera in large pipe.

The internal all-wheel-drive system is sealed. The unit has six 4.35-inch tires, six 5-inch tires and four 10.5-inch balloon tires. With the balloon tires installed, it can still use two smaller center-drive wheels to maneuver over large obstacles. The standard Roto-Lok quick-change wheel system allows users to lock the wheel and spacer onto the hub by twisting the wheel clockwise. It is then secured with only one setscrew. 800/666-0766; www.uemsi.com.



Prowler from UEMSI



Crawler from TV Ferret

One-piece platform

The main crawler body of the TV Ferret 6-inch steerable crawler is a one-piece mono-tube stainless steel platform. It has a stainless steel articulating cable receptor to alleviate stress on the main cable for longer cable life and fewer cable reterminations. The tracks are a one-piece continuous loop made of reinforced urethane. The steerable crawler uses skid-steering, allowing it to rotate about its own axis. For inspecting pipe up to 36 inches, a modular liftwheel system attaches to the outside of the crawler without removal of the tracks. 518/399-2211; www.tvferret.com.

Nickel-plated brass body

The KV-421 HD from Cyclops Electronics has forward/neutral/reverse capabilities; a heavy-duty, high-torque motor; nickel-plated, solid brass body; and stainless steel accessories. The unit can pull 1,000 feet of cable through 6-inch and larger lines. Bolt-on large-line wheels and auxiliary lights increase its capabilities and productivity. 830/249-9756; www.cyclopstv.com.



KV-421 HD from Cyclops Electronics

Versatile unit

The Gopher Crawler from Image Inspection Services can be used for pipes from 6 inches to 24 inches with various sizes of solid or pneumatic wheels and spacers. Features include a solid, anodized aluminum or brass body, stainless steel wheel hubs and axles, high-torque 48 V motor, O-ring sealed drive axles and bearings, all-wheel drive, and forward and reverse variable speed.

Three sizes of storm sewer and sanitary sewer tires are available. The unit is adaptable to multi-conductor systems and can make up to 500-foot pulls on mini camera cable. It is available with a desktop or 12-inch rack-mounted controller. 403/287-1053; www.image-inspect.com.



Gopher Crawler from Image Inspection Services

Hardened gearing

The Cobra 150 crawler from Cobra Technologies is a six-wheeled transporter for use in 6-inch lined pipe that also fits into pipe measuring 5.5 inches. Running on standard multi-conductor cable, it requires no special lightweight cable specially designed for small crawlers. Hardened steel gearing provides minimum maintenance and maximum longevity.

The device has a 90-degree stainless steel swivel and a 150-watt motor. It is 12 inches long, 5.2 inches in diameter and weighs 54 pounds. It uses multiple types of wheels for different pipe applications and conditions. The crawler will run on any American-made multi-conductor system. 800/443-3761; www.cobratec.com.



Cobra 150 from Cobra Technologies



Compact Pipe Ranger from CUES

Proportional steering

The Compact Pipe Ranger from CUES is a lightweight, compact, and steerable transporter used to inspect sanitary and storm sewers. The unit, designed to inspect 6-inch lined pipe through 30-inch pipe, includes full proportional steering to traverse meandering pipe and 45- and 90-degree turns. 800/327-7791; www.cuesinc.com.



P356 Crawler from Pearpoint

Water resistant

The P356 crawler, part of the Pearpoint Flexitrac P350 system, can operate fully submersed and is water resistant to depths of up to 100 meters. Constructed from brass and stainless steel, it uses two 50-watt motors. The integrated, sensitive inclinometer, offering ± 0.2 degree accuracy, and the multi-frequency sonde, allow for efficient mapping of pipeline topography. The steerable unit allows access in a

typical manhole and in pipes from 6 inches to 24 inches. It weighs 31.5 pounds and has quick-release wheels and a choice of hard or soft tires. 800/688-8094; www.radiodetection.com.

Autonomous inspection

The Solo crawler from RedZone Robotics is an autonomous inspection crawler. Onboard intelligence managed by mini computers built into the platform allows the robot to drive itself and conduct inspections without an operator present. Crews can initiate up to four inspections simultaneously. Designed for 8- to 12-inch pipe, the unit can be deployed anywhere it can be carried by hand and requires no special vehicle. Its full-coverage tracks allow it to climb over obstacles without high centering, and the flexible rubber material provides the grip of tracks without debris issues. 412/476-8980; www.redzone.com.



Solo from RedZone Robotics

Brushless motors

The Pathfinder tractor from Aries Industries is a 6-wheel-drive, steerable unit that can go into virtually any lined 6-inch pipe and is the only U.S.-made pipeline inspection tractor with brushless motors, according to the manufacturer. Brushless motors provide 50 percent more power than brush-type motors. The unit has a built-in camera



Pathfinder from Aries Industries

lift and a rear-viewing camera as standard equipment. Various wheel sets can be changed in seconds. 800/234-7205; www.ariesindustries.com.

Lateral launch system

The SuperVision SAT lateral launch system from Envirosight crawls 500 feet down mainlines 6 inches and larger and then inserts its camera as far as 100 feet into laterals 3.5 inches and larger. The auto-leveling color camera with shadowless illumination pans 360 degrees and tilts 90 degrees to view sidewall detail and distant targets.



SuperVision SAT from Envirosight

The crawler's steerable 6-wheel drive helps it maneuver to troublesome launch points. Auxiliary lamps and a backward-viewing camera enhance visibility in both directions. An integral sonde transmits at multiple frequencies, enabling location of the camera from above ground. The unit is available as a complete system or as an add-on package that works with an existing SuperVision system. The crawler and camera are constructed of stainless steel and maintain a 1 bar pressure rating. 973/252-6700; www.envirosight.com. ■

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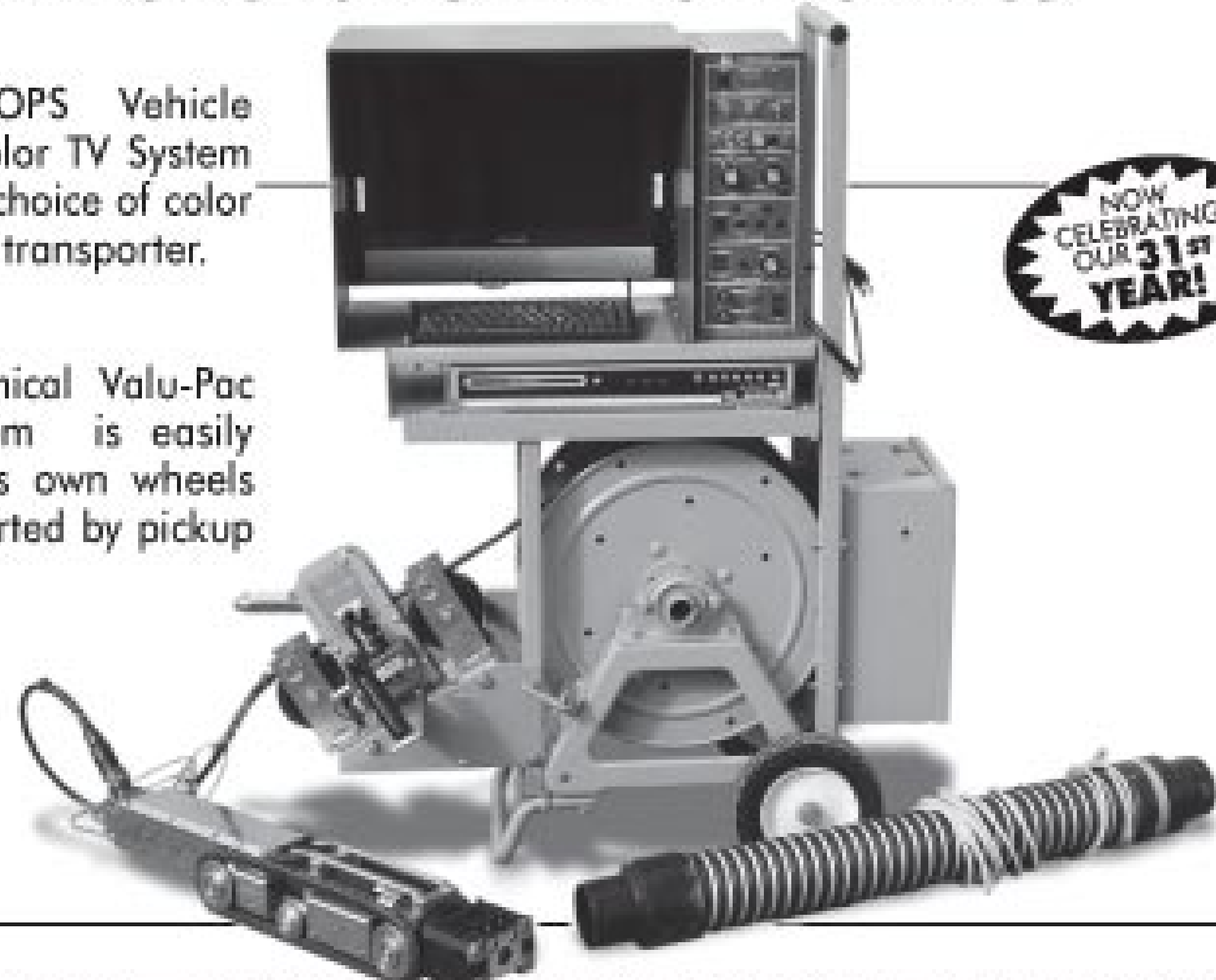
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Advice from a Founder

His picture is on the \$100 bill. So it should be no surprise that Benjamin Franklin knew a thing or two about money and business

By Jim Kneiszel

Jim Kneiszel is a COLE Publishing editor.



