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Bradley Tanks Inc. technician Dustin Steele (left) and operator Shawn Addison, use the company's Dino Series of suction-excitation trucks (MTS GmbH) on a job site near Danvers, California. The company, owned by Sharon Bonner, was founded in 1999 and offers services such as dry-suction excavation, transportation and disposal of hazardous and non-hazardous waste, and frac-tank rentals throughout California. (Photography by Collin Chappelle)

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- Profile: Infra-Track Inc. (Worthing, South Dakota)
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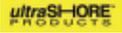
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Here We Go Again

ANOTHER MONTH, MORE ACCIDENTS BECAUSE OF FAILURE TO THINK ABOUT SAFETY MATTERS FIRST

BY CORY DELLENBACH, EDITOR

It's the busy season right now. Jobs are piling up, your crews are stretched thin and you have no time to slow down. Does that mean safety should be sacrificed? I sure hope not.

However, it seems like that is what happens often. Let's take a look at some news headlines from earlier this year:

- Two men killed in trench collapse near New Plymouth, Idaho (April 25)
- Two construction workers killed in a trench collapse in Windsor, Colorado (April 10)
- Worker killed after being trapped in 16-foot-deep trench in DeKalb County, Georgia (April 26)
- OSHA investigating trench collapse that killed worker in Marysville, Ohio (April 8).

OK, you get the point, but that's just from one month. Why does this keep happening? Because so many want to get the job done as fast as possible and are willing to sacrifice safety to do it.

MAKE IT A PRIORITY

It's time to stop treating safety like it doesn't matter. You matter, your team matters and so do the family members of those workers you employ.

Employers, supervisors and workers themselves need to take a look at job sites and all of the risks associated: potential cave-ins, traffic, electrical hazards and heavy equipment moving around.

Take the extra 15 minutes at the start of each workday and talk about what safety concerns there are for the day ahead and how to minimize that risk — either through the use of personal protective equipment and shoring boxes or changing the site setup.

Planning for risks encountered on jobs is the focus of the Safety First feature in this issue. Writer Jared Raney talked to a contractor about how they set up a job hazard analysis for their company and how they handle JHAs on a daily basis. Check it out: It might give you ideas of what to do for safety at your own company.

IT'S TIME TO STOP TREATING SAFETY LIKE IT DOESN'T MATTER. YOU MATTER, YOUR TEAM MATTERS AND SO DO THE FAMILY MEMBERS OF THOSE WORKERS YOU EMPLOY.

BEST PRACTICES

Sticking with the safety theme, the Tech Talk feature in this issue discusses best practices when it comes to vacuum excavation. You'll find tips on nozzle selection and use, as well as many other tips for when it comes time to dig.

California contractor Bradley Tanks Inc., featured this month, has been vacuum excavating since 2017 and keeps safety as the focus on every job they go out to. It's one of the big reasons they went with the air excavation route in the first place.

TAKING ON SAFETY

How is your company taking on the safety of employees? I'd like to hear from companies that have a safety-first attitude and are willing to share what they've learned. I can be reached at 715-350-8436 or editor@digdifferent.com.

Enjoy this issue! ▼

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TOOL TIPS

Safe Digging Begins With Good Utility Locating

Utility locating ahead of an excavation project is important if you want to maintain a safe job site and avoid line strikes. Of course, those efforts won't be of much help if you're not locating properly. Check out this refresher on how to effectively use an electromagnetic locator published back in April for National Safe Digging Month.
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OVERCOMING BURNOUT

Put the Joy Back Into Your Work

Working in this industry can be a thankless job. You can be called upon in emergencies when people aren't in the best of spirits. If the daily grind has killed some of the passion you had when you first got started in the industry, check out the tactics discussed in this online exclusive to get re-energized.
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THE TEST OF TIME

Keep Your Family Business Thriving

This industry is full of family businesses spanning multiple generations. There are also plenty of businesses that fail without making it to the second generation. This online exclusive looks at how you can create a company culture that puts you in the former category rather than the latter.
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VACUUM
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Profile



AIR POWER

CALIFORNIA CONTRACTOR EMBRACES NEW TECHNOLOGY THAT COULD CHANGE THE LANDSCAPE OF THE EXCAVATION INDUSTRY

STORY: KEN WYSOCKY PHOTOS: COLLIN CHAPPELLE

A couple of years ago, a customer asked Sharon Bonner if there was a way to reduce the high costs associated with transporting and disposing of mud spoil generated by hydroexcavating. As the owner of Bradley Tanks Inc. (BTI), a waste-hauling and frac-tank-rental company, Bonner did some research and found a solution: air-excitation technology that produces dry spoil, which can be reused on site.

Bonner was immediately intrigued by the technology. But there was a sticking point: No other company in the U.S. had purchased the trucks, known as the Dino Series of suction-excitation trucks, built by MTS GmbH, a German manufacturer.

