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Cleaner

NOVEMBER 2019
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It's More Than DRAINS

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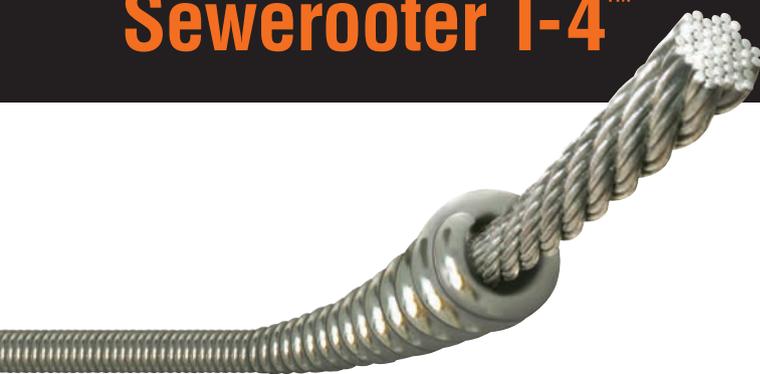


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ON THE COVER

Michael Williams is a third-generation plumber and drain cleaner who works tirelessly to carry on his family legacy with his company Just Drains in Philadelphia. He emphasizes his relationships with customers above everything else. "Life's not about me," he says. "A man is not measured by the cars, the money or the houses he has. He's measured by the people he helps along the way." (Photography by Kevin Blackburn)

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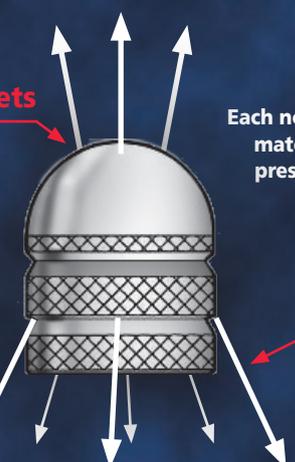
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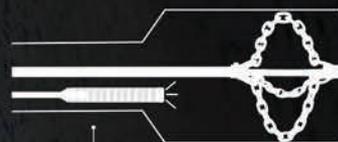
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Kim Peterson

Giving Thanks

Take time to tell the people who support you how much you appreciate them

This is a great time of year.

The fall season is winding down; the holidays are approaching, but still far enough away to not be causing too much stress yet (hopefully). Football season is in full swing.

It's a time when most of us can slow down a little. And what better time is there than this to remember everything and everyone we're thankful for?

Gratitude is something you probably feel in small doses on a daily basis, but how often do you take the time to give someone a truly heartfelt thank-you for all they do for you?

Showing people you appreciate them should be done more often, but it's nice that we have a holiday solely dedicated to giving thanks for all we have. Thanksgiving serves as a nice reminder to show important people in your life some appreciation, and when that's accompanied by great food and football, what's not to love?

I've been the editor of *Cleaner* for nearly a year, and I am so thankful for all the help I've received over that time as I navigated this new role and got accustomed to different responsibilities. From my mentor to my proofreader, I wouldn't be able to get this magazine into your hands each month without some help, and I'm incredibly grateful for all of them.

I'm also blessed with wonderful family members, many of whom live close enough to me that I see them on a regular basis. They are always there for me, something I try to never take for granted.

Both in your personal life and especially in your business, it's so important to have some sort of network of support around you — your success usually depends on it. Even if you are a one-man shop, that is still true; your support might just look a little different. Maybe you rely on your regional equipment dealer for insight on industry trends, or the plumber who refers jobs to you. Or maybe your support comes solely from people not involved in your business.

Whether you work solo, for a small family business where you have known everyone for years or for a large company where you're still learning everyone's name, surrounding yourself with people you can depend on is so important. Not only does it make life easier, it will probably make you happier as well.

No matter what your situation, that network of support needs to be shown some appreciation. Any relationship needs some work once in a while. No one enjoys being taken for granted.

So let those people who support you know how thankful you are that they play such an important role in your life. You don't need to make any grand gestures. Just point out something specific you appreciate and say "thank you." A little acknowledgment can go a long way.

I'd also like to say thank you to all of you. Your continued readership and support of this magazine is much appreciated.

I hope you enjoy this month's issue. **c**

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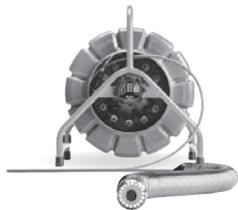
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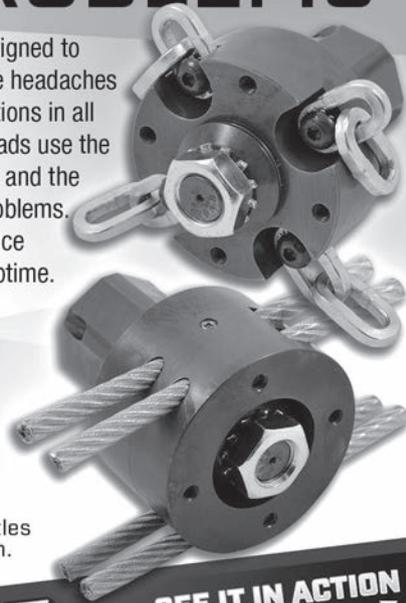
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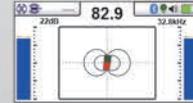
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It's More Than **DRAINS**

Third-generation plumber builds on his family legacy and helps everyone he can along the way

By Luke Laggis

Photography by Kevin Blackburn



Just Drains owner Michael Williams uses a General Pipe Cleaners Sewerooter T-3 to clear a residential lateral. His company serves not only suburban neighborhoods but also residential and commercial customers in crowded downtown Philadelphia.



“I’m not playing the short game. I’m playing for the legacy.”

Michael Williams

➤ Williams keeps a Captain America shield in his truck to show kids on his job sites. He hopes to inspire the next generation to learn a trade.

Later, his uncle Alexander Hickman, a master drain cleaner in Philadelphia, shared his knowledge and helped Williams develop his love and respect for drain cleaning. Along the way, he also attended trade school.

“I was very fortunate to go to a trade school here in Philadelphia called Randolph Skill. It was a school for inner-city youth and anyone who wanted to learn a trade. I learned some plumbing there, but

When Michael Williams talks business, he’s really talking about life and relationships. That’s what the business is to him.

And make no mistake, the owner of Just Drains in Philadelphia likes to talk. He’s quick to dispense advice, share wisdom and help whoever he can, whether it’s a customer, a colleague or a group of school kids.

“I’m not playing the short game. I’m playing for the legacy,” Williams says. “The way I live my life is like a marathon. It’s not a sprint. If it takes the last breath of my body to make sure somebody else is doing better before I leave here or that someone has a better life and can provide for their family, then mission accomplished.

“Life’s not about me. A man is not measured by the cars, the money or the houses he has. He’s measured by the people he helps along the way.”

EARLY INTRODUCTION

Williams grew up in the plumbing business. At only 54, he’s already spent the better part of a half-century in the industry, having started working with his grandfather at the age of 6. Arthur Williams was one of Philadelphia’s first African American master plumbers, and his grandson quickly took to the trade.

“He taught me about building relationships. He said a friendship will last longer than the money, and it’s true,” Williams says. “My grandfather was a very humble man. There was nothing and nobody he didn’t have time for, and he never forgot you. My father was the same way. My uncles were the same way. My mother’s the same way. I’m the same way. Real people don’t forget you. That’s something that stuck on me — seeing him talk to people and seeing people always wanting him to do work for them. He was the first black plumber in Philadelphia, and he helped everybody.”

When his grandfather passed away in 1996, Williams went to work with his uncle, Les Woods, a master electrician who was head electrical inspector for the city of Philadelphia for 30 years.



Just Drains LLC

LOCATION: Philadelphia

OWNER: Michael Williams

EMPLOYEES: 5

SERVICES: Drain cleaning, jetting, video inspection, pipe locating, plumbing repair

SERVICE AREA: Greater Philadelphia area

WEBSITE: www.justdrainsinc.com

PHONE: 215-879-8459

» Michael Williams uses a General Pipe Cleaners J-1450 electric jetter to clear a driveway drain.

» Williams pulls a General J-1450 electric jetter through a narrow driveway to a backyard. Tight spots like this are why he uses smaller vans and equipment for his residential jobs.



I learned plumbing all over. The drain cleaning I learned from my uncle Big Al. To learn a trade and to learn to respect the trade, that's the whole thing."

FREEDOM

Williams has now been a licensed plumber for almost 20 years. In 2007, he opened Just Drains in Philadelphia and hired his uncles and brother, Wesley Sanon, who now owns All Service Plus in New Jersey. While the company handles some light plumbing work, Williams' focus has been on drain cleaning from the start.

"Drain cleaning to me is freedom," he says. "With plumbing, sometimes it's a possibility that you'll be stuck on one job all day long. With drain cleaning, the most jobs I've ever done in one day is 12. I'm still trying to catch up to my uncle because the most jobs he ever did in one day was 20. But I'm traveling. I love people. I'm not in a box, not in a cubicle. I'm out there, and the money in drain cleaning squashes the money in plumbing. Drain cleaning is the thing people will always need."

Still, Williams hasn't abandoned plumbing, which accounts for about 15% of the business. "We only do light plumbing work," he says. "If it's something bigger or it requires excavation, we give it to a plumber who gives us work. We don't stand where we are without other people's help, so shame on me if I don't give work to plumbers who give us work."

The company's other services include drain cleaning, jetting, video inspection and pipe locating. About 65% of the work is residential.



“The plumbing and drain industry is all a close-knit family, so to have another plumber call you and recommend you, that’s priceless. It lets me know that what we’re doing is working.”

Michael Williams

The rest is commercial. Drain cleaning referrals from other plumbers account for an important chunk of business. Williams says he does drain cleaning work for about 425 plumbers in the Philadelphia area and gets 20 to 25 calls or referrals from other plumbers every week.

“Referrals are fantastic,” he says. “The plumbing and drain industry is all a close-knit family, so to have another plumber call you and recommend you, that’s priceless. It lets me know that what we’re doing is working.”

ON CALL

Williams has used a lot of different equipment over the years, but experience and time in the field have shown what works best for him and his crew.

“I have over 200 machines now, but our go-to machines are General Pipe Cleaners. You want to have the best equipment, and General equipment and machines are like tanks. They take a beating and they keep running. One of the Power-Vees I have, I’ve had for over 20 years. I’ve had a SewerMatic, which they don’t make anymore, for over 25 years and I still use it every week.”

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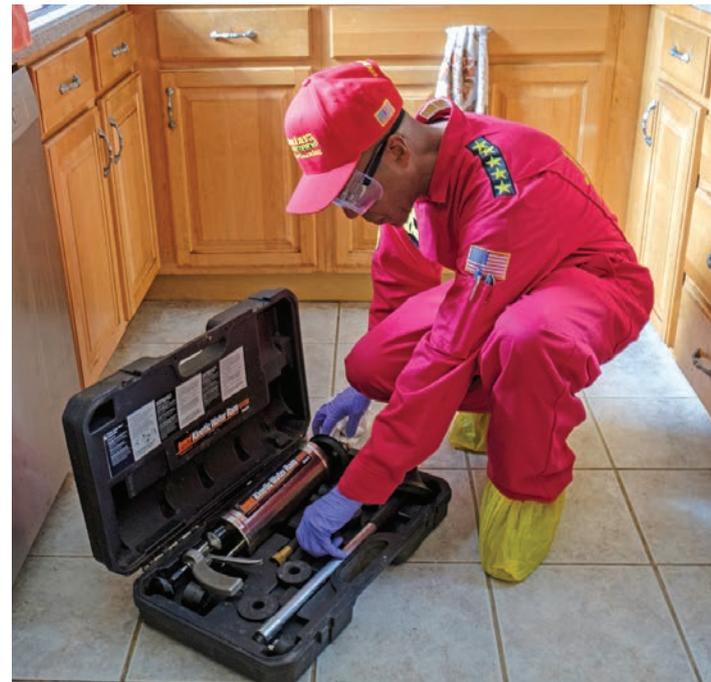
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« Michael Williams uses a General Pipe Cleaners Kinetic Water Ram to clear a kitchen sink and garbage disposal.

» Williams packs up his Kinetic Water Ram after finishing the job. He always wears booties to protect his clients' floors, and says he wants to leave every job site cleaner than he found it.



“It’s 24/7 because drains never take a day off and drains don’t sleep.”

Michael Williams

Williams recommends smaller vehicles. He and his four technicians run Chevy Astro vans because they’re big enough to hold all the necessary equipment and small enough to make parking easy. That’s important in downtown Philadelphia, with heavy traffic, narrow alleyways and limited parking.

“We can pull in and park in a regular parking space. We can park, get in, get out and be done versus having to circle the block looking for a place to park,” Williams says. “Big trucks are fine, but a big truck is like using only one drain machine: You can’t use it for every job.”

Trucks are stocked with the General Mini-Rooter, Sewerooter T-3, Speedroooter 91s and 92s, Power-Vees and Super-Vees, the Kinetic Water Ram and a JM-2900 cart jetter.

Trucks are all stocked with the same basic equipment, but some machines and tools get swapped between trucks depending on the job and workload. Some will run lighter than others. One of the technicians handles more inside work, so his van is loaded with smaller inside equipment, including a General JM-1450 electric jetter.

“It’s a great product,” Williams says. “It puts out 1.5 gpm and

has 1,500 psi. It’s a great machine for inside or smaller lines for the simple fact that it’s not gas.

“We’ve had quite a few jobs downtown where it’s really helped. If you always use a big jetter, you run the risk of flooding a place. When a restaurant calls on a busy Friday night, a small jetter like this gives you the ability to clear the problem without shutting the place down. We’ll try cabling it first, and if that doesn’t work, we’ll turn to the electric jetter.”

Technicians take their GPS-equipped vans home at night so they can head straight to their first job in the morning. The office is staffed by Williams’ longtime secretary, Helen Lewis, but service calls are handled by a 24-hour answering service and then dispatched.

Williams wants everyone who calls to get a real person on the line, regardless of the time.

“People want to talk to people, not a machine. It’s like going to the emergency room — you don’t want to talk to a robot, you want to talk to a doctor. It’s the same thing with us,” he says. “It’s 24/7 because drains never take a day off and drains don’t sleep. Christmas, New Year’s, Fourth of July, we’re out here.”

Take some advice

SERVING OTHERS

The 24/7 mentality is a big part of Williams' business. He's always willing to lend a hand, and he doesn't turn down work.

"I work every day for opportunity, but opportunities aren't like car accidents — they're not going to run into you. You have to make your opportunities, just like you make your own luck. People say I'm lucky; no, I work every day, seven days a week. If you put the time in, you will see the results."

Williams says a problem he sees with some companies, no matter how big, is that the people responding to service calls don't always want to do the work. They're not available on weekends or holidays, or they'll oversell a job because they don't really want to do it. And they lose track of the fact that they're in business to provide a service.

"We're here to serve. It's not the other way around. People think the customer needs you. Customers don't need you. The customer has a smartphone, and there are 50,000 other drain cleaning companies out there. They can surf

Michael Williams, owner of Just Drains in Philadelphia, is quick to offer advice and encouragement, both to fellow drain cleaners and anyone else who needs some help.

He's proven he knows what it takes to be successful in life and business, so here are some of his words to live and work by:

- Always carry business cards. Not having a business card is like trying to start your car without a battery.
- Wake up hungry every day. Don't ever be complacent.
- When you do things for the right reasons, you'll have everything you want.
- Do more than the other guy is doing.
- You don't get anything by being selfish.
- You have to love the journey and enjoy the process.
- Learn every aspect of drain cleaning, inside and out.
- If you provide excellent service, people will pay whatever you're charging.
- Referrals make your phone ring.
- Life is about how bad you want it. Nobody's stopping you.

Of course, Williams has learned plenty from the people who've helped him along the way.

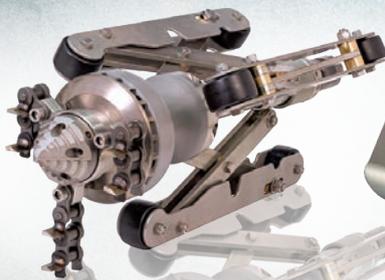
"As my uncle who passed away used to say, 'It's not the end of the world. There's somebody who's worse off. There's somebody right now who doesn't have water. There's somebody who doesn't have anyone to talk to. There's someone who doesn't have the opportunities you and I have. So stay humble, be respectful and help people.'"



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Michael Williams unloads a Sewerooter T-3 at a residential drain cleaning job.

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the web forever and never call you," he says. "You need them."

While there are plenty of other drain cleaners in Philadelphia, Williams doesn't see them as competition because he doesn't do business like everybody else.

"Yeah we come in with our clipboard and our booties, but we come in to listen to the customer first. We assess everything and then we go to fix the problem, whereas a lot of the companies out here are like robots. They have the same script. They do the same thing, day in and day out."

Instead, he treats every call as its own unique situation. There's always someone new to get to know, someone to help. Even if he's seen it a million times, it may be the first time the customer has had their basement drain back up. They may have damage to their house or personal belongings. It's an emergency, a situation that deserves care, both for the customer and the plumbing problem.

"A lady the other day summed it up. She said I care. She said, 'I only want you to come because you care. The first thing you always ask about is my husband. And then you ask about me, and then you ask about my children. And then you ask about the job. Nobody else does that.'"

Calling Williams a drain cleaner, or even a plumber and drain cleaner, doesn't begin to paint a complete picture of who he is. Williams is an entrepreneur, a tireless self-promoter, a resource for anyone who needs business or life advice, and someone who's always willing to lend a hand, regardless of whether you can return the favor.

"Our success is about people," he says. "I'm not just there to clean your drains." c

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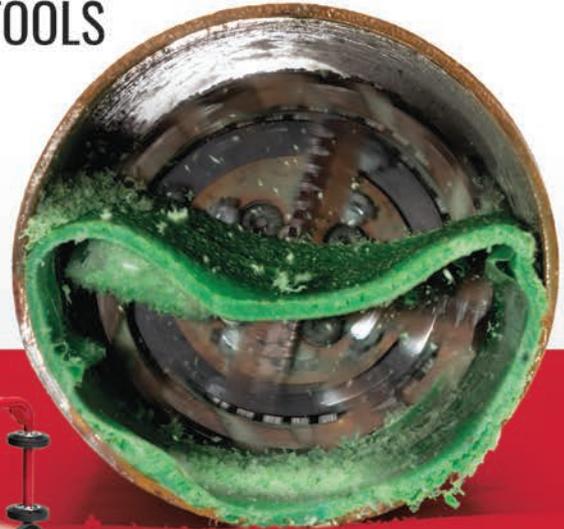
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No Trailers Required

Ohio drain cleaner is sold on the merits of a van-mounted jetter that frees up manpower

By Ken Wysocky

In 2015, Charlie Evans bought his first Groundhog van-mounted waterjetting system from Easy Kleen Pressure Systems. In 2017, the president and owner of DrainMaster in Columbus, Ohio, bought his second unit.