If Benjamin Franklin were alive today, he could make a heap of money as a keynote speaker at business-building seminars. A quick survey of this founding father's wise words reveals today's motivational speakers as pretenders to the podium.

For quotable quotes, few hold a candle to Franklin, whose one-liners can prove hilarious as well as profitable. Sure, everyone can have a chuckle over these:

- "Guests, like fish, begin to smell after three days."
- "Beer is living proof that God loves us and wants us to be happy."
- "Three may keep a secret, if two of them are dead."
- "He that displays too often his wife and his wallet is in danger of having both of them borrowed."

But for the small-business owner, Franklin had a lot to say more than 200 years ago that remains sound advice today. In fact, if more people had paid attention to Franklin's words, we may have sidestepped the recent bank collapse and recession.

Though many small-business owners have scratched and clawed back to prosperity over the past year, it's never too late for a reminder of

"An investment in knowledge pays the best interest."

Remember this bit of advice next time you're tempted to complain about continuing education requirements. Franklin clearly believed in lifelong learning and not getting stuck in a rut in the way you approach business challenges.

Through his editorials in *Poor Richard's Almanack*, he often advised readers to seek and heed

"If you want something done, ask a busy person."

How many times do you go back to your top-performing employee when a job has to be done right and on time? Franklin reminds owners to both reward their best employees and demand more of the rest. This means regularly praising the efforts of great workers, offering them more money and greater responsibilities. His advice also calls

"If you can't pay for a thing, don't buy it. If you can't get paid for it, don't sell it. Do this, and you will have calm and drowsy nights, with all of the good business you have now and none of the bad."

Benjamin Franklin

the genius of perhaps the cleverest of our Colonial statesmen. Here is some of Franklin's best small-business advice drawn from hundreds of his most famous quotes. Heed these words and, like old Ben, you might harness electric energy – for your company:

"Energy and persistence conquer all things."

One of Franklin's messages from his early days as an entrepreneurial printer was that hard work is the dominant ingredient for success. He couldn't abide laziness or time-wasting, and he implored business owners to watch out for both in themselves and their employees. Everyone knows his line: "Early to bed, early to rise, makes a man healthy, wealthy and wise." But how hard a person works during the waking hours is even more important. As Franklin said: "Fatigue is the best pillow."

good advice. "He that won't be counseled can't be helped," Franklin said. He could be speaking directly to today's small-business owners, who face growing government regulation and intense competition. "To succeed," he said, "jump as quickly at opportunities as you do at conclusions."

"Beware of small expenses. A small leak can sink a great ship."

In Franklin's day – as he sailed back and forth across the Atlantic to promote the American ideal – the second part of this tip could be taken literally. For people who run small businesses, as he did for many years, Franklin stressed paying attention to details.

Are you charging what you should to turn a profit on every job? Are you watching costs as closely as revenues? Are you keeping up with routine maintenance to preserve your expensive equipment? Is your accounting system working well? Many small drains on resources can imperil your company.

on you to motivate the rest to raise their efforts to match the standard-bearer.

"Anger is never without a reason but seldom a good one."

Simply put, don't blow your top when dealing with an employee, a difficult customer, or anyone you encounter in business. Let a cool head prevail in an argument. If you approach a conflict with a positive attitude, you may turn around a customer service disaster or a problem employee. Butting heads will usually get you nowhere fast. Franklin warned: "If passion drives you, let reason hold the reins."

"There are three great friends: an old wife, an old dog and ready money."

Franklin clearly wasn't concerned about political correctness. For today, this bit of advice isn't about an "old wife" or an "old dog." It's about "ready money," and the time-tested importance of positive cash flow and careful spending.





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Which companies were best suited to ride out the recession? The ones determined to collect on their bills in a timely fashion, watch borrowing, and salt some profits away for a rainy day. And when we read this line from Franklin, we can be certain he faced deadbeat customers just as you do: "If you can't pay for a thing, don't buy it. If you can't get paid for it, don't sell it. Do this, and you will have calm and drowsy nights, with all of the good business you have now and none of the bad."

"The best investment is in the tools of one's own trade."

There weren't many drains to clean in Franklin's day, but he knew that to print newspapers, build furniture or farm the land, the best tools available made the work easier and the results better. Franklin often preached about efficiency, reminding that "Time is money," and that "You may delay, but time will not, and lost time is never found again." Today, Franklin would advise business owners to keep an open mind to new trends, and maintain a reliable inventory of equipment.

"By failing to prepare, you are preparing to fail."

The buzzword used today is "systematizing." Break down every task in your business so you know how much time it should take to complete and so anyone can be trained to do a job to the same quality and efficiency. Franklin was sending the same message on getting organized in Colonial America.

You don't need a fancy life coach or a business consultant to get things together. Just listen to Ben when he says, "Drive thy business or it will drive thee," and "A place for everything, everything in its place!"



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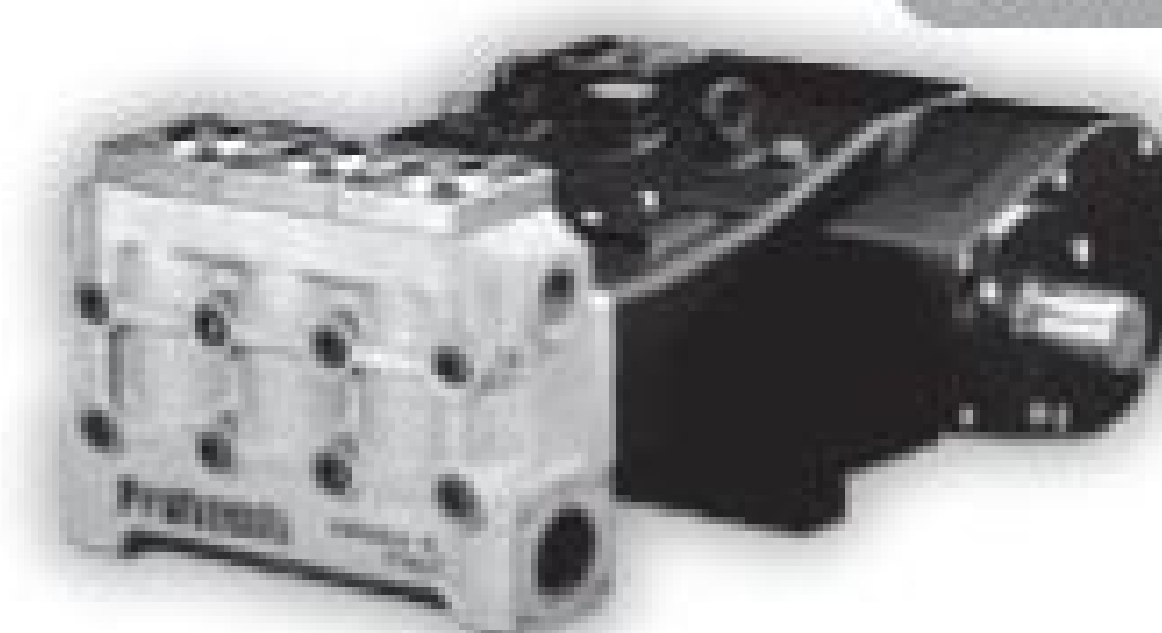
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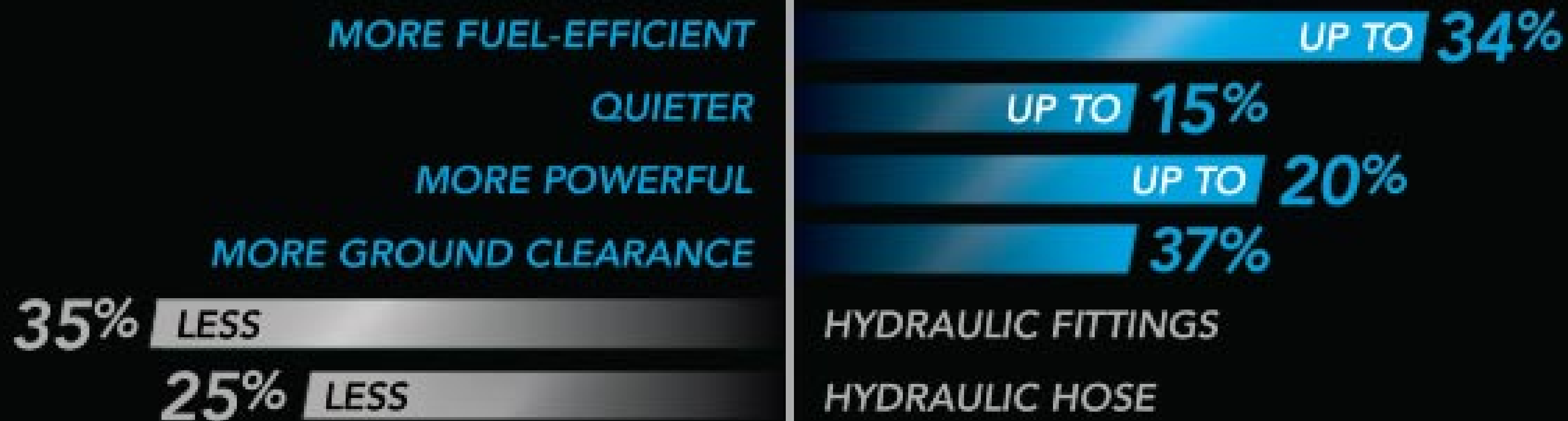
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Making Green