As such, Bonner had to make a significant decision to either serve as a technological guinea pig and persuade customers to embrace the technology, already popular in Europe, or avoid the risk entirely and stick with the status quo.

So in a pivotal if-you-invest-in-it, they-will-come moment in 2017, BTI bought a Dino suction excavator through OX Equipment. (Ontario-based OX is the North American distributor for MTS GmbH.)

But the gamble paid off. Today, BTI — based in Danville, California — is much more than just a company that rents frac tanks and provides nonhazardous and hazardous-waste hauling and disposal services. Instead, it's a forerunner in a new excavation frontier by virtue of owning seven Dino trucks, with another one on order.

Those investments make BTI the owner of the largest fleet of Dino excavators in North America. In fact, until a little while ago, it was the only company in the U.S. that owned any Dinos at all. The bottom line: What looked like a big calculated risk two years ago now appears to be a solid and sound business decision.

"It was a risky move," says Bonner, who founded the company in 1999. "But I always look to the future. You can't just say, 'This is what we're doing now and it's working, so we'll just keep doing it.' Things change, and you have to be ready to adapt to those changes.

"So we bought a Dino without even a contract in hand," she recalls. "And so far, so good."

"That's something Sharon always does — looks ahead to broaden the scope of what BTI does," says Kelly Graser, the company's director of compliance. "It's not the first time she's had us develop and finance equipment that doesn't even exist in the marketplace, just to provide specific solutions for our clients.

"IT WAS A RISKY MOVE. BUT I ALWAYS LOOK TO THE FUTURE. YOU CAN'T JUST SAY, 'THIS IS WHAT WE'RE DOING NOW AND IT'S WORKING, SO WE'LL JUST KEEP DOING IT.' THINGS CHANGE, AND YOU HAVE TO BE READY TO ADAPT TO THOSE CHANGES."

Sharon Bonner

Bradley Tanks Inc.
Danville, California

OWNER: Sharon Bonner

FOUNDED: 1999

EMPLOYEES: 75

SERVICES: Dry-suction excavation, transportation and disposal of hazardous and nonhazardous waste, frac-tank rentals

SERVICE AREA: California

WEBSITE: www.btienvironmental.com

Technician Dustin Steele (left) uses the air lance, while operator Shawn Addison operates the mechanical boom of a Dino suction excavator (MTS GmbH; distributed by OX Equipment) during an excavation job near Danvers, California.



Shawn Addison looks on as he uses the truck's remote to dump the debris from the box of the truck. One of the key features of the Dino is its ability to side dump spoils.



Dustin Steele operates the lance to break up the ground. The Dinosaurs are capable of handling dry or wet material.

“WE’RE CERTAINLY NOT HERE TO TAKE OVER THE HYDROEXCAVATING WORLD. HYDROEXCAVATING STILL HAS ITS APPLICATIONS. IT’S JUST THAT THIS TECHNOLOGY OFFERS A NUMBER OF BENEFITS THAT HAVE A PLACE IN PROJECT WORK.”

Kelly Graser

“This was just another time when she felt it was the right direction — the right time to step into this industry because it offered something completely different,” she continues. “We’re certainly not here to take over the hydroexcavating world. Hydroexcavating still has its applications. It’s just that this technology offers a number of benefits that have a place in project work.”

GO BIG OR GO HOME

BTI’s decision to invest in suction-excitation technology underscores both the importance of listening to customers and helping them find solutions to business challenges and of taking calculated risks to invest in game-changing technology.

In BTI’s case, the customer that spurred the investment was a utility company for which BTI handled wet-spoils disposal. While the air excavation technology intrigued BTI’s management team, it also presented a bit of a conundrum because it also would reduce revenue generated by contracts for hauling and disposal of wet spoils.

But Bonner felt the lost revenue could be offset by actually providing the air excavation service, which also has applications in other industries. “We saw a demonstration of a Dino and thought, ‘Hmmm, this could work,’” she says. “If we’re the ones that present the technology to customers, that’s a way to increase our revenue and make up for loss of revenue from wet-spoils contracts. It’s a risk you take.

“In the long run, we think this technology is the future because it’s more environmentally sustainable,” she adds.

AIR-TECHNOLOGY ADVANTAGES

Moreover, Bonner saw an advantage to being the first to embrace this new technology in the U.S. For starters, the sheer high cost of the equipment presents a formidable barrier to market entry by others. In addition, customers — both existing and potential new clients — were excited about the potential for reducing hauling and disposal costs.

“We did the research and saw the future,” Graser notes. “We knew how much customers were spending on disposal of wet spoil. The Dinosaurs will really help clients reduce the volume of mud. About 95% of the spoil on projects we now work on remains on site and gets immediately reused.”

