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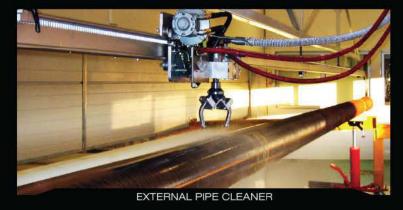
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On the cover: The LiquiForce executive team includes, from left, Jeff Lewis, president and chief operating officer; Kim K. Lewis, chair and chief executive officer; Christopher Lewis, vice president, Spray Coating Systems; and Kim M. Lewis, vice president, Business Development. (Photography by Dennis Pajot)

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pressure conversion option.

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 Profile: Lanzo Lining Services, Deerfield Beach, Fla.

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Be the Best



BY LUKE LAGGIS

n an industry with so many distinct components, it can be easy to feel obligated to offer as many services as possible. Sometimes that can work well and help a business grow a large and diverse customer base, but often it leads businesses toward becoming real-life incarnates of the old saying, "Jack of all trades and master of none."

Before a company can legitimately offer a full menu of services, it needs to establish a core business and the reputation – and real-life knowledge – for performing their services to a very high standard. Jim Aanderud's "Tech Perspective" column in this issue of *Cleaner* sheds some light on the importance of being the best at what you do.

Specialization can help a business, especially a young company, establish a firm foothold in the industry and create its own niche. That's exactly how LiquiForce of Kingsville, Ontario, grew into being a leading provider of lining services. While there were many sewer and drain cleaning businesses around at the time, few were focused on trenchless pipe rehabilitation.

When a local municipality expressed a need for sewer flushing services, LiquiForce CEO Kim K. Lewis recognized the opportunity, invested in a sewer cleaning unit and brought on experienced crew members. Video pipeline inspection followed soon after.

By 1990, LiquiForce was providing its cleaning and inspection services to municipalities, industries and utility companies as well as oil and gas producers throughout the region. The natural progression led these clients to ask Lewis and his team about rehabilitating infrastructure with methods other than traditional dig and replace.

Lateral rehabilitation is a large component of LiquiForce's business, and Lewis noticed growth in the scope of work surrounding this particular aspect of wastewater collection systems. As municipalities began taking on responsibility or offering property owners assistance with lateral repairs, Lewis started thinking about a totally trenchless method for lateral lining – no cleanout, no disruption of a property, everything handled completely from the mainline.



In 2009, Lewis approached the Ontario Provincial government for financial support to build and test a system prototype. He gained the government's support, and after a year of research and development, he had a working prototype. From the mainline, LiquiForce has been able to reline 4- to 6-inch laterals up to 150 feet in length. The system is capable of handling the multiple bends and transitions that are common to most laterals.

Before a company can legitimately offer a full menu of services, it needs to establish a core business and the reputation – and real-life knowledge – for performing their services to a very high standard.

Now, not only has LiquiForce become established as a premier provider of trenchless lining services, it has a commercially viable – and totally trenchless – solution for lining laterals from the mainline. Without a clear focus on trenchless technology, the development of this system and the evolution of the business would have never been possible.

Next month's issue will feature another company specializing in pipelining. The folks at Lanzo Lining Services of Deerfield Beach, Fla., know their trade well. They have become one of the largest independent CIPP lining companies in the United States, and have developed a reputation for accomplishing the impossible.

The company's success has helped it expand operations in Florida, Michigan, Georgia, Ohio and throughout the East Coast. Along the way, Lanzo set a record for the largest non-circular CIPP in the world, and won the Dow Chemical Fabricator Award of Excellence for advancing the field of composite resin technology.

Both of these companies are excellent examples of the success specialization can bring. If you specialize in a given service and establish a reputation as the go-to person for that service, opportunities for expansion will develop.

Even if your focus includes a wider range of services, the lesson to be learned from these companies is that knowing every aspect of the services you provide, inside and out, will lead to success. And that's what we're all after.

Enjoy this month's issue. C

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PROFILE

Joe Pennza feeds grouting hoses back into the CCTV Aries truck on a job site. (Photography by Kolman Rosenberg)



OHIO CONTRACTOR'S HIGH STANDARDS AND SPECIALIZED SERVICES KEEP CLIENTS' SEWER PROBLEMS TO A MINIMUM BY MARIAN BOND

Lake County Sewer Company has come a long way since its inception in the early 1980s. The company initially offered sewer cleaning, inspection and excavation, and while the latter has since slipped off the menu of services, the company has grown and is now offering a much wider range of services to satisfy their expanded client base.

The company acts as the general contractor on 80 percent of their projects, according to company president Frank Klima Jr., who says they have the equipment, trained personnel and safety record to meet the varied needs of customers across Ohio, Michigan, Indiana, Pennsylvania, West Virginia and Kentucky. They also travel to other states when requested and have gone as far as Houston to help a client.

Klima, who has been with the company since incorporation in 1981, says all of their functions are essential to their performance, from cleaning and televising, to grouting, manhole rehabilitation and sewer lining. The company has an impressive record of success and an array of equipment to satisfy the customer base. *(continued)*

profile	
LAKE COUNT WILLOWICK,	Y SEWER COMPANY INC., OHIO
OWNER	Rick Marucci, CEO, Majority Stock Holder
ESTABLISHED:	1980
SERVICES:	CCTV, CIPP, groutling, sewer cleaning, mainline and lateral sewer rehabilitation, manhole rehabilitation
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THE INTRUDERS

In Lake County Sewer's territory, 80 percent of the sewers are vitrified clay or concrete installed from the 1920s to the 1960s. The challenges are I&rI, roots and mineral deposits or calcium buildup where joints are leaking. Their job is to go in, televise and clean as much as 2,000 to 3,000 feet of pipe per day.

Klima says the client's engineer will look at the report and decide if it needs to be grouted. If there is structural damage, they may want to reline or do sectional lining.

"We open the pipe to the original carry capacity," says Klima. "The pipe may be good now, but in another couple years the roots and minerals will be back. The client will decide if those joints are not good and the pipe is failing and what the solution will be."

In manhole-to-manhole inspection, they may have a 300-foot run with 2-foot sections and 150 joints. If they are grouting the line, they will test and seal each joint with the packer. This involves an air test at each joint, and if it holds a certain amount of air for a defined period of time, they will deflate the packer and move to the next joint. The grouting process injects the solution outside the pipe and through the faulty area that leaked air. It is then sealed.

The company does mainline and lateral grouting. The grout trucks carry the Aries Illumi-Zoom Pan & Tilt camera as well

as the Aries Ultra Mini Pan & Tilt camera. They also have LETS (Lateral Evaluation Television System) capability on the grout and TV trucks.

For proper cleaning and clearing, they rely on nozzles from Enz USA and large chain cutters from USB-Sewer Equipment Corp. They also buy nozzles from Jack Doheny Supplies, MTech and various other suppliers.

"Nozzles can make or break you when you are out there working on a sewer. We operate with a series of nozzles on each truck, and they all have different functions in the pipe." Frank Klima Jr.

"Nozzles can make or break you when you are out there working on a sewer," says Klima. "We operate with a series of nozzles on each truck, and they all have different functions in the pipe. If the nozzle has the wrong orifices, or you put the wrong nozzle on the hose, the TV operator will see what is happening."

He says if the line is not properly cleaned, the CCTV operator will remove the jet and go to a root cutter or different nozzle. When they have cleaned the line from manhole A to manhole B, that line will be completely evaluated, cleaned and ready for rehabilitation.

Klima says they buy grouting products from Avanti International and PYCOSA Chemicals. Mainline and lateral packers come from Logiball.

For products in manhole rehabilitation, under some harsher circumstances,

they use sprayed application products from The Strong Company Inc., A.W. Cook Cement, and SewperCoat by Kerneos. The company is licensed to use all of these manhole rehabilitation products.

When the solution calls for full lateral lining, they use LMK Technologies' performance liner process. For short lining or sectional lining they use the Newlife Liner System from Stephen's Technologies.

FIRST LINE OF DEFENSE

& Services in Painesville, Ohio.

also two flat-screen monitors on board.



(continued)

On the equipment front, Lake County Sewer Company has as many as 40

For grouting and televising there is an 18-foot Morgan Corporation van on

The company also has a 2011 International 7500 6x6, body by US Truck

vehicles in all. Most of the fleet are International trucks from Lake Truck Sales

a 2005 4400 International chassis with dual CAT pumps producing 300 psi/3

gpm, 1,500 feet of multi-conductor Kevlar cable for television, and for grouting,

a 1,000-foot steel-armored cable and 800 feet of grout quad hose. There are

Body, which is used for grouting. The grout truck has laser profile and sonar



Joe Pennza, left, and Wayne McCloud prepare to lower the grouting unit into a section of sewer. RIGHT: McCloud checks the specific gravity of one of the grouting materials from PYCOSA Chemicals in the truck.





capabilities, along with dual pumps (300 psi/3 gpm) by CAT. There are three flat-screen monitors, 1,500 feet of multi-conductor Kevlar cable for television, and 1,000 feet of steel armor cable. The truck has 800 feet of penta grout hose. It is a much bigger unit suitable for off-road grouting, and can be used to grout laterals from the mainline.

"In this business you can't take more than half an hour to fix something. You have to be able to keep the job going." Frank Klima Jr.

The company's two B-15 Aquatech JetVacs (Hi-Vac Corporation) were built at the same time and purchased new. They're built on 2007 International 5600 chassis and feature 2,500-gallon plastic water tanks, 15-cubic-yard debris tanks and positive displacement blowers. The water pumps (2,000 psi/80 to 125 gpm) are by URACA (Chemac).

Water tankers are a 1995 Ford LN 8000 with a 3,800-gallon tank, and a 1998 4900 International with a 2,200-gallon water tank. Honda pumps transfer water from the tankers to jet combo trucks and are useful in remote areas where they do not have access to fire hydrants.

"We constantly run water hoses to the big jets to feed them so they don't have to break down and move to get water. This is a productive thing for us," says Klima.

Two Aries Industries CCTV trucks, and a 1999 and a 2009 4900 International box truck each have Aries Illumi-Zoom Pan & Tilt cameras and LETS (Lateral Evaluation Television System).

Frank Klima III attaches a sewer cleaning head to the high pressure hose.

Inventory also includes various push cameras and locators by RIDGID, along with other cameras by Aries.

Klima says they like to turn over their equipment every five to seven years. Most maintenance is conducted by the equipment manufacturers, although some minor repairs are dealt with in their garage.

BOOTS ON THE GROUND

"We believe in retaining good employees," says Klima. "Any kind of turnover with employees is very costly. New employees go through a trial period to be sure this is the work they want to do. When I say employee turnover is costly, it's because there are uniforms supplied, there is profit sharing, medical insurance. To bring people on board at any given time costs the company money if they don't work out. It's very important to keep good people happy. We have employees who have been with us 15 to 20 years."

Technicians attend NASSCO's Pipeline Assessment Certification Program and are trained in many procedures. Every employee who works in the field goes through confined-space entry training and will have a harness sized individually. A tripod and winch are also provided, as confined-space entry is conducted regularly.

"We have gas monitors on all trucks along with the other equipment," says Klima. "We have to be prepared when entering in any way a structure that may not be intended for a man to work in. If you even reach into a manhole it is considered confined-space entry. We work under these conditions all the time."

Drivers must have a Class B CDL license with air brake and tanker endorsements, and take responsibility for their equipment, starting each morning by fueling up and conducting pre-trip inspections to ensure all equipment is functioning properly.

Two men – operator and technician – work as a team on each truck. Backup equipment is always available, including two or three cameras, several tractors and other equipment and supplies.

"In this business you can't take more than half an hour to fix something," Klima says. "You have to be able to keep the job going.

"With a two-man team grouting a line, one is handling the packer as it goes into the pipe and the second man is at the other end of the manhole 300 feet away, where the winch is set up. This device pulls the equipment through the entire sewer," he says. "You have to have teamwork."

There are two superintendents with Lake County Sewer, Richard Smith and Frank Klima, who oversee the progress of ongoing projects. Klima says (continued)

TURN THE TIDE

The issue of I&I is the true battleground for Lake County Sewer as they provide their services in the region.

"We do not want that infiltration," says Frank Klima Jr., president of the company. "When that happens you have problems on the costs. Not only is the water that infiltrates sanitary sewers treated and resent to streams, lakes, etc., it can be costly to treat. The sewers are designed to hold only so many gallons.

"Any given day people are flushing their toilets and watering their lawns. The sewers are flowing; if it is raining and the water infiltrates the sanitary sewer, the sewer fills with water and they get to the point where basements flood. There is a lot involved in the work we do so that sewers don't have to be dug up to be repaired or replaced.

*By providing a turnkey operation, and solutions before costly damage to the infrastructure, our customers can determine how best the pipe can be rehabilitated. Now they can decide on the cost effectiveness of the various procedures available."





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Lake County Sewer president Frank Klima Jr. and vice president Patricia Marucci.

their technicians will often come up with good ideas they can share with the superintendents at the morning tailgate meetings.

WHEN IT'S TIME TO GO OR GROW

"When bidding a job, we typically will have a two-week period from start to finish by the time we get the bid book and decide to place a bid," says Klima. "So you have about one week to actually bid. You can't just look at the site of the work. You have to look at where you will get water, access – ingress and egress – where you park your vehicles, if they will be out of town, and where to house your men. There are traffic control issues and safety concerns. Bidding is not always fun."

"It's so important to get the crews out. Everything we do is based on an hourly rate. An hour delay is an hour wasted." Frank Klima Jr.

Klima, Richard Smith and Rick Marucci do the buying and bidding for the company, and they are cautious when it comes to adding new equipment or services.

"We will not buy it unless we're going to use it," Klima says. "We have to go with the flow of the economy. Sometimes a state will get a large grant, and the work might be something we always meant to get into but never had the work for it. Maybe there is not a lot of work for that business. We will always investigate during the bidding stage to see if it is something for us."

He says they will call the manufacturer to learn more about the potential for that type of work. On the other hand, manufacturers will sometimes contact Lake County Sewer to request that they test a new piece of equipment or product. This allows Lake County Sewer to test the durability and productivity of said equipment. Once tested, they report their findings back to the manufacturer.

FROM THE HOME FRONT

Lake County Sewer operates out of a 16,000-square-foot building on two acres. The building is designed so that as they grow, another bay can be added to the current nine bays.

"You have to remember that with the exception of December and January, all of our equipment is normally out on jobs, only coming back here periodically," says Klima. "They will likely be parked at the municipality we are working for, or in a building we may rent near a job site."