A Kentucky contractor's combination truck turns heads while improving employee safety and jacking up productivity

By Ken Wysocky

To boost employee safety, enhance productivity and decrease operating costs, Martin's Pipeline Inspection in Paris, Ky., went green – as in a lime-green Aquatech B10 combination vacuum truck from Hi-Vac Corp.

"Safety and employees' well-being were primary concerns," says

we set up backwards, with the nose of the truck facing oncoming traffic, for enhanced safety.

"Working from the back allows the truck to serve as a barrier between traffic and our people. If an accident occurs, our employees are behind the truck, not in front of it, where something bad could happen."

Just one engine

Thomton notes that the truck, mounted on a 2008 Peterbilt 340 tandem-axle chassis, reduces operating costs by 15 to 18 percent when

compared to the company's older, more conventionally configured combination truck. That's because the truck engine runs everything, instead of having a second

"pony" engine run other equipment, such as the frame-mounted waterjetter (2,500 psi/80 gpm).

"We can do vacuuming and jetting while running only one motor, which saves on fuel, repairs and maintenance," Thomton says. "The drive motor runs at 1,500 to 1,800 rpm, enough to handle the workload."

Another advantage is increased visibility and job site maneuverability, with a shorter wheelbase and a rear-mounted hose reel. "A front-mounted reel can hamper your turning ability, and it puts more weight on the front

axle," Thomton says. "With rear-mounted equipment, the weight is more evenly distributed on the rear-drive axles."

Easy off-loading

The truck includes a pump-off system, in which a hydraulic pump inside the debris tank pumps liquid waste onto another truck for transport to the disposal site. That allows the combination truck to stay put and keep on working.

Martin's purchased the truck, which doubles as a hydroexcavator, to handle a workload the company

MONEY Machines

owner Mike Thomton. "On this truck, all the controls and reels are mounted on the rear, so the operator is away from all the engine noise and can actually communicate with staff and engineers on site. A lot of times,

MONEY MACHINES

OWNER:	Martin's Pipeline Inspection, Paris, Ky.
VEHICLE:	Aquatech B10 combination truck
PRIMARY EQUIPMENT:	10-cubic-yard steel debris tank; PD blower (2,500 cfm); rear-mounted hose reel; pump-off system; frame-mounted waterjetter (2,500 psi/80 gpm), 360-degree rotating boom
COST:	\$260,000



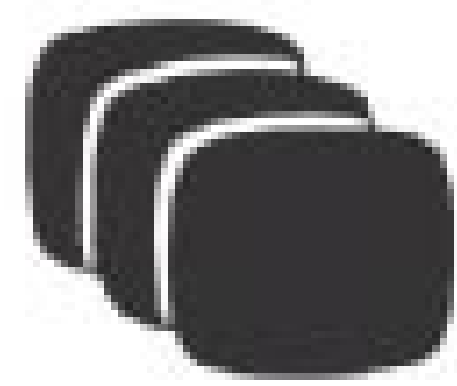


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could no longer accommodate with just one truck. It has a 10-cubic-yard steel debris tank, a positive displacement blower (2,500 cfm) and a foot-operated remote control. It is

“Every truck I’ve owned has been white with burgundy markings,” Thornton says. “But the guys talked me into the lime green, and it’s been one of best advertising

“On this truck, all the controls and reels are mounted on the rear, so the operator is away from all the engine noise and can actually communicate with staff and engineers on site. A lot of times, we set up backwards, with the nose of the truck facing oncoming traffic, for enhanced safety.”

Mike Thornton

used mainly to clean 30- to 48-inch sanitary sewers.

In the cab, Thornton paid extra for comforts such as air-ride seats, AM/FM radio, CD player, power windows and locks, tilt steering wheel and cruise control. Comfort is important because the truck travels to work sites in as many as nine states.

“The better the ride, the better off you are,” Thornton says. “Plus, I believe paying an extra \$4,000 or \$5,000 pays off in the long haul because guys take better care of a nicely equipped truck.” The lime-green color provides a marketing boost.

tools we’ve ever had. We’ve had more business come in because of that. It attracts attention from people who stop at job sites and ask what the truck is all about. Sometimes one thing leads to another and we get a job out of it.” ■

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Don't Ask

Certain questions, if asked in job interviews, are considered discriminatory and could set you up for costly legal trouble

By Ted J. Rulseh

Ted Rulseh is the editor of *Cleaner* magazine. He can be reached by calling 877/953-3301 or e-mailing editor@cleaner.com.



While in college I went to apply for a job at a car wash. My "interview" consisted of looking up at the owner, who fired questions at me while he stood on a step ladder and reached up to work on a piece of machinery suspended from the ceiling.

"Do you smoke?" No. "Do you drink?" A little. "Have you ever been arrested?" No. "Do you like girls?" Yes.

Can you pick out the questions that today could land this fellow in court? Whether or not you can, it pays to think long and hard about the kinds of questions you ask of job

For example, you might like to know if a person is in good health or has a condition that might mean using lots of paid sick days. You might like to know if a woman seeking employment will have family responsibilities that might limit her ability to work long hours when called for.

But it's against the law to make hiring decisions based on factors like those, and it's not permissible to ask about them in job interviews. Laws on employment and discrimination are complex, and you should not decide what to ask, or not, based on what you read here. With that caveat, here are some areas and some specific questions you should

guage is necessary to the job, you can ask about it specifically.

Citizenship. This gets a little tricky. It's permissible to ask, "Are you a U.S. citizen?" or "Do you have a valid working visa?" because it's against the law to hire someone who can't say yes to those questions. But you can't ask about the actual citizenship of non-U.S. citizens – only their work status.

Religion. You can't ask questions like, "Are you (Christian, Mormon, Jewish)?" "Do you go to church?" "Do you believe in God?" However, it's permissible to ask if the person has religious beliefs that might require special accommodation on the job.

Caucasians. If asking about convictions, it is best to stick to matters related to the job. For instance, if the person will handle money, you can ask about convictions for embezzlement or theft.

Marital status/gender. It may seem sensible and innocent to ask if an applicant is married or single, but that's not allowed. In particular, it's improper to ask a woman whether she is pregnant (or plans to become pregnant).

Sexual orientation. Discrimination based on sexual orientation is illegal, and so it's not permissible to ask, "Are you gay?" or "Are you a lesbian?"

Get good advice

Some advisors suggest that interviewers make up a standard list of questions to ask of every applicant, so they can't be accused of asking, for example, one set of questions for men and another for women.

Standards on discrimination may vary from state to state, and court rulings are constantly defining and refining what is and is not permissible to ask. To make sure you're on solid ground when conducting job interviews, it pays to consult with a legal advisor on whether the questions you plan to ask are legitimate. ■

You can ask if a person has any condition that might require reasonable accommodation at work. You can tell what the job requires and ask the person if he or she can do the work. But you can't ask specific questions about disabilities.

applicants. Many small-business owners still don't know the rules, which are not the same as they were 30 years ago.

The interview I just described took place in 1976, but just two years ago, a restaurant owner interviewing my 26-year-old daughter for a chef job asked her, "Do you plan on having children anytime soon?" In other words, "If there's a chance you're going to take a maternity leave or quit to become a full-time mother, I may not hire you."

My daughter didn't sue for gender discrimination, but she did decide on the spot that she would never work for that man (and, in my unbiased opinion, that's his loss).

Yes, things have changed. There may be things you'd like to know about a prospective employee that federal law says you have no business asking about.

avoid, as gleaned from a variety of authoritative sources.

Age. You might be able to estimate a person's age from dates on his or her resume or application, but you still can't ask about age during the interview. And don't think you can get at the answer through the back door by asking something like, "When did you graduate from high school?"