The immediate reuse of spoil is another big selling point for customers because it virtually eliminates the cost of buying and transporting materials

(continued)

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Sharon Bonner, owner,
Bradley Tanks Inc.

to job sites to backfill excavated areas. Moreover, the Dinos improve productivity because they don't have to leave job sites to refill water tanks the way hydroexcavators must, Graser says.

"And since it's dry excavation, the excavated area is dry," she continues. "So if people need to get back in there, they're working in a dry environment instead of a wet, muddy environment. Another advantage is that the Dinos don't use water to dig, so that conserves a natural resource. It also enables the trucks to work in remote areas where water isn't always readily available and would be expensive to transport to job sites.

"Also, because the Dinos use air, it's a soft-dig method, not mechanical," she adds. "That's significant because there are regulations about how close you can work to utilities with mechanical methods."

Moreover, BTI management envisions using the Dinos in other industries for various applications. "We felt it was the right fit not only for what our client needed, but for anyone doing utility and other similar work," Graser notes.

COMMONLY USED IN EUROPE

While suction-excitation technology has been used in Europe for decades, it's relatively unknown in North America. BTI is busy changing that dynamic with its investments in the Dino trucks, which use pneumatic tools powered by compressed air to break up soil.

The units then suction-up the loosened soil with a pair of high-powered fans. Unlike hydroexcavated soil, which turns into a slurry that's costly to haul

Business-building 101

For someone who graduated from college with a degree in organizational behavior, Sharon Bonner is pretty good at building a business. For proof, consider her company, Bradley Tanks Inc. (BTI), which has changed and grown dramatically since she first established it as a frac-tank-rental outfit in 1999.

BTI now owns a fleet of equipment worth millions of dollars, serves customers throughout California, employs 75 people (up from just two for the first 10 years or so) and has diversified into hauling and disposing of hazardous and nonhazardous waste and providing suction-excavating service with a fleet of innovative suction-excitation trucks made by Germany-based MTS GmbH.

Bonner got into the industry in a roundabout way. While working part time for a truck-rental agency while attending college, a mechanic said something that caught her attention.

"He told me that renting trucks is such a great business," she recalls. "He said, 'Look at all that equipment in the yard. It's all paid for, so every time it goes out, that's cash on the bottom line.' That thought always stayed with me."

After several jobs and some 20 years later, that thought emerged again. As her children were growing older, she started thinking about a business she could run herself.

"My husband worked for a landfill that hauled and disposed of hazardous waste, so I saw the kind of equipment that was on construction sites," she says. "I noticed a lot of frac tanks on job sites for holding stormwater and groundwater.

"There were only a couple of companies that rented them, and no one was really focusing on the environmental end of it," she continues. "So I bought a few tanks to see how it would go. It was just me and an assistant."

Growth came slowly, and the formula always was the same. Borrow money to buy some tanks, pay them off, rinse and repeat. "Slowly but surely, the ball got rolling and it becomes a viable business," she says.

As for the company's name, Bonner liked the tough image invoked by playing on the name of the legendary Bradley Fighting Vehicle, a tanklike military machine used by the U.S. Army.

"As a woman, I felt I needed a name that sounded strong and masculine," she explains. "You want to fit in where you're at."

As for being a woman in a male-dominated field, Bonner says she's rarely found it an obstacle. In fact, she thinks that at times, it's been an advantage. "If you're a woman in a male-dominated industry, people are curious about that," she explains. "So sometimes it actually helped.

"But aside from that, I've dealt with thousands of different businesses ... and I don't think being a woman matters so much," she adds. "You can have personality conflicts with anyone, male or female.

"You can overcome anything as long as you present yourself in a professional manner and people understand that you're smart and capable and willing to listen to what they have to say," she asserts. "In business, it all comes down to one thing: Can you do the work and provide the expertise they want for a rate they want to pay? That's really what people are looking at nowadays in business."

and dispose, the spoil generated by a Dino is dry and can be immediately reused on site for backfilling. That provides big cost-savings for customers, says Colin Donoahue, business development manager for OX Equipment.

(continued)

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Two key components are dual rotary-vane air compressors built by Mattei, which generate a total of 320 cfm of compressed air, and proprietary twin fans that produce 24,000 cfm of suction power. Along with powering the tools used to loosen soil, the air compress-

“YOU NEVER KNOW WHAT OPPORTUNITIES MIGHT COME UP. AND THAT’S WHERE BTI SHINES — JUMPING AT OPPORTUNITIES AS THEY ARISE.”

Kelly Graser

sors also operate a filtration system that automatically cleans the suction system and an optional boom-mounted vibrator that keeps debris from clogging the suction hose, Donoahue says.

The soil-loosening tools include an air lance made by AirSpade Division, Guardair Corp., pneumatic power shovels from Vogt GmbH and jackhammers built by Atlas Copco CMT. The tools are included as standard equipment; optional pogo tampers, made by MBW or Chicago Pneumatic, are available from OX, Donoahue says.