“I’m going to put another one in the next van I buy,” Evans says. “These jettors definitely help us get jobs done faster — clearing blockages in larger sewer lines. Plus, we typically can charge more money for jetting. They’ve been a great investment.”

DrainMaster used to rely on a trailer-mounted jetter for cleaning larger-diameter pipeline clogs. But using a trailer posed challenges for technicians, especially when it came to city driving and parking in tight spots.

“We can run the jetter remotely from up to 400 feet away. **It’s wonderful to be able to do a jetting job all by yourself.**”

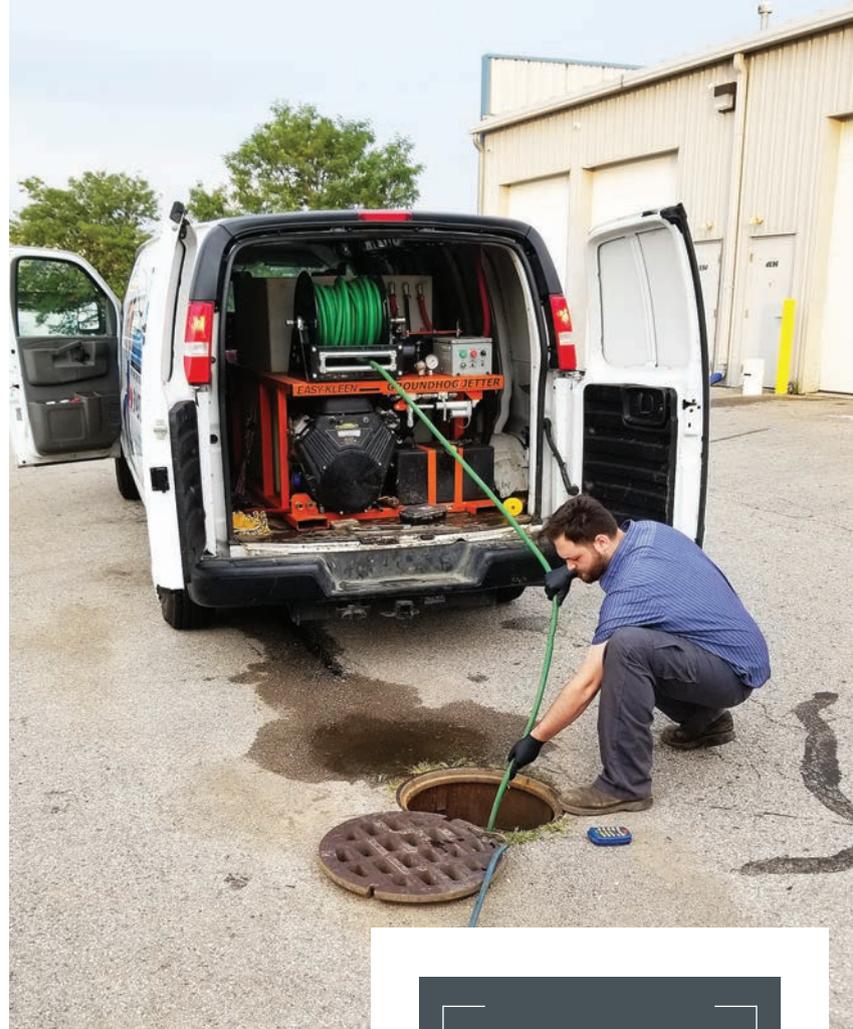
Charlie Evans

“The Groundhog is just as powerful as a trailer jetter, but we don’t have to train a guy how to drive with a trailer,” Evans says. “As long as they can drive a van, they can use this jetter, which is a huge advantage for us. We don’t run the risk of hitting something while trying to back up a trailer.

“There’s less liability, so we can carry less insurance than if we’re towing around a trailer. And if it’s cold outside, we can still use the Groundhogs because they’re enclosed, which keeps them warm enough to use.”

ONE-MAN OPERATION

The skid-mounted unit is used primarily to clean 1 1/4- to 6-inch-diameter lines. It measures roughly 64 inches long by 42 inches wide by 45 inches tall and weighs about 900 pounds.



▲ DrainMaster technician Dillon Evans uses the Groundhog van-mounted waterjetting system from Easy Kleen Pressure Systems to clean a sewer line.

It features a 35 hp Vanguard gasoline engine, a 200-gallon water tank with water-level sights, a water pump made by General Pump (12 gpm, 3,500 psi) and a swiveling reel that holds 300 feet of 1/2-inch-diameter hose.

The unit also offers an emergency shut-off valve and a fully welded, powder-coated frame made from 2-inch square tubing. In DrainMaster vans, Evans added a side-mounted reel that holds an additional 450 feet of 3/8-inch-diameter hose, he says.

Evans says the machine’s remote-control capability was a game changer, primarily because it made jetting a one-man operation instead of two. That frees up manpower to do more jobs, which boosts revenue and profitability.

DRAINMASTER

COLUMBUS, OHIO

OWNER: Charlie Evans

ESTABLISHED: 1999

MACHINE: Groundhog skid-mounted van jetter from Easy Kleen Pressure Systems

FUNCTION: Cleaning sewer pipes in commercial, residential and industrial settings

FEATURES: Roughly 64 inches long by 42 inches wide by 45 inches high; weighs about 900 pounds; 35 hp Vanguard gasoline engine; remote-control operation; 200-gallon water tank; water pump made by General Pump (12 gpm, up to 3,500 psi); swiveling reel; 300 feet of 1/2-inch-diameter hose

COST: About \$17,000

WEBSITE:

www.drainmasterohio.com

“We can run the jetter remotely from up to 400 feet away.” The remote includes controls for throttling up and down, increasing and decreasing the water pressure and retracting the hose. “It’s wonderful to be able to do a jetting job all by yourself.”

Technicians usually use the jetters in conjunction with nozzles made by StoneAge and Enz USA, as well as RIDGID SeeSnake inspection cameras and Maxi Miller drain machines from Picote Solutions. “Sometimes we use the Maxi Miller to descale pipes in, say, large apartment complexes, then use the jetter to flush out the heavy scale,” Evans says.

JETTERS DRIVE GROWTH

Evans founded DrainMaster in 1999 as strictly a drain cleaning company, then branched out into residential and commercial service and repair plumbing and trenchless pipe rehabilitation. He employs nine people and runs five service trucks, primarily Ford and Chevrolet vans.

As the company has grown, the Groundhogs have contributed better productivity and profitability. “We definitely finish jobs quicker and we’ve reduced on-the-job injuries (stemming from cable machines),” Evans says. “We don’t have to carry drain machines up and down stairs anymore either. We probably use the Groundhogs for 90% of our sewer work.

“In addition, the initial cost is a lot less expensive than a traditional van-mounted machine. They provide a great return on investment. I think they pay for themselves in less than a year.” c

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Michael Williams

Don't Get Stuck in Quicksand

A slow period in your business can make you feel like you're sinking, but there are ways to get out ahead of those problems

By Michael Williams

In our industry, when things get slow, you feel like you're in quicksand. It's like you're moving, but you're slowly sinking.

Maybe the phone isn't ringing as fast as it's supposed to and it seems like bills are coming in quicker than they normally do. But you have to stay focused, and you have to keep working.

I see so often that when times get tough, a lot of people quit. Instead of throwing in the towel, you have to get busy and do what you used to do to make the phone ring. I always tell people, "Never get comfortable — that's when the phone stops ringing."

I always tell people,
"Never get comfortable
- that's when the phone
stops ringing."

Always stay hungry and aggressive. That quicksand feeling happens to all of us at some point, but it's all about your mindset. The mindset you should have is that it will always get better.

The phone will always ring as long as you're always

out there plugging away and staying in front of your customer. What has worked for me in the past and still works for me today is staying visible — letting people see you're out there.

Stay visible and let people know how to get ahold of you. Make sure you have a very visible phone number on your truck so people can call you.

This business is hard, yes, but it's worth it. I wouldn't trade it for the world, and I know a lot of you feel the same way.

If you're a small business, I know what you go through — because we all went through this at some time or another. Even big companies go through slumps. If you see morale is down in your shop, and even if your numbers are down, treat your guys to lunch

or dinner. Let them know things will get better but they have to be out there every day pounding the payment, letting people know you're here.

Other ideas to boost morale are to take your employees to a ballgame or treat your team to time at an amusement park. Have an "open shop" day where your employees can bring their kids to work for an hour or two so they can see what their father or mother does for a living.

Staying visible and staying positive has never failed for me. I know it'll work for you too. Company morale starts at the top. If you're the leader, then lead with positivity.

That quicksand feeling can happen at any time of the month and any time of the year. What matters is how you handle it. It's all mental; you have to stay in the right frame of mind. Nothing lasts forever. Slow times are just like the weather — if it's raining, sooner or later you know it's going to stop and the sun's going to come out.

You have to knock on doors and put out flyers. Network. Go to plumbing supply houses. All the things you did in the beginning of your business to make your phone ring — the things you stopped doing after seeing some success. So often we think if we do it once, we don't have to do it anymore. That's not true. We have to do it every day. You have to be consistent. You have to make sure you use every option that is in front of you.

1. Make sure your phone number is everywhere. If you deal with suppliers, post your phone number with them; if you deal with different companies as a subcontractor, make sure your phone number is with them. Make sure your phone number is visible on your truck.

2. It's very important to make sure you answer your phone. If the phone rings, don't discard any of those calls. Check on former customers to see how they're doing. Send them thank-you cards. A lot of times we look for new customers, but we already have plenty of business — we just don't stay plugged into it. You must check on your customers. Treat your customers like family because they are the ones helping you take care of your family.

3. Stay positive. Stay around positive people, people who are making it happen. If you have competitors around you and their phone is ringing, never be too proud to find out what they're doing differently. Every little bit helps in business. It's like a puzzle: We

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need certain pieces in place so we can finish the picture. It's also important to remember when you go into business that it's a marathon, not a sprint, so take your time. Cross your t's and dot your i's, and always be looking to learn.

4. Give your employees bonuses. Let them know they should always be drumming up business wherever they go. Remind them that the more business they get, the more money they earn. Make it a game or competition. An employee of the week program where the winner gets a small bonus is always a motivator. It gives them a reason to want to drum up more business.

Another important thing to remember is to always provide excellent service so you keep the customers you already have. Let your employees know when they're in a customer's house to always go the extra mile and leave it better than they found it.

If you keep doing these things all the time, the phone won't stop ringing. **c**

ABOUT THE AUTHOR

Michael Williams is a high-energy, highly motivated drain cleaner and businessman. He is the owner of Just Drains LLC in Philadelphia, providing drain cleaning and plumbing services in the tri-state area. Williams welcomes calls from others in the industry. If you have questions for him or topic suggestions for this column, he can be reached at 215-879-8459.

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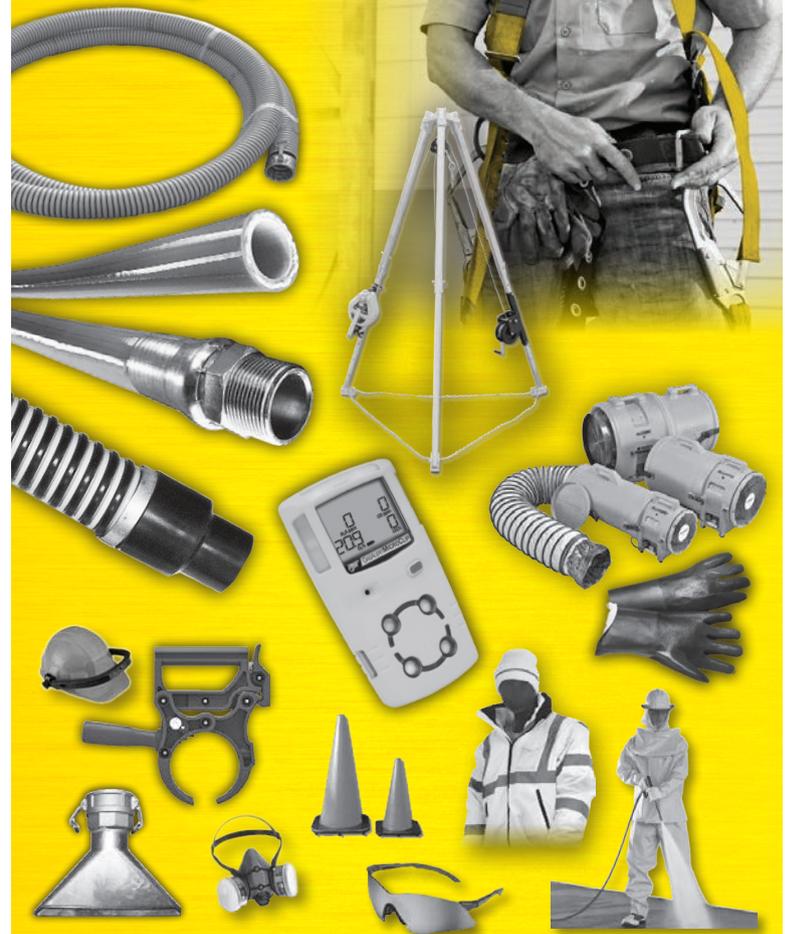


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SOMETHING **NEW**

Building customer trust and embracing innovative technology lay a foundation for success

By Giles Lambertson // Photography by Amy Voigt

Joel George never hesitates when the opportunity arises to try something new. The founder of Drain Doctor plumbing and drain cleaning services in Toledo, Ohio, has an entrepreneur's risk-taking instincts.

But he also has an overriding sense of loyalty to customers that sometimes leaves his employees shaking their heads.

"They said, 'Is this like your mom's friend or something?'" George recalls being asked after charging relatively little for a service call to the home of one of his longtime customers. "We have lots of people on our customer list who I have served for more than 10 years.



« The crew at Drain Doctor includes (from left) Bryan Baumbarger, D.J. Pasko, Dustin Porter, John Surgeson and owner Joel George.

We don't charge them that much because it makes me feel better to help people doing what we are good at doing.

"I tell my employees that we are helping people. Some plumbing companies are just plumbing companies. We are a service company. Every job we do we are helping someone. Sometimes employees don't understand that," George says.

STARTING SMALL

Drain Doctor is in its 20th year of helping people deal with clogged drains and leaky pipes. But it wasn't a seamless rise from launch to business success. The Toledo native didn't even get into plumbing until after he had worked for a while at the city's Chrysler Jeep plant and then had a stint as a sprinkler system maintenance person.

He finally entered the plumbing industry as an apprentice and worked for a couple of plumbing companies before succumbing to his entrepreneurial impulses and starting Drain Doctor. For the first seven years, he stayed small, with just one employee — and then got even smaller, working alone for the next decade as a one-man shop.

That decade included the U.S. recession after the financial crisis hit in 2008, a period of struggle for many construction and utility maintenance companies. "I knew it probably wasn't a good idea to expand a business during a recession," he says. "I could look around and see companies that tried to do that and filed for bankruptcy." When the economy eventually "straightened up a little bit," George began to develop his small company into a larger one.

Gifted with an open and inviting personality, he retains customers by quickly earning their trust. This same characteristic served him well as he made the transition from plumbing employee to plumbing shop owner. He frankly told one potential plumbing service employer just what he planned to do.



Drain Doctor

LOCATION: Toledo, Ohio

OWNERS: Joel George

EMPLOYEES: 6
(technicians and helpers)

SERVICES: Plumbing, sewer cleaning and repair, sewer lining, hydrojetting, camera location work

SERVICE AREA: Toledo, surrounding counties, and just across the Michigan state line

WEBSITE:
www.toledoplumbingcompany.com



“We are a service company. Every job we do we are helping someone.”

Joel George

“I am coming here to apply for a job, but about a year out I’m going to start my own business,” he told his startled job interviewer. “In the meantime, I want to make you a ton of money.” His candor not only won him a job, it earned him respect that has endured through the years. He and his former employer, and current competitor, are on the best of terms.

WELL EQUIPPED

George is a certified master plumber, but he is also a licensed sewer contractor in surrounding northwest Ohio counties. His plumbing work carries him as far south as Bowling Green, 24 miles away. He performs drain work north into Michigan just across the state line from Toledo. When he started Drain Doctor, he mostly cleaned drains. Drain cleaning remains a key component of what the company does today, accounting for 60% of business activity.

His stable of equipment reflects that emphasis. It includes a new Valor drum machine from Drainscables Direct, which has a 1.5 hp motor that spins cable at more than 200 rpm and will clear floor drainlines 1 1/4 inches to 4 inches in diameter. “It’s a cool-looking

machine,” George says. “You just set it down and adjust it for a 45-degree angle. I’ve used it twice and love it.”

A drain cleaning mainstay is an older Electric Eel Z5 unit. Its 1/3 hp motor rotates a 1/2-inch cable to chew through impacted debris using twisted saw-blade cutter heads. The unit is designed to open lines up to 3 inches in diameter. Each work van carries 200 feet of cable for the machine.

For cutting through roots in pipes as large as 10 inches, George uses a Picote Solutions Maxi Miller. A Shark 1,500 psi jetter with 150 feet of 1/4-inch hose is frequently utilized; and for larger pipes — up to 24 inches — George relies on a US Jetting 4018 jetter, which produces 4,000 psi at 18 gpm, with a 300-gallon tank and 500 feet of Piranha hose with Warthog nozzles (StoneAge).

Cameras are used every day in evaluating the condition of pipe, and RIDGID is his go-to brand for camera work. Drain Doctor techs employ RIDGID SeeSnake cameras, one with a 200-foot reel, to peer into drainlines. To find an underground line, George grabs a RIDGID NaviTrack Scout locator. “I’ve used all kinds of locators, but I’ve had the Scout for 15 years. That thing is awesome.” When calls come in to uncover and replace underground infrastructure, a John Deere mini-excavator in the equipment yard is sent out.