They count among their many clients Northwestern Water and Sewer District in Ohio, the Cities of St. Clair Shores and Eastpointe in Michigan, Mount Pleasant and Mt. Lebanon, Pa., and many other municipalities in Michigan, Pennsylvania and Ohio.

Klima says most jobs last about one to two weeks, but it all depends on the nature of the job and where it's located. The company is frequently called for emergencies. With some clients they will have a purchase order. Others will have a one-year contract with an option to extend for another two years.

JUST REWARDS

At the start of each day at Lake County Sewer, Klima says they are focused primarily on seeing that the crews are safely on the road, which includes employees who are out of town and just leaving their hotel rooms. They need to be ready with their equipment and ready to fix problems in the sewers – and to know that they will do it right.

"It's so important to get the crews out," he says. "Everything we do is based on an hourly rate. An hour delay is an hour wasted."

On a personal note, he most enjoys seeing each employee mature in the company, and to see Lake County Sewer Company continue to move forward.

"Just to see these guys grow up and move up. At the end of the day, that is my reward," says Klima. ${\tt c}$

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BY DOUG DAY

hen statistics showed a consistent spike in January recordable injuries over a number of years, many people thought it was probably because of winter cold, snow and ice. Assumptions weren't good enough for Dan Ryan, executive VP of Management Systems and Health and Safety at Veolia Water North America. He dug

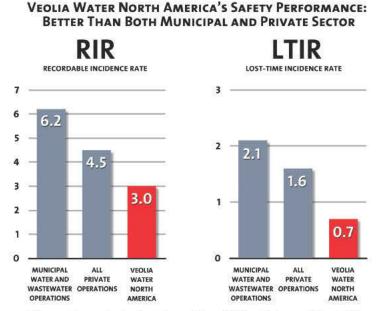
and private water and wastewater sectors. The company's Lost-Time Incidence Rate (LTIR) of 0.7 was 67 percent better than the national average for municipal operations and 56 percent better than that for private firms. Its Recordable Incidence Rate (RIR) of 3.0 was 52 percent better than municipal operations and 33 percent better than the private sector.

into the data and came up with an idea that significantly reduced the spike.

"The three legs of a successful safety program are tools for success (policies, procedures, awareness materials and campaigns, audits, inspections, safety equipment, etc.), training and enforcement," "We think and speak about safety every single day; it's become a natural part of our work process. We're striving toward a perfectly safe workplace and every day that we meet our safety goals, we see that it is indeed a possibility." Dan Ryan

says Ryan, who has headed up health and safety for 13 of his 28 years at Veolia.

In April, the company released safety data from the Bureau of Labor Statistics (BLS) that shows Veolia Water significantly outperforms both the municipal



Data comparisons are based on the most recent data available from the Bureau of Labor Statistics.

Veolia's Lost-Time Incidence Rate (LTIR) of 0.7 was 67 percent better than the national average for municipal operations and 56 percent better than that for private firms. Its Recordable Incidence Rate (RIR) of 3.0 was 52 percent better than municipal operations and 33 percent better than the private sector.

The January spike was discovered about seven years ago and Ryan found the root cause had more to do with the malaise of returning from the holidays than winter weather. "Our minds were not focusing on the task at hand," he says. So the company started spending five minutes at the start of every day in January discussing safety. January recordable events have progressively dropped from an average of 17 (maximum of 21) to 5 since the January "Take 5 for Safety" program began. January 2012 set a new company-best with only three OSHA recordable injuries – none of which resulted in lost-time.

Ryan says the company has learned much about safety from its work in the private sector like chemical plants, steel mills, energy, pulp and paper, and mining where there is more potential for catastrophic events. "I think the industrial sector took safety much more seriously than the municipal sector for a number of years," he says. "We've been able to apply those principles and practices to municipal customers."

Ryan says he's convinced there are a wide variety of things that Veolia Water does that lead to the outcomes it's achieved. "It starts at the top with our president and CEO Laurent Auguste," he says. "I'm part of the senior management team, so I know that health and safety is as important to him as finance and human resources, for example. He's made safety a core value and that trickles down through the organization. Worker safety is as critical as effluent compliance, water quality, customer satisfaction or financial performance. Success is at the ground level where safety is everyone's job.

"We think and speak about safety every single day; it's become a natural part of our work process. We're striving toward a perfectly safe workplace and every day that we meet our safety goals, we see that it is indeed a possibility."

This summer the company distributed stop sign wallet cards reminding people that all 2,700 employees have the authority to stop work for safety concerns. c

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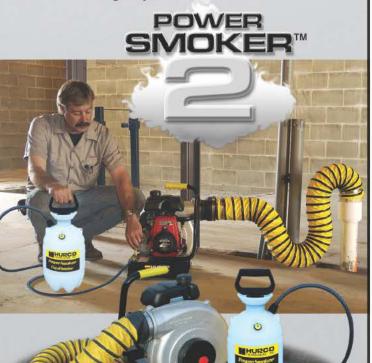
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BETTER BUSINESS

Ten Things Your Lawyer May Not Tell You

IF YOU WANT THE BEST REPRESENTATION AT THE MOST REASONABLE COST, FIND OUT IF YOUR ATTORNEY HAS EXPERIENCE WITH THE TASK AT HAND

BY FRED S. STEINGOLD

our lawyer may not automatically tell you everything you need to know about legal services. If you don't ask questions, you may be in for some surprises. Here are 10 things your lawyer may not tell you – unless you ask.

I've never done this before

You've found some new space for your expanding business. After stumbling through the dense verbiage in the landlord's lease, you decide to have your lawyer review the lease before you sign. Smart move. But what if your lawyer has never reviewed a commercial lease before? Will he or she volunteer that information? Maybe not.

Legal ethics don't require a voluntary disclosure. They only require a lawyer to become competent in a legal matter before proceeding. In theory, a lawyer can get up to speed by consulting with a colleague, reading professional books and attending seminars. But given a choice between a novice and a lawyer who's checked out 50 commercial leases, wouldn't you be more comfortable with the more experienced one? If so, find out how much of this type of work your lawyer has done.

There are many law-related tasks you can do yourself – like getting a tax assessment reduced or suing in small claims court. There are other things that can be accomplished by hiring non-lawyers who can work more effectively and charge less than a lawyer.

You don't need a lawyer to do this

There are many law-related tasks you can do yourself – like getting a tax assessment reduced or suing in small claims court. There are other things that can be accomplished by hiring non-lawyers who can work more effectively and charge less than a lawyer. For example, an accountant may be better and cheaper at sorting out a financial mess. A real estate broker may be better at negotiating a land purchase. Some lawyers won't tell you about less expensive options unless you ask.

I charge for faxes, photocopies and postage

When you're paying a lawyer \$250 or \$300 an hour – or even more – you may be shocked to find yourself nickeled and dimed as well. Some lawyers bill for the faxes they send or receive, for the photocopies they produce, and for postage and long-distance charges. Don't assume your lawyer will be absorbing these expenses as a part of doing business. Get a clear understanding up-front about whether you'll be hit with these incidental costs.

I'm about to go away for six weeks

Terror can grip your heart when you call your lawyer to ask a follow-up question, only to be told: "I'm sorry. Ms. Jones is on a long trip to Asia and can't be reached." Reasonable access is a reasonable expectation – especially in today's digital world. You'd like to know in advance if your lawyer will be out of touch for an extended period. To avoid rude surprises, inquire about your lawyer's travel plans, and who will be handling their work while they're gone. Ask to meet the backup person and make sure that he or she will be fully briefed about your legal situation.

Fighting for a principle is expensive

If your chances of getting any real money in a lawsuit are zero, you'd like to know before you sink thousands of dollars into a lawsuit. You'd like to get even with the scoundrel who scammed your business, but it may cost you a bundle to duke it out in court – and you may wind up empty-handed. Ideally, your lawyer will give you a frank assessment of your odds of winning, odds of collecting, and how much all of this will cost you. Sometimes the best advice is to put the matter behind and forget about suing.

I don't like this kind of work

A lawyer who enjoys drafting corporate documents may dislike appearing at zoning hearings. A lawyer who likes to litigate may not like to take a matter to mediation. You need a lawyer with a zest for your type of legal work. Someone who finds a certain kind of work distasteful may just go through the motions – not very comforting when you need someone to aggressively champion your legal position. Lawyers may be reluctant to refer you to someone else. They worry that if they do, they may never see you again.

I'll do this for a flat fee

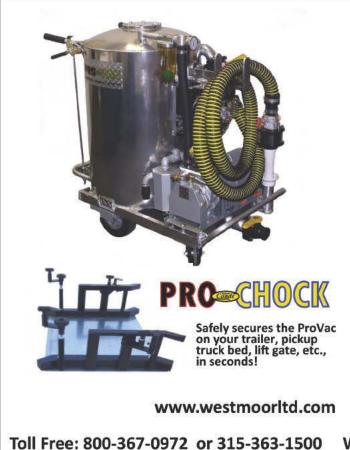
Most lawyers do most work on an hourly basis, but would be willing to do particular tasks for a flat fee. Trouble is, they may not volunteer this information. They worry that clients may take advantage of a flat fee by making endless demands on their time. Still, they may be willing to draft a business document or attend a meeting at City Hall for a flat fee. If you don't ask, you'll never know.

I bill in quarter-hour increments

That five-minute phone call to your lawyer may cost you \$75. Why? Because your \$300-an-hour lawyer bills in increments of 15 minutes. That's something you need to know and discuss in advance. Billing is not a precise art, but increments of five or six minutes seem much more reasonable than quarter-hour segments. To avoid getting burned, ask about the units the lawyer uses in billing. Maybe you'll decide not to call the lawyer's office quite as often.



Fred S. Steingold practices law in Ann Arbor, Mich. He is the author of Legal Guide for Starting and Running a Small Business and The Employer's Legal Handbook, published by Nolo. Legal strategies may vary depending on the state in which you live and the specifics of your situation. See your lowyer for legal advice.





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My paralegal will be handling this

Paralegals - also called "legal assistants" - play an important role in a modern law office. Rightfully so. They're usually well trained and capable of handling many routine transactions.

But what if your lawyer is planning to let the paralegal do all the work? You may want to know.

For one thing, you'll want to make sure the paralegal's time is being billed at a substantially lower rate than the lawyer's. In addition, you'll want to make sure you're comfortable with the amount of the lawyer's supervision – or lack of it – that the paralegal will be receiving.

You may also want to meet the paralegal so you can have an effective working relationship.

I stopped learning the day I left law school

Some states don't require lawyers to continue their education once they pass the bar — which means that a lazy lawyer may not be up-to-date on the latest legal changes.

A lawyer who ignores legal seminars or doesn't read professional journals isn't likely to brag about it. You may not find out until it's too late that your lawyer was less than sharp on a crucial legal point.

Here's where learning a lawyer's reputation comes in handy. A lawyer who's highly regarded by other lawyers in your community is probably doing his or her homework. ${\tt c}$

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THINKING BCG

LIQUIFORCE DEVELOPS TRULY TRENCHLESS TECHNOLOGY TO BATTLE CANADA'S AGING INFRASTRUCTURE ISSUES BY SUZAN MARIE CHIN

When his customer base came looking for a better way of dealing with deteriorating pipelines and ways to manage the rising costs of maintenance caused by I&I, LiquiForce Services CEO Kim K. Lewis and his fledgling company rose to the challenge. Jumping into the trenchless technology arena full force has not only helped this small startup grow into one of Ontario's largest sewer service contractors, it is now helping to bring some advanced rehabilitation methods and products to market to benefit the underground infrastructure industry as a whole.

HUMBLE BEGINNINGS

LiquiForce began its operations in 1987 in the Town of Kingsville, Ontario, with just four staff members and a few trucks operating from an old renovated gas station. The company started out as a high-pressure blasting service provider until the City of Learnington, Ontario, expressed a need for sewer flushing services and wondered if Lewis would consider getting into the business. Never one to pass up a good business opportunity, Lewis invested in a sewer cleaning unit. He didn't know much about it personally but surrounded himself with a crew that had experience to open up this new profit center for the company.

"We started looking all over North America and Europe for various potential systems. Trenchless technology wasn't very advanced in those days; it was actually quite primitive."

Kim K. Lewis

The news of Lewis' cleaning service and quality work spread quickly and within a year, Leanington, along with other neighboring communities, came to him again asking if he would be willing to get involved in video pipeline inspection as there was a growing need for the service. Lewis jumped deeper into trenchless technology, purchased camera equipment and brought on additional staff to meet his clients' requirements.



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ABOVE: Rick Chapman puts together a gasket seal for a lateral pipe liner. RIGHT: Dave Laman sews a flange for a felt pipe liner.

A NATURAL PROGRESSION

By 1990, LiquiForce was providing its cleaning and inspection services to municipalities, industries and utility companies as well as oil and gas producers throughout the region. The natural progression was that these clients started asking Lewis and his team about rehabilitating infrastructure utilizing methods other than traditional dig and replace.

"We started looking all over North America and Europe for various potential systems. Trenchless technology wasn't very advanced in those days; it was actually quite primitive," says Lewis. "Insituform [Aegion] had brought their lining process to North America probably 15 years prior to that, so that was a good starting point, but everything else was in the very early stages, so there was a lot of trial and error in what we did."

Client cities were willing to consider these new trenchless methods because they were looking to save money and resolve their issues with as little disruption to their community as possible, but getting full buy-in wasn't always

BE PREPARED

With the launch of its innovative lateral lining solution, LiquiForce CEO Kim K. Lewis and his team knew that they would need to be prepared for the increase in data processing and record keeping required to keep their growing business running as efficiently as their new invention.

LiquiForce utilizes a complex management system, nicknamed The Pipeline, that tracks and manages every facet of the company. This system makes project information and data seamless and transparent for customers and LiquiForce staff alike. The system's real-time data is available in the office, field and online to allow a customer to know exactly where things stand with a project in terms of work progress, costs and estimated time to completion.

Every piece of data entered into the system is populated across multiple areas, eliminating multiple data entry and potential errors in cost calculations and project bidding.

"The Pipeline has made LiquiForce bigger than any one person in the company because it really allows us as a company to monitor all of our benchmarks. We know where we're at, we know where we're going," says Lewis. "Customers need and want to know more and more these days and with this system, we can give it to them and they really appreciate it."



profile

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easy. To get past this, LiquiForce worked with its clients performing a lot of small pilot trials of various methods.