Ethnicity. It is against federal law to make hiring decisions based on race, national origin, or ancestry. Even if you're asking out of innocent curiosity ("What kind of accent is that?"), such questions are considered discriminatory. Some other questions that could lead to trouble are: "Where were your parents born?" or "What do you think of the situation in the Middle East?" You shouldn't ask what languages a person speaks, though if a certain lan-

Health or disability. You can ask if a person has any condition that might require reasonable accommodation at work. You can tell what the job requires and ask the person if he or she can do the work. But you can't ask specific questions about disabilities. Note that under the Americans with Disabilities Act, disability includes not just physical limitations but also alcoholism, drug addiction and mental conditions. Questions that would be out of bounds include: "How is your health?" "Do you have a hearing impairment?" "Have you ever filed a workers' compensation claim?"

Criminal history. Most experts advise against asking questions about arrests – only convictions. In part this is because African-Americans are arrested statistically more often in proportion to the population than, for example,

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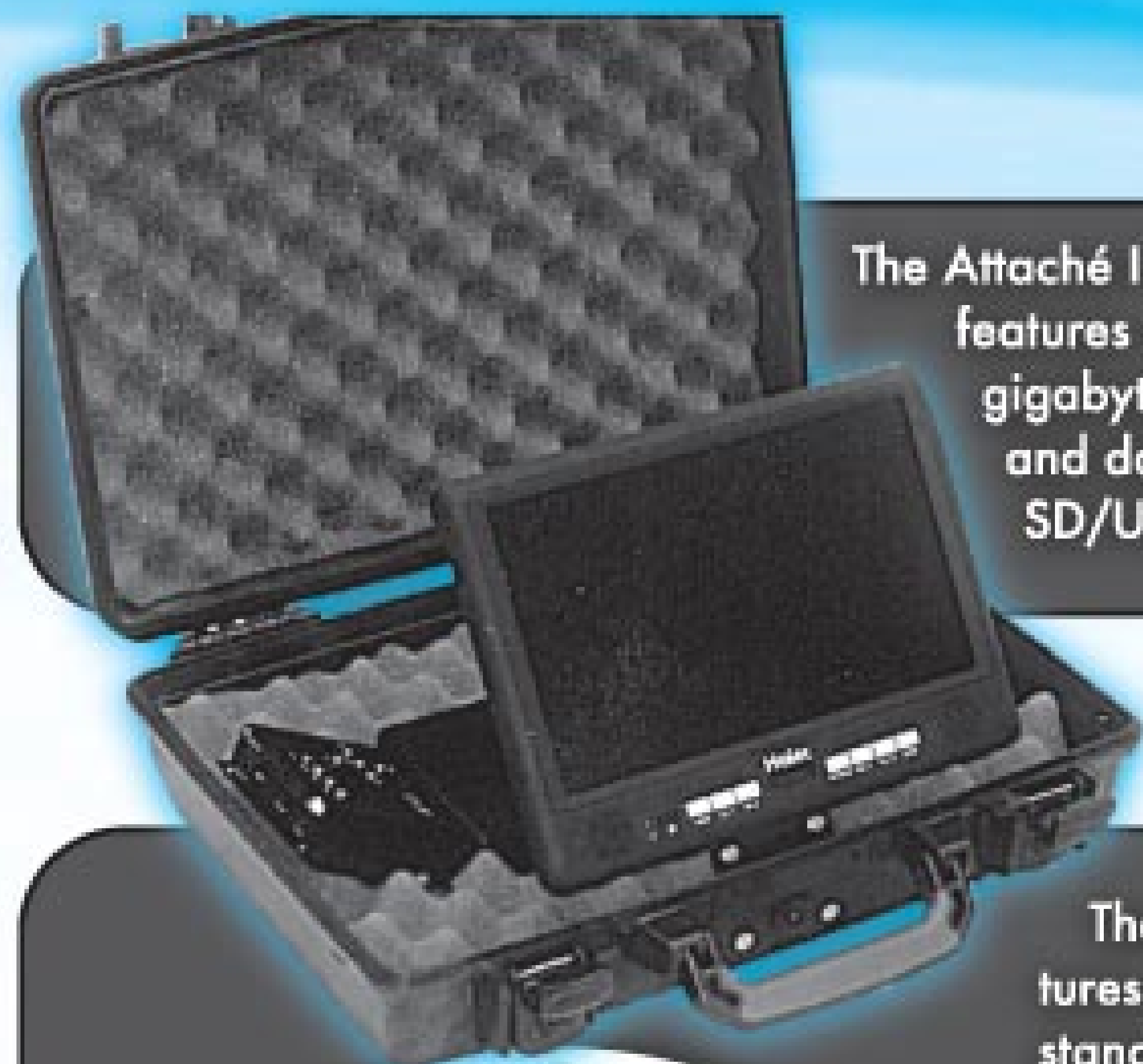
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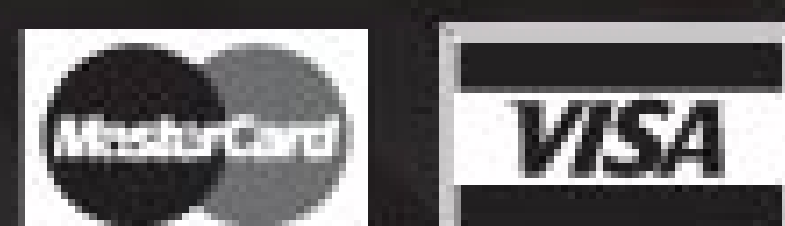


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Eyes Underground

Contractors describe their favorite techniques for selecting, grooming and training high-quality pipeline video inspection operators

By Ken Wysocky

It can be tough to attract and train high-quality inspection operators. The position requires a unique combination of precision skills, and because the equipment represents a sizeable investment, contractors want to make sure their operators maximize productivity.

Business owners find inspection operators through a variety of channels, including word-of-mouth referrals or promotion from within the company. They also look for a wide range of aptitudes and skills to fill this demanding and critical position. Here's what three contractors do to make sure they find the right person for the job.

"First of all, we like to get inspection operators started on the sewer-cleaning end of it, so they understand the cleaning



Mark Maurier
President
Cam-Trac Inspection
Services Ltd., Legal, Alberta
 Employees: 10
 Years in business: 25

process," says Mark Maurier, president of Cam-Trac Inspection Services Ltd., Legal, Alb.

"Understanding the cleaning process is a big portion of camera inspection because you need to know what's in the line and the severity of the line's condition. By doing this first, you'll understand about sags, roots and deterioration in the pipe when you do an actual inspection.

"We like to have them spend three or four weeks on the cleaning trucks so they can understand it. Then, once they start to do the camera work, they can tell the flushing operator that he's going too fast

"We like to do the PACP training first. That way, once they're ready to move on to the camera system, they'll have the PACP to guide them through."

Mark Maurier
Cam-Trac Inspection Services Ltd.

on the cleaning and leaving debris behind, for example, or to slow down and use a different nozzle for the different application.

"We also require operators to complete a Pipeline Assessment Certification Program. A lot of our municipal clients are requesting that operators

be certified in PACP. It ensures uniformity of skills and helps them understand what the codes mean.

"We like to do the PACP training first. That way, once they're ready to move on to the camera system, they'll have the PACP to guide them through. They can look at a fracture in the pipe and go back to a manual from PACP and make a decision if it's a fracture or a light crack. It gives them some guidance.

"Then we take them out with an experienced operator. That operator sits behind the trainee and guides them through the process and reviews the video. If there's an area in town we want to inspect, we'll start at the upstream manhole and work our way down and try to bring all the inspections down to the lower end.

"Operators in training get supervised for two to three months, depending on how fast they pick it up. Some will pick it up in two months and others may take an extra month. Our customers look for experienced operators, so we spell out to them the steps we take in training. Plus, providing quality work ensures more jobs down the road."

"To find inspection operators, we look for someone with mechanical and electrical aptitude," says Bobby Chesnut, co-owner of Pipe Eyes LLC in Louisville, Ky. "They don't need professional training, but you want someone who can do simple maintenance and who will show up every day. Drug testing is a big thing. It's difficult to find someone with all those attributes and who's also willing to put in a hard day's work.

"It helps that the younger generation nowadays has great eye-hand coordination from playing computer games. Operating a pan-and-tilt camera is a lot like a joystick on a computer game. You have to be able to maneuver things. It's second nature to kids these days. But the more critical thing, because of the technicality of what's going on, is the aptitude in mechanics and electronics. For instance, it goes a long way if they understand



Bobby Chesnut
Co-Owner
Pipe Eyes LLC,
Louisville, Ky.
 Employees: 12
 Years in business: 10

continuity and how to check a wire to make sure it's good. The rest of it, you can learn.

"Probably the next hardest thing is to find someone who also has a sense of computers, because operators are being asked to do more and

Comments may be directed to Ken Wysocky in care of Cleaner.



more with computers every day in the field. They need to move files, do data transfers. They have to understand codes and know that re-booting a computer doesn't mean kick it across the room!