◀ Drain Doctor technician Dustin Porter uses a 2019 Valor drum machine from Drainables Direct to clean a floor drain on a commercial property.

✔ Joel George uses a 2005 US Jetting 4018 jetter to clean a drain in a warehouse.



With the exception of the trailered jetter and the John Deere excavator, the Drain Doctor's equipment is hauled from job to job in style — in four new Mercedes-Benz 2500 Sprinter vans George purchased from Vin Devers Autohaus of Sylvania, Ohio. Sporting bright-yellow Drain Doctor logos and promotional messages, the vans announce to customers that well-equipped and trained plumbing technicians have arrived at their door.

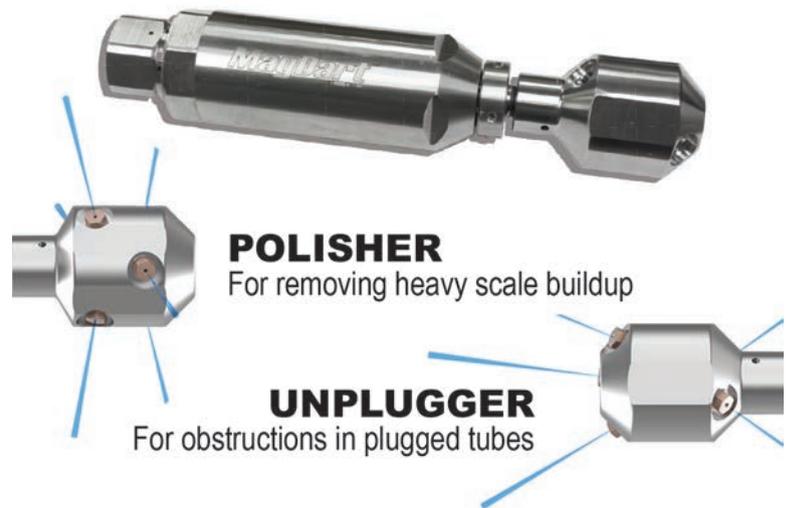
But the vehicles also were chosen to send a second message, this one to George's team of millennial employees. His message to his employees born in the 1980s and '90s is simple: We are state of the art, so be all-in for the company.

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Millennials sometimes are characterized by a sense of entitlement and a willingness to jump from job to job. George, who is 46, has methodically engaged the younger generation in conversations about work expectations. "Back before 2000, when I worked for other companies, it seemed to me people were always waiting for your job. This generation seems like it isn't worried about losing a job."

TEAM PLAYERS

To encourage his employees to embrace the work, George caters to their individual preferences in assigning out tasks. Even though each of his employees — which include three journeyman plumbers and three helpers — is fully capable of cleaning a drain or fixing a leaky faucet, each has a favorite work assignment.

"Back before 2000, when I worked for other companies, it seemed to me people were always waiting for your job.

This generation seems like it isn't worried about losing a job."

Joel George



✔ Technician D.J. Pasko reels up the hose of the US Jetting 4018 truck-mounted jetter after a job.

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Exciting challenges

If Joel George has a business philosophy, it might be stated this way: Be willing to think outside the box and allow yourself to become excited about your work.

The founder and owner of Drain Doctor plumbing and drain cleaning in Toledo, Ohio, certainly exemplifies both attitudes. "This industry is so dynamic," George says. "It changes daily. Not one day goes by that I don't see something I haven't seen before."

That sounds tough, but the Ohioan knows tough. He used to play hockey, where getting banged against the boards is an art form. He pushed the puck in high school and college and coached the game for a while. Toledo is in hockey country, after all, home to a midlevel professional hockey franchise.

But his hockey experience is "ancient history," George says, even though he keeps a hockey stick in his office as a reminder. More relevant to his career success is the example his parents set during their working lives. George's father, also named Joel, was an automotive engineer commuting 30 minutes each morning to put in

12-hour days in a Michigan plant.

For more than 30 years, his mother, Janet George, taught a cooking class in a local school. Her students were Ohioans wanting to refine their culinary skills. She teamed with celebrated area chefs to teach individual specialty dishes. Janet George, like her son, was also an entrepreneur, operating a business on the side.

So, Joel George credits his parents' work ethic in teaching him the perseverance that held him in good stead during the early years of Doctor Drain, when expanding the business was mostly a pipe dream. Today, George has seen success with his company and the business challenges that come his way excite him.

"So many different tools are coming out. I find myself looking at something and I'm not sure what I'm looking at," he says. "But you have to keep up. You don't have a choice. You just have to try to improve how you are doing things every single day. You can't freak out about it."

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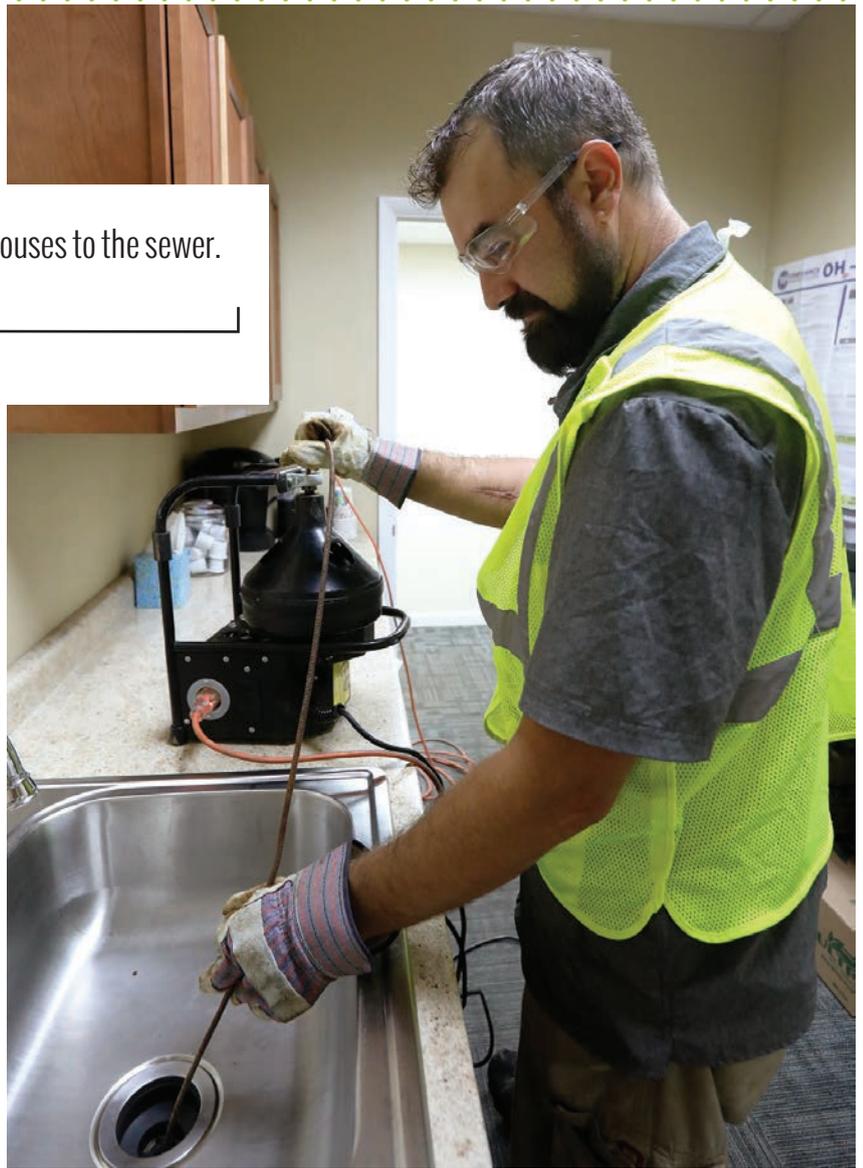
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“Just imagine how many miles of pipe there are running from houses to the sewer. Lining them will keep me busy right here in town.”

Joel George

“I have a guy who does most of the sewer lining, a guy who does most of the plumbing, another guy who does faucets — he loves repairing old faucets,” he says. “And then there’s Mr. Water Heater, as I call him. He puts in most of them for us. The other guys don’t really sell water heaters like he does.”

George reflects on the situation. “Back in the day, we did everything. ‘Here’s a call. Go do it.’ That’s how it was,” he says about an earlier era in the workplace. “In my first plumbing truck, the air conditioning was a floorboard we pulled out to get air flowing. You could see the street below. I drove that one for two years.” He realized, however, that such “good old days” talk was not likely to impress his employees, so he looked to the future and invested in the Mercedes vans.

Generational differences aside, George is not down on millennials. He believes in his team. “You have to challenge them, but they’re responding.” As for his customers, he relies on his website, Facebook and other social media to reach them. “I go online with everything.”

His willingness to try new things led him to test a pipe lining product he now swears by. Formadrain is a lining system that’s pulled into place instead of being unfolded. The environmentally friendly and thin fiberglass-and-epoxy system is steam-cured and fits so tightly against the interior of a pipe that there’s no measurable loss of pipe capacity. What’s more, it can be fully installed in just four hours. An industrial version of the system is notably impervious to kerosene and diesel fuels, even to sulfuric acid.

“I get excited about this product,” George says. “I studied liners for 15 year before I bought this franchise. I love lining. You could line the world with this stuff, but that wouldn’t be cost-effective.” Most of his Formadrain jobs are 100 feet or less.

Toledo has some 1,100 miles of sanitary sewers. “Just imagine how many miles of pipe there are running from houses to the sewer. Lining them will keep me busy right here in town,” he says. George estimates 60% of the galvanized and clay pipe in the greater Toledo area is years past its expected life span.

“I’m going to go on a mission. I’ll knock on doors and ask if I can get a camera in there and show them that lining the pipe has to be done. Maybe they’ll let me get in there before it collapses on them.” **c**

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1776 Standard Edition



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- Winch mount for easy loading and unloading
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- Removable Top handle for easy storage

Motor: 23 hp Briggs & Stratton V-Twin
Fuel: Gas / Propane
Pump / Pressure: 5.5 GPM Pump @ 4,000 PSI
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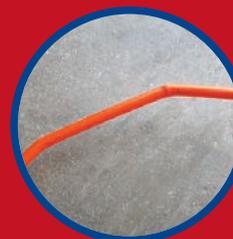
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Think Small

Some contractors opt for smaller trailer-mounted units when getting started in the vacuum excavation game

By Cory Dellenbach

Investing in a large hydrovac unit isn't always feasible for contractors like Jim Tieffel who don't do a lot of hydroexcavation work to begin with. Currently when Tieffel, a plumbing contractor in Alabama, finds an underground pipe that needs replacing, he calls upon others to handle it. But he's ready for that to change.

"I'm tired of paying out that money when it's something I could easily take on," Tieffel says.

So at the 2019 Water & Wastewater Equipment, Treatment & Transport (WWETT) Show in Indianapolis, a top priority for Tieffel was to check out the various trailer-mounted vacuum excavation options on the market — something much more economically realistic for his business.

"Contractors are paying \$50,000 a year to contract out these services, but they can buy trailer units for as little as \$120,000," says Mike Richards, a sales rep for RED Equipment, a Vac-Con dealership in Iowa. "They pay for themselves, and they last a long time."

MANY APPLICATIONS

Operating trailered units to expose and replace damaged waterlines is only one way the machines can be used. There are many others. Manufacturers have even started to see arborists use them to plant trees.

"It's a very broad market in what we're seeing," says Chapman Hancock, vacuum excavator product manager for Ditch Witch. "As vacuum excavation is getting accepted in more and more areas, we're seeing different uses for trailer units. Drill operators aren't only using it for the mud disposal — they have that vac in front of the drill exposing every line, using that best practice to make sure they're seeing every line they cross."

Telecom companies themselves are starting to add units.

"Telecom crews are making sure the utility line was put in where they thought it was," Hancock says. "There are a lot of owners of utilities — whether it's gas, fiber, water, whatever it is — going out and doing GPS locations themselves after the contractor has done the work."

Adam Russell of JD Brule Equipment, a Tornado Global Hydrovacs dealership, says his company's trailer unit isn't only for digging, either.

"It's not just a hydrovac, it's a sewer cleaning tool," Russell says. "It's for the utility guys who have frozen conduit or guys who are doing catch basins."

EASING INTO THE INDUSTRY

Terry Rawn, who was an integral part of the design of Tornado Global Hydrovacs' trailer unit, says trailers are a way to introduce contractors to the market without having to buy the big \$500,000 trucks.

"Trailers are a great way to get started in the industry," says Rawn, who also operates Hydrovac Nation, a website and social media group for the hydroexcavation industry. "Companies would rather get their feet wet with a smaller unit than take on the cost of a large hydrovac unit. We find that company owners want to go back to owning equipment instead of contracting work out. A trailer unit is a great way to get started, and for some, that is all they will ever need."

"Contractors are paying \$50,000 a year to contract out these services, but they can buy trailer units for as little as \$120,000."

Mike Richards

Tornado Global Hydrovacs' unit, called the T70 Twister, has a 6-cubic-yard debris tank and is capable of holding 720 gallons of freshwater. The T70 is powered by a Tier 4 Final, 74 hp Cummins diesel engine and has an industrial positive displacement blower capable of 1,200 cfm at 15 inches Hg. The water pump is capable of up to 5.6 gpm at 3,500 psi. The trailered unit has operator controls on the rear and is capable of wireless operation.

"This unit will compete with the smaller chassis-mounted hydrovac units currently on the market," Rawn says.

NO CDL NEEDED

The T70 Twister is much like other trailer units from Ditch Witch and Vac-Con in that they can be easily hauled around with a non-CDL driver's license.

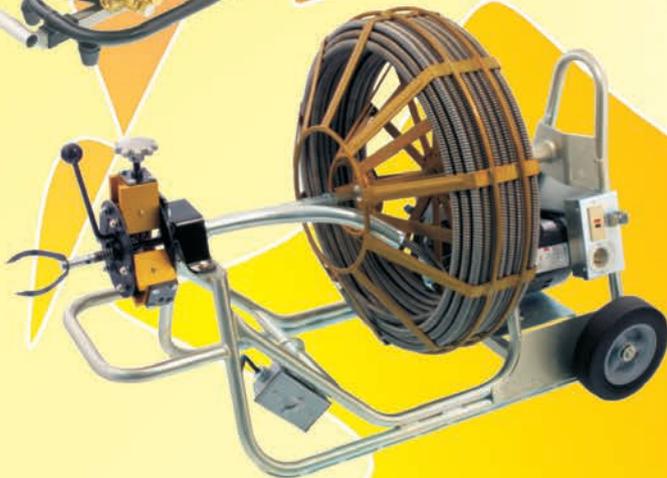
"You just need the right-sized truck, like a Ford F-350 or a similar-sized vehicle," says Richards of RED Equipment. "Most cities and contractors have vehicles that big, which makes trailered units attractive."

CONTINUED >>



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➤ The T70 Twister from Tornado Global Hydrovac is a smaller, trailer-mounted unit that can be easily hauled around with a non-CDL driver's license.

➤➤ Vac-Con's Mudslinger is an example of a smaller, trailer-mounted unit that makes it easier for contractors to start offering vacuum excavation services.

➤➤ The Ditch Witch HX50 (left) and HX30 trailer vacuum units were on display at the WWETT Show in Indianapolis. Trailer units make it possible for more contractors to use vacuum excavation without the price point of a large hydroexcavator.



Vac-Con's Mudslinger trailer-mounted unit can be fitted with either a 990 or 1,190 cfm, 16-inch Hg positive displacement blower and can have debris tank sizes of 535 or 845 gallons. The debris tank has a hydraulic dump hoist with a 55-degree dump angle. The Mudslinger water pump is capable of 4 gpm at 4,000 psi.

ALWAYS CHANGING

Ditch Witch's lines of trailered vacuum excavation units have been on the market a number of years, but the company continues to make improvements to them.

The HX line of trailer excavators has standard cyclonic filtration, adding extra filtration before material is delivered to the debris filtration.

The HX50, equipped with a 49 hp Kubota diesel engine, features a 1,005 cfm blower and a water pressure capacity of 3,000 psi. The boom is capable of 330-degree rotation. The HX30, powered by a 24.8 hp Kubota diesel engine, features a 512 cfm blower and a water pressure capacity of 3,000 psi.

"If you look at the overall package, we've really made the trailer purpose built," Hancock says.

The changes between the FX line and the HX trailered units include taking out all the mesh lining on the deck, making the trailer

itself the skid for the vac system. The overall height of the unit is cut down by 10 inches, and ground clearance is increased by 5 inches. The trailer is also 6 inches narrower, allowing for easier access on job sites.

"When we took a step back and looked at the FX and what we wanted to do, everything we did was contractor driven," Hancock says. "We go out and we talk to them. All of our designs are based heavily on their input. We want to make sure we're making it better. It has to have a good look to it but, more important, it needs to function the way an operator would want it. If there's improvement points, we always want to know about them."

MAKING THE MOVE

By the end of the WWETT Show, Tieffel had gathered a few quotes from some manufacturers and knew he was going to make a decision in the coming weeks.