After selling and convincing the local engineers and town fathers that a potentially successful CIPP lining method was available, LiquiForce would perform field demonstrations. Some processes came from Europe, some from North America, and Lewis admits that only half of the projects and systems worked, some not at all and a few marginally.

"Back in those days, getting trenchless to be fully accepted like it is today was a long, slow and cumbersome process and sometimes we wondered if we'd ever get there, but persistence has paid off and we've finally arrived," Lewis says.

As they celebrate their 25th anniversary in business, Lewis and his team have witnessed many changes in CIPP lining and trenchless technology. Methods, materials and processes are now proven and many options are available. Because of this, LiquiForce manufactures its own lining technologies in-house. Felt and other raw materials are purchased to create the liners, and chemicals are sourced from various firms to create custom blends for lining projects.

A SHIFT IN THINKING

Lateral rehabilitation is a large component of LiquiForce's business, and Lewis noticed growth in the scope of work surrounding this particular aspect of wastewater collection systems. Shifts in responsibility and the desire for a







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less financially painful way to deal with these aging underground assets were creating a demand for contractors like LiquiForce to come up with more costefficient and time-saving methods to perform trenchless repairs.

"There is more and more emphasis being put on eliminating I&I and tying projects together to remove all the sources of infiltration in the entire system and not just deal with one portion like the main or a manhole," says Lewis.

Instead of performing lining of just the mainline, Lewis has seen a shift in municipalities of either assuming the responsibility of the repair of the lateral

A NEW WAY

Approximately 10 years before this new way of viewing laterals in relationship to the collection system and I&I began, Lewis had a dream of devising a totally trenchless method for lateral lining – no cleanout, no disruption of a property, everything handled completely from the mainline. Everything he had learned or been told indicated this was an impossible dream but Lewis wasn't about to give up, he was "thinking big."

In 2009, Lewis approached the Canadian Federal government for financial

Back in those days, getting trenchless to be fully accepted like it is today was a long, slow and cumbersome process and sometimes we wondered if we'd ever get there, but persistence has paid off and we've finally arrived.

from the right-of-way all the way to the house or when performing the municipal lateral portion of the repair, providing an opportunity for the property owner to take care of their portion at the same time at a reduced cost.

"By approaching it this way, you're making the whole system leak-free from the edge of the house right to the treatment plant. This approach is becoming more and more prevalent because over time it saves the community a lot of money in treatment expenses," Lewis says.

But with this shift in thinking comes a challenge. Bigger lateral lining programs mean more linear feet to deal with on each project. The budgets need to go further but the technology still has to meet performance standards. How do you do more without sacrificing quality? Build a better system.

support to build and test a system prototype. If successful, this system would not only be used in Canada by LiquiForce on its projects but also be offered commercially worldwide so that other contractors could utilize this new system and method to save their clients money.

One of the driving reasons for developing the system was to eliminate the cleanout and restoration costs from the lining project equation. A recent study presented at the 2012 No-Dig Conference cited that it cost an average of \$3,400 to install a cleanout for access at the front area of a property. If that step wasn't required, the financial savings would be significant on large-scale lateral rehabilitation projects.

But that wasn't all Lewis dreamed of eliminating. The more streamlined the *(continued)*



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process, the fewer steps and hands involved, the more cost-effective and efficient the lining process could become.

"The lining process was a 13-step process for every lateral, from the time you went in, excavated the cleanout, performed a camera inspection, cut the line open and performed the rehabilitation and post-lining quality checks and reinstatement," Lewis explains. "With our 'dream system' we were confident we could significantly cut down the steps."

The new system took one year of research and development and Lewis indeed created a super-efficient lining system. The new totally trenchless lateral lining system requires just four steps:

- Deploy a camera unit from the mainline (manhole entrance) to inspect the main and the lateral condition.
- Deploy a device that cleans and inspects the lateral, measures it and then records the data, which is then transferred to the LiquiForce plant so that a customfit liner can be created for the specific lateral.
- Return to the site after the liner and resin are manufactured and install the liner from the main.
- Perform a post-lining CCTV inspection.

These four steps are accomplished utilizing approximately a half-dozen pieces of equipment that include two "centerpieces" – a PFM truck, which

"A few years ago, they hoped it could be done. They wanted us to find a way to get rid of the cleanout so that they could reduce rehabilitation costs and make it easier for the homeowners. Now they have seen firsthand that lining laterals can be done completely trenchlessly. With 250,000 active sewer laterals, this equates to monumental savings." Kim K. Lewis

prepares the lateral, cleans it, takes pictures and deploys the measurement device, and the lining rig, which houses multiple video screens so the operators can monitor the entire process to ensure a proper installation on the first try.

From the mainline, LiquiForce has been able to reline 4- to 6-inch laterals up to 150 feet in length. The system is capable of handling the multiple bends and transitions that are common to most laterals. During the measurement step, these critical transition measurements are captured and the liner is custom-manufactured to include the transitions and slack for bends so the liner fits perfectly. Wet-out is performed on site. The junction connector portion of the liner is built-in and installed at the same time as the lateral. The junction liner is structural with built-in hydrophilic seals that stop leaking and connect seamlessly to either an unlined or previously lined main. It is held in place by a special mechanical device that is incorporated into the lining system.



SEEING IS BELIEVING

With Lewis' dream becoming a reality, the City of Hamilton, Ontario, is now able to take advantage of this new technology for their lateral rehabilitation program.

"A few years ago, they hoped it could be done. They wanted us to find a

way to get rid of the cleanout so that they could reduce rehabilitation costs and make it easier for the homeowners," says Lewis. "Now they have seen firsthand that lining laterals can be done completely trenchlessly. With 250,000 active sewer laterals, this equates to monumental savings."

For Hamilton, LiquiForce will not only eliminate the cost of surveying and excavating each lateral, but also the need to gain permission to access private property. This all adds up to a win-win situation for

homeowners and asset owners alike.

"Now that we know it works, we are looking for other contractors in other parts of the world who are interested in utilizing our technology and helping

us to continually make it better," says Lewis. "We had a dream and it came true but we don't want it to stop there. As a business owner you have to be persistent and make a decision not to quit. There's still more all of us can do to make trenchless better, so never quit learning and dreaming and above all, make sure you think big." c



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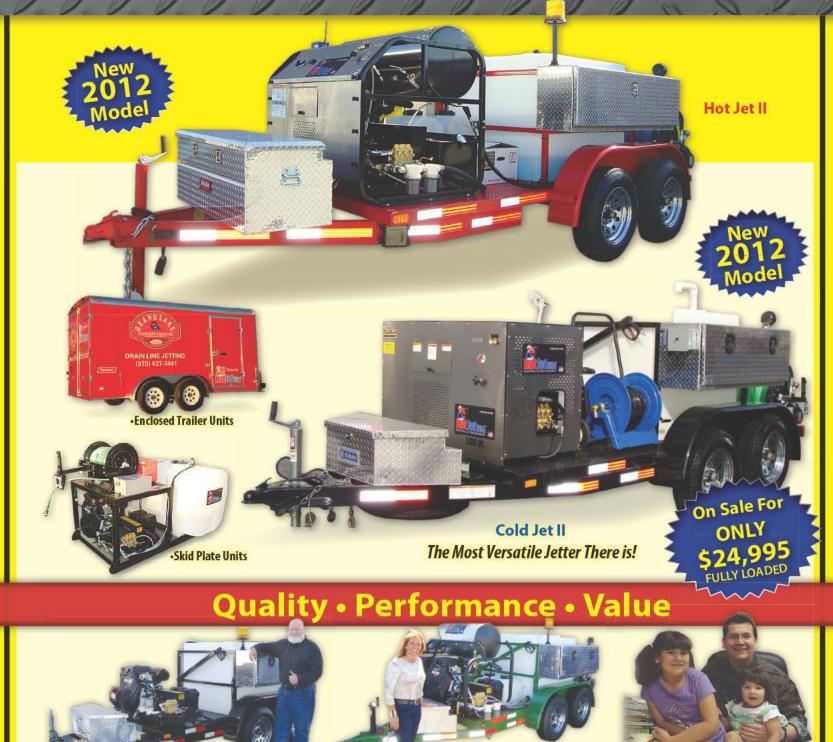
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Tech Perspective looks at technology-related issues and provides information and advice that cleaning professionals can apply to equipment selection and to their daily work in the field. Industry members are welcome to offer ideas for this column.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

The Skill to Succeed

OPENING YOUR OWN CLEANING OR INSPECTION BUSINESS REQUIRES YEARS OF TRAINING AND PREPARATION

BY JIM AANDERUD

Starting up a new business is a dream shared by many people in this industry. Employees think about how great it would be to say goodbye to their employer and venture out on their own, how wonderful it would be to have that kind of freedom and to be able to set their own course.

But then they start thinking about the possibility of failure, and reality sets in. This is where most people's dreams unravel. It's usually a fantasy that never quite gets off the ground. You play the "what if" game over and over but never take the first step.

Unfortunately, most people who dream of being their own boss have a skewed view. They focus on the term "being my own boss" as if it means that they won't have to answer to anyone. They look at it as being able to do whatever they want, whenever they want. It's like wanting to take everything that's wrong with their present job and thinking "if only I had my own business, I wouldn't have to deal with ... [fill in the blank]." Nothing could be further from the truth.

MISCONCEPTIONS

My first years in business taught me tough lessons. It was me in the field inspecting pipe all day because I couldn't afford to hire someone else. It was me in the late afternoon returning phone calls and scheduling tomorrow's work. And it was me late into the evening paying bills and printing out invoices.

Financially, it's important to consider the real cost of running a

business, including insurance, fuel, maintenance, permits and the multitude of other real costs. These realities were sobering in my early years. I would invest weeks on a project and then not get paid for six months or more. It was very difficult to see my operating capital disappear. I had creditors knocking at the door trying to take what little I had. But, through it all, I would manage to put a little bit of money aside, and at the end of the day, the IRS took the rest.

WHAT IT TAKES

The fact is that many of us who are making it as business owners have succeeded in spite of our

Relationships are critical to the success of any business, especially in the cleaning industry. (Photo courtesy of Innerline Engineering) ignorance. Most of us really had no idea what we were getting into beforehand. People often call us fortunate or even lucky. But the truth is that there isn't one successful entrepreneur who hasn't done it by the sweat of his brow.

There is no shortcut to becoming the best cleaning operator or CCTV inspection operator, and the years spent in apprenticeship will allow you to fully develop a strong skill set.

The motivation to start your own business must come from a different place. Individuals who take the plunge and succeed are special and rare. They tend to be serious and goal-oriented. You will find that most of them are not motivated by money per se, but are motivated by the challenge. Their goal is to achieve success by building a prosperous business empire. They are willing to sacrifice now for the possibility of financial returns in the future.

Those who succeed tend to see things in context. They look at their goals; they study them thoroughly and then weigh the possibility for



success. These people often plan and plot for years before actually making their move. They understand exactly where they need to be before they can take that first step. They wait patiently, watching and learning, planning and plotting their future.

Of course, as an employer, I hate to lose good employees. It's hard to accept the fact that I am sometimes the training ground for my future competition. There isn't much anyone can do about that, and the worst part is that it's usually the star employees who leave. Unfortunately, many of these individuals grow impatient and leave prematurely. It's critical that you know this business from top to bottom before striking out on your own, and that takes time.

There is no shortcut to becoming the best cleaning operator or CCTV inspection operator, and the years spent in apprenticeship will allow you to fully develop a strong skill set. Being known as an expert in your field will go a long way toward building your future business. Your customers will want to know that they are dealing with someone who is knowledgeable and able to fulfill their needs. Having that reputation will open many doors in your future.

The years of apprenticeship are not only valuable for learning how to inspect and clean pipe, they are valuable in building relationships. Relationships are critical to the success of any business, especially in the cleaning industry. Good relationships were the key to my success in the beginning, and continue to be so to this day. It was the existing customers with whom I had established relationships who were willing to give me an opportunity when I went on my own. There is no doubt that without them I wouldn't have made it this far.

Taking the time to learn about how business works before breaking away will increase the odds of success exponentially. Taking basic accounting courses and preparing for my contractor's license exam proved to be a few of the best decisions I ever made. Had I waited until I was on my own, it would have been difficult to find the time to do it effectively.

THE REALITY

Starting your own business can be very rewarding. Each new customer or contract will be exhilarating. Those first few checks in the mail will be exciting, but starting your own business can be very stressful. When there isn't enough money in your account to meet payroll or pay your bills you will be stressed out. When your primary equipment breaks down and you can't meet the obligations of your best customer, you'll be stressed out. When your best employee quits in order to start his own business, you'll be stressed out.

As a business owner, I found my health deteriorating because of the continual stress and lack of sleep. I found that regular exercise and healthy eating habits made me feel better, gave me more energy and helped me cope with the stress.

Remember that as a business owner there is no such thing as leaving your work at the office. You are literally on 24/7. Any problems that arise will fall squarely on your shoulders. You may be cleaning toilets one minute and sitting in front of a customer the next. You may be spending time with your family in the evening and then dropping everything in order to respond to an emergency. There is no delineation of responsibilities. You are it. The buck stops with you.

REWARDS

The rewards of owning your own business can be great. The satisfaction I have experienced in seeing my company flourish has been very gratifying. Experiencing those moments of growth when new contracts come in and new employees come on board is very rewarding. It is not an easy road, but in the end, the whole experience has been more than worthwhile. c

ABOUT THE AUTHOR Jim Aanderud is owner of Innerline Engineering, a video pipeline inspection company based in Corona, Calif.



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Opening New Markets

PEARPOINT CAMERA SYSTEM LETS TEXAS CONTRACTOR TREAD ON DANGEROUS GROUND

BY KEN WYSOCKY

nspecting chemical pipelines for defects is a risky business. For that reason, Specialized Maintenance Services Inc. (SMS) in Pasadena, Texas (a Carylon Company), relies heavily on its fleet of seven EX-Zone Approved pipeline inspection cameras made by Pearpoint/SPX.

The cameras are made mostly of brass and are equipped with Kevlar-coated cables that are sealed on the ends. That enables the tractor-mounted cameras to safely inspect hazardous environments without creating explosion-igniting sparks, says Darrell Martin, president of SMS, which cleans industrial pipelines and tanks and also provides hydroexcavating services.

"It's extremely dangerous work," Martin explains. "When we open a manhole, we first do an air reading to detect the presence of volatile organic compounds (VOCs). We also wear Nomex (flame retardant) suits. These machines have to be explosion proof. If we're going down the line and we hit something and create a spark, and there still are VOCs in the line, there's potential it could explode."