"To find guys like that, I talk to my own employees who have friends that are good at that. It's sad that this industry doesn't have a formal training ground, like with truck drivers. Sewers are out there in the ground, and the only way to learn about them is through experience. If they have the qualities we're looking for, we start them at the back door.

"It helps that the younger generation nowadays has great eye-hand coordination from playing computer games. Operating a pan-and-tilt camera is a lot like a joystick on a computer game. It's second nature to kids these days."

Bobby Chesnut
Pipe Eyes LLC

A mentor of mine always said find what a man doesn't like, then give him plenty of it. If he doesn't like to do certain things, but still does them, then he's worth keeping.

"You have to put trainees with someone more experienced because that's the only way for them to learn. A lot of it is on-the-job training. You can't sit in front of a TV screen and show them every possible defect they're going to see. You have to teach them to use a little bit of logic. You teach them about the pipes, and how pipes flow and how they're put together – give them a history through your knowledge and background. It might take a year or two, because there's so much to learn. Every job is so different."

"We usually promote from within, so we look for someone who's well organized, pays attention to detail, is mechanically inclined, is proficient with computers, and takes good care of the equipment," says Mike Frailing, safety director and training coordinator for Visu-Sewer Inc. in Pewaukee, Wis.

"After we select someone, we have him sit with a camera crew and observe. Typically, he's already spent time at the bottom end as a jet truck operator, assisting a camera operator. Some guys work out well quickly, and some guys have to grow into it. For others, the electronics is too much for them.



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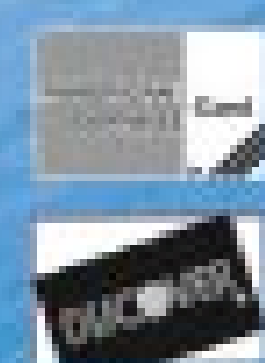
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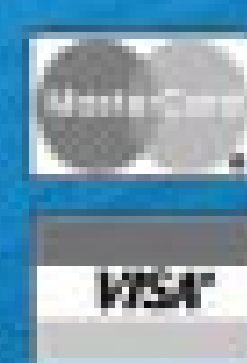
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"The trainee watches for a while – maybe two, three or four weeks – under the direct supervision of a TV operator. At some point in time, they also take a two-day PACP course and get certified.

"When everyone feels comfortable releasing him into the field on his own, we



Mike Frailing

Safety Director and Training
Coordinator
Visu-Sewer Inc., Pewaukee, Wis.
Employees: 50
Years in business: 35

let him take on easy, basic jobs – maybe a one-day cleaning and TV job, or a new construction acceptance job. During this time, a supervisor stays with him a little more than usual, keeping an eye on him.

Though they now understand the basics, new operators still need to get a feel for what's too much detail and what's not enough. Experienced operators can walk that fine line – what might be a sag in a pipe and what might not. All defects should be noted, but it's how you note them that makes a difference.

"Hiring from within keeps everything more uniform. We have hired operators off the street, but because every company has its own methods and systems, trying to get someone to switch over to new methods is often difficult." ■



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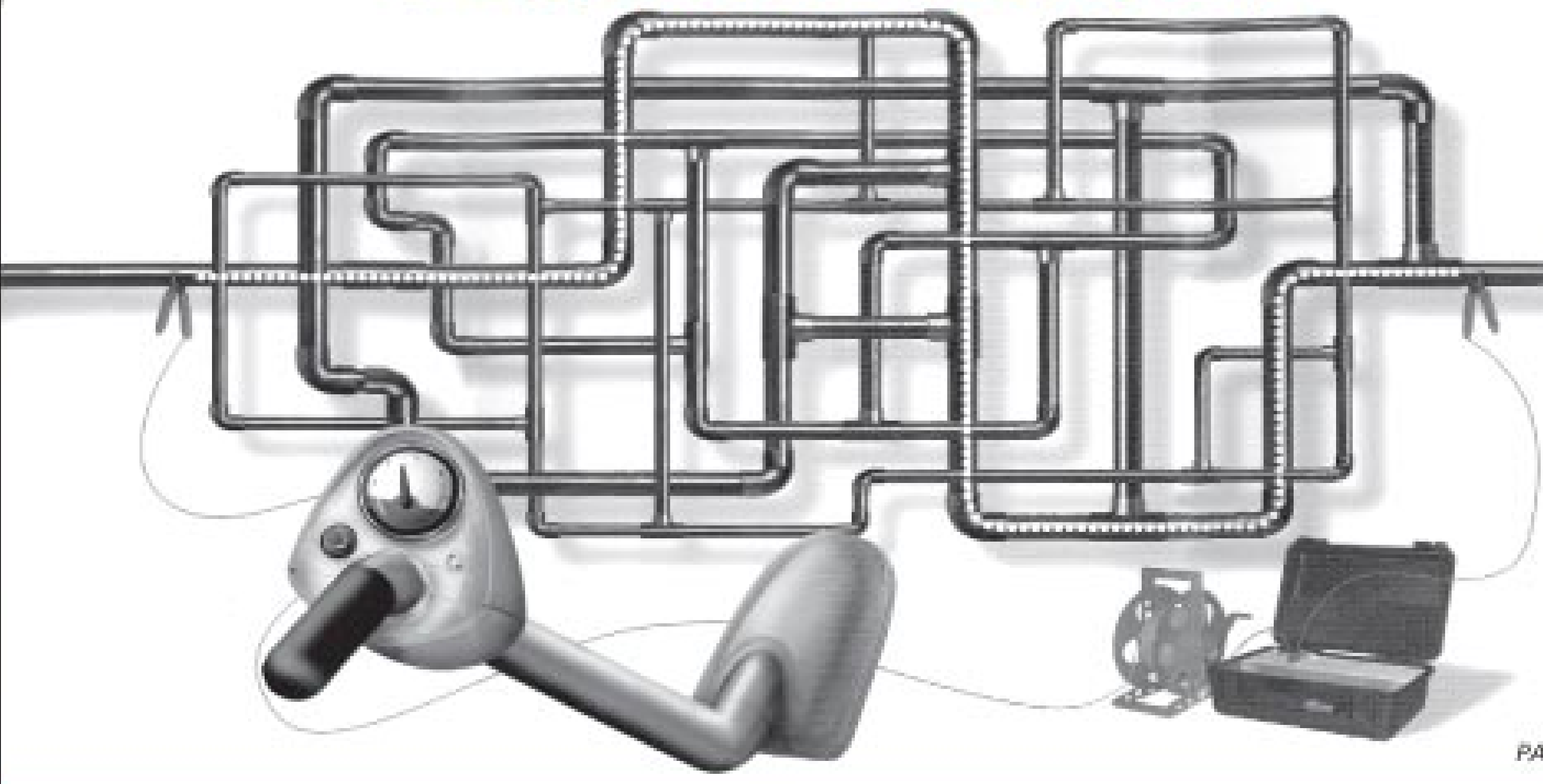
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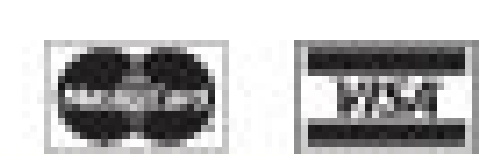


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A Fix at Last

A tunneling machine enables replacement of 450 feet of sewer pipe where persistent discharges had plagued residents of a mobile home park

By **Scottie Dayton**

For years, sewage discharging from cleanouts affected as many as 40 properties at the 650-unit Millpond mobile home park in San Jose, Calif.

The 6-inch terra cotta clay sewer lines had bellies packed with grease and debris. Pipe bursting and lining systems did not work because they followed the host pipe without correcting the problem. Repairs involved moving the modular homes off their concrete foundations, then open-cutting to replace the bad sections.

The scenario changed when the park owner hired Rod Herrick of H&H Co. in San Martin. After the next sewage eruption, Herrick used a UB-40 tunneling machine from Roddie Inc. in San Martin to install three lines paralleling the old sewer. The equipment maintained a 0.3 percent grade and replaced 450 feet of pipe. Most residents of the retirement community were not even aware that the work was being done.

Sound planning

Herrick televised the lines using a GatorCam3+ from Radiodetec-

tion. "The sewers looked like a roller coaster," he says. "Our challenge was to achieve an even percent of fall with the 6-inch HDPE pipe."

Locating utilities and marking their elevations was the touchiest part of the job. Herrick used a tape measure and drafting board to plot the tunneling route before entering the final coordinates into a computer.

The sewers ran under and behind homes, making them inaccessible to vehicles. Herrick hired Biggie Crane in Scotts Valley to lift the tunneling machine's hydraulic

power pack and pallets with pilot tubes over a home and into the backyard. He set them down on the three-foot-wide walkway between the house and a toolshed.