ARTICULATING AND SWIVELING BOOM

Other features include a 10-inch suction tube and a 23-foot-8-inch-long hydraulic articulating “mega arm” that swivels, providing 180 degrees of coverage off the back of the truck; and remote-control operation, including a remote hydrostatic drive system, which allows an operator to remotely position the truck without disengaging the suction system.

The mega arm features four hinge points that allow more precise location of the suction tube and a rigid dig tube that can extend the mega arm’s length to 30 feet, Donoahue says. In addition, the truck is quiet, operating at less than 85 dB at a distance of 15 feet; for comparison’s sake, a refrigerator typically runs at anywhere from 37 to 47 dB.

BTI provides the operator with thorough training that includes a mix of classroom education and hands-on operation. BTI provides its operators with in-house training that’s based on manufacturer’s guidelines, plus additional education from two training organizations, Industrial Training Services and Veriforce. Operators also need a commercial driver’s license, Graser notes.

After that, operators obtain certification by certified third-party evaluators. “We do it both for the health and safety of our employees and for clients that require specific operator qualification in order to bid on jobs,” Graser says.

“It’s a good month before employees are out shadowing someone who does actual fieldwork,” she continues. “And they probably spend another month shadowing as an extra hand on a project. I’d say it takes roughly three months to become proficient, but guys who’ve run a hydrovac truck before and are used to working around underground utilities tend to pick it up faster.”

Along with the Dinosaurs, BTI also owns more than 300 frac tanks; 35 Peterbilt tractor trailers; 50 aluminum and steel end-dump trailers for hauling bulk soil and debris, some of which are made by Hanson Trailers; and more than 20 stainless steel vacuum tanker-trailers (used for liquid hauling) and rocket-launcher trailers (used for carrying waste containers).

MORE GROWTH EXPECTED

Looking ahead, Graser anticipates further growth for BTI, with some of it coming through finding other applications for using the air excavation tech-



BTI boasts seven dry-suction Dino excavator trucks (MTS GmbH; distributed by OX Equipment) and 75 employees. The company offers dry-suction excavation services, transportation and disposal of hazardous and nonhazardous waste, and frac-tank rentals.

nology. That could include things such as removing and then putting back collected ballast in railroad yards and sucking up gravel from rooftops undergoing repairs.

“I would say our growth will come from within California,” she says. “But you never know what opportunities might come up. And that’s where BTI shines — jumping at opportunities as they arise.

“You never know — we might be doing something in Arizona a few months from now,” she adds. “We’re always open to new opportunities.”

Growth also could come through further investments in advanced technology. Some companies don’t want to be the first one in a market to try something new; Bonner says BTI isn’t one of them. But doing so requires a certain degree of patience to develop a new market, as well as the willingness to thoroughly educate customers about how the new technology can benefit them.

As for the financial risks, Bonner says she operates with a nothing-ventured, nothing-gained mentality. “I’ve never really been fearful of taking risks,” she says. “If you have the finances and resources and can afford to take a calculated risk, it usually pays off. You need to continually move forward.” ▼

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IN EMERGENCY PROJECT, FLORIDA CONTRACTOR USES INNOVATIVE TECHNOLOGY TO REHAB MILES OF FORT LAUDERDALE SEWERS IN JUST NINE MONTHS

BY KEN WYSOCKY

Faced with a public works emergency caused by a series of disastrous breaks in aging, ductile iron sewer force mains — including one line that handles about a third of the city’s sewage — officials in Fort Lauderdale, Florida, found themselves in crisis mode in mid-2017.

To resolve the burgeoning problem, which at one point had inundated some residential neighborhoods with more than a foot of sewage, the city hired Murphy Pipeline Contractors in Jacksonville to use trenchless technology to rehab a little more than 4 miles of sewer force mains.

City officials opted for trenchless technology because speed was of the essence in the wake of more than 20 million gallons of raw sewage leaks during the previous several years. The leaks were especially troublesome because

“THIS WAS A TRUE EMERGENCY IN EVERY SENSE OF THE WORD. ON A SCALE OF ONE TO 10, IT WAS AN 11.”

Richard Crow

of Fort Lauderdale’s location amid intracoastal waterways and other environmentally sensitive marine areas.

The nearly \$15 million project centered on two different rehab technologies. The first involved installing approximately 8,600 linear feet of new 30-inch force mains via horizontal directional drilling. The second included rehabilitating another 11,500 linear feet of existing 30-inch force mains with an innovative new technology called compression-fit lining, which uses HDPE pipe.

“This was a true emergency in every sense of the word,” says Richard Crow, director of engineering and special projects for Murphy Pipeline Contractors. “On a scale of one to 10, it was an 11. It made the national news, with whole neighborhoods submerged in sewage. There was a dire need for repairs.”