"The upside is that they've opened up new markets to us, and they are very profitable from a billing standpoint. If you're capable of keeping them working, they'll eventually pay for themselves." **Darrell Martin**

Customers require SMS camera operators to obtain safe-operation certification from the manufacturer, Martin adds.

SMS bought its first Pearpoint inspection camera and camera van about eight years ago. Two factors drove the decision: the company's location on the Gulf Coast of Texas, amid a region dotted by hundreds of chemical plants, and federal clean-air regulations that required petroleum refineries to inspect pipelines to ensure they're not allowing VOCs to leak out.

"Our location is unique," Martin points out. "We're in southeast Texas, on the Gulf Coast, and there are about 400 chemical plants between Corpus Christi and Lake Charles, La., so we're in the middle of a potentially huge market. We're not some wonder child down here with these – we just happened to be in the right place and have been able to market this service and keep the equipment working."

After cleaning chemical lines with either water, various kinds of soaps or neutralizing agents (depending on what the pipelines carry), camera crews inspect the lines, looking for defects that might allow infiltration and exfiltration of VOCs. If the operator spots a defect, he stops the camera and photographs it, then continues the inspection. When completed, SMS provides the customer with a DVD of the inspection, along with pictures and a bound report, Martin says.

The Pearpoint P455 cameras are mounted on P448 steerable tractors;

together, they cost about \$85,000. That cost rises to about \$150,000 with a camera van and all the other accessories included. While that's a significant investment, it's also a barrier to market entry for would-be competitors. As an expert in the field, SMS develops enough business volume to keep them busy and generating revenue, Martin notes.

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"We probably have one of the largest fleets of these inspection cameras in North America," he explains. "If you're not committed to this, and don't have the steady work, the cost is definitely prohibitive. You can't make that kind of investment and have them sit.

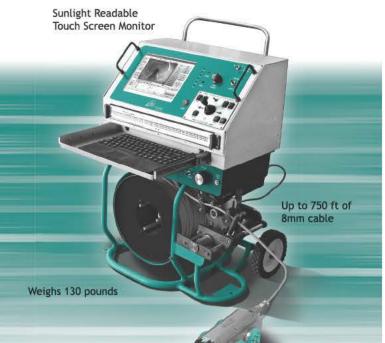
"The upside is that they've opened up new markets to us, and they are very profitable from a billing standpoint," he continues. "They're our most profitable line of business, representing a substantial percentage of our total volume ... if you're capable of keeping them working, they'll eventually pay for themselves." c

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BY SCOTTIE DAYTON

ombination fittings on mobile homes in three Oklahoma City parks tapped directly into 6-inch clay sewers blocked by massive root intrusions that cracked the hubs and pipes, causing backups. Broken fittings on some homes allowed wastewater to discharge on the surface.

Plumbers routinely snaked the lines and drilled holes through the worst impactions at huge expense to the previous owners. In places, the mains were no longer serviceable.

When the new owners learned that open cutting to replace the lines would cost twice as much as buying the real estate, they called John Johnson of Water Works Plumbing in Oklahoma City. His company specializes in pipe bursting residential and commercial sewer lines.

Using a 40-ton ram from Pipe Genie Mfg., the crew worked six months to replace the most critical lines with 6-inch HDPE SDR17 pipe. Besides roots, they fought a dense sandstone substrate and undocumented utilities without interrupting service to homeowners.

soil aside. At 15 feet under the street, the head stopped moving, while the ram 200 feet away began pushing into the timber cribbing.

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CUSTOMER:	Mobile home parks, Oklahoma City, Okla.
CONTRACTOR:	Water Works Plumbing, Oklahoma City
Equipment:	Plpe bursting system, Pipe Genie Manufacturing 877/411-7473 www.pipegenie.com
RESULTS:	Sewers replaced in six months at huge savings to owners

WHAT TROUBLE LOOKS LIKE

Throughout the project, Johnson's plumbing crew arrived once or twice a day to unblock clogged lines and keep the sewers flowing, while his sewer team located problem areas with an inspection system from Vu-Rite and NaviTrack locator from RIDGID. When roots blocked the camera's progress, they opened a path with a RIDGID K-1500 sewer and drain cleaner, but even that bound up on some occasions trying to pass through the drilled holes.

Workers pipe burst 200 feet of mains in the first park, 1,600 feet in the second and 2,000 feet in the third. At each residence they used shovels to excavate the sewer, cut a hole in it, and ran temporary laterals from the stubs under the homes to the pipe.

On the second pull in the last park -220 feet under three homes, two alleys and a city street - progress went from substantial to awful.

"The sewer lay on sandstone under 4 feet of sand," says Johnson. "As it passed under the street for 40 feet, the compacted road bed was like granite around the pipe."

Pressure on the 3,000 psi ram increased to more than 2,900 psi as the bursting head struggled to push the restricting

Casey Hill (left) and Jeff Cole set up the 40-ton pipe bursting system from Pipe Genie Mfg. for the pull through the 90-degree bend under a mobile home. (Photos courtesy of John Johnson)







LEFT: Casey Hill uses the Borit tool with 3-inch backreamer bit attached to an industrial drill to widen the channel for feeding the pullback cable to the chain. The communications conduit and two electric lines pass above him. ABOVE: Eric Howell (left) and Casey Hill use the M.T. Deason electrofusion processor to install a HDPE saddle wye.

Johnson killed the power and called Pipe Genie inventor Gerry Robinson, who recommended spreading the pulling force over a larger area and setting the vertical timbers deeper.

FULL STOP

"Naturally, it was Friday afternoon and those homes were still on a disconnected sewer," says Johnson. "We pulled out the ram, brought in a sewage pump and bypassed the liquid to another main downstream."

Johnson visited a steel scrap yard on Saturday morning looking for two 6-foot I-beams and a 4- by 6-foot by 5/8-inch-thick resistance plate. Meanwhile, Eric Howell widened the pulling pit to accommodate the larger plate, then he and Johnson jackhammered two holes in the sandstone at the head of the pit before setting the I-beams and plate with the excavator.

The pull resumed at 4 p.m. with the pressure on the ram hovering near maximum capacity. "As soon as the head crossed the street, the pressure dropped to 900 psi, which is barely more than an idle," says Johnson. The last 180 feet went flawlessly.

Throughout the job, Johnson used Plasson electrofusion 45-degree saddle wyes on laterals and M.T. Deason electrofusion couplings to join the separate pulls of pipe. Obtaining a variance from the state's Construction Industries Board to use the saddles took three months, since the International Plumbing Code prohibits them on private laterals.

"They made all the difference in efficiency and integrity," says Johnson. "We delivered a root-proof product with no seams or rubber gaskets."

SUCCESS TAKES A TURN

Another uneventful run of 500 feet followed. "After that, I was convinced my men and the ram were bulletproof," says Johnson. "Our next pull was 120 feet at a depth of 4.5 feet with a 90-degree turn centered under a mobile home. Although risky, I decided to pull through the 90."

The pulling pit was 50 feet from the elbow. The job went smoothly until the 2.75-inch chain pulling the head tried to line up with the ram, came out of the elbow, and lodged somewhere in the sandstone. The pull stopped.

With only 18 inches of clearance under the home, workers increased the headroom by spending two days digging a 4-foot-deep trench to the elbow. Unable to leave the pipe running through a backyard, a privacy fence, and into the street, they severed it at the entry pit and relocated it. They also removed the ram, which allowed the sewer to flow while they worked.

"The sewer lay on sandstone under 4 feet of sand. As it passed under the street for 40 feet, the compacted road bed was like granite around the pipe." John Johnson

Once the trench was completed, the crew used a Bosch rotary chipping hammer with a spade bit to excavate through the sandstone to the main. They used the camera to locate where the chain left the pipe and chipped down to it. At one point, it ran under a structural support beam.

The park manager sent his maintenance man to relocate the beam. "Every delay took half a day," says Johnson. "The guys finally freed all of the chain and found the pulling head another 20 feet away under the home."

MORE TYLENOL MOMENTS

Using shovels and the chipping hammer, the crew excavated a second pulling pit behind the home and aligned it with the lateral. After requesting a utility locate, they exposed a marked communications conduit, but nicked one of two undocumented electrical lines. A few sparks sent them dashing for safety. Several minutes later, sparks began arching 10 to 15 feet high. It took the local utility all afternoon to repair the line.

The next morning, project manager Casey Hill drilled a 1.5-inch pilot hole from the second pulling pit to the elbow excavation to feed the pullback cable to the chain. His tool, a Hydro Bore from Pipe Genie, achieved 20,000 pounds of pushing power with a high-pressure jetting nozzle on the end of a hardened steel

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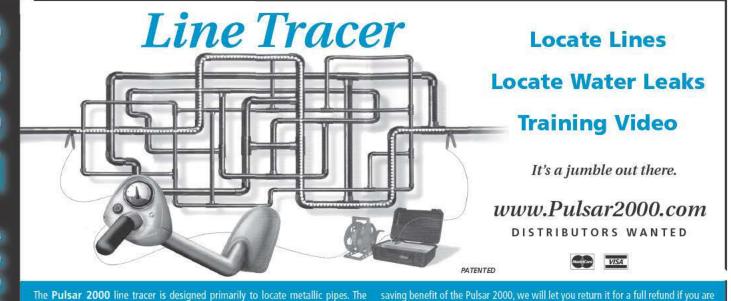
An exhausted Jeff Cole stands under the mobile home waiting for the Borit tool to enter the excavation at the 90-degree elbow.

rod. As water from the RIDGID portable pressure washer blasted a hole through the sandstone, Hill threaded on 2-foot-long extension pipes.

To enlarge the channel, Hill and Jeremiah Gravitt switched to a Borit tool with a 3-inch backreamer bit attached to an industrial drill. Boring took the entire morning. Meanwhile, Jonathan Waite and Jason Dunn reassembled the ram and set the fusing machine in the entry pit. Reattaching the severed pipes was done with both ends in midair.

The pull from the second pit brought the bursting head up to the elbow. The crew then disconnected the ram, set it in the original pulling pit and reconnected the chain to the head to complete the run.

"We never expected to use every tool in our arsenal on the same job in the same yard on the same day, but it took that to see pipe moving again," says Johnson. ${\tt c}$