To excavate a 7-foot-diameter, 9.5-foot-deep shaft for the tunneling machine, John Mahana maneuvered an excavator onto the concrete patio slab next to the home, barely fitting under the patio roof and between its support columns. The crane operator then lifted and lowered the

TOUGH JOB

PROJECT:

Replace 6-inch sewers without moving 40 mobile homes

CUSTOMER:

Mobile home park company,
San Jose, Calif.

CONTRACTOR:

H&H Company,
San Martin, Calif.

SUBCONTRACTOR:

Biggie Crane,
Scotts Valley, Calif.

EQUIPMENT:

UB-40 tunneling machine,
Roddie Inc., San Martin

RESULTS:

Backups eliminated and
pipes replaced

John Mahana of H&H Company prepares to activate the UB-40 tunneling machine. Its dual hydraulic rams push the boring head through a seal in the round corrugated steel liner. (Photos courtesy of Bob Campbell)





John Mahana and Jim Voudy fuse a 40-foot section of HDPE pipe. A gate in a privacy fence provided the space for the fusion machine.



The LED target is mounted behind the boring head. The camera can see it through the hollow rods.

2,600-pound tunneling machine into the hole. Meanwhile, Jim Voudy dug entry pits under the foundations of three homes using a custom-built hydroexcavator from Keith Huber Inc.

"The tunneling shaft was near the middle of a 450-foot run and intersected with a 200-footer coming in at 90 degrees," says Herrick. "By boring two feet away from these lines, we maintained sewer service until we tied in the new laterals."

To prevent the shaft walls from collapsing and to form a thrust block for the tunneling machine, Mahana and Voudy lowered a round corrugated steel liner into the excavation, then poured two-sack slurry in the annular space. (The mix was soft enough to be hand-excavated later if necessary.)

Once the tunneling machine was in the shaft, Mahana set the height, grade and direction using jacking screws that secured the unit to the liner. Releasing the screws allowed him to rotate the machine with the help of a hydraulic winch chained to an I-beam across the top of the shaft.

Guidance system

A camera on a surveying transit focused on an LED target behind the boring head. Mahana mounted the transit on an independent adjustable support, setting it to the required height, grade and direction.

"We began by pushing in hollow

pilot tubes," says Herrick. "The camera looked through the rods to see the LED target, which was visible on John's monitor. Crosshairs on the monitor indicated the correct alignment. By rotating the rods using a joystick, John could turn the boring head to correct any course deviations."

correction," says Herrick. "We hit some rocky areas that slowed us down a little, but the matrix around them was compressible. The process just pushed them out of the way."

Smooth transition

Voudy mechanically coupled a 7-inch bell-shaped steel expander to

"Mobile home parks don't have the standard 1 percent grade for 6-inch sewers. The average grade is 0.5 percent, but we can maintain as little as 0.10 percent with this machine."

Rod Herrick

Using the forward-reverse joystick, Mahana slid back the machine's dual hydraulic rams, inserted the first tube with boring head, then advanced the rams. "Provided the soil displaces easily, we don't need a boring auger," says Herrick. "The unit's 40 tons of forward thrust is sufficient to push the tube through a flexible seal in the liner and into the soil."

Mahana then inserted a 3-foot-long pilot tube into the machine, coupled it to the end of the boring head tube, and jacked it forward. He repeated the process until the head appeared in the entry pit, where Voudy disconnected and removed it.

"Had a deviation occurred, John would have stopped jacking and rotated the rod to make a course

the end of the protruding pilot tube. A pulling eye behind the expander was coupled to the first 40-foot length of pipe. "To avoid blocking off the street to stretch out 200 feet of pipe, my guys fused another 40-foot stick each time the machine pulled back 40 feet," says Herrick.

Bushes, privacy fences and hedges in the path of the pipe were aids rather than hindrances. The crew draped the flexible pipe over them, providing increased elevation that helped smooth the transition into the entry pit. The pullback worked like a pipe-bursting system. Mahana extracted the steel tubes as they returned to the shaft.

"Mobile home parks don't have the standard 1 percent grade for 6-inch sewers," says Herrick. "The

average grade is 0.5 percent, but we can maintain as little as 0.10 percent with this machine."

Voudy had the most arduous part of the job, lowering and retrieving the pilot tubes. A canopy over the shaft provided shade and protection from the elements. On hot days, a ventilation system down the shaft kept Mahana comfortable.

To reinstate the laterals, Voudy core-drilled the HDPE pipe or cut in a wye, while Mahana hydroexcavated 3-foot-diameter, 4-foot-deep shafts and connected the laterals to the new main. The men installed a cleanout at the three new upstream risers before abandoning the old sewer. The project took two-and-a-half weeks. ■

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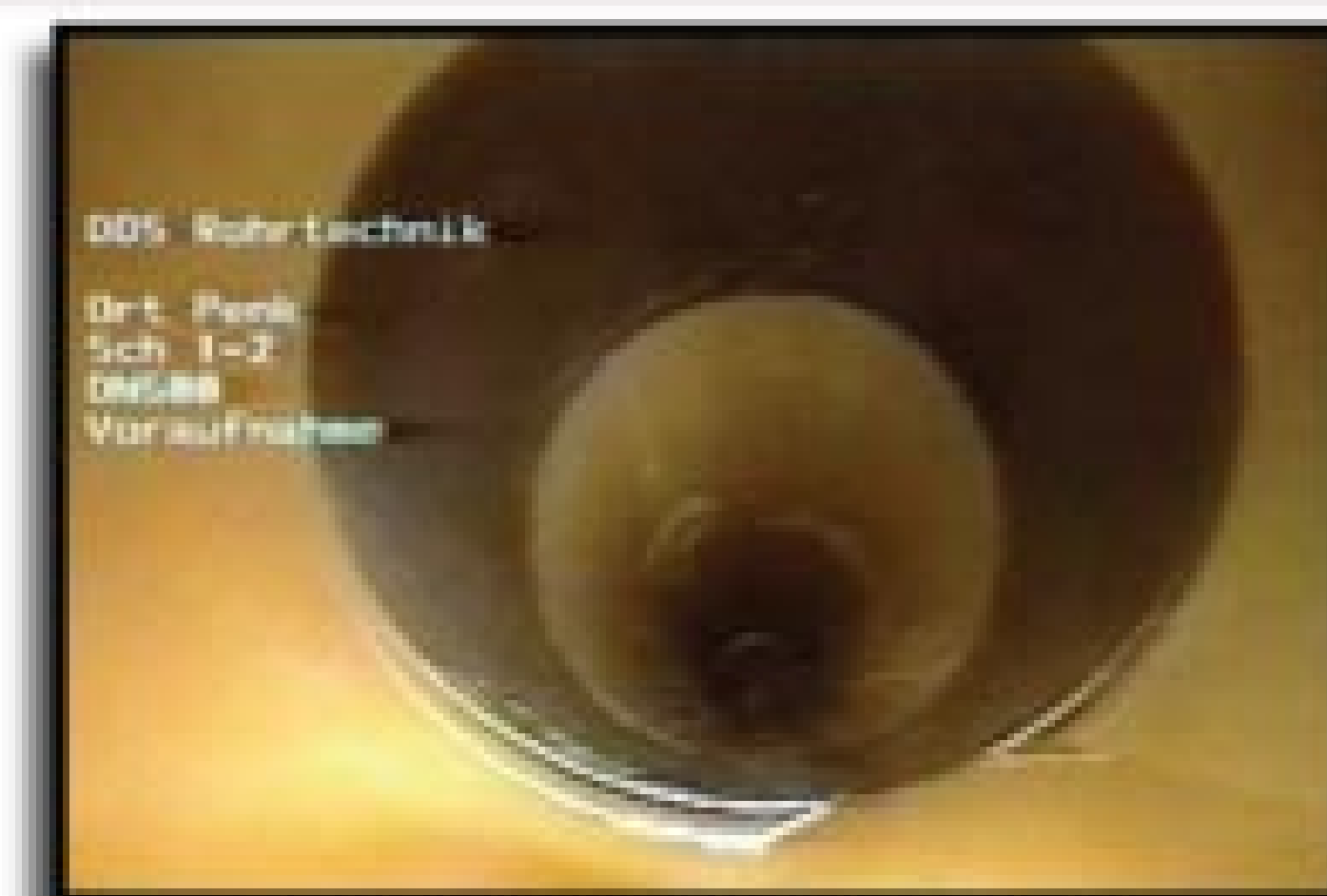
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Root-cutting Machine Combines Flexibility and Durability

By Ed Wodalski



The Speedroooter 92 root-cutting machine from General Pipe Cleaners is designed for one-person operation. Weighing 115 pounds without cable, the machine has a swept-back handle and loading wheel that enables it to roll onto the back of a truck. Equipped with 10-inch, heavy-duty wheels and V-belt stair climbers, it can easily be moved up or down steps.

The machine is made to be both flexible and durable, says Marty Silverman, vice president of marketing. "When I talk about durability, the first thing is our Flexicore cable," he says. The cable consists of heavy gauge wire coiled around 49-strand wire rope and heat treated for strength and flexibility.