It also hit the city hard financially. After city officials closed off the broken segments of force mains, they had to hire contractors to pump wastewater out of lift stations. The contractors then transported the waste to manholes far-

An entry pit on the project shows a DD-440T directional drill and P-600 mud pumps from American Augers. Murphy Pipeline Contractors installed 8,600 feet of new pipe in Fort Lauderdale, Florida, using primarily directional drilling.



PHOTOS COURTESY OF MURPHY PIPELINE CONTRACTORS

PROJECT: Use trenchless technology to rehab a little more than 4 miles of sewer force mains
CUSTOMER: City of Fort Lauderdale, Florida
CONTRACTOR: Murphy Pipeline Contractors, Jacksonville
EQUIPMENT: DD-440T directional drill and P-600 mud pumps
American Augers, West Salem, Ohio
800-324-4930; www.americaaugers.com

RESULTS: The project started in August 2017 and finished in May 2018. They rehabbed 11,500 linear feet of force main and installed 8,600 feet of new pipe.

DOWN & DIRTY

“SOME OF THE LOCATIONS WERE QUITE CHALLENGING DUE TO UNSUITABLE SOILS. IN OTHER AREAS, THE ORIGINAL FITTINGS DIDN'T WORK. WE WERE WORKING SO FAST THAT WE DIDN'T HAVE AN UNDERSTANDING OF WHAT WAS IN GROUND UNTIL WE ACTUALLY STARTED WORKING.”

Richard Crow

ther downstream, where it was discharged for treatment. At one point during 2017, the city spent nearly \$12 million for pumping in just five months. (The cost was exacerbated by heavy rain from Hurricane Irma, which caused sewer overflows.)

OBSTACLES ABOUNDED

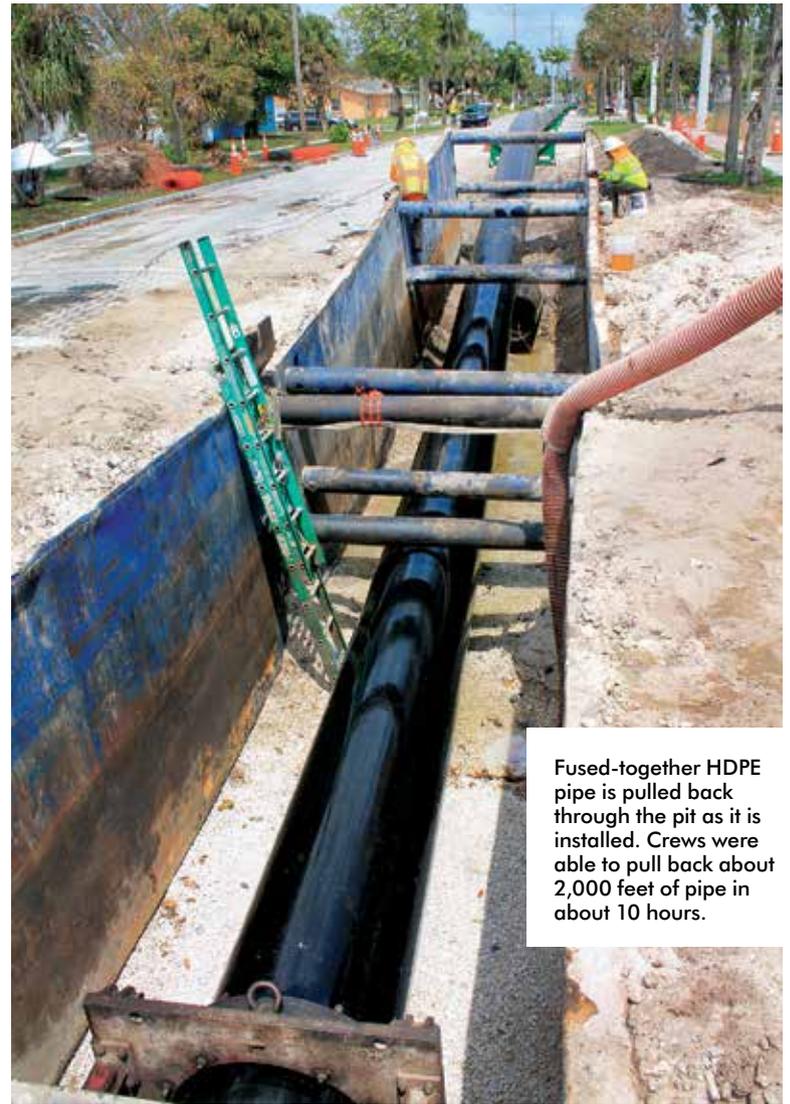
The project, which was designed by engineering consultant Chen Moore and Associates, posed numerous challenges. First of all, there was pressure to fast-track the project and complete the bulk of it in six months, from August 2017 through January 2018.

“We had three days to submit a bid,” Crow notes. “There was no time for feasibility studies or analysis. We had to design and build almost immediately.”