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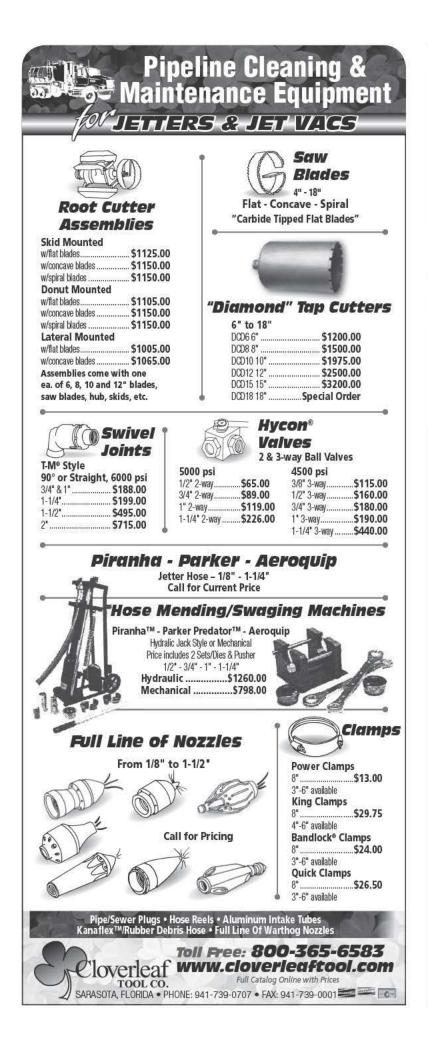
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Com	pany Directory 2012	Dealer of	Pipe Diameter	Reel Sizes	Recording Methods	Software A	Repair From	Repair p.	Accessoriac	Inspection 1.	Location Equipment
See ads pages 17, 55	Allan J. Coleman Co. 5725 N Ravenswood Ave., Chicago, IL 60660 773-728-3400 - (f) 773-728-2499 info@allanjcoleman.com www.allanjcoleman.com	RIDGID [®] , G-Vision, General, Spartan, Electric Eel, Insight Vision, Rycorn, Ratech	1.25" - 12"	30' - 400'	Flash Drive/USB Thumb Drive, SD Card, DVR, DVD, VHS	1	~	~	~		~
See ad page 37	Amazing Machinery, Inc. 2288 Gunbarrel Rd., Ste. 154-151, Chattanooga, TN 37421 800-504-7435 - 423-326-2676 - (f) 800-504-7435	Amazing Machinery, Forbest, Probuilt, Remote Vision, Vu-tech, Wöhler	2" - 24"	65' - 380'	Flash Drive/USB Thumb Drive, SD Card, DVR		~	4	~		4
ARIES See ad page 39	Aries Industries, Inc. 550 Elizabeth St., Waukesha, WI 53186 800-234-7205 - 262-896-7205 - (f) 262-896-7099 sales@ariesindustries.com www.ariesindustries.com	Aries Industries	2" - 200"	100' - 3,000'	SD Card, DVR, DVD	~	~	*	~	~	~
See ad page 77	Central Oklahoma Winnelson 5037 NW 10th St., Oklahoma City, OK 73127 888-947-8761 - 405-947-8761 - (f) 405-947-1934 krjones@winnelson.com www.centralwinnelson.com	RIDGID®	0.5" - 12"	30' - 325'	Flash Drive/USB Thumb Drive, SD Card, DVD		V	V	~		4
See ad page 47	Cobra Technologies 4806 Wright Dr., Bldg. C, Smyrna, GA 30082 800-443-3761 - 770-435-8991 - (f) 770-435-0402 sales@cobratec.com www.cobratec.com	Cobra Technologies	6" - 120"	500' to 4,000'	HDD, Flash Drive/USB Thumb Drive, SD Card, Compact Flash, DVR, DVD	~	~	۲	~	~	~
See ad page 81	Cua Claws 2376 Maize Rd., Twentynine Palms, CA 92277 714-697-8697 jerry@cuaclaws.com www.cuaclawscom	CuaClaws							~		
The Survey of the Incomp CLIE 5 See ad page 22	0155 3600 Rio Vista Ave., Orlando, FL 32805 800-327-7791 - 407-849-0190 - (f) 407-425-1569 salesinfo@cuesinc.com www.cuesinc.com	CUES	2" - 200"	500' - 4,000'	HDD, Flash Drive/USB Thumb Drive, SD Card, Compact Flash, DVR, CD, DVD, VHS, Any digital media	~	۲	~	~	~	4
See ad page 69	Cyclops Electronics, Inc. 123 Commerce Ave., Boerne, TX 78006 830-249-9756 - (f) 830-249-8535 cyclopstv@beecreek.net www.cyclopstv.com	Cyclops Electronics	3" - 48"	200'-1,000'	HDD, Flash Drive/USB Thumb Drive, SD Card, DVD	4	۷	~	~	~	
See ad page 48	Draineables Direct 4370 Moline Martin Rd., Millbury, OH 43447 800-421-4580 - 419-838-6071 - (f) 800-752-8524 sales@draincables.com www.draincables.com	RIDGID®	1.5" to 12"	25' - 200'	HDD, Flash Drive/USB Thumb Drive, SD Card, Compact Flash, DVR, CD, DVD	~		~	×.		~
See ad page 12	Duracable Manufacturing 300 Ashworth Rd., West Des Moines, IA 50265 877-244-0556 - (1) 515-223-4220 sales@duracable.com www.duracable.com	RIDGID®, Hathorn, Wohler	2" - 12"	100' - 400'	Flash Drive/USB Thumb Drive, SD Card, DVD	~		۷	~		V
See ad page 81	Dynamic Repairs 40 Arnot St., Unit 20, Lodi, NJ 07644 973-478-0893 - (1) 973-478-0895 dynamiccablerepairs@yahoo.com www.dynamicrepairs.com	GWS, RIDGID®, Vision Technology, Insight Vision, Pearpoint, Gator Carn					~				~
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<i>Electric Eel</i> . See ad page 40	Electric Eel Mig. 501 W Leffel Ln., Springfield, OH 45501 800-833-1212 - 937-323-4644 - (f) 937-323-3767 info@electriceel.com www.electriceel.com	Electric Eel Mfg.	1.5" - 12"	125' - 300'	HDD, Flash Drive/ USB Thumb Drive, DVD		~	~			~
electro ³ scan See ad page 86	Electro Scan, Inc. 1745 Markston Rd., Sacramento, CA 95825 800-975-6149 - 916-779-0660 - (f) 916-779-0661 sales@electroscan.com www.electroscan.com	Electro Scan, Inc.	6" - 60"	100' - 2,000'	Cloud	~	~	~	4	V	~
See ad page 80	Electronic Repair Company 8518 1st Ave. N, Birmingham, AL 35206 205-836-0454 repair@servicewithasmile.com www.servicewithasmile.com	General Wire, Ratech, Vision, RIDGID [®]			Flash Drive/USB Thumb Drive, SD Card, Compact Flash, DVR, CD, DVD, VHS		1	~	1		
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See ad page 63	Forbest Products Co. 315 Harbor Way, Ste. B, South San Francisco, CA 94080 650-757-4786 forbestusa@gmail.com www.forbestusa.net	Forbest Products Co.	0.5" - 50"	65' - 400'	Flash Drive/USB Thumb Drive, SD Card, DVR		~	~			~
General PIPE CLEANERS See ad page 2	General Pipe Cleaners/General Wire Spring 1101 Thompson Ave., McKees Rocks, PA 15136 800-245-6200 - 412-771-6300 - (f) 412-771-2771 info@drainbrain.com www.drainbrain.com	General Pipe Cleaners General Wire Spring Gen-Eye	1.5" - 10"	100' - 400'	HDD, Flash Drive/USB Thumb Drive, SD Card, DVD	~	~	4	۷		4
See ad page 73	Image Inspection Services LTD. 4650 - 50 Ave. SE, Calary, AB T2B 3R4 CANADA 800-667-6670 - 403-287-1053 - (f) 403-243-4564 sales@image-inspect.com www.image-inspect.com	Image, Prototek, Riezler, Spering	0.5" - 72"	0' - 2,500'	HDD, Flash Drive/ USB Thumb Drive, SD Card, DVR, CD, DVD, VHS	4	~	~	~	~	~
See ad page 80	MTech 7401 First PI., Cleveland, OH 44146 800-362-0240 - 440-646-0996 - (f) 440-646-9953 sales@mtechcompany.com www.mtechcompany.com	MTECH	6" - 200"	500' - 2,000'	Flash Drive/USB Thumb Drive, SD Card, DVR, DVD	~	V	4	4		V
MyTana See ad page 31	MyTana Manufacturing Co., Inc. 746 Selby Ave., St. Paul, MN 55104 800-328-8170 - 651-222-1738 - (f) 651-222-1739 mytana@mytana.com www.mytana.com	MyTana Manufacturing	1.5" - 12"	100' - 400'	HDD, Flash Drive/USB Thumb Drive, SD Card, DVR, DVD				~		~
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See ad page 30	Pipelogix Inc. PO Box 14014, Palm Desert, CA 92255 866-299-3150 - (f) 760-406-6023 joan.stone@pipelogix.com www.pipelogix.com	Pipelogix, MuniXS			HDD, CD, DVD	~					
Prototek corporation See ad page 26	Prototek Corporation PO Box 1700, Poulsbo, WA 98370 800-541-9123 - 360-779-1310 - (f) 360-779-1510 prototeksales@prototek.net www.prototek.net										V
See ad page 54	R.S. Technical Services, Inc. 1327 Clegg St, Petaluma, CA 94954 800-767-1974 - 707-778-1974 - (f) 707-769-8806 sales.info@rstechserv.com www.rstechserv.com	R.S. Technical Services, Inc.	3" - 200"	500' - 3,000'	HDD, Flash Drive/USB Thumb Drive, SD Card, Compact Flash, DVR, CD, DVD, VHS	~	~	~	~	~	~

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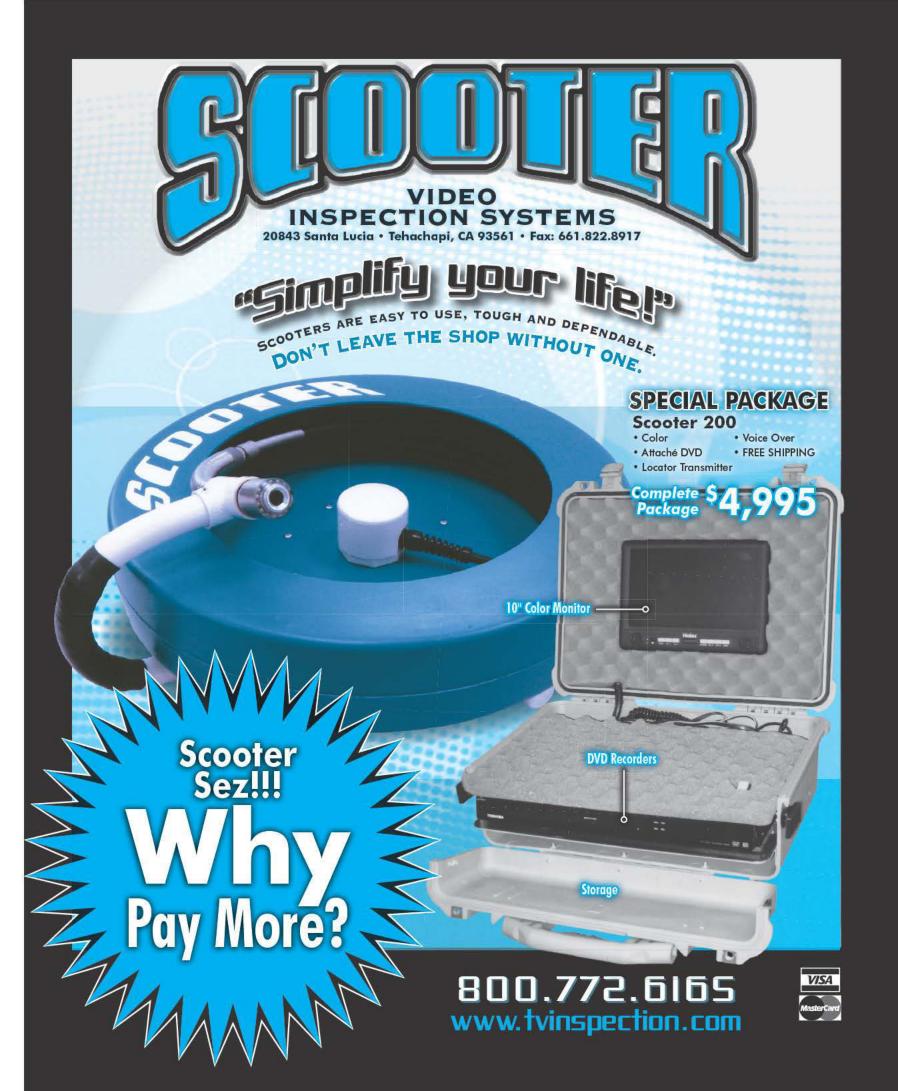


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Veiled Threats

DON'T LET POOR BUSINESS PRACTICES WIPE OUT YOUR CORPORATE PROTECTION

BY ERIK GUNN

t's a given – or should be – that your business is formally incorporated. And if it isn't, go back and read the October 2010 column that directly addresses why it should be.

Incorporating can help ensure that in times of trouble your personal assets are secure even when your business assets are under threat. But that's not enough.

Once incorporated, you need to employ the best practices to keep your corporate status intact. That's because courts and regulators can sometimes find reasons to wipe it out.

Lawyers call it "Piercing the Corporate Veil." When it succeeds, it can be devastating to a business owner who thought his or her personal assets were protected.

The obvious way to avoid any of these troubles is to make sure your business is adequately capitalized, pays its bills on time, and stays well on the right side of the law and ethical business practices.

WHY IT HAPPENS

Don't panic. Veil-piercing isn't some kind of random strategy taken out against just business owners. It happens for a reason.

Typically, it's because the business or its owner is suspected of committing some sort of fraud – against a customer, vendor or financer, or the government.

Failing to deliver a service that's been paid for, cheating on taxes and lying to the bank are obvious examples. But under the law, business fraud also includes any spending or investment of corporate funds that is reckless, irresponsible or dishonest.

Any of those misdeeds can bring your business to the attention of authorities who may then try to undo your corporate structure.

But well-meaning businesses that wind up on the bad end of a big lawsuit may also be in jeopardy. If a plaintiff wins a big judgment against your company – and if there are questions about how separate your personal assets and finances are from the corporate entity – that may present an opportunity for an aggressive attorney to question, and try to undo, your corporate status.

Besides fraud or losing a big lawsuit, there are other factors that can lead the court, a plaintiff's lawyer or the taxman to try to rip away a company's corporate protection.

One is too much debt. Consider a business that's financially so deep in the hole it can never hope to reasonably pay back the money it owes – whether to suppliers or to the government. The creditors are going to look for ways to get back at least some of what they're owed.

Erik Gunn is a magazine writer and editor in Racine, Wis., where he operates Great Lakes Editorial Services, consulting for businesses, nanprofitis and individuals. Readers may direct inquiries to him by contracting this publication at 800/257-222 or emailing editor@cleaner.com. The information here is offered for general interest, and is never a substitute for direct, professional counsel from a licensed legal, investment or financial advisor.

The flip side of that is too little startup cash. The business term for this is "inadequate capitalization." It's not a crime to start up your company with little or no money, but if the unfunded company looks like a pretense – perhaps a phony shell set up to hide the owner's income from some other venture – and the court catches on, the company's corporate status will be at risk.

STAYING SAFE

The obvious way to avoid any of these troubles is to make sure your business is adequately capitalized, pays its bills on time, and stays well on the right side of the law and ethical business practices.

But just as always driving safely doesn't guarantee you'll never have a car crash, maintaining a sound business – although it's absolutely critical – isn't always enough to keep you out of trouble.

So the other half of protecting your corporate status is to do just that – protect it. That means you simply take a number of common-sense steps that show the world that you and the company really are two separate entities. How?

1. Follow corporate formalities. Don't just pay the fee, sign the papers and file them with the state office where corporations are registered. Keep up that registration each year (or however often your state requires it to be renewed). And do all the other things that your state requires of corporations.

- Maintain an active board of directors and hold regular board meetings to carry out business.
- Document your board meetings and other corporate actions. File an annual report with your state if one is required.
- · Hold an annual meeting and keep minutes.

2. Keep personal and corporate finances separate. This is such a basic rule we shouldn't have to repeat it here – but in fact, a lot of startup business owners violate this one. Your business should have its own bank accounts, its own investment accounts – even its own credit card, if you find having a business credit card useful.

Also, never co-mingle your business finances and your personal ones. Don't pay the mortgage for your house with a check from your business account. Don't use a personal check to pay for supplies you pick up for your business.

Finally, when it comes to taking payments from the company, you're better off establishing from the start a systematic payment schedule. In short, put yourself on a salary. Better yet, establish a written payment agreement between the business and you – and have your board sign off on it.

It's easy, and probably tempting, to fall into a pattern of just transferring excess cash from the business account to your personal account as you find you need it. But that can also be a red flag for anyone trying to prove you and your business really aren't separate from each other.

Set up formal policies as well for other financial matters, like how your company makes purchasing decisions and how you decide when to borrow

MONEY MANAGER

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money. Finally, make sure you subject the business to regular audits with a properly certified or licensed financial professional.

3. Be ethical – and set an example for employees. Don't just try to practice your ethics by the seat of your pants. Set forth some basic principles, stick to them, and make sure everyone who works for you understands them and follows them as well.

Incorporation is a valuable form of protection for your business, and for you and your family. By following these simple guidelines, you can help ensure that protection does all it's supposed to.

Then, instead of a flimsy corporate veil someone can easily rip down, you'll have a long-lasting safeguard: a shield as strong as steel. c







HOOKS...

- > Several different styles of heat-treated hooks are available
- > Top Poppers are great to open manhole covers
- > The Handy Hooks allow two handed use

PROBES...