"It's a move we have to make to remain competitive in our market," Tieffel says. "I'm not ready for a huge truck, but these trailers will come in handy, and in the long run, the money will stay with me at these jobs." c



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2019 Cleaner SEWER NOZZLES DIRECTORY

MANUFACTURER	NAME OF NOZZLE	APPLICATION	PIPE DIAMETER	FLOW RATE (GPM)	MAX OPERATING PRESSURE (PSI)	WEIGHT	# OF AVAIL FRONT JETS	# OF AVAIL REAR JETS	HOSE SIZE/ CONNECTING THREAD
 <p>All Jetting Technologies, Inc. 2740 Martin Downs Blvd., Ste. 318, Palm City, FL 34990 772-286-1218 • (f) 772-286-0069 www.alljetting.com info@alljetting.com SEE AD ON PAGE 88</p>	1/4" - 28 UNF Sapphire Nozzles and Plugs	Ultra High Pressure waterjetting up to 55,000 PSI		3 to 30	20,000 - 55,000		1		
	3/8" - 24 UNF Sapphire Nozzles and Plugs	Ultra High Pressure waterjetting up to 55,000 PSI		3 to 30	20,000 - 55,000		1		
	7/16" - 20 UNF Sapphire Nozzles and Plugs	Ultra High Pressure waterjetting up to 55,000 PSI		3 to 30	20,000 - 55,000		1		
	Long Stem Sapphire, 60° seating angle	Ultra High Pressure waterjetting up to 55,000 PSI		3 to 30	20,000 - 55,000		1		
	M10 x 1.5 thread - 5MM Hex Key	Ultra High Pressure waterjetting up to 55,000 PSI		3 to 30	20,000 - 55,000		1		
	5/16" Hex with 3/8" - 24 UNF	Ultra High Pressure waterjetting up to 55,000 PSI		3 to 30	20,000 - 55,000		1		
 <p>Aqua Mole Technologies, Inc. 3778 Timberlake Dr., Richfield, OH 44286 877-457-2782 • 330-523-5317 www.aquamole.com aquamole@sbcglobal.net SEE AD ON PAGE 8</p>	Custom Drilled Nozzles	Aqua Mole offers custom designs for specific applications: cleaning from downstream up, from structure out to the main, long distance pulling, specific types of debris removal, etc. We can work with ANY jetter, no matter the flow rate.							
	Monster Mole	Dual angle nozzle used to clean sand, gravel and grit	2" - 24"	1.7 to 80	200 - 10,000	.3 oz for 1/8" NPT up to 16 oz for 1" NPT	1	6	1/8", 1/4", 3/8", 1/2", 3/4", 1" NPT
	RH Super Thruster (15° or 20° rear angle)	Maximizes distance capability w/ penetrating power	2" - 24"	1.7 to 25	200 - 10,000	.5 oz for 1/8" NPT up to 3.0 oz for 1/2" NPT	1	3, 4, or 6	1/8", 1/4", 3/8", 1/2" NPT
	Degreaser & High Thrust Degreaser	Clearing grease blockages, pushing debris forward	2" - 24"	2.5 to 80	200 - 10,000	.3 oz for 1/8" NPT up to 16 oz for 1" NPT	3	6	1/8", 1/4", 3/8", 1/2", 3/4", 1" NPT
	Super Pusher	Optimized nozzle for pushing debris forward	2" - 24"	2.5 to 25	200 - 10,000	.5 oz for 1/8" NPT up to 3.0 oz for 1/2" NPT	3	6	1/8", 1/4", 3/8", 1/2" NPT
	Thruster 3R, Thruster 4R, Thruster 6R	Clear blockages going upstream	2" - 24"	1.7 to 80	200 - 10,000	.3 oz for 1/8" NPT up to 16 oz for 1" NPT	1	3, 4, or 6	1/8", 1/4", 3/8", 1/2", 3/4", 1" NPT
	Blind Thruster 3 Rear, 4 Rear, or 6 Rear (jets)	25° rear angle for pulling. More jets add additional coverage	2" - 24"	1.7 to 80	200 - 10,000	.3 oz for 1/8" NPT up to 16 oz for 1" NPT		3, 4, or 6	1/8", 1/4", 3/8", 1/2", 3/4", 1" NPT
	Flusher, Flusher 8R & Flusher 12R	45° rear angle for flushing line from either end	2" - 24"	1.7 to 100	200 - 10,000	.3 oz for 1/8" NPT up to 16 oz for 1" NPT		6, 8, or 12	1/8", 1/4", 3/8", 1/2", 3/4", 1" NPT
	Corner Mole (3 jets @ 45 degree, w/ one 90° side jet)	Helps operator to make tight turns	2" - 24"	1.7 to 25	200 - 10,000	.3 oz for 1/8" NPT up to 1.5 oz for 1/2" NPT	1	3 @ 45°, 1 @ 90°	1/8", 1/4", 3/8", 1/2" NPT
	Rotor Jet, 90° side jet, 45° rear	360° of coverage for polishing a line after cleaning	2" - 24"	2.5 to 50	500 - 10,000	.7 oz for 1/8" NPT up to 11 oz for 3/4" NPT		2 side / 2 rear @ 45°	1/8", 1/4", 3/8", 1/2", 3/4" NPT
 <p>ARTHUR PRODUCTS CO. an LSG Mfg Company Arthur Products Co. 1140 Industrial Pky., Medina, OH 44256 800-322-0510 • 330-725-4905 (f) 330-722-2698 www.arthurproducts.com apc@apclsq.com</p>	Cnt-r-KUT™ Elite Kit	Roots and Other Blockages	2" - 12"	4 to 80	2,000 - 10,000	varies	Cust Spec	Cust Spec	3/8" - 1/2"
	Cnt-r-KUT™ Elite Mini Kit	Roots and Other Blockages in tight spaces	2" - 12"	4 to 80	2,000 - 10,000	varies	Cust Spec	Cust Spec	3/8" - 1/2"
	Cnt-r-KUT™ Basic Kit	Deicing/Degreasing, Penetration, Flushing	2" - 12"	2.5 to 80	2,000 - 10,000	varies	Cust Spec	Cust Spec	3/8" - 1/2"
	Cnt-r-KUT™ Basic Mini Kit	Roots and Other Blockages	2" - 12"	2.5 to 80	2,000 - 10,000	varies	Cust Spec	Cust Spec	3/8" - 1/2"
	Cnt-r-KUT™ Tow Hook	Pulling and Towing Applications	2" - 12"	2.5 to 80	1,200 - 15,000	varies	Cust Spec	Cust Spec	3/8" - 1/2"
	Cnt-r-KUT™ Tow Hook Mini	Pulling and Towing Applications	2" - 12"	2.5 to 80	1,200 - 15,000	varies	Cust Spec	Cust Spec	3/8" - 1/2"
	Mini-Mole	Special tapered thread for use in small tube cleaning on rigid lance	.200" - 1"	1.7 to 20	1,200 - 10,000	varies	Cust Spec	Cust Spec	Special tapered thread
	Rodder Jets	General tube cleaning for use on rigid lance	.250" - 1"	1.7 to 40	1,200 - 15,000	varies	Cust Spec	Cust Spec	Various male thread sizes
	Cnt-r-KUT™ Centering Device	Flexible elastomer for nozzle centering - for your existing nozzles	1" - 24"	1.7 to 80	1,200 - 10,000	varies			3/8" - 1/2"
	Mega-Thruster PX Revolver	Full 360° rotation for cleaning & polishing; designed for long runs	1" - 24"	1.7 to 80	1,200 - 10,000	varies	Cust Spec	3	3/8" - 1/2"

MANUFACTURER	NAME OF NOZZLE	APPLICATION	PIPE DIAMETER	FLOW RATE (GPM)	MAX OPERATING PRESSURE (PSI)	WEIGHT	# OF AVAIL FRONT JETS	# OF AVAIL REAR JETS	HOSE SIZE/ CONNECTING THREAD
 Envirosight 111 Canfield Ave., Unit B3, Randolph, NJ 07869 866-936-8476 • 973-252-6700 (f) 973-252-1176 www.envirosight.com office@envirosight.com SEE AD ON PAGE 5	JetScan	HD video nozzle for jetter trucks and trailers	6" - 30"	40 to 80	2,000 - 3,000	16.3 lbs.		6	3/4" or 1"
 Enz USA Inc. 1585 Beverly Ct., Unit 115, Aurora, IL 60502 877-369-8721 • 630-692-7880 (f) 630-692-7885 www.enzusainc.com sales@enzusainc.com SEE AD ON PAGE 60	Bulldog Antiblaster	Anti-Toilet Blowing in Residential	8" - 24"	55 to 80	1,500 - 1,800	17 lbs.	6		1" - 1 1/4"
	Bulldog	Cleaning grease, roots, deposits, etc.	8" - 24"	50 to 120	2,000 - 2,900	17 lbs.	7	6	1" - 1 1/4"
	Rotodril	Cleaning blocked pipes, frozen pipes, heavy debris	2" - 14"	13 to 80	2,000 - 4,000	25 lbs. to 1.5 lbs.	1	6	1/2" - 1"
	Grenade	Flushing heavy debris	6" - 12"	40 to 80	2,000 - 3,600	11 lbs.		10	1"
	Chisel 60.100L	Penetrating clogs, root masses, frozen pipes	6" - 16"	50 to 80	2,000 - 3,600	6 lbs.	4	6	1"
	10.125TR Chain Scraper	Root removal, hard grease, hard deposits	5" - 12"	14 to 80	2,000 - 3,600	6 lbs.		6	1"
	10.200R Rotating Chain Scraper	Removal of root masses, clogs, hard deposits	8" - 16"	50 to 80	2,000 - 3,600	78 lbs.		6	1"
	10.400R Rotating Chain Scraper	Removal of root masses, clogs, hard deposits	16" - 32"	80 to 120	2,000 - 3,600	105 lbs.		6	1"
	14.200 Milling Cutter	Removal of concrete & mineral deposits	8"	80 to 120	2,000 - 2,200	178 lbs.		6	1" - 1 1/4"
	Bulldozer 50.100G	Flushing debris from larger pipe	16" - 40"	40 to 80	2,000 - 3,600	57 lbs.	1	8	1"
General Pipe Cleaners 1101 Thompson Ave., McKees Rocks, PA 15136 800-245-6200 • 412-771-6300 www.drainbrain.com info@drainbrain.com SEE AD ON PAGE 2	Chisel Point Nozzle	Penetrating, breaking up debris	4" - 10"	12	2,500	4 oz.	4	6	1/2"
	Traction Nozzle	Sand and mud removal	4" - 10"	12	2,500	8 oz.	1	6	1/2"
	Cleaning Nozzle	Maintenance Cleaning	4" - 10"	12	2,500	12 oz.		8	1/2"
	Spring Leader Nozzle	Guiding hose around tight bends	2" - 10"	1.5 to 8	1,500 - 3,000	4 oz.		3 to 4	1/8" - 1/4" - 3/8"
	Downhead Nozzle	Dropping down T's	2" - 4"	1.5 to 4	1,500 - 3,000	2 oz.		3	1/8"
	Chain Saw Nozzle	Cutting roots	4" - 10"	4 to 12	2,500 - 3,000	2 lbs.		2 to 4	3/8" and 1/2"
	Rotary Nozzle	Scour pipe walls clean	2" - 10"	1.5 to 12	1,500 - 3,000	2 oz. to 10 oz.		2 to 4	1/8" - 1/4" - 3/8" - 1/2"
Giant Industries, Inc. 900 N Westwood Ave., Toledo, OH 43607 800-633-4565 • 419-531-4600 (f) 419-531-6836 www.giantpumps.com sales@giantpumps.com SEE AD ON PAGE 73	Sewer Cleaning Turno Nozzle	Sewer Cleaning	1" to 2 1/2"	1.7 to 48	500 - 4,350	.1 lbs. to 1.8 lbs.	1	Up to 6	1/8" BSP, 1/2" BSP, 1" BSP
Jetstream of Houston 5905 Thomas Rd., Houston, TX 77041 800-231-8192 • 832-590-1300 (f) 832-590-1304 www.waterblast.com sales@waterblast.com SEE AD ON PAGE 41	15K Orbi-Jet	Surface Cleaning	N/A	25	15,000	N/A	4		1/2" NPT Female
	15K Straight Tip	Surface Cleaning	N/A	51.7	15,000	N/A	1		1/4" NPT Male
	15K Fan Tip	Surface Cleaning	N/A	51.7	15,000	N/A	1		1/4" NPT Male
	15K Rotomag	Pipe Cleaning	>3"	50	15,000	N/A	2	2	3/4" NPT Male
	15K Tube Spinner w/Nozzle	Tube Cleaning	>.5"	50	15,000	N/A	Various	Various	Various
	15K Compact Nozzle	Tube Cleaning	>.5"	36.2	15,000	N/A	Various	Various	Various
	15K Evaporator Nozzle	Tube Cleaning	>.5"	36.2	15,000	N/A	Various	Various	Various
	15K Abrasive Nozzle	Surface Cleaning	N/A	8	15,000	N/A	Various	Various	3/8" NPT Female
	20K Orbi-Jet	Surface Cleaning	N/A	7.5	20,000	N/A	4		9/16" MP Female
	20K Straight Tip	Surface Cleaning	N/A	20.7	20,000	N/A	1		Gun Nozzle Holder
	20K Fan Tip	Surface Cleaning	N/A	20.7	20,000	N/A	1		Gun Nozzle Holder
	20K Rotomag	Pipe Cleaning	>3"	55.3	20,000	N/A	2	2	3/4" MP Female
	20K Pineapple	Pipe Cleaning	>3"	7.6	20,000	N/A	4	6	3/4" MP Female
	20K Tube Spinner w/Nozzle	Tube Cleaning	>.5"	14.6	20,000	N/A	2	2	Various
	20K Compact Nozzle	Tube Cleaning	>.5"	41.8	20,000	N/A	Various	Various	Various
	20K Evaporator Nozzle	Tube Cleaning	>.5"	41.8	20,000	N/A	Various	Various	Various
	20K Abrasive Nozzle	Surface Cleaning	N/A	4.8	20,000	N/A	Various	Various	9/16" MP Female
	40K Tornado Nozzle	Surface Cleaning	N/A	8.2	40,000	N/A	3 to 4		9/16" Button Seal
	40K UHPE Nozzles	Tube Cleaning	>.5"	7.8	40,000	N/A	Various	Various	Various
	 KEG Technologies, Inc. 6220 N Pinnacle Dr., Spartanburg, SC 29303 866-595-0515 • 864-804-6637 (f) 864-804-6629 www.kegtechnologies.net sales@kegtechnologies.net SEE AD ON PAGE 18	Russian Rotor 1" Tier 2	Reverse Cleaning Technology	6" - 16"	50 to 125	1,000 to 3,000	7.2 lbs.	4	4
Stallion 1" Tier 3		360° Cleaning-Heavy Debris	6" - 48"	30 to 125	1,000 to 3,000	9.4 lbs	1	6	3/4" - 1 1/4"
Aqua Power 700 Tier 2		Control Rotation - Grease & Roots, Mineral Deposits	6" - 24"	50 to 125	2,000 to 3,000	23 lbs	6	4	3/4" - 1 1/4"
Aqua Power Jr. Tier 2		Grease & Roots	4" - 16"	30 to 80	2,000 to 3,000	8 lbs.	5	4	3/4" - 1"
Royal Tier 3		360° Wall Cleaning Storm & Sewer	12" - 48"	40 to 180	1,500 to 3,000	17.6 lbs.		12	3/4" - 1 1/2"
Cleaning Tier 3		Everyday Routine Cleaning	3" - 16"	8 to 80	1,000 to 4,000	1 lb. - 6.6 lbs.		8	3/8" - 1"
Traction Tier 3		Hill Climbing - deteriorated/damaged or cracked pipes	2" - 12"	6 to 125	1,000 to 4,000	0.6 lbs. - 6 lbs.	1	7	3/8" - 1 1/4"