Murphy Pipeline Contractors also had to contend with several contaminated sites; sensitive adjacent intracoastal ecosystems; and dense commercial and nightclub areas where rights-of-way were limited and businesses couldn't afford major disruptions. The company also had to deal with a thicket of permitting agencies — nine all told, including the Army Corps of Engineers and the Florida Department of Environmental Protection.

Moreover, there was a little snag called Hurricane Irma, which pummeled Florida with high winds and rain in early September. Crews also had to work around concerts and other large special events that had been booked a long time ago and couldn't be canceled. “We worked a lot at night,” Crow says. “We wanted to avoid disturbing communities or places of business as much as possible.”

At the peak of the nine-month-long project, which concluded in May 2018, Murphy Pipeline Contractors had about 60 employees working on its various phases. “It was a massive operation,” he says. “To help us out, some of our



Fused-together HDPE pipe is pulled back through the pit as it is installed. Crews were able to pull back about 2,000 feet of pipe in about 10 hours.



Murphy Pipeline Contractors crew members fuse together HDPE pipe using a pipe fusion machine from McElroy on the job site in Fort Lauderdale, Florida.

clients (with less time-sensitive projects) let us work on their jobs later on. It was really great to see the mutual respect they gave us — they were very accommodating.”

MINIMAL DISRUPTION

To avoid complete disruption to business operations and potential accompanying financial losses, open-cut replacement of the force mains wasn't an option. “It would have been challenging, costly and very slow going,” Crow says. “Plus, the water tables here are very high, so there's a lot of wet, nasty soil.”

But Murphy Pipeline Contractors had a perfect alternative technology: compression pipe-lining with HDPE pipe. The company's owner, Andy Mayer, brought the technology — popular in Europe for decades — to the U.S. from England in 1999, the year he established Murphy Pipeline Contractors.

Here's how compression pipe-lining works: Using powerful winches, workers pull long runs of HDPE pipe through custom-made steel dies and into the host pipe; the dies are slightly smaller in diameter than the host pipe.

As the pipe passes through the die under extremely high force — anywhere from 70 to nearly 100 tons of pressure, depending on the length of the pull — it gets compressed to a smaller diameter than the host pipe. Crews can pull up to 5,000 feet of pipe at one time. When the pull is complete, the line from the winch is removed.

Now no longer under pressure, the pipe slowly expands back to its original diameter and tightly conforms to the interior of the host pipe, typically within 48 hours. This forms an inner liner that should last about 100 years. The pipe can remain under tension for a couple of days; after that, contractors run the risk of the pipe hardening in its smaller-diameter configuration. After the new pipe passes a pressure test, it's good to go online, Crow explains.



The method of compression pipe-lining with HDPE pipe technology was brought to the U.S. from England in 1999.

The actual pipe-pulling doesn't take that long; on a good day, a crew can complete, say, a 2,000-foot-long pull in about 10 hours. So why did the project take nine months to complete?

Because crews first have to dig access pits at the points of entry and exit (small pulls require 40-foot-long-by-8-foot-wide pits and longer pulls require 80-foot-long-by-8-foot-wide pits, with depths that vary by project).

Workers also have to camera the lines to see if any obstructions exist, clean the lines to remove any debris and obstructions, send through a "proving pig" to ensure the pipe is ready for lining and so forth, Crow says.

"It also took awhile just to get materials," he adds. "We pulled in our crews quickly, but that doesn't mean materials are on the shelves, ready to go. It's not like 30-inch plug valves and 30-inch HDPE pipe is just sitting on shelves in a store."

MANY MOVING PARTS

About 65% of the 22,000 feet of force mains were rehabbed with compression-lining technology, and about 30% of them were replaced with new mains, using horizontal directional drilling, performed by DBE Utility Services. The rest of the repairs required open-cut work, Crow says.

"Some of the directional drilling also involved installing interconnects to cross-connect some of the force mains," he explains. "That way, the city could stop pumping (out the lift stations) by diverting wastewater from the bad sections of pipe to the new pipes."

DBE Utility Services used a DD-440T directional drill and P-600 mud pumps from American Augers on the site. To fuse the pipe together, crews used McElroy fusion machines. Excavation equipment from Hitachi was also on site.

The project was broken down into four phases, the first three of which started concurrently. "We couldn't start phase four until the first three were completed," Crow says. Here's a breakdown of the phases:

1. Rehab several sections of force main — 3,200 linear feet in all — with compression lining and install 700 feet of new force main under the Tarpon River via horizontal directional drilling. (Six bore pits required.)
2. Install 1,500 linear feet of new pipe with horizontal directional drilling. (Two bore pits required.)
3. Install 6,400 linear feet of new pipe with horizontal directional drilling. (Three bore pits required.)
4. Rehab three segments of force mains — a total of 8,300 linear feet — using compression lining. (Six access pits required.)