- > Insulated, standard, and specialty soil probes
- > Metal shaft sizes: 3/8" round, 3/8" hex, or 7/16" hex
- > Replaceable tips are threaded on and hardened
- > A "slide" allows the handle to pound the shaft into the ground

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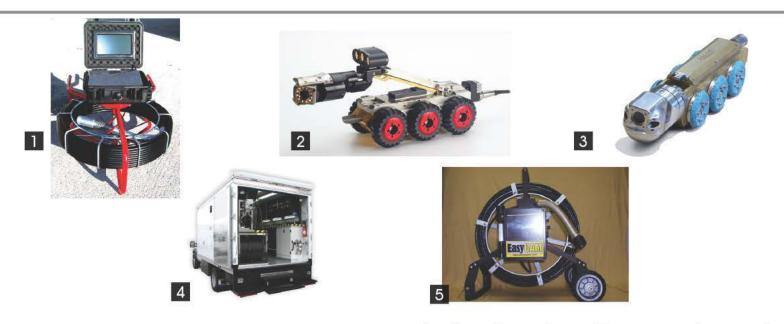
Cleaner magazine is written solely for professionals who service residential and commercial drain and sewer maintenance, cleaning and repair business along with industrial high pressure cleaning contractors

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Mainline Sewer Inspection BY BRIANA JONES



1. COMPONENT CAMERA SYSTEM

The Quick View camera system from Amazing Machinery is equipped with a commercial grade camera head and cable. The unit has a 7-inch flatscreen LCD in an ABS case, and records to an SD card. The high-quality color camera head is 1 3/8 inch in diameter and has a built-in 512 Hz sonde transmitter. The stainless steel camera body with sapphire lens makes the head durable. The camera head is waterproof to 500 feet, and equipped with 10 white LEDs, a dimmer control and an 11-inch steel spring loader.

The system has a 130-foot-long, 3/8-inch super slick push cable, with a 20-inch lay-flat storage reel. The component-based system allows the user to change the camera head, recorder or monitor if it is damaged. 800/504-7435; www.amazingmachinery.com.

2. STEERABLE TRACTOR

The Pathfinder XL tractor from Aries Industries has a six-wheel steerable drive system that allows it to drive over obstructions and offset joints. Tires range from the standard 3 3/8-inch for lined 8-inch pipe to 10-inch tires with bolt-on gear-reduction side plates for 36-inch and larger pipes. The tractor can be converted to tread-track drive.

With the remote-operated camera lift in the down position, the unit can navigate 8-inch lined pipe. With 9 inches of lift, the operator can center the camera in the pipe or raise the camera above the waterline. Additional features include a tip-up connector with integral rear-viewing camera and LED lights, sealed and pressurized electronics cavities, on-screen diagnostics, brushless DC drive motors with temperature sensors, and permanently lubricated drive gears. The tractor has a built-in 512 Hz sonde beacon, and optional auxiliary lights can illuminate large-diameter pipes. 800/234-7205; www. ariesindustries.com.

3. CAMERA/CRAWLER UNIT

The Cobra V10 C310 camera from Cobra Technologies is a short pan, tilt and zoom camera and 6-inch crawler combination for relined 6-inch pipe. Used with the Cobra C601 crawler, the camera can operate in relined

6- through 24-inch pipes. The 18-inch-long camera/crawler unit provides a compact assembly to avoid protruding laterals.

The stainless steel camera features an automatic iris, focus, zoom and Luxeon lighting modules capable of lighting 36-inch-diameter pipe. The lighting operates on the camera power supply, eliminating the need for light head controls. The rotate and pan are capable of 360-degree continuous rotation. High-traction carbide wheels are available. Wheels can be added using a single point connection allowing for quick change for pipe sizes through 24 inches. The unit can be installed on any multi-conductor system. The camera can be used with any of the Cobra crawlers and is available with a conventional 3-inch body for use on industry standard multi-conductor systems. 800/443-3761; www.cobratec.com.

4. VEHICLE-MOUNTED SYSTEMS

Truck-, van-, ATV- or trailer-mounted systems from CUES can include TV inspection equipment for sanitary and storm sewer lines, laser and sonar pipe profiling systems, mainline joint and lateral sealing, and lateral reinstatement cutters for the relining industry. Equipment can be ergonomically mounted to inspect 6- to 200-inch mainlines and 3- to 8-inch laterals. Interior, cabinets, equipment and mounting configurations can be customized.

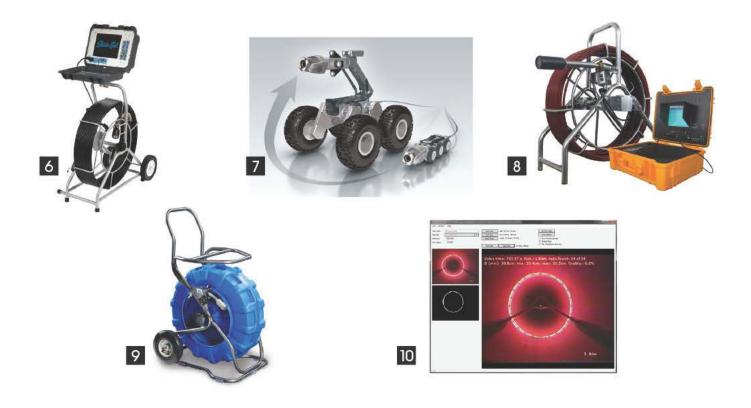
Truck- and trailer-mounted grout rehabilitation systems are also available for mainline, manhole and lateral joint sealing and can be equipped with the latest CCTV equipment and decision-support software for television inspection with documented condition assessment. All systems can be configured to run urethane, acrylimide and acrylate grouts. Systems can be mounted in a dry freight box for export. Grout packers are available for mainline and lateral sealing. CUES Granite XP software is available to integrate data with enterprise asset management systems. 800/327-7791; www.cuesinc.com.

5. MODULAR INSPECTION

The EasyCAM III inspection camera from EasyCAM offers modular components for easy service. Features include a steerable color camera head, the choice of 150 or 200 feet of HYTREL pushrod, 512 Hz transmitter,

(continued)

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on-screen digital footage counter, 8-inch LCD daylight readable monitor, voice over, anodized aluminum frame, 12-volt cordless operation, custom lift/ centering kit and onboard lighting for night work. The camera also offers SD card recording and can invert pictures 180 degrees. A second RCA video jack is available to use with any off-the-shelf monitor, laptop or TV video goggles. 239/260-2056; www.plumbersbestcamera.com.

6. PIPELINE INSPECTION SYSTEM

The eCAM Pro 2 pipeline inspection camera system from Electric Eel Mfg. inspects 3- to 10-inch-diameter pipes and locates a variety of pipeline problems. It includes a stainless steel-housed 1.68-inch-diameter self-leveling color camera with sapphire lens, 20 LED light ring and high-resolution CCD element. A flexible camera spring navigates 3-inch P-traps. The camera features a 10.4-inch daylight readable display with an on-screen footage counter, 16 pages of text writing with memory saves, and click-touch controls with one-touch recording.

Users can record directly to a USB flash drive and rename files on the flash drive after recording. Other features include built-in voice over recording, audio/video out jacks, 8X zoom function, adjustable light controls, and two-hour battery with built-in charger. The unit comes standard with 200 feet of Kevlar-braided 1/2-inch-diameter pushrod (available with 300 feet of pushrod) and powder-coated steel tube and bar construction with secure-locking reel brake. It rolls on 8-inch wheels for easy maneuverability. **800/833-1212**; **www.electriceel.com**.

7. CAMERA CARRIAGE

The **bolt-on carriage** for **Envirosight's** ROVVER X raises the crawler, expands its wheelbase and gives it ground clearance. The carriage attaches in seconds and accepts all ROVVER wheels, as well as two pneumatic wheel options. When used in tandem with the system's remote camera lift accessory, the carriage gives the camera an overall inspection capability of 6 to 72 inches, plus the ability for centered viewing in most common pipe sizes 24 inches and larger.

The carriage elevates the crawler 4.4 inches or more with pneumatic wheels. It lengthens the crawler's wheelbase 75 percent, widens it 150 percent, and offers 7 3/4 inches of ground clearance. The camera's ultrapowerful

motors and efficient gear train allow it to pivot in place and easily pull the full length of its 1,000-foot cable. The carriage is available with two large pneumatic wheel sets. One style measures 10.4 inches in diameter by 3.8 inches wide and has knobby tread suited for deep silt and debris. The other style measures 8.4 inches in diameter by 2.2 inches wide and has less aggressive tread. 866/936-8476; www.envirosight.com.

8. ELECTRONIC METER INSPECTION

The FB-PIC3388M inspection camera system from Forbest Products comes with a 10-inch control station with DVD recorder, 195 feet of 3/8-inch cable and an 18-inch reel with a self-leveling color camera that can be upgraded to include a 512 Hz built-in transmitter. With an electronic meter counter installed on the reel, the system can indicate on the screen the length of cable pulled out. It can also be used as a wireless inspection system when working with the company's wireless transmitter/receiver. Via Forbest Wi-Fi mini processor, the system can be networked with Internet and the photos captured by the camera can be viewed live from computers worldwide. 650/757-4786; www.forbestusa.net.

9. BASIC INSPECTION

The MY30 basic mainline inspection system from MyTana Mfg. Company includes 200 feet of pushrod, a black-and-white camera head, the all-digital DCB12 control box, and the AccuStic 512 locator. All camera heads include a 512 Hz transmitter for locating problems found during inspection. 800/328-8170; www.mytana.com.

10. LASER MODULE

The WinCan laser module from Pipeline Analytics captures geometric information to verify proper pipe installation, plan relining projects, determine remaining pipe life, monitor erosion/corrosion and analyze partial collapses. It accepts standard and HD video and links collected data to the asset being inspected for easy recall from a section view or GIS entity. The module works with most laser profiling hardware, capturing data in one of three modes.

In parallel laser mode, a properly equipped camera aims its parallel lasers perpendicular to a pipe wall, then rotates 360 degrees. Video is analyzed to determine pipe diameter and deformation at that location. In ring mode, a *(continued)*

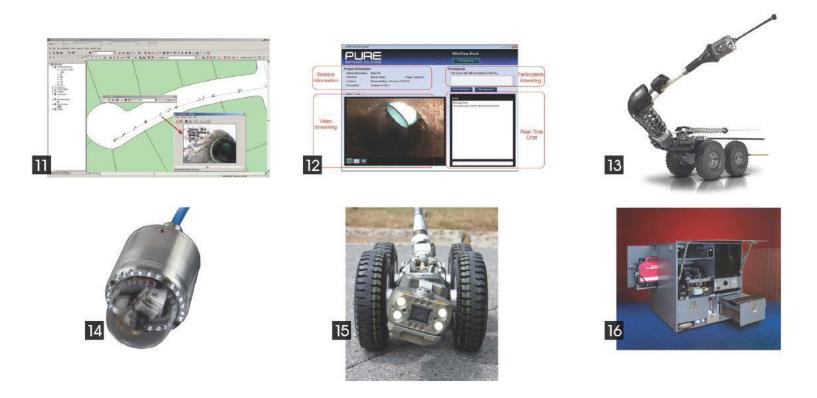


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laser ring pattern is extracted frame by frame from crawler video to trend a pipe's diameter and deformation over its full length. This data is readily converted to a solid model, ovality graph or color plot. In scanning mode, a ring pattern is interpolated from the laser dots cast by a properly equipped side-scan camera. The readings are trended frame-to-frame, yielding diameter and deformation data that can be converted to a solid model, ovality graph or color plot. **877/626-8386; www.pipelineanalytics.com**.

11. GIS MAPPING

The GIS module from PipeLogix allows users to create a map of assets from existing survey work. Once the GPS coordinates are added to the survey data with the "Get GPS" tool, users can export new or existing pipes to update or create a map. The tool can be used to import the coordinates from a GPS unit that is connected to a computer, or information can be manually entered by copying and pasting from other forms.

The system makes exporting pipeline inspection survey conditions and displaying them on maps with correlated exact footage easy. Users choose the condition export needed (shape file, personal geodatabase, enterprise geodatabase, and file geodatabase are all supported), map the fields and export. Once added to the ArcMap and using the toolbar, users can select the condition and open the video file to view it. **866/299-3150**; www.pipelogix.com.

12. CCTV VIDEO SHARE

WinView 2.1 software from PURE Software Solutions enables CCTV operators to invite project specific individuals to view the video stream directly from the CCTV equipment via the Internet and secure connection. Video also can be saved to a remote location for future analysis. Unlimited 3G/4G broadband wireless cards are available. 303/867-1414; www. puresoftwaresolutions.com.

13. INSPECTION ROBOT

The LISY 3 lateral launch inspection and cleaning robot from RapidView IBAK North America can travel 500 feet up the mainline sewer, inserting a pan-and-tilt camera and then inspecting as much as 100 feet up the lateral line. The cleaning accessory package enables users to clean and inspect laterals from the mainline in the same operation. 800/656-4225; www.rapidview.com

14. PORTABLE INSPECTION

The Pan n' Tilt push camera from Ratech Electronics is a portable inspection system for pipes and drains as small as 3 inches in diameter. Users can choose the type of camera to use with the push system: black and white, color, self-leveling, micro or pan n' tilt. The camera can be retrofitted to the company's existing systems or as a stand-alone unit. It rotates 330 degrees vertically and 220 degrees horizontally. The cost-efficient unit is adaptable to the company's Jet Cam.

Combining the camera with one of the company's control units, such as the Elite SD, gives recording capability using SD/USB drive and allows MPEG video capture and JPEG image capture. Also included is an on-screen display overlay system providing electronic distance counter, time, date and eight pages of memory for listing problems and displaying of company information. Standard 200-foot gelrod cable is included. **800/461-9200**; www. ratech-electronics.com.

15. THREE-IN-ONE SYSTEM

The KS135 scan from Rausch Electronics USA is a three-in-one system. The CCTV camera features two integrated laser diodes on either side of the pan-and-tilt camera head so it can perform laser profiling, crack measurement and mainline pipe inspections. On the way into the pipe, the system performs conventional TV inspection and measures all joint widths.

Individual measurements can be taken at any time for determining the actual pipe diameter and deflection. Those measurements then become part of the inspection report. On the way out of the pipe, the system performs a laser scan of the entire pipe length. The camera head swivels perpendicular to the pipe wall and rotates at a defined speed. The scan software continuously calculates the exact pipe diameter and all deflections via triangulation. Once the run is completed, the software generates a graph in 2D and 3D, showing any deflection and the average pipe diameter. **717/709-1005; www. rauschtv-usa.com**.

16. COMPACT INSPECTION

The CUBE from RS Technical Services is a compact, all-inclusive mainline system that offers all the inspection capabilities found in vehicle-mounted systems. It provides portability and transport flexibility and is well suited for (continued)

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easement work or for users needing a full mainline system in a free-standing, highly mobile format.