KEG TECHNOLOGIES, INC. CONTINUED >>

MANUFACTURER	NAME OF NOZZLE	APPLICATION	PIPE DIAMETER	FLOW RATE (GPM)	MAX OPERATING PRESSURE (PSI)	WEIGHT	# OF AVAIL FRONT JETS	# OF AVAIL REAR JETS	HOSE SIZE/ CONNECTING THREAD
KEG Technologies, Inc. CONTINUED Spartanburg, SC 29303 866-595-0515 • 864-804-6637 www.kegtechnologies.net sales@kegtechnologies.net	Flour Cleaner 5,6,8,10,12 & 14 Tier 3	Clean from Spring line down	6" and Up	18 to 180	1,000 to 4,000	18.75 lbs. - 51.35 lbs.		5,6,8,10, 12 & 14	1/2" - 1 1/2"
	Torpedo Tier 3	Heavy Debris Removal - All Around Cleaning	6" to 16"	30 to 125	900 to 3,000	14 lbs.		8	3/4" - 1 1/2"
	OMG Tier 3	Sanitary/Storm - flushing nozzle deteriorated pipe no bottom	12" and Up	60 to 125	1,500 to 3,000	36 lbs.	1	12	1 1/2" down to 3/4"
 MyTana Mfg. Co. Inc. 746 Selby Ave., St. Paul, MN 55104 800-328-8170 • 651-222-1738 (f) 651-222-1739 www.mytana.com mytana@mytana.com SEE AD ON PAGE 27	Cornering	Flushing through corners	1 1/2" - 12"	2 to 8	1,500 - 3,000	< 8 oz.	1	3	1/8" - 1/4" - 3/8" - 1/2"
	Penetrating Thrust	Paper Products	1 1/2" - 8"+	2 to 8	1,500 - 3,000	< 8 oz.	1	3	1/8" - 1/4" - 3/8" - 1/2"
	Monster Flush	Pulling & Cleaning	1 1/2" - 8"+	2 to 8	1,500 - 3,000	< 8 oz.	1	6	1/8" - 1/4" - 3/8" - 1/2"
	General Flusher	Cleaning	1 1/2" - 8"+	2 to 8	1,500 - 3,000	< 8 oz.		6	1/8" - 1/4" - 3/8" - 1/2"
 NozzTeq® Inc. 1949 Calumet St. Clearwater, FL 33765 866-620-5915 • 727-223-4979 (f) 603-413-6744 www.nozzteq.com info@nozzteq.com SEE AD ON PAGE 52	BL Swiper® (Med)	Reduces blown toilets/services	4" - 36"	10 to 266	400 - 4,000	2 - 12 lbs.		4 to 6	1/2" - 3/4" - 1" - 1 1/4"
	JAWS® 100	High performance sewer cleaning or storm water cleaning	6" - 12"	5 to 80	400 - 4,000	4 lbs.		4	1/2" - 3/4" - 1"
	Multi-Global Nozzle™	Sewer and pipe cleaning for penetration	2" and Up	4 to 170	400 - 4,000	2 lbs.	4	1 to 6	1/2" - 3/4" - 1" - 1 1/4"
	JAWS™	High performance sewer and pipe cleaning heavy debris	6" - 30"	30 to 265	400 - 4,000	7 lbs.		5	1/2" - 3/4" - 1" - 1 1/4"
	IceBear Penetrating Nozzle™	Sewer and pipe cleaning penetrating nozzle	1" and Up	4 to 170	400 - 4,000	1 - 3 lbs.	3		1/4" - 1/2" - 3/4" - 1" - 1 1/4" - 1 1/2"
	C-RAY 200™	Bottom cleaning for sewer and pipe	12" - 36"	30 to 265	400 - 4,000	22 lbs.	1	6	1/2"
	C-RAY 400™	Bottom cleaning for sewer and pipe	15" and Up	40 to 350	400 - 4,000	42 lbs.	1	8	3/4" - 1" - 1 1/4" - 1 1/2"
	BL Swiper® (large)	Ventura effect type nozzle to clean with water in the line and sucks the water down	15" and Up	40 to 265	400 - 4,000	13 lbs.		39	
	Spinner Nozzles (No rebuilds)	Grease and other obstructions	4" and Up	14 to 350	400 - 4,000	3 - 15 lbs.	2		1/2" - 3/4" - 1" - 1 1/4" - 1 1/2"
	Goblin Grease Eater™	Grease nozzle sewer lines or storm lines	6" and Up	40 to 350	400 - 4,000	12 lbs.	1	10	3/4" - 1" - 1 1/4" - 1 1/2"
	MONRO-JET™	Hydro-Excavation	2" - 8"	3 to 20	2,000 - 36,000	2 lbs.	1		1/2"
	ORCA™	Two truck operation at either end of the pipe	15" - 60"	40 to 350	400 - 4,000	15 lbs.		8	3/4" - 1" - 1 1/4" - 1 1/2"
	MANTA™	Bottom cleaner for recycled water trucks	12" - 72"	60 to 528	900 - 3,000	45 - 60 lbs.	1	8 to 12	1/2" - 3/4" - 1" - 1 1/4" - 1 1/2"
FIR™	All stainless type penetrators	2" - 12"	5 to 80	400 - 4,000	1 lb.	1	3 to 6	1/8" - 1/4" - 3/8" - 1/2" - 3/4" - 1"	
C-RAY 800™	Dual truck operation for double the flow for large pipes	36" - 96"	120 to 350	400 - 4,000	50 lbs.		8	3/4" - 1" - 1 1/4" - 1 1/2"	
 Root Rat PO Box 740, Bolivar, OH 44612 800-288-7873 • 330-874-4300 (f) 330-874-4448 www.rootrat.net kelly@chempure.com SEE AD ON PAGE 14	1" Root Rat	Roots and Encrustations	8" - 30"	40 to 120	Up to 5,000	5 lbs.		3	3/4" or 1"
	1/2" Root Rat	Roots and Encrustations	4" - 10"	5 to 18	Up to 8,000	1 lb.		2	1/2" or 3/8"
	3/8" Root Rat	Roots and Encrustations	2" - 6"	4 to 12	Up to 5,000	8 oz.		2	1/4" to 3/8"
Sewer Equipment 1590 Dutch Rd., Dixon, IL 61021 815-477-7611 www.sewershop.com sales@sewershop.com	Avanti	Rotating penetrator for ice, roots and mineral deposits	3" - 12"	15 to 80	2,000 - 4,000	0.75 - 2 lbs.		6	1/2" - 3/4" - 1"
	Tri-Star	Chisel penetrator for ice, grease, and hard scale	3" - 20"	15 to 80	2,000 - 4,000	0.25 - 4 lbs.	4	6	1/2 - 3/4" - 1" - 1 1/4"
	Rondo	Final cleaning for pre-commissioning pipe and cleaning before re-lining	3" - 18"	12 to 80	2,000 - 4,000	0.5 - 3 lbs.		3	1/2 - 3/4" - 1"
	HW	Flushing for heavy debris	6" - 24"	30 to 80	2,000 - 4,000	0.5 - 17 lbs.		12	1/2 - 3/4" - 1" - 1 1/4"
	Roto-Max	Rotator for roots, grease, solids, and heavy debris	4" - 32"	18 to 80	2,000 - 4,000	2 - 16 lbs.	1	6	1/2 - 3/4" - 1" - 1 1/4"
	Dual Degree	General cleaning with excellent flushing power	4" - 18"	18 to 80	2,000 - 4,000	2.5 - 9 lbs.	1	8	1/2" - 3/4" - 1"
	RDS	Rotator for grease and general cleaning	3" - 24"	15 to 80	2,000 - 3,500	1.3 - 14 lbs.		6	1/2 - 3/4" - 1" - 1 1/4"
	Wiesel	General cleaning for long-distance jetting	4" - 18"	18 to 80	2,000 - 4,000	0.5 - 1.5 lbs.	1	8	1/2" - 3/4" - 1"
	Combi Chain Cutter	Aggressive cleaning for complete removal of roots and concrete residue	6" - 24"	30 to 80	2,000 - 2,500	5 - 19 lbs.		6	3/4" - 1" - 1 1/4"
	Mega	Heavy flushing for debris in large lines and culverts	4" - 120"	18 to 80	2,000 - 4,000	3 - 50 lbs.	1	11	1/2" - 3/4" - 1"
	Power Jet	Ejector-style flushing for 16" and larger water filled pipes and ditches. Increase flow volume 4X with low working pressure for debris removal	16" - 120"	60 to 80	2,100	82 lbs.		12	1" - 1 1/4"
	Wamax	The ultimate milling system for removal of concrete, grout, protruding taps, roots, and anything that can block a line	4" - 40"	30 to 100	2,000 - 2,900	17 - 82 lbs.		8	3/4" - 1" - 1 1/4"
	Rotojiggler	Vibrating nozzle for removal of mineral deposits, concrete, and slag	4" - 16"	15 to 65	2,000 - 2,900	2 - 6 lbs.		6	3/4" - 1" - 1 1/4"
	K114 Chain Rotor	Adjustable to aggressively clean up to 62" diameter pipe	10" - 62"	80 to 100	2,000 - 2,900	44 lbs.		6	1 1/4"
Eel Cutter	Chain cutter with short body and flexible centering skid to maneuver through bends and bad offsets	4" - 8"	18 to 65	2,000 - 2,900	3 - 6 lbs		6	1 1/4"	

MANUFACTURER	NAME OF NOZZLE	APPLICATION	PIPE DIAMETER	FLOW RATE (GPM)	MAX OPERATING PRESSURE (PSI)	WEIGHT	# OF AVAIL FRONT JETS	# OF AVAIL REAR JETS	HOSE SIZE/ CONNECTING THREAD
 <p>Sewer Pro Shop 1061 Triad Ct., Ste. 1, Marietta, GA 30062 877-864-9394 • 470-592-1715 (f) 770-984-2802 www.sewerproshop.com info@sewerproshop.com</p>	Emperor Nozzle	Flushing debris from large lines	12" - 32"	80 to 120	2,000 - 2,5000	19.8 lbs.		12	1" - 1 1/4"
	Penetrator Nozzle	Flushing heavy debris in lines with off sets	6" - 16"	50 to 80	2,000 - 4,000	15.4 lbs.	1	8	3/4" - 1 1/4"
	Power Pull Nozzle	Mud, Sand, Silt	4" - 12"	18 to 80	2,000 - 4,000	1.5 - 9 lbs.		8	1/2" - 1 1/4"
	Spear Nozzle	Penetrating clogs/blockage, root mass	8" - 24"	50 to 80	200 - 4,000	6.2 lbs.	4	6	3/4" - 1"
	General Nozzle	All around sewer cleaning, prevent maint.	4" - 16"	18 to 80	2,000 - 4,000	1.5 - 9 lbs.	1	8	1/2" - 1"
	Arrow Nozzle	Penetrating clogs/blockages, frozen pipes	4" - 16"	18 to 80	2,000 - 4,000	1 - 2.5 lbs.	3 + 1	8	1/2" - 1"
	Stealth Nozzle	Flushing heavy debris	8" - 24"	60 to 80	2,000 - 4,000	17.6 lbs.		8	3/4" - 1 1/4"
	Raptor Nozzle	Penetrating clogs, roots/grease masses	4" - 24"	18 to 80	2,000 - 4,000	2.4 - 5.5 lbs.		3(1/2")6(1")	1/2" - 1"
	Big Foot Nozzle	Flushing debris from floor of large pipes	16" - 48"	40 to 120	2,000 - 3,000	33 - 56 lbs.		6 to 14	1" - 1 1/4"
	Twister Nozzle	Cleaning grease, light roots, mineral deposits	8" - 24"	50 to 120	2,000 - 4,000	15.4 lbs.	5	4	1" - 1 1/4"
	Typhoon Nozzle	Grease, light crust, light roots	6" - 12"	18 to 80	2,000 - 4,000	11 lbs.	4	6	1/2" - 1"
	Antiblower	Shallow sewer line or close to home	6" - 16"	40 to 80	2,000 - 3,000	9 lbs.	1	8	3/4" - 1"
 <p>SPARTAN Spartan Tool 1619 Terminal Rd., Niles, MI 49120 800-435-3866 www.spartantool.com sales@spartantool.com SEE AD ON PAGE 96</p>	Sandshoe	Sand, dirt and rocks	4" - 18"	12 to 18	2,000 - 4,000	7 lbs.		4	3/8" - 1/2"
	Rotating	Scrubbing pipe walls	2" - 12"	4 to 18	2,000 - 4,000	1 - 3 lbs.		3	1/4" - 3/16" - 3/8" - 1/2"
	Q Nozzle	Downhill jetting	4" - 12"	12 to 18	2,000 - 4,000	1 - 2 lbs.	3	4	3/8" - 1/2"
	Rocket Nozzle	Long distance jetting	4" - 12"	12 to 18	2,000 - 4,000	2 lbs.	1	4	3/8" - 1/2"
	Closed Nozzle	Standard jetting	2" - 12"	4 to 18	2,000 - 4,000	1 lb.		4	3/8" - 1/2"
	Open Nozzle	Standard jetting	2" - 12"	4 to 18	2,000 - 4,000	1 lb.	1	4	3/8" - 1/2"
	Brass Ball	Stainless steel hose jetting	2" - 8"	4 to 18	2,000 - 4,000	1 lb.		4	3/16"
<p>StoneAge, Inc. 466 Skylane Dr., Durango, CO 81303 866-795-1586 • 970-259-2869 www.sewernozzles.com bill.shires@stoneagetools.com SEE AD ON PAGE 4</p>	Warthog WGR Magnum	Sewer jetting	8" - 36"	50 to 80	1,500 - 5,000	13 lbs.	1	4	1"
	Warthog WG-1	Sewer jetting	8" - 36"	50 to 80	1,500 - 5,000	10 lbs.	1	4	1"
	Warthog WGP-1	Sewer jetting	8" - 36"	50 to 80	1,500 - 5,000	10 lbs.	1	4	1"
	Warthog WHP	Sewer jetting	6" - 18"	15 to 50	1,500 - 4,000	4 lbs.	1	2	1/2" - 3/4"
	Warthog WH	Sewer jetting	6" - 18"	10 to 45	1,500 - 8,000	4 lbs.	1	2	1/2" - 3/4"
	Warthog WS - 1/2	Sewer jetting	4" - 8"	8 to 20	1,500 - 5,000	3 lbs.	1	2	1/2"
	Warthog WT - 3/8	Sewer jetting	3" - 6"	5 to 12	1,500 - 5,000	1 lb.	1	2	3/8"
	Warthog WV - 1/4	Sewer jetting	2" - 4"	3 to 8	2,000 - 5,000	1 lb.	1	2	1/4"
	Warthog WD 1-1/4	Sewer jetting	8" - 36"	80 to 120	1,500 - 5,000	11 lbs.	1	6	1-1/4"
	Warthog WT - 1/2	Sewer jetting	3" to 6"	5 to 12	1,500 - 5,000	1.2 lbs.	1	2	1/2"
<p>USB-USA LLC 7565 Owl Creek Dr., Douglasville, GA 30134 844-285-5770 www.usb-usa.com usb-usa-llc@gmail.com SEE AD ON PAGE 25</p>	Primus 3D	Grease, Crusts, Light Roots	4" - 24"	18 to 120	2,000 - 4,000	2.6/7.0/8.3/20.1	1	3/4/5/6	1/2" - 3/4" - 1" - 1 1/4"
	Rocket 3D	Sand, Silt, Large Debris	4" - 24"	12 to 120	2,000 - 4,000	6/2.6/4.85/11.4/4		6/8/10/12	1/2" - 3/4" - 1" - 1 1/4" - 1 1/2"
	Pipe Wolf 3D	Total Blockages from Roots, Grease & other Organic Matter	4" - 24"	14 to 120	2,000 - 4,000	2.4/5.7/11.9		6	1/2" - 3/4" - 1" - 1 1/4"
	Bagger Max 3D	Sand, Silt, Solids, Sludge & other Heavy Debris	18" - 96"	50 to 120	2,000 - 3,000	33/53/66/114.5	5	6/8/10/12	3/4" - 1" - 1 1/4" - 1 1/2"
	Chisel	Total Blockages from Roots, Grease, etc.	2" - 15"	8 to 120	2,000 - 4,000	22/33/66/154	4		1/4" - 3/8" - 1/2" - 3/4" - 1" - 1 1/4"
	FS 3D	Total Blockages from Roots, Grease & other Obstructions	2" - 15"	8 to 80	2,000 - 4,000	22/44/66/154/3.7	4	6/5/6/8	1/4" - 3/8" - 1/2" - 3/4" - 1"
	Tri-Jet 3D	Mud, Sand, Silt - Everyday Cleaning	4" - 48"	60 to 120	2,000	4.8/12.1/17.6/23.1/44		12/15	1" - 1 1/4"
	FD 2 3D	Half-Open or Complete Open Drains - Mud, Sand, Silt	4" - 12"	14 to 120	2,000 - 4,000	2.6/4/8.3/14.3		6/8	1/2" - 3/4" - 1" - 1 1/4"
	3D Extreme	Mud, Sand, Silt	6" - 15"	40 to 120	2,000 - 3,000	9.4	1	8	3/4" - 1" - 1 1/4"
	3D Cleaning	Everyday Cleaning - Sand, Mud, Silt, Grease	4" - 15"	14 to 80	2,000 - 4,000	6/12.1/17.6/23.1	1	6/8/10/12	1/2" - 3/4" - 1" - 1 1/4"
 <p>Vac-Con, Inc. 969 Hall Park Rd., Green Cove Springs, FL 32043 904-284-4200 www.vac-con.com vns@vac-con.com SEE ADS ON PAGES 3, 83</p>	C70	Cleaning and Inspection	6" - 40"	40 to 170	2,000 - 4,000			8	3/4" - 1" - 1 1/4"
<p>Vector Manufacturing 1621 S Illinois St., Streator, IL 61364 800-627-3171 • 815-672-3171 (f) 815-672-2779 www.vactor.com sales@vactor.com</p>	HXXpose	Hydroexcavation		3 to 12	1,000 - 3,000			1	1/2" NPT
	Super Flusher	General Cleaning and High Coverage Flushing		3 to 12	1,000 - 3,000			1	1/2" NPT

MANUFACTURER	NAME OF NOZZLE	APPLICATION	PIPE DIAMETER	FLOW RATE (GPM)	MAX OPERATING PRESSURE (PSI)	WEIGHT	# OF AVAIL FRONT JETS	# OF AVAIL REAR JETS	HOSE SIZE/ CONNECTING THREAD
 VARCO LANDSCAPER & CONTRACTOR HOSE ACCESSORIES 7489 Mason King Ct., Manassas, VA 20109 866-872-1224 • 703-334-5980 (f) 703-334-5979 www.varcopumper.com ron@varcopumper.com	Super Sewer Squad Kit	Penetration, Flushing, Deicing, Degreaser, Polishing	1" - 24"	1.7 to 80	1,200 - 10,000	varies	Cust Spec	Cust Spec	1/8" - 1"
	Elite 6 Pack Nozzle Kit	Penetration, Flushing, Deicing, Degreaser, Polishing	1" - 24"	1.7 to 80	1,200 - 10,000	varies	Cust Spec	Cust Spec	1/8" - 1"
	Evaporator (EV)	Deicer, Degreaser	1" - 24"	1.7 to 80	1,200 - 10,000	varies	Cust Spec	Cust Spec	1/8" - 1"
	Impactor (LT)	Heavily fouled pipes	1" - 24"	1.7 to 80	1,200 - 10,000	varies	Cust Spec	Cust Spec	1/8" - 3/4"
	PX Revolver	Full 360° rotation for cleaning & polishing	1" - 24"	1.7 to 80	1,200 - 10,000	varies	Optional	Cust Spec	1/8" - 3/4"
	Round Nose (Button)	General Cleaning/Cornering	1" - 24"	1.7 to 80	1,200 - 10,000	varies	Cust Spec	Cust Spec	1/16" - 1"
	Round Nose Hex	Penetration or Flushing	1" - 24"	1.7 to 80	1,200 - 10,000	varies	Cust Spec	Cust Spec	1/8" - 1"
	B Style	Penetration or Deicing, Degreaser	1" - 24"	1.7 to 80	1,200 - 10,000	varies	Cust Spec	Cust Spec	1/8" - 3/4"
 World-Tech Industries 9319 Ravenna Rd., Twinsburg, OH 44087 330-405-7300 • (f) 330-405-7301 www.worldtechindustries.com worldtech@worldtechindustries.com	Ellipse "Slider" Series								
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<p>Allan J. Coleman 5725 N Ravenswood Ave., Chicago, IL 60660 773-728-2400 www.allanjcoleman.com • customerservice@allanjcoleman.com</p> <p>SEE ADS ON PAGES 17, 94</p>	<p>Aqua Mole, Direct Hit, StoneAge Warthog</p>
<p>American Jetter 6908 Pine Grove Rd., Knoxville, TN 37914 866-944-3569 • 865-524-4647 • (f) 865-247-5105 www.americanjetter.com • andy@americanjetter.com</p> <p>SEE AD ON PAGE 88</p>	<p>Aqua Mole, StoneAge Warthog</p>
<p>Drainables Direct 1703 Toll Gate Dr., Maumee, OH 43537 800-421-4580 • (f) 800-752-8524 www.drainables.com • sales@drainables.com</p> <p>SEE AD ON PAGE 47</p>	<p>Aqua Mole</p>
<p> GapVax, Inc. 575 Central Ave., Johnstown, PA 15902 888-442-7829 • 814-535-6766 • (f) 814-539-3617 www.gapvax.com • scott@gapvax.com</p> <p>SEE AD ON PAGE 95</p>	<p>Giant Turbo Nozzle, Hydra-Flex (Ripsaw), General Pump Hydroexcavation Nozzles, Sewer Pro Shop (Blue Star Nozzles)</p>
<p>HotJet USA 14773 S Heritage Crest Way, Riverton, UT 84065 800-624-8186 • 801-545-0777 www.hotjetusa.com • sales@powerlineindustries.com</p> <p>SEE AD ON PAGE 89</p>	<p>Arthur Products, Hydra-Flex, KEG, StoneAge Warthog</p>
<p>Jetter Depot 1595 Redi Rd., Ste. 100/200, Cumming, GA 30040 770-406-8248 • 678-431-8136 • (f) 678-807-2944 sales@jetterdepot.com • www.jetterdepot.com</p> <p>SEE AD ON PAGE 46</p>	<p>nuovaContec</p>
<p> Patriot Sewer Equipment & Repair 6390 Columbus St., Riverside, CA 92504 888-318-9888 www.patriot.us • service@patriot.us</p> <p>SEE AD ON PAGE 45</p>	<p>Hydra-Flex (Reaper), Enz, nuovaContec, Root Rat Nozzles</p>
<p> SPARTAN SEE AD ON PAGE 96</p> <p>Spartan Tool 1619 Terminal Rd., Niles, MI 49120 800-435-3866 www.spartantool.com • sales@spartantool.com</p>	<p>Enz USA</p>
<p>The Cable Center 8318 Olive Blvd., St. Louis, MO 63132 800-257-7209 • 314-993-3099 • (f) 314-432-8024 www.thecablecenterinc.com • thecablecenter@gmail.com</p> <p>SEE ADS ON PAGES 52, 77</p>	<p>General Wire Spring, RIDGID, StoneAge Warthog</p>
<p>Vac-Con, Inc. 969 Hall Park Rd., Green Cove Springs, FL 32043 904-284-4200 www.vac-con.com • vns@vac-con.com</p> <p>SEE ADS ON PAGES 3, 83</p>	<p>Enz USA</p>



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A Blueprint for Success

No change in your company should go forward without a revision to your business plan

By Joan Koehne

Small businesses are forever evolving to meet the needs of their customer base and remain competitive. Determining the right approach to adapt and grow can be the difference between success and failure.