ON TIME AND ON BUDGET

The project started in August 2017 and finished in May 2018. Along the way, Murphy Pipeline Contractors officials had to continually react on the fly to unexpected situations and obstacles — pretty much what they expected, given there was so little time for analysis and planning, Crow says.

"Some of the locations were quite challenging due to unsuitable soils," he explains. "In other areas, the original fittings didn't work. We were working so fast that we didn't have an understanding of what was in ground until we actually started working."

"In phase two, we did some excavating and saw things wouldn't work as planned," he continues. "Keep in mind we were working with only aeri- als and as-built drawings. We took on a lot of risk because most times we didn't know what was in front of us. We had a game plan, but we had to pivot a little bit each day in order to keep moving forward."

"Sometimes we'd just roll out (as-built) plans on the tailgate of a pick-up truck and figure things out with city engineers," he notes. "It was a total collaborative effort to find solutions. That was the best part of the project."

It helped that Murphy Pipeline Contractors also has hundreds of miles of compression lining under its belt. The company has worked all over the U.S. and even internationally in Mexico, South Korea, Saudi Arabia and other countries.

"We're definitely a niche contractor," Crow says. "There's only two other companies in the world that do compression-fit technology."

"WE'RE DEFINITELY A NICHE CONTRACTOR. THERE'S ONLY TWO OTHER COMPANIES IN THE WORLD THAT DO COMPRESSION-FIT TECHNOLOGY."

Richard Crow

Crow hopes that the success of the Fort Lauderdale project will help other communities buy into the compression-lining technology and HDPE pipe as a trenchless rehab solution, especially since it demonstrated what can be accomplished in terms of minimal disruption to residents, businesses and vulnerable ecosystems.

"This shows that HDPE pipe is a good long-term solution for clients that need to solve problems caused by corrosion and cyclical fatigue in ductile and cast iron pipes," he says. "It also demonstrates what can be achieved on an emergency basis when installing HDPE pipe with trenchless methods and qualified contractors." ▼

To see a video on the project

from Murphy Pipeline Contractors, go to
www.youtube.com/watch?v=o_sKkXwj7VE

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Vacuum excavators are an increasingly popular method for exposing underground utilities on congested, urban projects. Some of the best practices for doing the work safely include using the correct nozzle, keeping a safe distance from the utility and not digging with the nozzle.



PHOTO COURTESY OF DITCH WITCH

Best Practices for Avoiding Damage

TAKING THESE STEPS CAN HELP A CONTRACTOR HAVE A SAFE AND SUCCESSFUL DIG ON JOB SITES

BY CHAPMAN HANCOCK

With new utility projects on the rise, damage prevention continues to be a growing concern for the underground construction industry. Especially in developed urban areas, new utilities share the ground with other existing fiber, gas, electric, water and sewer lines. The congested underground space leaves little to no room for error.

To mitigate underground utility damage, some cities require operators to expose parallel utilities near the projected bore path using soft excavation. Regardless of regulations, revealing nearby utilities using soft excavation is an industrywide best practice.

Today's versatile vacuum excavators are an increasingly popular method for exposing underground utilities on congested, urban projects. Here are five best practices for safely and efficiently exposing utilities with vacuum excavation.

1. USE A ROTATING NOZZLE

Water can be a powerful source — and the conduit or polyurethane on a utility isn't invincible. A rotating nozzle, also known as an oscillating nozzle, is the only nozzle that should be used for exposing utilities.

This type of nozzle does not have a direct spray, which can damage utilities. Also, it delivers a constant stream of circulating water that pulls away more dirt and can use up to 50% less water than a fan nozzle.

Essentially, the oscillating water stream maintains safety without sacrificing productivity.

2. DON'T EXCEED 3,000 PSI

The recommended pressure for soft excavation is between 2,500 to 3,000 psi. Although many vacuum excavators and nozzles offer higher pounds-per-square-inch capabilities, too much pressure can damage utilities.

If using heated water, pressure should be reduced.

3. STAY AT LEAST 8 INCHES FROM THE UTILITY

Holding the nozzle too close to the utility also increases the risk of damage. The recommended distance is 6 to 8 inches from the utility.

IN ADDITION TO PUTTING CREWS AT RISK, FAILING TO PROPERLY EXPOSE UTILITIES CAN HAVE A COSTLY CONSEQUENCE. AFTER DAMAGING A UTILITY, UNDERGROUND CONSTRUCTION COMPANIES CAN FACE DEVASTATING FINES AND REPARATION COSTS.

4. KEEP THE NOZZLE MOVING

Although the rotating nozzle keeps the intense stream of water from remaining in constant, direct contact with the utility, it's important to physically move the lance/nozzle around as well. Keeping a rotating stream of water during excavation avoids applying excessive pressure to a single area and, in turn, reduces damage.