Housed in quarter-inch, powder-coated, glare-resistant aluminum, the system has forklift access in the front and rear along with stainless steel lift and tie-down hooks for easy handling and storage. The system is designed to fit on an ATV or in the bed of a pickup truck. It can be configured to operate any of the company's mainline cameras and transporters with up to 1,500 feet of cable for inspections in lines 6 inches in diameter and larger. Everything is self-contained, including an onboard generator, two 500-pound capacity storage drawers and a front-access 9-gallon pressurized washdown system. An optional rack mount or laptop computer with a choice of data collection software is available. 800/767-1974; www.rstechserv.com.

17. TOUCH CAMERA SYSTEM

The PROvision touch camera system from Spartan Tool provides all controls on the touchscreen monitor. The system features a self-leveling camera head, 512 Hz beacon, and a fully daylight visible 15-inch screen. All video is recorded to a thumb drive, allowing operators to give customers a copy. The telestrator allows users to circle drain problems right on the screen, or a QWERTY keyboard can be brought up. 800/435-3866; www. spartantool.com.

18. STEERABLE CRAWLER

The Model 636S 6-inch steerable crawler from TV Ferret employs full differential steering, allowing it to rotate about its own axis. The main crawler body is a one-piece mono-tube stainless steel O-ring sealed structure, forming the basis for the streamlined, submersible design. The easy-to-control crawler has a stainless steel articulating cable receptor to alleviate stress on the main cable for longer cable life and is designed for quick, easy connection without any tools.

The tracks are one-piece continuous loops and are made of reinforced urethane. The solid, paddle tracks obtain maximum traction in the worst conditions and do not bind when in loose grit. For inspecting pipe up to 36 inches, the easy-to-use, modular lift wheel system attaches to the outside of the crawler, without having to remove the tracks. The pan-and-tilt camera head contains a high-resolution camera and ultrabright LEDs for illuminating tough environments. Options include industry standard 512 Hz locating sonde, rear-viewing backup camera, internal pressure monitor, pan-tilt-zoom camera, and high-traction lift wheels. 518/399-2211; www.tvferret.com.

19. FULLY EQUIPPED INSPECTION

The Type-P inspection system from Vivax-Metrotech is a fully equipped system with a choice of two interchangeable camera heads. The reel comes with 400 feet of 12 mm Kevlar reinforced pushrod. The 1.8-inch D46 selfleveling camera is for 4- to 8-inch pipes and a smaller 1.3-inch D33 selfleveling camera is for 3- to 4-inch pipes. The Type-B skid with light kit expands inspection range up to 15 inches. The system is fitted with field serviceable termination and dual-frequency locatable sonde.

The system includes a modular control module with 8-inch color LCD, dual-frequency transmitting sonde, digital recording to the internal hard drive or SD card, full-function keyboard, internal microphone, AC/DC power, rechargeable batteries, USB interface, distance counter and camera LED brightness control. The vCam design makes it field serviceable if a problem should arise. 800/446-3392; www.vxmt.com.

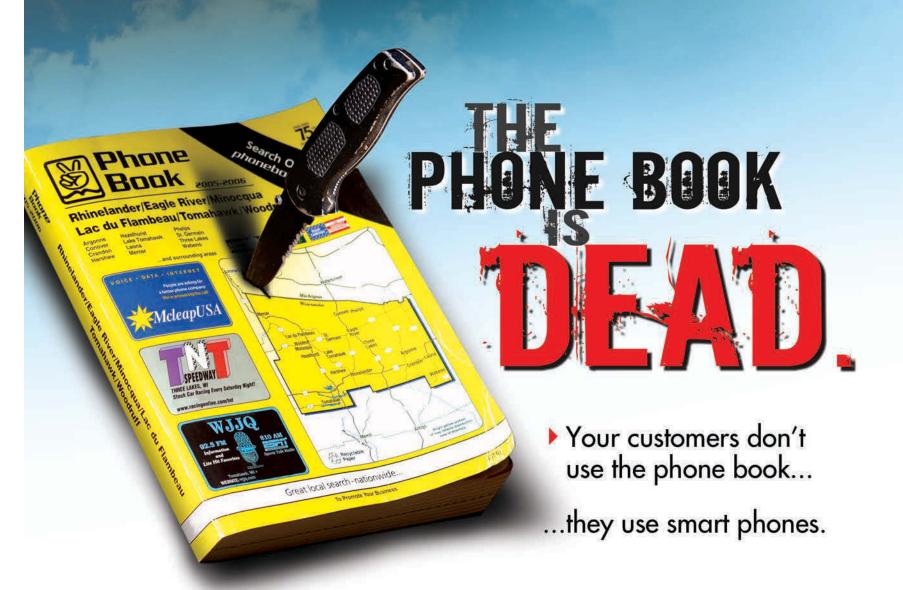
20. DUAL CAMERA HEADS

The VIS 340 Plus inspection camera system from Wohler USA features dual camera heads. It comes with a 1 1/2-inch, 360-degree pan and 180-degree tilt camera head, and a 1-inch, straight camera head. Both camera heads are waterproof and come with brilliant LED lights. The system can be used to analyze defects in water pipes and inspect ducts, welding seams, gaskets and manholes. It includes a TFT color monitor and moves easily around 90-degree bends. The system's digital distance measurement feature can pinpoint the exact location of trouble spots. Users can record, save and replay inspections for customers on a laptop. The system comes in a tough, self-contained carrying case. 978/766-2956; www.wohlerusa.com. c

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NLB 125 waterjetter offers pressure conversion option

BY ED WODALSKI

PRODUCT NEWS

The 125 Series high-pressure waterjetting system from NLB Corp. features 125 hp and 145 hp models that can be configured in about 20 minutes to operate at any of eight pressures, from 6,000 to 40,000 psi, with the optional conversion kit. Comparable flows range from 4.4 to 29 gpm for the 125 hp model or 4.8 to 32.5 gpm for the 145 hp model. Both models are powered by either a Cat C4.4 or QSB 4.5 Cummins continuous-duty, six-cylinder diesel engine.

"The conversion kit gives contractors the option of having one pump in their fleet that can go from tube cleaning at 10,000 psi at 17 gpm on Monday to paint removal on Tuesday (at 40,000 psi and 4 gpm)," says Jim Van Dam, marketing communications manager for NLB. Unit output is determined by the size of plunger in the positive displacement reciprocating pump.

"It's a balancing act," Van Dam says. "You can't run at 40,000 psi with the same set of plungers you use at 10,000 psi because the forces on the power end of the pump would be too great and it would fail. You're trading off the amount of water for higher pressure. Essentially, the conversion kit is a different sized plunger that's installed into the pump."

The 125 Series is available in models that deliver 29, 22 or 17.5 gpm

at 6,000, 8,000 and 10,000 psi or 12, 9,

7.5 and 4.4 gpm at 15,000, 20,000, 24,000 and 40,000 psi. The 145 Series is available in models that deliver 32.5, 24.5 and 19.5 gpm at 6,000, 8,000 and 10,000 psi or 13, 10, 8 and 4.8 gpm at 15,000, 20,000, 24,000 and 40,000 psi.

The trailer-mounted unit comes standard with four-wheel electronic brakes, full DOT lighting package and heavy-duty axles. The tandem-axle trailer has 14-inch tires and measures 80 inches wide, 164 inches long, approximately 90 inches high and weighs 5,500 pounds.

Other features include water-pressure actuated throttle control that monitors operator demand and adjusts output, heavy-duty V-belt enginedriven pump assembly, 80-gallon fuel tank, 12-volt electric start, inlet water filter and 30,000-pound oil-filled pressure gauge with snubber. All operating controls, including the pressure compensating bypass valve and pressure gauge with snubber, are mounted on a separate accessory manifold for extra protection. 800/441-5059; www.nlbcorp.com.

JENNY DIRECT-DRIVE COLD PRESSURE WASHER

Steam Jenny direct-drive cold pressure washers from Jenny Products are powered by 9 or 13 hp Honda GX Series engines and feature a triplex ceramic plunger pump. Pressures range from 3,000 to 4,000 psi with flow from 3 to 4 gpm. The washers have thermal pump protection, unloader valve and high-pressure relief valve to protect the pump. The engine automatically shuts down

if low oil levels are detected. The powder-coated chassis is made from 7-gauge steel. 814/445-3400; www.steamjenny.com.



RIDGID FOLDING PIPE STAND

The VF-99 folding pipe stand from RIDGID is designed for joining pipes up to 12 inches in diameter and 2,500 pounds. The 24-pound stand features folding rectangular profile legs (27 inches in diameter open, 7 inches closed) and comes with an ergonomic V-handle that adjusts from 28 to 58 inches high and locking ring to hold the stand in place. 800/769-7743; www.ridgid.com.









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BALDWIN FILTERS PLANT RECEIVES SAFETY AWARD

Baldwin Filters' Gothenburg plant received the Safety Spirit Award for 2011 from the Nebraska Safety Council. The award is based on training activities, safety



committee activities, sustainability and current year statistics. Baldwin Filters, a CLARCOR company, produces 6,000 lube, air, fuel, hydraulic, coolant and transmission filtration products.

LECHLER PUBLISHES SPRAY PRODUCT CATALOG

The Lechler Catalog 500 features spray products and accessories as well as information on spray system design, material options, conversion tables, product differentiation and a new section on lances and nozzle headers. The catalog can be downloaded at www.lechlerusa.com.

AQUA BLAST MARKS 50TH ANNIVERSARY

Aqua Blast celebrates its 50th anniversary this year. The maker of pressure washing machines was founded by Paul Gerber in February 1962. Located in Bluffton, Ind., Gerber sold the company to Phil Kaehr in 1984. Former employees Bob Heyerly and David Tumbleson acquired the company in 1985, with Heyerly, upon his retirement, selling his portion of the business to Tumbleson in 2008.

GUARDAIR ACQUIRES ALLEN GASKET

Guardair, manufacturer of tools and accessories for the industrial maintenance, repair and operations market, acquired Allen Gasket Cutting Machine Co. of New Bedford, Mass. Allen will be absorbed into the Allpax Gasket Cutter Systems Division of Guardair's Chicopee, Mass., headquarters.

RS LINING SYSTEMS RECEIVES NSF-61 CERTIFICATION

The RS BlueLine cured-in-place pipe (CIPP) system for pressure pipe rehabilitation received certification to NSF/ANSI 61: Drinking Water System Components-Health Effects by NSF International. RS BlueLine is installed by Inland Pipe Rehabilitation (IPR) and approved for the renewal of all municipal pressure pipe systems, including drinking water mains, transmission lines and force mains.



RAPIDVIEW TEAM COMPLETES TRIATHLON

RapidView team members completed the June Manitou Monster Triathlon in Rochester, Ind. The event included a 400-meter swim, 13-mile bike ride and 5K run. Twelve employees and family members participated as part of the company's ongoing program to encourage fitness and exercise.



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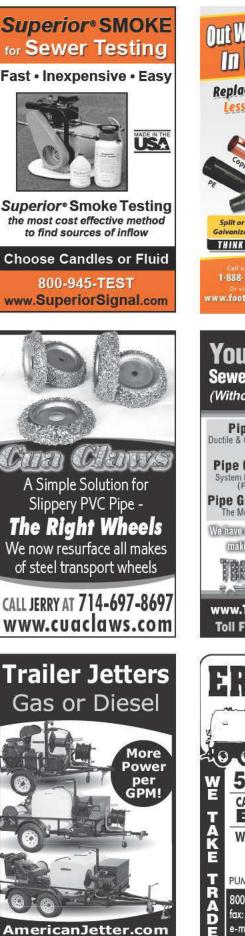
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HAZARDOUS WASTE UNITS

2010 Peterbilt 340 cab and chassis with a used 3,200 U.S. gallon, stainless steel, DOT certified vacuum tank with a Presvac PV 750 vacuum-pressure pump. (Stock #7530C) www.VacuumSalesInc.com, (888) VAC-UNIT (822-8648). (CBM)

1988 Freightliner cab and chassis with a pre-owned 3,150 U.S. gallon, carbon steel, vacuum tank; with a Demag Wittig RFL100 vacuum-pressure pump. (Stock #173GC) www.VacuumSalesInc.com, (888) VAC-UNIT (822-8648). (CBM)

New 3,200 U.S. gallon, carbon steel, DOT certified 407/412 vacuum tank; dump type with full open rear door and a Presvac PVB 750 vacuum-pressure pump installed on a 2012 Peterbilt, 348 cab and chassis. (Stock #13511V) www.VacuumSalesInc. com, (888) VAC-UNIT (822-8648). (CBM)

1998 Mack RD6885 with a 3,000 U.S. gallon, DOT certified, carbon steel vacuum tank unit. (Stock# 6653V) www.VacuumSalesInc.com, (888) VAC-UNIT (822-8648). (CBM)

JETTERS-TRAILER

2010 Mongoose 184 tow behind jetter: Low hours, Orlando, Florida. 267-249-3774. (C09)

1998 SECA: 700 gallon, trailer jet w/640 hrs, runs like new, GM gas engine w/40 @ 2,000 FMC pump. \$13,900. Jim at 1-800-293-2012 for details. (C09)

JETTERS-TRAILER

1989 SJ-600E Hydro-Jetter trailer with 600 gallon water capacity: Pump is BAD, engine runs great. \$2,800/OBO. Mike 970-201-8006 or 970-434-3113, CO. (C09)



Xtreme Flow Hot/Cold Jetter! Model #HJ2TA8536, tandem axle trailer, 35 hp Vanguard 8.5 gpm @ 3,600 psi, 325 gallon water tank, 300' hose, General Pump. List \$34,995. On sale for \$29,995. Fully loaded! 800-213-3272

www.hotjetusa.com CPBM

2010 US JET 4018, 600 gallon, less than 50 hours, speed control reel, mini kit reel, unloader valve, reel counter, Hatz silent pack, LIKE NEW CONDITION. \$32,000. Call 540-921-3542, cell: 599-3545, ask for Chuck. (C09)

JETTERS-TRUCK

1999 Freightliner FL 80 with 2100 Vactor, 12 yard debris body, 1,500-gallon water tanks, 80 gpm @ 2,500 psi water pump. \$75,000. 614-837-3010, OH. (C10)

2006 GMC TC6500 cab and chassis with Pipe Hunter trunk mounted jetting unit, 3,000 psi @ 50 gpm with a 1,000-gallon water tank, rear mounted hose reel with Jet Eye Camera System, **6,800 original miles, like new. \$115,000 sale price.** (Stock #13234V) www.VacuumSalesInc.com, (888) VAC-UNIT (822-8648). (CBM)