One helpful tool to help address these changes is a business plan. A business plan is a blueprint that identifies obstacles and opportunities that businesses face. The plan includes carefully researched financial projections, budgets and cost analyses, plus marketing and operational strategies.

Contractors should update their business plan when considering:

- Introducing new products or services
- Opening a new branch
- Bringing in new management
- Changing ownership
- Expanding a service area
- Modifying the company's vision
- Securing a different type of financing.

Dave Kaster, principal at Fidelis, has written over a thousand business plans for clients at his business advisory practice in Green Bay, Wisconsin. He's also helped clients rewrite their business plans to flesh out new ideas and goals for the future.

"I think the biggest reason people want to change their business plan is if it doesn't reflect reality," Kaster says. The business plan of a startup becomes outdated as the company hires employees, adds assets and expands services. The plan no longer serves its purpose as a business model and guide. Some situations require a thorough overhaul of a business plan, while other circumstances require just small changes.

"If you're just switching one loan for another to reset the cash flow, it's just one change to the financial part." This process can take place at a single meeting with a banker.

"Once you figure out where your financial plan is going or how your finances are going to change, then you need to change your business systems to reflect the reality of that."

Dave Kaster

A change of ownership may or may not require a change in the business plan, depending on the individual coming on board.

"If you're bringing in a new owner and he has worked for you for 15 years and wants to keep everything the same, then that doesn't change the business plan much," Kaster says. Bringing in an outsider is a different story.

"A business plan will have to change because you have different philosophies."

FINANCES FIRST

When updating a business plan, the first task is to create a financial plan.

"You have to figure that out first because it gives you the range and parameters of everything else," Kaster says. A financial plan will define your budget, cash flow, sales numbers to meet, etc. You can develop a financial plan with your banker, accountant or financial planner.

"But don't stop there. Once you figure out where your financial plan is going or how your finances are going to change, then you need to change your business systems to reflect the reality of that."

For example, a contractor who purchases additional equipment to introduce a new service will need to determine how to achieve a return on the investment. This is where financial projections are helpful. If projections signify the equipment is profitable when used at least 10 hours a week, then business operations need to incorporate these additional 10 hours.

"That 10 hours a week reflects both on labor and sales. You have to change the employee mix and change your marketing process to get those 10 hours," Kaster says. The domino effect might prompt additional changes, like extending into a new geographical area, complying with a new set of regulations or securing new certifications. An updated business plan can spell out these scenarios and serve as a useful guide.

He advises business owners to use a two-step process to prepare and evaluate financial data in their business plan. First, look at your historical finances.

CONTINUED >>

“Find out exactly, on a percentage basis, what you spent on every part of your budget, how much every new customer is worth to you and how much every new customer costs you.” By looking at averages and thresholds, owners can get a clear picture of the company’s financial health.

FUTURE GROWTH

Second, business owners should make projections. As a starting point, you should calculate your fixed costs, like insurance, loan payments and utilities. These fixed costs aren’t dependent on the amount of business transacted, unlike variable costs that fluctuate with the volume of work performed.

“You have to decide when those variable costs are going to change or when the fixed costs are forced to change,” Kaster says. While this involves some guesswork, some direction can be provided by industry research and collaboration with financial advisors.

Once the financials are updated, it’s time to look ahead five to 10 years and envision how the business should look down the road. This gives you a goal to strive for. Big changes for the company, like opening a new branch or introducing a new product or service, should be carefully researched before jumping in headfirst. It’s important to find out what customers need and want through market research.

“Research online or hire someone to find current trends in the industry. Find out which businesses are doing things successfully — that’s who you want to model.”

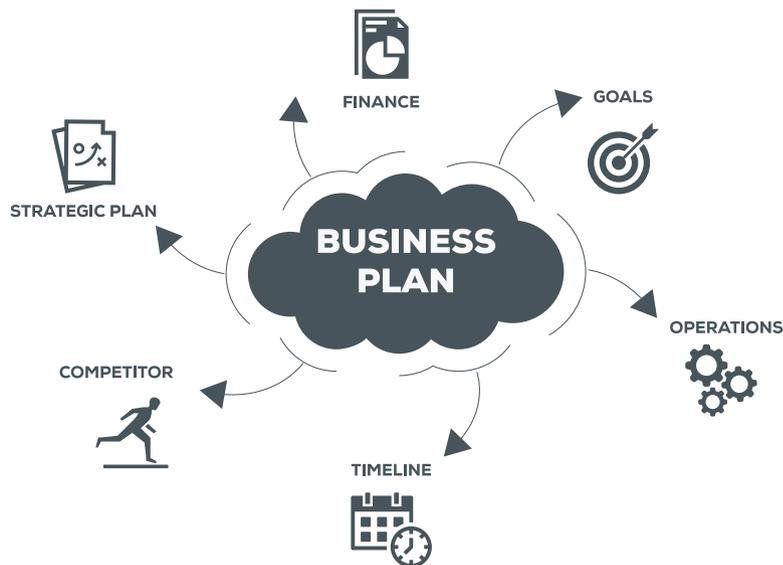
Contractors can identify a need for a new product or service through online surveys and comments, feedback from customers, and reviews on the company website. If certain requests or complaints continue to surface, that’s a clear sign to introduce a product or service to address those issues.

When planning for a new product, service or service area, Kaster advises business owners to be aware of the domino effect. One change in the business leads to others. As a company grows, its operations need to grow along with it.

With fewer workers, an owner can get by using QuickBooks, handwritten checks, paper records and calling employees on their personal cellphones. When the workforce expands, it’s best to invest in an accounting program, communications system and other technology upgrades. All of these changes can be spelled out in an updated business plan.

Marketing is another area to revamp in a revised business plan.

“Generic marketing is OK, but once you’re over \$2.5 million in sales, you better have a professional marketing program and formalized marketing for the business,” Kaster advises.



Marketing plans should include a description of the following:

- Target market: Focus marketing on people most likely to buy a product
- Market analysis: Determine the size of the market to ascertain if it can sustain business
- Market segmentation: Group customers to understand how they’ll respond to marketing messages
- Competition: Evaluate competitors’ strengths and weaknesses.

Kaster says no business plan is complete without an exit plan. Oftentimes a business is passed to a relative or employee, but what happens if this individual is no longer interested or capable of taking charge? An updated business plan should incorporate a new exit plan.

“I can guarantee that if you don’t plan for how to get out, then someone else is going to force you out in some shape or form,” he says.

FOLLOW THE VISION

One more piece of advice: Follow the plan.

“If the business plan means nothing to the day-to-day running of your business, do you really want to research and change it if you’re not going to use it?” A business plan is only effective if it’s adopted and adhered to over time.

“I’ve seen so many businesses that spend a lot of money, hire a consultant and get a fantastic business plan, and then it just sits on the shelf and gathers dust,” he says.

Lastly, updates to any business plan should align with a company’s vision statement.

“If you have access to a new market, new product and new financing, then you have to test that up against your vision. If your vision changes, too, then you have to change your business plan. That is your single most important reason to exist — your vision statement.” **c**

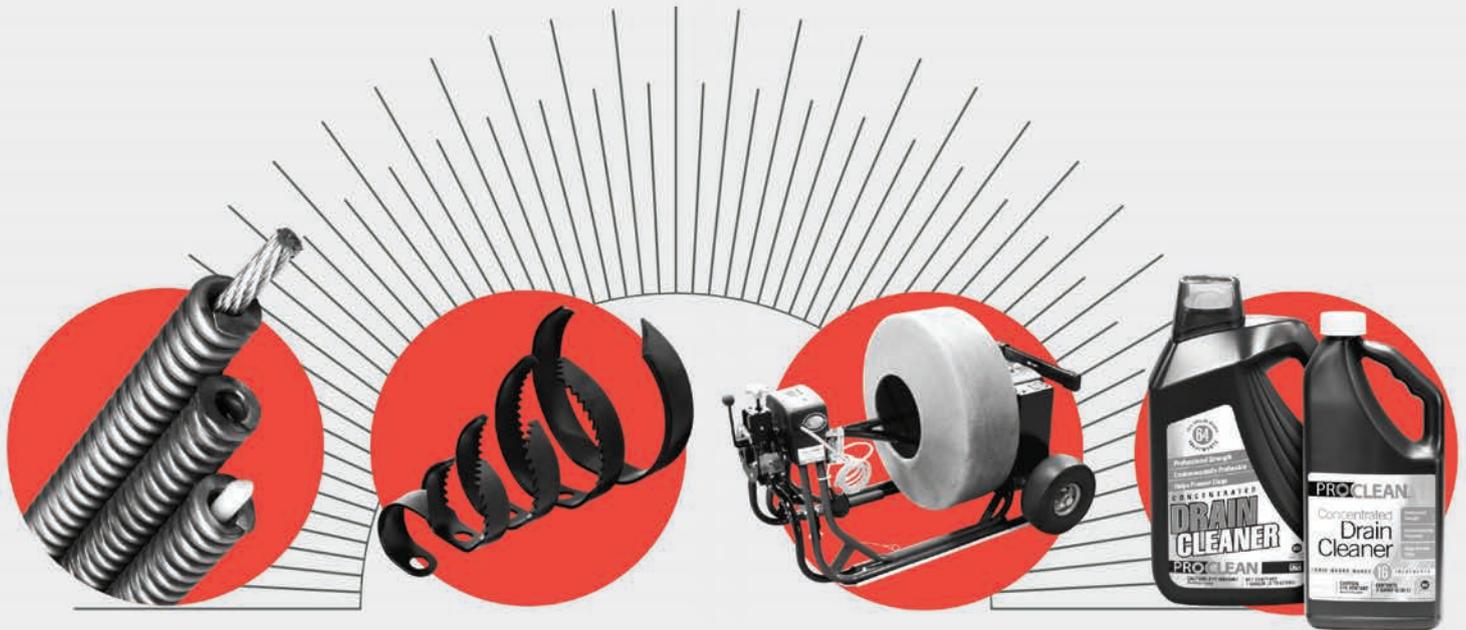
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Bad Habits Could Kill You

Remember these simple but often overlooked keys to safe hydroexcavation

By Giles Lambertson

During the last decade, Gary Toothe has traveled a million miles — literally — promoting safe operation of high-pressure water and vacuum machinery in excavation and cleaning work. Some longtime operators may think they don't need safety courses anymore, but what Toothe teaches are important reminders that are helpful for anyone working in hydroexcavation.

His work in the industry began 35 years ago as a rookie tech on the working end of an industrial vacuum hose. He moved into middle management and eventually got into safety training “after I began getting too many accident reports. I decided I would be the guardrail and start teaching people how to work safely.”

Toothe became a certified OSHA expert and for the last 10 years has been training manager at Federal Signal. From his experience in the industry, he has crafted effective safety presentations that he gives all across the country. “Having worked on the vacuum hose years ago is kind of my hook. Yes, I have been there and done that, I tell an audience. Pretty soon I have them listening.”

His early days blasting and cleaning industrial sites predated hydroexcavators, “but we were using air compression and pressurized water and vacuums,” he says. The dangers to bodies of operators were the same in 1984 as today. Then and now, limbs are sucked into hoses with disastrous results and fingers and other body parts are assaulted by water with shotgun force.

What Toothe talks about, however, is not principally about staying out of the way of all that suction and blasting power. Operators are well aware of the deadly forces they wield to accomplish a task. What they don't know, he says — or, rather, need to be reminded about — is the constant need to avoid bad habits when handling the powerful tools.

BAD HABITS

His top recommendation for safe and effective hydroexcavation might surprise you: Don't use too much water. “That's the biggie.

That's what I try to push the most. OSHA requires that you use the minimal amount of water possible. Anything more is not acceptable. But some operators use way too much water and end up dumping chocolate soup.”

The extra water sometimes happens because an operator affixes the wrong kind of nozzle to the end of his wand and ends up loosening dirt by washing it away rather than cutting it away. “Each nozzle has its own purpose. I recommend a straight nozzle. A rotating nozzle is used way too much. It is supposed to be used to clean out and expose utilities. It liquifies the dirt. The rule against using too much water is consistently ignored.”

More to the point, the extra water permeates the ground, softening it and weakening the walls of an excavation. That leads to Toothe's second reminder: Don't stand too close to the edge without a physical restraint. It seems rudimentary, “but operators literally put their toes out over the hole. I see people just hanging out over the hole. If that ground gives way, bad things happen. If it caves in, good luck trying to hold on to the remote and shut down the machinery.”

Toothe distinguishes between a fall “restraint” and fall protection. He recommends using a harness tied off to a truck that will prevent an operator from falling rather than relying on systems that might mitigate the effects of a fall. “If someone falls into a hole or trench he is digging, he's exposed to the vacuum suction or high-pressure water. You want to avoid falling even 2 or 3 feet because you are exposed. I would rather eliminate the fall altogether by tying off to the truck.”

WORK TOGETHER

“The last thing I would recommend, to give just two or three rules, would be to never work by yourself. If something happens to an operator and no one else is there to shut down the truck ...” Toothe says, leaving the consequences unstated. “I just got back from talking to hydroexcavator crews working for the oil industry. Sometimes they're in the field and no one is around for miles and miles, not till the end of a shift. If something happens to a lone operator in those circumstances ...”

Mark Allen agrees. The general manager of Diversified Underground, based in Aurora, Colorado, says he normally sends out two-person teams on his hydroexcavation jobs. “I can't say there isn't a time when they work alone, maybe if they are excavating a shallow trench, but if we are locating utilities, I always send a two-man crew.”

Safety aside, some would argue it's more efficient to send out two operators in two trucks to do two jobs rather than double up on one. Allen doesn't believe it. “I find that's not the case. When we are doing a pothole, a single operator has to set out equipment, unpack hoses, get water by himself and dig by himself, holding the dig rod

and manhandling a 6- or 8-inch hose — to me that's a lot slower. Plus, the guy gets tired but still has to backfill by himself and then do the paperwork. You might save a little on labor by sending out one guy, but it isn't as productive."

Toothe completely concurs. "That's what I hear all the time: That it's more efficient with one person. Well, I did studies. If you have two people working on a job for 12 hours, productivity might be a little less, but it is still about 85% of the optimum. With one guy by the end of the 12 hours, he is working at 30% of optimum. He's burned out. You save on labor, but you don't increase efficiency."

Toothe is agnostic about which is the more dangerous component on a hydro rig — the high-suction vacuum or the high-pressure water. "If you have a dead-man trigger, the water stops in an emergency. It didn't used to be that way. We used to have 'suicide nozzles' that lacked a shut-off. We have eliminated most of them, so high-pressured water is not so much an issue. However, vacuum doesn't stop unless you hit the remote. If you have two men on a job, everybody should be fine in an emergency."

"Problems happen when shortcuts become ingrained in working culture. They become internalized."

Gary Toothe

CONTINUED TRAINING

Wade Glasscock of Smith Industrial Services in Mobile, Alabama, is a longtime advocate of safety training. Today he oversees the trainer, but he used to do the training himself. All 300 people in the company who work with high-pressure equipment are safety trained, from new hires to veterans.

"In some companies, they put new hires out there without the training," he says. "They'll hire temporary labor and let them do the tunnels. Our training includes training the attendants. They have to know enough to take care of everything in an emergency. As for the old hires, we have a tailgate meeting before every task is started, a job safety meeting before every job. Every day. You have to stay on top of that."

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safety
FIRST

A two-person buddy system is an absolute operating procedure at Smith Industrial Services, as is wearing protective clothing. “We use Kevlar on everything. Anything under 4,000 psi we consider power-washing, but operators still need to wear face shields and hard hats. Over 4,000 psi, they wear safety boots and pressure-resistant gloves. Depending on the job, we go up on our expectations of what they should wear,” Glasscock says.

Allen says the rocky dirt of Colorado impacts his operators’ decisions. “Excavating in Colorado soil can be pretty brutal. Our operators are trying to do everything correctly, but a contractor can be standing there saying he wants to get this job done and sometimes my guys will turn up water pressures to get more cutting action. They do sometimes cut corners, but they *never* do when it comes to safety.” Allen says he would counsel new hydroexcavator operators to “never cut a safety corner and put yourself and a utility in jeopardy.”

Toothe believes all operators should start out by reading safety and operation manuals. Revisiting the manuals is almost as important. “Problems happen when shortcuts become ingrained in working culture. They become internalized.” That is, bad habits and rationalizations take root. “There is one chance in a hundred that this or that will happen if you take a shortcut.’ People say that sort of thing. But then they do it a hundred times.”