The machine measures 26 inches deep, 22

inches wide and 41 inches high. "The steel frame is reinforced everywhere," Silverman adds. "We also use a steel drum rather than plastic, which is significant for handling the weight of the cable."

The drum holds 100 feet of 3/4- or 5/8-inch cable, and an optional small drum holds 100 feet of 1/2-inch cable. The 3/4-inch cable is for cleaning 4- to 10-inch lines and 3-inch lines without sharp bends. The 5/8-inch cable can clean 3- to 6-inch lines, and the 1/2-inch cable cleans 2- to 3-inch lines.

The unit uses a spring rather than cast aluminum Flexitube distributor tube, an upgrade from earlier models. "It's much more durable and is not affected by the abuse of the machine," Silverman says. "If you knock the machine out of alignment with the new distributor tube, it's not

affected by that. It will allow the cable to move smoothly in and out of the drum and will not let it tangle up. It's not affected by alignment issues."

The root cutter is powered by a 1/2 hp motor with capacitor. It has a forward-off-reverse switch, 20-foot power cord and ground fault interrupter. The pneumatic foot switch has no electrical contact between the pedal and motor. The power cable feed drives and retracts at variable speeds up to 20 feet per minute.

Other features include a wheel brake that helps keep the machine in place and a rear toolbox for holding various cutters. Also included are leather gloves with double-reinforced palms for hand protection when guiding the cable. 800/245-6200; www.drainbrain.com.



RIDGID Offers Tailpiece Extension Cutter

The P-TEC 2550 tailpiece extension cutter from RIDGID makes a lean, fast and straight cut with one tool on polyethylene, polypropylene and thin-walled PVC plastic used in sink drain

extensions and tailpieces. The tool provides an auto-feed cutter for 1 1/2- and 1 1/4-inch outer diameters. The automatic deburring feature eliminates the need for a second tool and produces a fine strand of plastic rather than fuzz around the cut. The automatic beveling feature allows for the assembly of slip joints and kits for immediate joining to other sink drain pieces. The easy-view window ensures straight cuts on a measured and marked pipe. 800/769-7743; www.ridgid.com.



NLB Introduces New Family of Rotating Line Moles

NLB's family of rotating line moles are made to clean the inside of tubes from 0.5 to 1.5 inches in diameter, including around bends. The nozzles offer operating pressures of 10,000 or 20,000 psi and come with left- or right-hand threads and wrench flats for easy attachment to a

flex or rigid lance. Featuring self-lubrication for reduced wear, parts can be replaced in the field in minutes using the rebuild kit. 248/624-5555; www.nlbcorp.com.

IPS Introduces Test-Tite Mechanical Cleanout Plug

The Test-Tite mechanical cleanout test plug from IPS Corp. is made for quick testing of plumbing drains, waste and vent systems without tools, compressors, pumps, hoses or gauges. The plug can be used to test pressure or temporarily



block DWV systems for up to 40 vertical feet of pipe. Features include an expandable rubber gasket compressed between two plastic plates for an air- and water-tight seal. Additional features include a clear cap that enables the user to monitor test media, ensuring that drainage is complete prior to releasing the plug. Made of nylon-reinforced plastic, the plug is available for 2-, 3- and 4-inch pipe. 800/888-8312; www.ipscorp.com.

TV Ferret Offers Snake Eye Camera System

The Snake Eye mini pushrod camera system from TV Ferret features a stainless steel frame with 200 feet of Kevlar reinforced multi-conductor push cable. The unit comes with a 10.4-inch color LCD monitor, DVR, onscreen footage counter and built-in microphone housed in a durable, briefcase style console. The 3-inch long by 1.4-inch wide O.D. camera has a 0.5 lux low-light sensitivity rating, variable high-intensity LED light and comes with a self-charging power source. 518/399-2211; www.tvferret.com.





Miller Pipeline Offers WEKO-SEAL

WEKO-SEAL from Miller Pipeline Corp. is made to repair leaking joints in 14- through 216-inch pipe. The flexible rubber leak clamp provides a non-corrodible, bottle-tight seal around the full inside circumference of the pipe joint. The lip

seal creates a leak-proof fit on either side of the joint and can be installed on an array of pipeline configurations. 317/293-0278; www.millerpipeline.com.

Zistos Offers Video Zoom Camera Pole

The self-illuminated color zoom camera (10:1 optical plus digital zoom) from Zistos Corp. is designed to safely inspect difficult-to-reach or potentially dangerous areas. The camera is mounted to a telescoping pole, displaying video on a 5-inch LCD monitor. Cameras and extension poles are submersible.



The unit is packaged in a foam-filled hard case. A dual-mode thermal camera is available. 631/434-1370; www.zistos.com.

PrimeLine Offers No-Kit Point Repair Materials

Sectional point repair materials, including ambient cure resin, point repair carriers, fiberglass cloth and air pushrods, are available from PrimeLine Products. Materials are available "cafeteria" style, eliminating the need to purchase a kit. Accessories, including lay flat tubing and fasteners, also are available, along with training on installation. 877/409-7888; www.prime-line.net.

Mr. Manhole Introduces Chimney Repair Package

The Six Shooter cutter/extractor and Easy Slope level tool from Mr. Manhole are designed to cut, remove and replace the frame and surrounding road material in the repair of manhole chimneys. The level is used to place the manhole frame even with the height and slope of the road. Sealants create a waterproof, vacuum testable permanent structure. Ready-mixed concrete is poured and dyed black to match the asphalt and complete the repair. 419/229-3015; www.mrmanhole.com.



StoneAge Introduces VE 900 Safety Device

The VE 900 flex lance safety device from StoneAge is made for high-pressure hose operations. Designed to operate in both the vertical and horizontal position, the assembly can be attached to the tube face in various positions and offers a variety of hose collets, making the device adaptable to different cleaning applications. The unit positions the flex lance manually from tube to tube and locks in place when the handles are released. The stainless steel VE 70000 also is available. Different sized collars

are stored in the extension arm for quick access. Two ergonomic handles lock the unit in place. 866/795-1586; www.stoneagetools.com. ■

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VT Specialized Vehicles Launches Contractor Site

VT Specialized Vehicle Corp.'s Hackney Division has launched a contractor service industry Web site, www.hackneyusa.com. The site includes drawings and detailed specifications for all Hackney products.

McLaughlin Vacuum Excavators Used to Clean Gulf Spill

McLaughlin vacuum excavators are being used to help with oil cleanup efforts in the Gulf of Mexico. The excavators are being deployed on barges to remove oil from skimmers located throughout the Gulf. Units also are being used to clean oil from sea walls and riprap.

Geospatial Creates Infrastructure Blog

Geospatial Holdings' infrastructure blog (www.geospatialholdings.blogspot.com) offers technology developments and facilitates discussion on events driving the underground infrastructure industry toward more efficient operation and expansion.

ADS Acquires Inserta Fittings, Piedmont, Foltz

Advanced Drainage Systems has acquired Inserta Fittings of Forest Grove, Ore., manufacturer of Inserta Tee. The acquisition follows the purchase of Piedmont Concrete, Pineville, N.C., manufacturer of precast sanitary and stormwater structures, and the April purchase of Foltz Concrete Pipe Co. of Winston-Salem, N.C.

Henrich Joins SewerVUE

Gordon Henrich has joined SewerVUE as vice president of sales and marketing. He has extensive experience working with North American engineering companies as well as major municipalities and utilities, assisting in understanding and matching the appropriate inspection technologies with the condition-based asset management requirements of pipeline owners. ■



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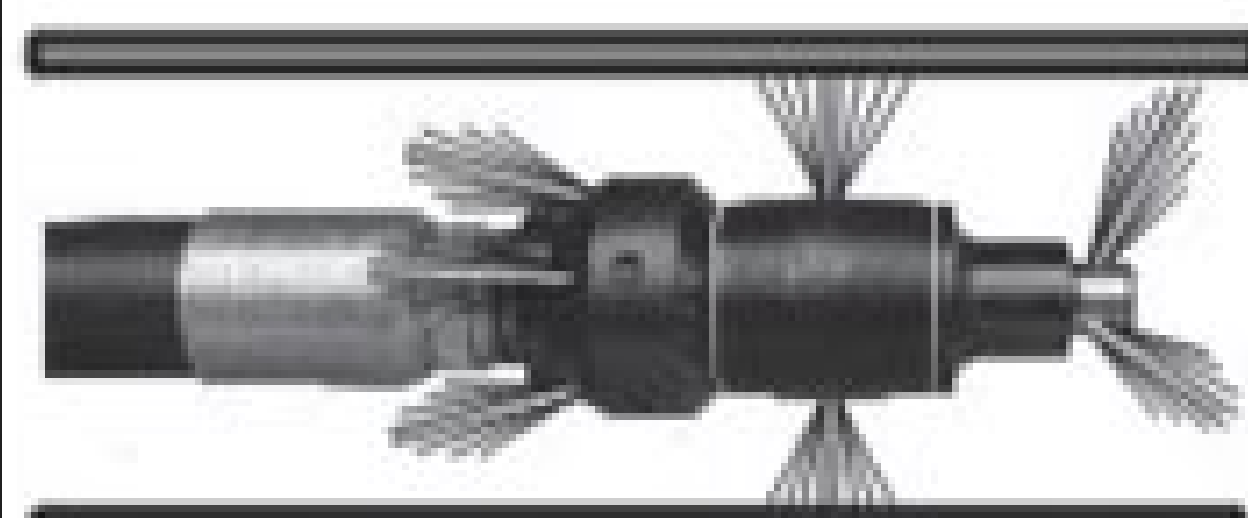