Jack Doheny Supplies Inc. offers a full range of late model combo units and DOT industrial vacuum loaders. Call us @1-800-3DOHENY. (CPBM)

JET VACS

1999 Sterling cab & chassis with a Vactor 2110, combination vacuum loader and high pressure sewer cleaning system. (Stock #2775C) www.VacuumSalesInc.com, (888) VAC-UNIT (822-8648). (CBM)

2006 Sterling with a VacAll AJV 1215: 12 yard debris body, 1,500 gallon water, combination vacuum/jetting unit. (Stock #5673C) www. VacuumSalesInc.com, (888) VAC-UNIT (822-8648). (CBM)

2000 Sterling 2112 Vactor: 2 stage fan, low hours, hydro excavation kit, 80 gpm. Unit is in good condition. 2005 GapVax MC1510 with 18" blower, 800' hose reel, newer pump, 80 gpm. Unit is in good condition. Call Jeff at 602-614-3019. (C10)



2004 Sterling Vac-Con: New C-7 CAT engine with 2 years on warranty, Myers DP 80 gpm/2,000 psi pump, new telescoping boom, 12 yard debris tank, 3 stage fan, 126,000 miles. \$70,000. Call 813-489-3108. (C10)

2005 Sterling Vac-Con, re-powered with C-10 335 hp engine, Myers DP 80 gpm/2,000 psi pump, 3 stage fan replaced 2 years ago, 12 yard debris tank, 126,000 miles, ready to work. \$75,000. Call 813-489-3108. (C10)





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JET VACS

1996 Ford LT9000 2112 Vactor: Cummins, 370 hp, 15 speed transmission with low reduction, twin fan, 100 gpm pump @ 2,000 psi, telescopic boom, extendable hose reel, debris pump off system, and more. Photos available. Call: 503-931-6026. Price: \$70,000/OBO. (C10)

1995 Vactor 2100: 10-yard debris tank, 1,000-gallon water capacity, articulating hose reel, and PD vacuum system, single axle L8000 chassis with 55,000 on odometer. Debris tank needs work. \$27,500. Call 262-951-8979, WI. (C10)

1995 Vac-Con with 1,250 gallon water capacity, 11 yard debris tank, extendable boom, articulating hose reel, 3-stage vacuum, and John Deere aux engine with 1,074 hours. System mounted on a L8000 Ford chassis with 4,229 hours, municipal truck. \$40,000. Call 262-951-8979. (C10)



2005 International Vac-Con Jet Vac: DT466 engine, 6 speed automatic trans., 60,000 gvwr, 72,322 miles, Roots 827 PD blower, 2 stage telescopic vacuum boom, articulated front hose reel, 11 yard debris tank, 80 gpm @ 2,000 psi, 1"x 600' jet hose. Call for price. 708-475-7100 ^{C09}

Vac-Con industrial machine mounted on a pre-owned 1999 International cab and chassis. (Stock #3918C) www.VacuumSalesInc. com, (888) VAC-UNIT (822-8648). (CBM)

1991 Vactor 2110 w/rebuilt 80 gpm, rodder pump, rebuilt 2-stage fan unit, Mack chassis, 600' of 1" hose, good condition, unit running daily. \$35,000/OBO. 207-897-3348. (C09)

JET VACS

1995 Vactor 2107: Ford LN8000 Allison auto, single axle truck, 80 gpm @ 2,500 psi, w/multi flow valve, 600' of 1" hose, 2-stage fan unit, good condition, unit running daily. \$32,500/ OBO. 207-897-3348. (C09)

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

2008 International Vac-Con: Approx. 50,000 miles, 1,650 auxiliary engine hours, 5,700 engine hours, 80 gpm at 3,000 psi, hydroexcavation kit, 800' of 1" hose, automatic. \$165,000. 916-442-5400, CA. (C09)



1980 Aquatech C-2000: 1,000-gallon water, 1,000-gallon debris, 60 gpm on 1980 International diesel w/automatic transmission, positive vacuum pump, front hose reel. \$7,000/OBO. 916-399-9595, CA. (C11)

LEASE/FINANCING

North Star Commercial Credit: Commercial loans for trucks or equipment. Flexible purchase programs to fit your budget. 21 years in the industry. Contact Tom Myers -877-804-2274. (CPBM)

MISCELLANEOUS

Chemical Cleaning (tt) trailer: Main tank capacity 1,350 gallons, designed for caustic material, (2) CAT pumps, (2) heat exchangers, (2) 50 hp elect motors, (2) 425 gal. tanks, piping and tanks all stainless, extra pumps, has chemical hoses, pumps and reels. 617-680-4569. (C09)

PARTS & COMPONENTS

US Jetting provides aftermarket rebuilding services and **replacement parts for Harben® pumps.** Low prices, fast response. Why pay more? Call today. 1-800-538-8464, ext 25 or 18. (CBM)

PIPE BURSTING EQUIPMENT

2008 Hammerhead PB30 G2 pipe bursting trailer for sale: 4 and 6 inch bursting heads, two hydraulic units, fusing machine, 200' of 4" HDPE included. \$25,000/OBO. Call 267-249-3774. (C09)

PIPELINE REHABILITATION

Perma-Liner lateral trailer. All equipment in excellent condition. Have 4, 5 and 6 inversion heads. Call 973-993-5544 or email for pictures, sewerpronj@aol.com. Asking \$45,000. (C10)

1974 International Braden: Winch truck with 3-speed hyd., 15,000# Braden, constant speed 6, capstan head with 1,200' of 1/2' cable, articulating hyd arm. No need for top or down hole rollers. Can be used for large diameter balling, bucketing, poly liner, or pipe bursting, mounted on 1974 International Cummins diesel with 13 speed. \$10,000/OBO. 916-399-9595, CA. (C11)

One trade-in model of Pipe Genie heavy duty, pipe bursting equipment. Excellent condition, looks new, 30-ton, 100 feet cable, full 2-year warranty. 877-411-7473. (CBM)

POSITIONS AVAILABLE

SALES MANAGER needed to lead a field sales force for an industrial cleaning company located in Southwest Ohio. At least 5 years sales management experience required. Email resume and salary requirements to hti707@aol.com. (CP10)



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RENTAL EQUIPMENT

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



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1985 Champion sewer and duct rodder: 1,000 feet of continuous 1/2" rod, V4 Wisconsin on 1975 Ford 1-ton, hose, saws blades, tools and spare parts. \$6,000/OBO. 916-399-9595, CA. (C11)

ROOT CONTROL

1992 Engineering Co. trailer: Hose thruster machine: Used to apply Sanafoam Vaporooter to sewer lines, trailer mounted, 2 cylinder Onan engine, can be connected to a jetter truck. \$6,000/OBO. 916-399-9595, CA. (C11)

SERVICE/REPAIR

*** www.servicewithasmile.com *** Sewer Cam Reel and Camera Repair: Authorized for General Wire, Ratech, Vision & RIDGID. Quality service on all brands. Need more info? Give Chuck a call. Electronic Repair Co., Birmingham, AL 35206. 205-836-0454; email: part@servicewithasmile.com. (CBM)

Dynamic Repairs - Inspection Camera Repairs: 48 hour turn-around time. General Wire, Ratech, RIDGID, Electric Eel Mfg, Gator Cams, Insight Vision, Vision Intruders. Quality service on all brands. Rental equipment available. For more info call Jack at 973-478-0893. Lodi, New Jersey. (CMPBM)

TOOLS

T&T Tools: Probes, hooks. Probes feature steel shafts with threaded and hardened tips. The insulated Mighty Probe™ tested to 50,000 volts. Top Poppers™ open manhole covers easily. Free catalog. www.TandT tools.com. Phone 800-521-6893. (CPBM)

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

TV INSPECTION

4-wheel drive sewer/pipeline TV inspection van: RST "Omni" pan, tilt, color equipment with tractor and spare parts, fully operational, city unit, 1,000' cable, capable of working with 6" to 16" pipes, newer equipment mounted in older 4x4 Chev., small ambulance with only 39,000, one-owner, always garaged miles. Let's Roll Autos & Equipment, Colorado Springs, Co., link to full description with many pictures: http://www.truckpaper.com/listings detail/detail.aspx?OHID=3626467&dlr=1&pc id=2000801049. \$29,950. (CP09)

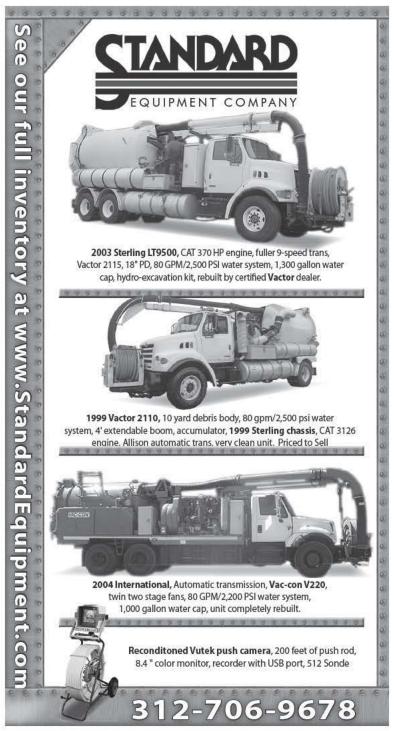


FOR SALE: Used 2002 Ford camera truck, mileage 69,759, new tires, excellent maintenance record, TV/video equipment included. Call Pine Bluff Wastewater Utility

870-535-6603, AR

2004 Ford E450 Aries inspection camera truck. Equipment is ready to be put to work. The truck was manufactured on 5/4/04: Order #60859, system # sys 144, there is over 700' of cable on the unit. There is dual viewing station equipped with win cam software and is NASSCO certified. We have two tractors, one is a Badger TR3000 wheel camera transporter tractor, two is a TR2000, the camera head is a illuminator pan tilt camera, model #Pe-2700. The truck also comes with air compressor tools, tool box & various wheel spacers and tracks to change height and width of unit for multiple applications. \$89,000. I have a ton of pictures I can email you. Charles 203-494-6525, CT. (CP09)

Aries video inspection equip. for sale: 2 badgers, (1) camera, wheels, blocks, spare parts, Satellite III, and portable easement machine with 500' cable, used once. Call 800-356-4468 or email sales@russellreid.com for photos and details. (C10)





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TV INSPECTION

1999 Freightliner MT45: Inspection van, Cummins, 45k miles, Bore Tech/Xantrex camera system, 7kw generator, a/c, heat, bathroom, ex-municipal. Pictures at generalfleet services.com, 503-705-1620. \$19,950. (C09)

1998 Cues Mainline TV System: GMC Savanna 3500, Cues with Pro-Data on-screen titler, Honda generator, Sony combo DVD/VHS, 1,700' of M/C cable, pan & tilt camera with shorty transporter. \$39,500. 608-835-7767, WI. (CBM)

VACUUM EQUIPMENT

For Sale: 1989 International chassis with 1994 Vactor/Guzzler vacuum system, wet or dry. Truck runs and operates, good condition. Please contact Chris Martin at 478-628-5664 for details. \$30,000. (C09)



3,450-gallon stainless tank, 11.1 Detroit, 8 speed, 46 rears, only 104,347 miles. 814-696-4343 PENNA. СРВМ

VACUUM LOADERS

2009 Peterbilt 365 Power Vac 3800: 3,250 U.S. gallon, carbon steel vacuum tanker with a Hibon PD blower 3800 SCFM with vacuum to 27" mercury, dump type, DOT 407/412 regulations. (Stock #3892C) www.Vacuum SalesInc.com, (888) VAC-UNIT (822-8648). (CBM)



1,492 original hours, 73k miles, 1024 blower, 8' boom, Fuller 10 speed transmission, 18k front axle, 44 rears, 11.24.5 rear tires, garage kept.....\$135,000 914-739-3300 NY coop

1998 Sterling cab & chassis with a Cusco MasterVac 3800 wet & dry industrial loader. (Stock #5088C) www.VacuumSalesInc. com, (888) VAC-UNIT (822-8648). (CBM)

PowerVac 3800, 3,250 gallons, carbon steel vacuum tanker with a Hibon PD blower, 3800 SCFM with vacuum to 27" mercury, dump type, DOT 407/412 regulations installed on a 2009 Sterling tri-axle. (Stock #4931) www.VacuumSalesInc.com, (888) VAC-UNIT (822-8648). (CBM)

VACUUM LOADERS

1999 Sterling cab & chassis with a Cusco Turbovac 3800 industrial loader with a jetting system. (Stock #3163C) www. VacuumSalesInc.com, (888) VAC-UNIT (822-8648). (CBM)

POWERVAC 3800, 3,000 U.S. gallon, carbon steel vacuum tanker with a Hibon PD blower 3800 SCFM with vacuum to 28" mercury, hi-dump type, DOT 407/412 regulations. (Stock #13478V) www.Vacuum SalesInc.com, (888) VAC-UNIT (822-8648). (CBM)

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Colorado based PURE Software Solutions, Inc. is seeking a Sales Manager to establish sales functions first domestically and, eventually, internationally. Our product line consists of software and hardware designed to increase efficiency in the wastewater market. For more information please call 303-867-1414 or email b.stenson@epuresoft.com. (C09)

WANTED: Old sewer trucks running or not. Any brand, any make. PH: 713-900-9565, email: mmachinerymexico@gmail.com. (CBM)

Wanted to Buy: Vactor 2100's and late model Guzzlers. Cash. 800-336-4369. (CPBM)

WATERBLASTING

Used and rebuilt water jetters in stock. General J-2900, J-1450, RIDGID KJ-1750, Spartan 717. The Cable Center, 800-257-7209. (CBM)

FOR SALE: NLB 40-250, 40,000 psi @ 10 gpm, 3306 CAT engine, 1,100 hours. \$70,000. NLB 20-250: 20,000 psi @ 20 gpm, N14 Cummins engine, 4,700 hours. \$45,000. Tommy: 256-762-4392, AL. (C10)

Gardner Denver T-375M: 21 gpm @ 10,000 psi. Gardner Denver T-450M: 52 gpm @ 10,000 psi. NLB 10-200: 34 gpm @ 10,000 psi. NLB 20-600: 44 gpm @ 20,000 psi. Gardner Denver LC-1500: 390 gpm max, 15,000 psi max. NLB 10-325: 10k max, 51 gpm max. NLB 10-235: 10k @ 34 gpm. Jetstream 4220: 20k psi @ 17 gpm, Allis-Chalmers 10x8x22, 700 hp. Boatman Ind. 713-641-6006. View @ www.boatmanind.com. (CPBM)

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