Toothe wishes every operator would take an OSHA competent person trenching class “so he will understand soil dynamics and recognize the signs of imminent collapse of a trench wall. If I could wave a magic wand, every hydroexcavation job would have a competent person there.” He notes that every operator who has created a hole or trench that someone else will be entering is legally liable in the event of a collapse. The creator of the hole is as liable as the project owner ordering it, the contractor whose people are entering the hole or trench, and the contractor responsible for shoring it properly.

Of course, not every hazard can be foreseen and prevented. In fact, Glasscock says the biggest danger for his hydroexcavation crews has nothing to do with the equipment or the operator — it’s the surrounding traffic. “There are so many people moving around in public places, so many distractions. We can have a 40-foot-long truck with its lights flashing and some girl texting while she’s driving runs into us. Our guys don’t back off trucks into holes. They don’t cut off their feet with high-pressure water. None of that. It’s traffic that’s the big hazard.”

There will always be dangers in hydroexcavation work, but breaking bad habits will go a long way toward keeping you safe on the job. **c**

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Hydroexcavation and Industrial Jet/Vac Services, Sewer Nozzles

By Craig Mandli



CLEANING NOZZLES

1 / ENZ USA MADDOG NOZZLE

The **MadDog Nozzle** from Enz USA is a redesigned Bulldog nozzle with optimized ceramic inserts for the highest ideal cutting power. It removes aggressive tree roots with flows as low as 5.5 gpm at 3,500 psi with 3/8-inch hose and up to 18 gpm at 4,000 psi with 1/2-inch hose. It is suitable for accessing mainline stoppages from a 2-inch toilet roof vent, wall clean-out or 8-inch manhole using a skid body due to it only being 1.5 inches in diameter and 3.3 inches in length. A front-oscillating penetrating insert is included and can be installed by the user for front cutting. It has a hardened steel body and is oil free and zero maintenance. 877-362-8721; www.enz.com.

2 / HAMMELMANN RD MASTERJET

The **RD MASTERJET** nozzle from Hammelmann has HPS sealing technology and adjustable-speed rotation. It is designed for use with shotguns, robotic lance systems or replacement of any rotating tool. It is lightweight at 2.2 pounds and has a compact, ergonomic design that's 2.2 inches in diameter and 6.5 inches long. It can be used at operating pressures up to 46,500 psi with optimum internal flow allowing the pump's total performance to be used. It has a versatile universal nozzle hub for working with nozzles with two or four inserts. Nozzle inserts are countersunk in the nozzle carrier with blast-back shields. Speed is controlled by an infinitely variable magnetic brake. It can be used for cleaning and washing, expansion joint removal, coating and paint removal, blasting pipe externals, paint booth grid and skid cleanup, superstructure surface preparation, heavy machinery cleanup and surface preparation. 800-783-4935; www.hammelmann.com.

3 / JETSTREAM OF HOUSTON ROTOMAG X22

The **Jetstream of Houston RotoMag X22 2D**, self-powered rotary pipe cleaning nozzle has a stainless steel body and rotor and a body shroud to protect it while cleaning. Available as a single tool rated up to 22,000 psi, it has a magnetic braking system that controls rotational speed for minimal wear and maximum impact without streaking. Spinning on a film of high-pressure water, the nozzle has no ball bearings to replace, making field service simple. The Premium Kit is available with all components needed for repair in a convenient, watertight case. A variety of standard nozzles for different cleaning applications is available with the RotoMag X22. Nozzle extensions come in three sizes to enable more effective cleaning in larger pipes. For large pipe applications, several different-style centralizers are available, including pipes with and without bends. The back-out preventer stops the tool from retracting out of the pipe unexpectedly or in the event of a sudden shift in thrust. 800-231-8192; www.waterblast.com.

4 / SEWER PRO SHOP BLUESTAR TWISTER

BLUESTAR Twister and **Twister Plus** nozzles from Sewer Pro Shop are made of high-grade stainless steel and are equipped with ceramic nozzle inserts. They utilize optimized 3D hydromechanics where the water coming from the pressurized sewer hose is used in its entirety for cleaning purposes. The Twister is a highly efficient hydrodynamic tool to remove heavy obstructions caused by grease, roots, mineral deposits or other solid organic material from 8- to 24-inch sewer lines, with the Twister Plus operating in 28- to 36-inch lines. The nozzles can also be used with recycled water. They require no maintenance and have been designed to be extremely operator-friendly. 877-864-9394; www.sewerproshop.com.



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5 / VAC-CON SEWER ROBOTICS C70

The Sewer Robotics C70 HD video cleaning nozzle, distributed by Vac-Con, boasts eight interchangeable cleaning jets, double sapphire lenses, LED lighting and a self-leveling HD camera for optimal video recording and clarity. It is designed to jet pipelines ranging from 6 to 40 inches. To ensure durability and longevity on the job, it is equipped with an eight-hour-plus runtime and is fully submersible. It offers a flow of 40 to 170 gpm and operates at a pressure of 2,000 to 4,000 psi. The Wi-Fi-integrated nozzle allows for wireless video downloading to the included tablet, which also features GPS. It is offered in a protective case kit, which includes the nozzle, tablet, pipeline viewing software, jet inserts and battery charger. A range of optional accessories is also available, including skids and assessment software. 904-284-4200; www.vac-con.com.

HYDROEXCAVATION EQUIPMENT

6 / DITCH WITCH HX30

The Ditch Witch HX30 vacuum excavation trailer offers a 24.8 hp Kubota diesel engine designed for performance and productivity on midsized potholing, soft-excitation or cleanup tasks. The low-profile machine reduces unit height without compromising ground clearance. It is available with a 500- or 800-gallon debris tank and in a light or heavy version. Also available are advanced optional boom designs to improve ease of use. With advanced sound-reducing technology, it creates minimal disturbance in noise-sensitive areas. An optional reverse-flow feature allows quick and easy spoil off-loading for improved productivity. 800-654-6481; www.ditchwitch.com.

7 / DYNABLAST CAB420FLS-12V

The Dynablast CAB420FLS-12V water heater produces 420,000 Btu with an output temperature of 175 degrees F at 5 gpm to work in colder climates and for improved digging in clay-filled areas. With a 24-by-24-inch footprint, it is designed to fit most municipal hydrovac trucks. It is ETL certified, providing improved heat transfer between the Schedule 80 pipe and water. It comes with two service access panels and two momentary override controls. The cabinet is designed with a reversible door for a variety of truck configurations and uses 14-gauge steel with polyester UV-protected, powder-coated paint with an aluminum discharge cap and stainless steel hardware. 905-867-4642; www.dynablast.ca.

8 / EASY KLEEN WILDCAT HEATERS

Wildcat Heaters high-pressure, oil-fired hot-water/steam heaters and hydraulic pump systems from Easy Kleen Pressure Systems are designed for reliability and efficiency and are installation-ready for vacuum trucks and hydroexcavators. A full range of heater options includes dry steam, redundancy packages, Schedule 80 and 160 stainless steel or A53 boiler pipe, fine-tuned temperature and flow-control systems. All coils are manufactured in-house, with CRN boiler-approved coils now available. Heaters can be designed for mounting in a cabinet or supplied as a completed cabinet unit. They are CSA and ETL approved. Hydraulic pumping systems are available. 800-315-5533; www.easykleen.com.

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9 / GAPVAX HV33

Designed to safely transport water and debris in urban areas, the **GapVax HV33** is shorter, smaller and more compact than its predecessor. It is 30 feet long overall on a medium-duty chassis and includes a 600-gallon water tank, 6-cubic-yard debris body, 6- or 8-inch top-mounted telescoping boom with a 14- to 17.5-foot reach, 4,000 cfm power and an inverted, full-opening tailgate. 888-442-7829; www.gapvax.com.

10 / KAISER PREMIER CV SERIES

The CV Series hydrovac from **Kaiser Premier** has all critical components centralized and housed in an insulated, heated aluminum van body. The RB-DV series of rotary three-lobe positive displacement blowers can operate at high vacuum levels thanks to a device that injects atmospheric air. RB-DV series blowers can reach vacuum levels of up to 93% on a deadhead and 27 inches Hg without the need to inject water or use an upstream heat exchanger. Its hydraulically assisted off-load method eliminates overhead conflict concerns by avoiding the need to raise the tank. To release hot, high-pressure water, the vehicle can be equipped with a 700,000 Btu boiler. The transfer case is designed for vacuum excavation trucks requiring a highly configurable and easily serviceable gearbox. 970-542-1975; www.kaiserpremier.com.

11 / RIVAL HYDROVAC T7

The T7 hydrovac from **Rival Hydrovac** was designed primarily to be a unit that can be loaded with debris and drive within legislated road limits with most types of debris on board. Additionally the unit comes standard with a scale that reads real-time weights both in the cab and on the wireless remote to confirm weights prior to travel. It is operator-friendly, and the operating system is engaged through one PTO switch. The remainder of the operation occurs from the rear panel or the wireless remote. The components are high performance in nature, and the unit will dig at levels competitive to large units. 403-550-7997; www.rivalhydrovac.com.

12 / SOIL SURGEON HYDROEXCAVATING TOOL

The **Soil Surgeon** hydroexcavating tool fits any sewer combination truck equipped with a telescoping 6- or 8-inch boom. The tool has a 1-inch water connection. The operator controls water pressure and power through truck controls. It has a 6-foot Tuff Tube with handles to guide the unit down for potholing or side to side for trenching. Six jets boring inward cut the soil, while six boring outward bring the tube down. 949-363-1401; www.soilsurgeoninc.com.

13 / SUPER PRODUCTS MUD DOG

The **Mud Dog** hydroexcavator from **Super Products** is designed for operator convenience and consistent performance in the harshest environments. It offers an air excavation option, which allows the operator to choose the best application, water or air, for the job. It is available with 12- or 16-yard debris capacity. Each model comes standard with safe tilt ejection unloading and is equipped with a rear-mounted boom that can reach 27 feet with a 335-degree rotation. 800-837-9711; www.superproductsllc.com.

14 / TORNADO GLOBAL HYDROVACS F4 ECOLITE

The F4 **ECOLITE** from **Tornado Global Hydrovacs** has a 12-cubic-yard mud tank and holds 1,550 gallons of freshwater. The unit is more than 7,000 pounds lighter than the company's older models and offers more than double the payload. The boom has a 342-degree rotation and a 26-foot reach. The smaller F3 **ECOLITE** is a 10-cubic-yard, 1,250-gallon tandem-axle unit that also more than doubles older payload capacities. It features an 8-inch boom and a 3,800 cfm blower. 715-441-7157; www.tornadotrucks.com.

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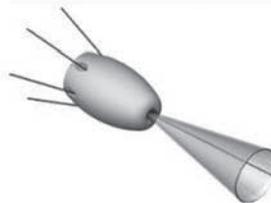
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15 / TRUVAC BY VACTOR PARADIGM

Designed for utility, municipal and contractor customers involved in the installation, maintenance and repair of underground water, sewer, gas, electric and telecommunications lines, the **Paradigm** subcompact vacuum excavator from TRUVAC by Vactor can dig holes with water or air; vacuum, contain and dispose of drill mud; power pneumatic, hydraulic or electrical tools; and provide transport and storage of replacement parts, equipment and tools. The truck's Park-n-Dig design minimizes time between job site arrival and excavation, including the ability to dig up to 6 feet without additional pipe and hose. The air compressor powers utility tools such as jackhammers and tampers. The truck offers tool storage space, including a long-handle toolbox. The truck can tow up to 20,000 pounds. 800-627-3171; www.truvac.com.

16 / VACALL ALLEXCAVATE

Vacall AllExcavate hydroexcavators include AllSmartFlow smart controls that help to conserve water during high-performance jet/vac digging around utilities and waterlines or while cleaning frac tanks and vessels. Single-engine efficiency helps conserve fuel and reduce emissions. It has a high-pressure water system with rheostat control to vary water volume and capacity output. A heated compartment protects the water system components against freezing. Its water tanks are made of high-quality aluminum for extra strength. Large, galvanized steel debris tanks are also available. A single control is used to open, close and lock the tailgate. It has double-cyclone filtration with a simplified design to reduce maintenance, extend performance and increase working life. Its rear-mounted boom front-loads debris. It is available with a cold-weather package. 800-382-8302; www.vacall.com.

17 / VECTOR TECHNOLOGIES MUDSLINGER

The **Mudslinger** line of compact trailer-mounted hydroexcavation vacuums from Vac-Con, in cooperation with **Vector Technologies**, have multiple Tier 4 diesel and gas engine options, with a 1,190 cfm, 16-inch Hg positive displacement blower, and come with a 535- or 845-gallon debris tank with 55-degree hydraulic dump hoist and a hydraulic door. The water system is 4 gpm at 4,000 psi with 50 feet of 3/8-inch hose and comes with a 225- or 325-gallon HDPE water tank. A 9-foot boom with 24 inches of hydraulic extension, hydraulic up/down and 270 degrees of manual rotation is also available. It is mounted on a heavy-duty welded tube steel trailer. 800-832-4010; www.vector-vacuums.com.

18 / WESTECH VAC SYSTEMS WOLF

The **Wolf** noncode hydrovac truck from **Westech Vac Systems** is suitable for oil and gas customers working in extreme conditions. The debris body is positioned on the optimal chassis location to ensure the payload is proportionately distributed across all axles, maximizing legal payload for customers and improving operational efficiency. The side-mounted water tanks reduce the weight by more than 40%, lowering the overall cost of the truck. The 1,500-gallon capacity ensures ample water for large or remote jobs. A top-mounted, no-touch water fill system is easily accessible from the passenger side of the vehicle. The debris body is lifted using a telescoping, dual-acting hydraulic cylinder capable of 36,000 pounds of force. When fully extended, the debris body exceeds a 45-degree dump angle for fast and efficient off-loading. To help the off-loading process, a heavy-duty, hydraulically powered tank vibrator is mounted to the belly of the debris body. 780-955-3030; www.westechvac.com.

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INDUSTRIAL VACUUM TRUCK/TRAILER

19 / GUZZLER CL

The CL (Classic) industrial vacuum loader from Guzzler is designed to recover, contain, and carry solids, dry bulk powders, liquids, slurries and thick sludge from hard-to-reach areas. The truck offers upgraded operator ergonomics, improved air routing, filtration and maintenance, a longer body for improved material separation, an enlarged bag house and cyclone clean-out access doors for easier access. Its modular design allows for a wide selection of off-loading configurations, including a rear-door-mounted sludge pump for unloading sludges from the debris body, an XCR system with a swing-out cyclone that allows material discharge into collection vessels while vacuuming, and a high-rail system (available in three configurations) with a loading boom, hydraulic creep drive and rear-mounted operator chair. Options include a telescoping boom, vane pressure off-load system (high-pressure, low airflow) for liquids and slurries, and a full-opening rear door for improved dumping. 800-627-3171; www.guzzler.com.

JET/VAC COMBO UNITS

20 / BUCHER MUNICIPAL NORTH AMERICA CITYFLEX 205

The CityFlex 205 from Bucher Municipal North America was developed to operate efficiently in tight spaces, including septic pumping applications. It is provided with multiple cabinets with lockable roller shutter doors, lights and heating. All functions can be managed through a simple control panel on the back. With the arctic option, the user can also operate in temperatures as low as 5 degrees below zero. It includes a telescopic boom, fully automatic end cover and movable partition. 704-658-1333; www.buchermunicipal.us.

21 / CUSCO SEWER JETTER

The Sewer Jetter from Cusco can help perform major cleanups by excavating debris using a 26-foot boom reach and a 600-foot 3,000 psi jetting system. According to the maker, the jetter is outfitted with quality components and reverse engineered for optimal weight and payload using a superior operator control system. The unit is designed for simple maintenance and features durable and uncomplicated systems to reduce repairs and downtime. It can be paired with a Cusco SJX hydroexcavator to provide a powerful option for handling sewer and waterline maintenance and digging new lines with one piece of equipment. Options include various tank and chassis sizes and can be modified based on customer specifications. 800-490-3541; www.wastequip-cusco.com.

22 / SEWER EQUIPMENT MODEL 900 ECO

The Model 900 ECO from Sewer Equipment is available in 6-, 9-, 12- or 15-yard debris capacities, equipped with Duraprolene water tanks carrying 900 to 2,000 gallons of onboard water. Its Hydro Drive powertrain system eliminates the need for a transfer case. Both single-piston and triplex pump options are available at 55 to 80 gpm at 2,000 to 3,000 psi with a 4,400 cfm blower and 18 inches Hg, built on an eco-friendly platform that provides greater fuel efficiency and offers noise reduction. 888-477-7611; www.sewerequipment.com.

23 / SUPERVAC TRITON

The Triton combination sewer cleaner from Supervac has a water recycling system using a Juggler filter to allow continuous work without downtime for water filling. It filters water collected in the debris tank and transfers it to a water reservoir used by the water pump. It comes with a 2,500-gallon debris tank with stainless steel liner and vibrator, 1,500-gallon water tank, hydraulic boom and dump, and a full-opening rear door. Vacuum is provided by a 3,800 cfm at 27 inches Hg Robuschi blower, while jetting power is provided by an 80 gpm, 2,500 psi Pratisoli water pump. The rear door-mounted hydraulic hose reel holds 600 feet of 1-inch hose. 866-839-5702; www.supervac.co.

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ROOT CONTROL EQUIPMENT

24 / DRAIN REHAB SOLUTIONS ZIP-ZIP

ZIP-ZIP flexible shaft cables from Drain Rehab Solutions offer professionals greater speed and efficiency when cleaning drains. The ultrahigh-speed drain cleaning cables save time by cleaning out roots, scale, debris and grease clogs in a fast and efficient manner. They have the capability to clean and reinstate pipes between 1,500 to 3,500 rpm and attach to a standard 1/2-inch electric or battery drill. They are available in 1/2- or 3/8-inch diameters and come with a bright green protective cable casing for easy camera viewing. They can be used in both clockwise and counterclockwise rotation and are available with T-slider connectors or with bare ends. They are recommended to attach to a drill clutch for longer cable life and are compatible as a replacement or extension cable with other high-speed drain cleaning machines. 514-379-3544; www.drainrehabolutions.com.