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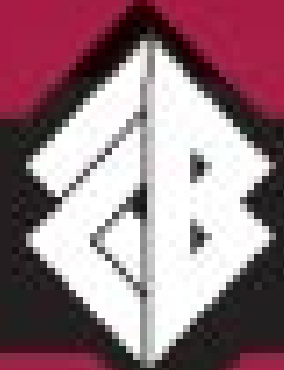
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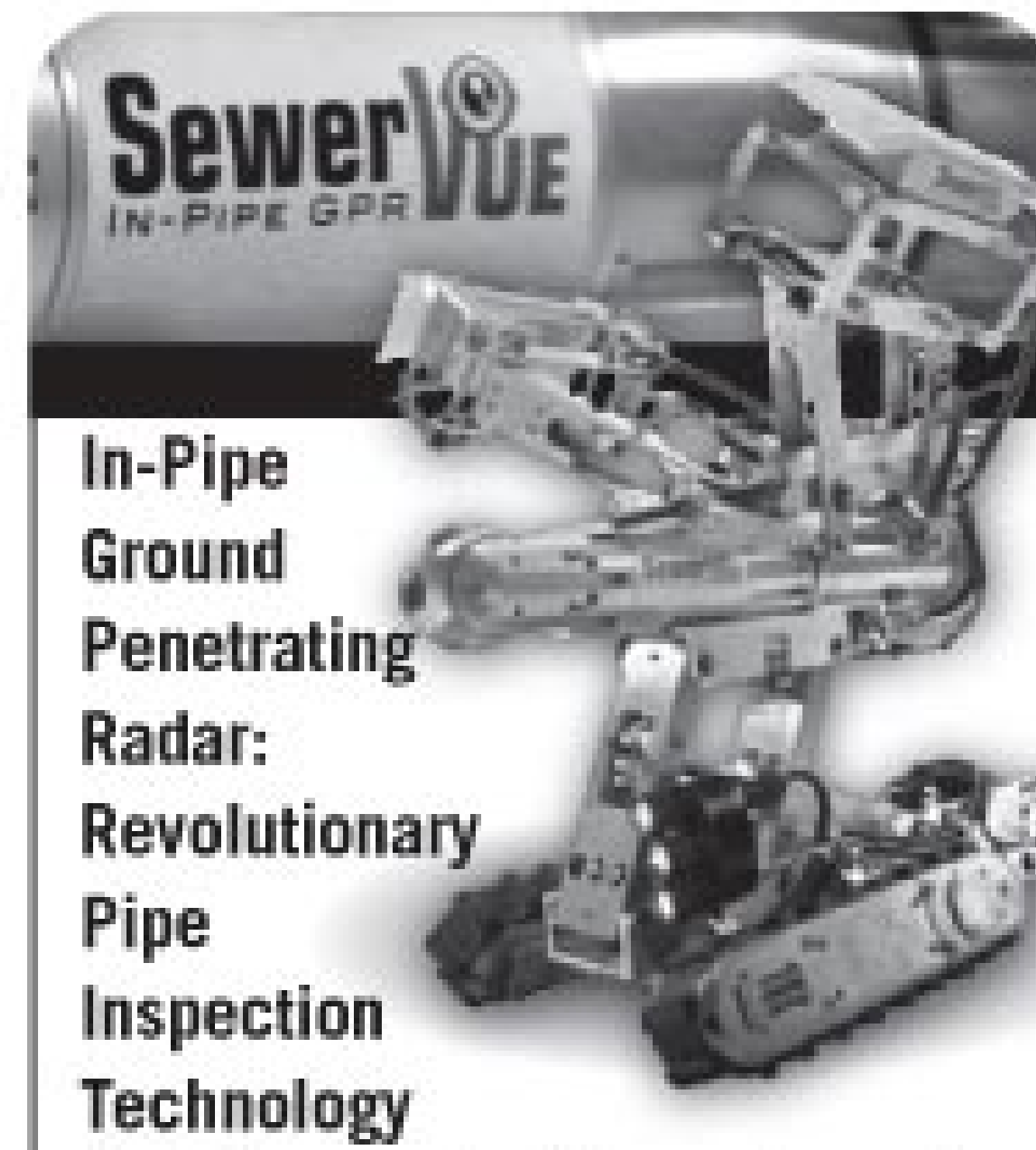
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BUSINESSES

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1995 Chevy Van with **8100 original miles**, RST video system, Omni Eye II color camera, transporter, RST data display plus system with VCR and 19" monitor. Was municipal owned and in like new condition. 714-639-8352. **www.empireequip.com.** (CPBM)

Ridgid camera, SeeSnake, DVD, color TV, 200 ft., and SR-20 locator. I bought these units brand new 2 yrs. ago. I bet I have maybe 1.5 hrs. on these. Absolutely like brand new. \$9,500. You won't be disappointed. 513-200-1821. (C10)

1990 GMC Cues grout truck, electric winch, packers from 8" to 42", color camera, \$35,000 not including the packers over 12", ready to work. 1995 Chevy truck with Cues color TV system, 900' of cable, tractor, Mud Master, pan/tilt & straight camera, diesel generator, DVD system, \$40,000, ready to work. 561-310-4011. (C9)

Camera Van, 2000 Isuzu roll up door, lift gate, built-in 5500 wt generator, fresh water wash down unit, air compressor. Insulated and paneled. RST Omni-Eye2 main line color camera and tractor, extra lights, full console, 2 recorders, VHS & CD. Mainline winch with 1,400' cable - Ready to work! \$31,000. 541-664-1192; kottked@aol.com. (C9)

1996 CUES Camera Trailer, pan/tilt camera, A/C, many accessories, complete w/o blower. Excellent condition. \$12,500 OBO. Montana. 406-698-6339. (P8C9)

TV INSPECTION

CUES van mount system, approx. 1000' cable, Pipe Ranger with large wheels, camera lift, shorty transporter, P/T camera with back-up, \$18,900. Call 801-518-5356. (C9)

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

2010 Cues Granite Xp 3.4.2 (new) Data Collection Software on Toshiba laptop ready to use. Was bought for possible second crew. Never happened. Price \$12,500. Call Mark @ 865-388-3045. (TN) (C9)

TV Ferret: Complete used, pan & tilt system, 600 ft. cable, 6" crawler. More turn-key systems. Starting at \$20,000. **www.tvferret.com.** 518-399-2211. (CBM)

RST TV Inspection System, OMNI III camera, tractor, reel with 1500' cable, PCU and auxiliary controller. ONLY \$16,750. Call 435-655-2797. (C9)

VACUUM LOADERS

1999 International with a Guzzler Ace 27" HG wet/dry industrial vacuum tank loader. **Demo/Rental unit.** (Stock #7390) **www.VacuumSalesInc.com, (888) VAC-UNIT (822-8648).** (C9)

2008 Demo Internationals 7600 with a Guzzler Ace XXS4118TS wet/dry industrial vacuum loaders, 18-yd. debris body, dump-type, carbon steel vacuum tanks. **Demo/Rental unit.** (Stock #'s 4400V & 4401V) **www.VacuumSalesInc.com, (888) VAC-UNIT (822-8648).** (C9)

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WANTED: We buy sewer trucks. Any year, any condition. Results immediately. 915-239-2266 or mmachinerymexico@gmail.com. (C9)

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40,000 PSI sapphire nozzles, UHP hoses & replacement parts. Excellent quality & prices. 772-286-1218; info@alljetting.com; www.alljetting.com. (CBM)

Gardner Denver T-450M w/Series 40 Detroit 10K 39GPM. **Jetstream** 4215 w/ Cummins 10K @ 39GPM. **Gardner Denver** TX-450SB w/V12-71 Detroit 10K @ 70GPM. **Gardner Denver** T-450 w/ Jetstream fluid end transmission 10K @ 40GPM. **THE-500UH** 50K bareshaft pump. **NLB** 10-600 Cummins 10K @ 104GPM. **Wheatley** 165 10K @ 30GPM. Boatman Ind. 713-641-6006. View @ **www.boatmanind.com.** (CPBM)

2001 NLB 4075d: 40,000 psi, 3-gallon water blaster, factory trailer mount, great condition, 600 hrs. Accessories available. \$33,000. Call 973-476-7194. (C10)

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