25 / NOZZTEQ LUMBERJACK

NozzTeq Lumberjack cutters are low-torque, variable-speed, multipurpose cutting nozzles powered by common sewer jetting or combination trucks. The cutting chains rotate at speeds of 10,000 to 50,000 rpm, depending on pressure and flow rate. The precisely engineered cutter is designed to cut roots, but it also effectively clears out concrete, tuberculation, grease, protruding laterals and other obstructions. Low torque means it won't get stuck, won't harm host pipe and won't spin off the hose end. The cutters are sealed, include grease-lubricated bearings and are water-cooled so they don't need daily maintenance. Five models clear pipes from 3 up to 48 inches. The entire kit includes the turbine, water supply tube, chain plate/pull plate, tow ring, cutting blade, sleds, five sets of chain per sled size, propelling nozzle with jets and adapter, spanner wrench, hand tools and toolbox. 866-620-5915; www.nozzteq.com.

26 / PICOTE SOLUTIONS MINI SWEEPER

The Mini Sweeper from Picote Solutions is designed to clean and descale pipes, including removing tree roots. It grinds away debris from the inside of the pipe at 1,000 to 1,500 rpm. The aggressive tool is effective in situations where there is thick scale, rust or other waste materials that are difficult to remove. It can also be used to remove wrinkles in liners or to remove excess lining material from the pipe wall after a failed liner has been removed. It is rebuildable after the legs become dull. It is available for 2-, 3- and 4-inch pipe sizes and is powered by the Picote Mini or Maxi Miller. 708-267-6366; www.picotesolutions.com.

27 / PIPE LINING SUPPLY RENSSI CHAIN KNOCKERS

Renssi Chain Knockers, distributed by Pipe Lining Supply, are available with drill heads for 5/16-, 3/8- and 1/2-inch cable connections. This companion tool helps with cutting roots and other obstructions. It is made of stainless steel chains with carbide tips and is suitable for cast iron, concrete and stainless steel pipes, making it durable. It is offered in common pipe sizes from 2- to 8-inch lines. This is a suitable companion tool to high-speed cleaning machines to remove roots, descale and clean pipes. 888-354-6464; www.pipeliningupply.com.

CONTINUED >>



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28 / USB-USA HEAVY-DUTY TURBO CHAIN CUTTER

The **Heavy-Duty Turbo Chain Cutter** from USB-USA is tough and extremely powerful. These cutters continuously adjust from 8 to 15 inches (Turbo S200) or 12 to 24 inches (Turbo S600) and easily fit into the pipe. Turbine technology powers the durable chain retainer on a durable body to remove roots, concrete, calcium deposits, hardened grease and tuberculation from sewer lines. The chain cutters are very aggressive for the hardest materials. They have double the amount of turbine-driving water jets as the company's other cutters, generating tremendous cutting power. Easily adjust the cutter to within a 1/16 inch by spinning the rear to make it larger or smaller. Internal 3D fluid mechanics in conjunction with one-piece ceramic nozzle inserts allow the cutter to be used with recycled or clean water. 844-285-5770; www.usb-usa.com.

PORTABLE/TRUCK/TRAILER JETTERS

29 / AMERICAN JETTER HOT JETTER

Hot Jetters from American Jetter include a water-heating system that uses efficient dual-coil burners. Burner exhaust temperatures are reduced from 400 to around 127 degrees F, effectively releasing less heat into the atmosphere. This is coupled with 20% or more fuel savings from the optional Kohler 19 to 38 hp EFI engines. The increased fuel savings will provide longer runtimes. 866-944-3569; www.americanjetter.com.

30 / CAM SPRAY CV SERIES

The **CV Series** cargo van drain jet from **Cam Spray** offers diesel-fired hot water to add additional jetting power. Several models are available up to 4,000 psi and 12 gpm. A triplex plunger pump with power pulse valve provides an extra push when needed. Air purge and recirculation to the tank are provided for freeze protection. A 5-gallon fuel tank provides hours of runtime on a single fill. It comes with a

heavily built, powder-coated frame with a full deck and 130-gallon water capacity, a 12-volt DC reel with 2-1 clutch drive allowing for free spooling, and powered hose return. It is controlled by push button or foot switch. Accessories include a four-nozzle set, storage box, tip cleaner, tiger tail, safety shield, rubber gloves, high-visibility safety vest, 50-foot wash down hose and trigger gun. 800-648-5011; www.camspray.com.

31 / GORLITZ SEWER & DRAIN MODEL GO 1500A SERIES

The **Model GO 1500A Series** jetter from **Gorlitz Sewer & Drain** has a functional frame construction with a carrying handle, reel accessory tube, retractable pull handle and phenolic 4-inch wheels for easy transportation to the job site. All models come with a custom-built, dual-capacitor, 2 hp electric motor drawing 19.8 amps at full load. The duplex ceramic plunger pump with dual pulsation will generate more than 1,500 psi at 2.1 gph to clear tough stoppages or open frozen pipes. The unit is supplied with one 1/8-inch by 50-foot-long trap hose to clear drainlines 1 1/2 to 3 inches in diameter. The hose and reel connections are provided with quick-disconnect fittings to simplify operation. The reel accessory tube accepts an optional hose reel for compact hose storage and operation. 562-944-3060; www.gorlitz.com.

32 / HOTJET USA VAC 'N JET SERIES

The **HotJet USA Vac 'n Jet Series** of vacuum trailer jetters are rugged and compact; are engineered to haul equipment and spoils loads; and can clean valve boxes and storm drains, and hydroexcavate and/or clean drainlines and sewer lines. They offer hot- and cold-water operation with a choice of engine options ranging from 13 to 66 hp and gas or diesel operation. They are equipped with premium triplex pumps, a 500-gallon spoils tank, 200-gallon water tank, Gardner Denver vac/blowers, 4-ton hydraulic dump and centri-clean filter system. They can also be custom engineered and designed to meet specifications. 800-624-8186; www.hotjetusa.com.

CONTINUED >>



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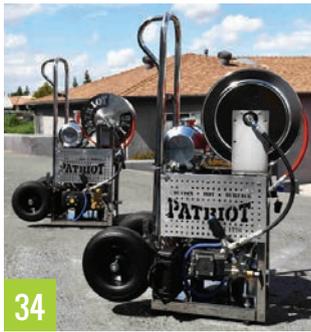


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33 / JETTERS NORTHWEST EAGLE 200

The **Eagle 200** midsize trailer jetter series from **Jettters Northwest** is available in 12 gpm/3,000 psi (model Eagle-200/3012) with 1/2-inch I.D. jet hose or the 9 gpm/4,000 psi (model Eagle-200/4009) with 3/8-inch I.D. jet hose. It comes with either a Kawasaki (liquid-cooled) or Kohler (air-cooled) fuel-injected engine, an industrial-duty trailer with brakes for safety, and an A-frame tongue that allows it to be towed when full of water. Flattop fenders allow for additional mounting surface. Chrome wheels give it a sharp appearance. It comes with a super-duty triplex UDOR U.S.A. pump, 12-volt power-wind hose reel with wind-speed controller, 200-gallon water tank, large 60-inch lockable tool storage bin, 300 feet of jetting hose on the main 12-volt reel, 100 feet of 3/4-inch water-supply hose on a second reel, adjustable pulsation control and four jetting nozzles. 877-901-1936; www.jetttersnorthwest.com.

34 / PATRIOT SEWER EQUIPMENT & REPAIR 1776 HEAVY-DUTY EDITION

The **1776** heavy-duty edition from **Patriot Sewer Equipment & Repair** generates 3,500 psi at 11 gpm. Standard equipment includes a Piranha 3/8-inch, 300-foot, red jetter hose and remote start for one-man operation. A portable 100-gallon water tank with autofill valve and stainless steel nozzle set is custom-engineered to work at max pounds per square inch and gallons per minute. It can be used to clean 4- to 6-inch sewer pipes with ease. Propane or gas models are available. It includes an all-stainless-steel reel and frame. All units are built to order. 888-318-9888; www.patriot.us.

35 / RIDGID KJ-3100

The **RIDGID KJ-3100** portable water jetter offers 3,000 psi of working pressure and 5.5 gpm of flow for fast, effective cleaning of large commercial and industrial lines. The jetter propels a flexible and lightweight hose through 2- to 10-inch lines, blasting through sludge, soap, grease and sediment blockages. As the hose is pulled

back, it power-scubs the line, flushing debris away and restoring drainlines to their full, free-flowing capacity — all without the use of chemicals. Pulse action allows for easy negotiation of difficult bends and traps. It has a removable hose reel and triplex pump with corrosion-resistant, forged brass head. It comes on a two-wheeled cart that easily fits through standard-size doors and negotiates tight turns with ease. 800-769-7743; www.ridgid.com.

36 / SPARTAN TOOL CADET

The **Cadet** portable electric jetter from **Spartan Tool** can effectively clean the entire circumference of the line and make quick work of grease and soft clogs. The triplex plunger pump with electric motor provides a true 1,500 psi at 0.75 gpm, or 700 psi at 2.0 gpm; and at just 14 by 22 1/2 by 9 inches, it leaves plenty of room in a work truck for more equipment. 800-435-3866; www.spartantool.com.

37 / VACTOR RAMJET 850 SERIES

The **RamJet 850 Series** truck jetter from **Vactor** has a choice of front or rear hose-reel locations and productivity-enhancing options. An integral aluminum rear shroud with heavy-duty, see-through Lexan windows is available. Large service access doors on both sides of the shroud enable easy greasing, maintenance and service. The rear shroud keeps the hose and components warm and protected for quick setup and cleaning in extremely cold conditions. It comes standard with a certified flow of zero to 80 gpm at a variable pressure up to 2,500 psi at the hose reel to clean any size line. An optional JetRodder water-pump heated cabinet keeps the pump and plumbing covered and protected. 815-672-3171; www.vactor.com. **c**

C70

HD Video Cleaning
Nozzle

A **Nozzle** Idea

The Sewer Robotics C70 video nozzle features 8 cleaning jets, battery pack, LED lighting, WiFi, and self-leveling HD camera for video recording and jetting 6" to 40" pipelines.

Video is recorded on an SD-card inside the nozzle and downloaded to the included tablet via integrated WiFi as soon as the nozzle has returned to the manhole.

Specifications

Scope of Use:	6" - 40" Diameter Pipelines
Jet Angle:	20 Degrees
Hose Connection:	1.25", 1", and .75" Fitting
Flow:	40 - 170 GPM
Pressure:	2,000 - 4,000 PSI
Battery Runtime:	8+ Hours
Video Memory:	8+ Hours

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SPOTLIGHT

Combo unit designed with easy operation in mind

By Craig Mandli

While there are dozens of combination sewer cleaning truck options available, when it comes down to it, they all perform the same services: jetting and vacuuming. The difference in these units comes down to the specs — capacities, cleaning power — and ease of use.

The developers of the 2100i combination sewer cleaner from Vactor believe that giving operators the easiest unit to control and use is the key to success. The Vactor 2100i combination sewer cleaner combines proven performance with features that highlight operating simplicity, including IntuiTouch controls and an optional RDB 1015 rapid deployment boom.

“Public works professionals and others involved in cleaning and maintaining sewers and catch basins recognize Vactor as the first name in sewer cleaners,” says Sam Miceli, vice president and general manager of Vactor. “For 50 years, Vactor has been at the forefront of developing combination sewer cleaners featuring innovative technology, user advantages and customized solutions. The Vactor 2100i is the latest entry in a long, distinguished line of industry firsts in sewer cleaning technology.”

The IntuiTouch one-touch control system provides advanced, yet intuitively simple controls designed to maximize operator efficiency. Features inside the cab include a 7-inch screen with backlit, tactile buttons and one-touch control for quick startup and engagement. Outside the cab, operators will find a single control panel including a 7-inch dashboard screen with touch screen and glove-friendly buttons featuring at-a-glance data for maximum efficiency. In addition, the articulating controls adjust to the desired location for the operator’s optimal placement.

“The series also features the Modul-Flex design system that allows every customer to build a machine engineered to their specifications on the chassis of their choice,” says Josh Malmassari, product manager at Vactor. “As the successor to the popular Vactor 2100 Plus, the Vactor 2100i couples durability with enhanced ergonomics for complete operator comfort and effectiveness.”

Uniquely designed for sewer cleaning, the unit’s JetRodder water pump provides smooth, continuous flows through its entire operating range from zero to 100 gpm and pressures up to 3,000 psi. In addition, the RDB 1015 rapid deployment boom telescopes 10 feet out and extends the debris hose down 15 feet, minimizing the need for additional tubes and speeding and easing operation in a wide range of dynamic applications. 800-627-3171; www.vactor.com.



1



2

1 RIDGID NXT LINE OF WET-DRY VACS

The RIDGID NXT line of 6-, 12-, 14- and 16-gallon models underwent an ergonomic makeover, with enhanced features designed to make job site cleanup even easier. Redesigned features include a front-to-back top carry handle for comfortable grab-and-go maneuverability and added comfort-grip side handles for extra ease in lifting, carrying or emptying the vac. The NXT vacs also have a new drum key and side latches that create a tighter lid-to-drum seal to securely keep dirt, dust and debris inside the vac. A larger on/off switch makes for easier operation with gloved hands and a built-in cord wrap to more neatly store the cord for transport. 800-769-7743; www.ridgid.com.

2 GSSI STRUCTURESCAN MINI XT GROUND-PENETRATING RADAR

The Geophysical Survey Systems Inc. (GSSI) StructureScan Mini XT portable ground-penetrating radar can help locate rebar, conduits, post-tension cables and voids. It can also help identify structural elements, including pan deck and concrete cover, and provide real-time determination of concrete slab thickness. The radar is equipped with a 2.7 GHz antenna, positioning system and control unit combination. It can reach depths of 24 inches and is positioned 0.31 inches off the surface, providing enough ground clearance that it can be used over rough concrete surfaces. 800-524-3011; www.geophysical.com.



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4

3 TORO TRX WALK-BEHIND TRENCHERS

The TRX-250 and TRX-300 walk-behind trenchers from Toro feature Intelli-Trench technology, an innovation that optimizes the machine's hydraulic flow for the digging conditions. The system automatically diverts the hydraulic flow from the traction motors, providing more power for the trencher head. As a result, the traction handle can be held in one place without requiring constant adjustment, reducing operator fatigue and optimizing performance. In addition, the Intelli-Trench feature decreases track wear and maintains engine revolutions per minute for efficient engine cooling. The TRX models also have a new hydraulic design that requires significantly fewer components than previous models, simplifying maintenance and potentially reducing service needs. 855-493-0088; www.toro.com.

4 AVANTI AV-500 EPOXY INJECTION GROUT

The AV-500 epoxy line from Avanti International is used to stabilize soils and rock, restore structural integrity, stop leaks and control groundwater. The line includes the AV-502 injectable bonding series, developed for structural concrete repair by crack injection, gravity feed or patching. The AV-522 crack sealing paste is a two-component, nonsag structural epoxy designed to offer mechanical strength in anchoring and bonding applications. The AV-580 joint filler epoxy is ideal for filling saw-cut control joints and contraction joints in concrete. The AV-590 joint filler is a two-component, 100% solids, VOC-free, rapid-setting polyurea system that cures to a semirigid resiliency to support joint edges. 800-877-2570; www.avantigrout.com.

5 BRICKING SOLUTIONS ROLLING WORK PLATFORM

Bricking Solutions' rolling work platform is designed for improved safety and efficiency during maintenance of horizontal vessels. The platform offers 25% increased productivity over traditional rolling scaffolds and features a durable, custom-engineered design. It is used in a variety of applications including water treatment, tunneling and mining. Coupled with a hydraulic jack system, the rolling work platform is erected in as little as 30 minutes and adjusts to maintain a level working surface in less than 20 minutes, while operating in vessels with an incline of up to 20 degrees. Four-inch swivel caster wheels further increase mobility on flat or rounded surfaces, such as those found in tunnels and pipes. 360-794-1277; www.bricksolutions.com. **c**

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Aries Industries expands nationwide dealer network

Aries Industries announced it added two companies to its growing network of dealers. Williams Equipment, based in Henderson, Colorado, for over 40 years, will sell and service Aries pipeline video inspection products, such as the Mobile Pathfinder System, to customers in Colorado and New Mexico. Also joining the Aries family of dealers is Instrument Technology Corp., located in Sonoma County, California. ITC, in business for nearly 20 years, will provide Aries products and service to customers in Northern California and Nevada.

Fernco acquires Source One Environmental

Fernco has completed the acquisition of Source One Environmental, the original manufacturer of PipePatch. Source One Environmental will continue to deliver its service while educating customers through their training programs and customer service. "With the distribution and partnership support from Fernco, Source One Environmental will continue our commitment of supporting our contractor base and distribution market," says Ron Smith, president of Source One Environmental.

Full In Partners makes growth investment in ServiceCore

ServiceCore announced that growth equity investor Full In Partners agreed to acquire a significant interest in the company to enable ServiceCore to continue its rapid growth and expansion. ServiceCore empowers more than 350 companies across the liquid waste industry to better manage their routing, scheduling, accounting and invoicing.

COXREELS announces new shipping program

Based on customer feedback, COXREELS announced it has launched a new shipping program called Coxreels Ship Ready. With more than 80 SKUs included, the program ships all confirmed orders the next business day after the order is placed, with a maximum of 10 per SKU per purchase order.

Allan J. Coleman opens new location in the Southwest

Allan J. Coleman opened a second location in Phoenix. The new location will provide for faster turnaround times in the service department in the Western region of the U.S. and minimize equipment downtime. Allan J. Coleman, founded in 1905, is headquartered in Chicago. **c**



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JET VACS



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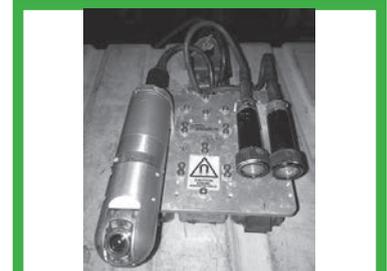


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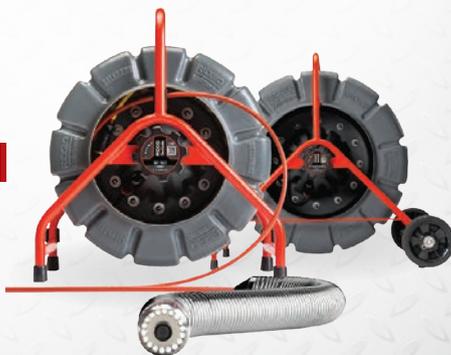
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