5. NEVER DIG WITH THE NOZZLE

As tempting as it may be to push the nozzle into the dirt, this can clog the nozzle and decrease efficiency. If you're struggling to expose utilities in hard soil or heavy clay, hot-water heater packages are an option with most vacuum excavators. Using hot water can help break down clay without applying additional water pressure. However, keep the temperature below 150 degrees F and reduce pressure to avoid damaging utilities.

APPLYING BEST PRACTICES

In addition to putting crews at risk, failing to properly expose utilities can have a costly consequence. After damaging a utility, underground construction companies can face devastating fines and reparation costs.

Operators can apply these best practices to limit unanticipated costs and delays on underground projects while maintaining job site safety and productivity.

ABOUT THE AUTHOR

Chapman Hancock is the Ditch Witch product manager for vacuum excavation. For more information, visit www.ditchwitch.com/safety. ▼

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Little Planning Goes Long Way

JOB HAZARD ANALYSIS CAN BE THE BEST GUIDE TO PUT CREWS ON THE SAFEST PATH

BY JARED RANEY

For many contractors, safety means throwing personal protective equipment at employees and setting them loose — but a little planning before the job is much more effective in ensuring employees' protection.

"We're always going to provide PPE to our employees, but we don't want that to be the first line of defense for hazards, because a lot more can go wrong," says Mike Fisher, executive vice president of service and risk for Therma. "You just open yourself up to more risk if you're relying solely on PPE."

Therma has a robust safety program that uses job hazard and job safety analyses — the golden standard of hazard mitigation in service industries. A job hazard analysis, in short, is a step-by-step breakdown of any given job or task, with the goal of identifying potential dangers and mitigating them.

"Identify the hazards of each step — what can potentially go wrong, what are the possible consequences, how could it happen?" Fisher says. "Then a big part of the JHA is looking at any potential contributing factors that could occur."

Some people use job safety analysis interchangeably, but Therma differentiates the two, using JSAs for every job and JHAs for specific high-risk tasks like confined space or working from heights.

"A JSA is done anytime anybody goes out and performs any kind of work. It's going to be the job itself, and the JHA would apply to the hazardous task," Fisher says.

Crew members have to go through a kind of checklist. Does it involve confined space? Does it involve anything unusual in terms of fall protection? If it doesn't, then they continue on and complete their JSA: Identify the steps involved in the work, specific hazards that need to be addressed, such as traffic control and protecting the public, and those types of general terms. Then the crews will list out what the mitigation measures are. If, during the course of their evaluation, they say they do have to enter a confined space or a dangerous situation, then a specific JHA would be written for that part of the work.

JUST GOOD PRACTICE

OSHA does not require JHAs, but says in its JHA guidance literature, "One of the best ways to determine and establish proper work procedures is to conduct a job hazard analysis. A JHA is one component of the larger commitment of a safety and health management system."

A guide from OSHA recommends JHAs be conducted for jobs with high injury or illness rates; with potential for severe or disabling injury or illness, even without a history of accidents; where human error could lead to accident or injury; jobs new to employees or that fall under new procedures; and complex jobs requiring written instruction.

Many sources agree that including employees in the process — specifically those employees who will be physically providing the labor — is essential to successful job hazard analysis and mitigation.

It's a sentiment that is reflected in Therma's JHA form: "A copy of this JHA will be kept at the work site available for review upon request. This JHA will be reviewed by all workers prior to the start of activities. Should conditions change, all work is to stop until those conditions are addressed in the JHA."

"That's one of the things they're trained to do — one of the main things about our JHA pro-



"WE LOOK AT ANY ENGINEERING CONTROLS WE CAN APPLY FIRST, BECAUSE THEY ARE GOING TO BE THE MOST RELIABLE."

Mike Fisher

cess is anytime there's any kind of change in conditions, whether it's equipment or whatever it might be, they have to stop and redo the JHA. That's one of our policies," Fisher says. "And it's more than just redoing the JHA: They have to then sit down and review the changes with the workers who are involved."

Included in typical JSA/JHA forms are tables with three columns: the operation, potential hazards and mitigation actions.

"It's a step-by-step planning process, so essentially we walk through the tasks that are involved for that part of the work," Fisher says. "For example, if it's a confined-space entry where we're going into a manhole, we have to include air monitoring, confined-space entry process, ventilation, hazards of the actual space itself, and making sure the appropriate, trained people are on standby and proper notification has been taken, in terms of notifying your rescue services and the office itself."

Companies have to look at all those parts and pieces, and then lastly, how likely is it that an actual hazard could occur? Look at the personnel involved — the training and experience level — along with the environment they are working in.

"That's where you're relying on the experience of the supervisor, collaborating with the safety professionals, and that's how you're going to determine the likelihood that a hazard would occur," Fisher says.

A company of 900 employees, Therma has its own safety department, with

“THAT’S ONE OF THE THINGS THEY’RE TRAINED TO DO — ONE OF THE MAIN THINGS ABOUT OUR JHA PROCESS IS ANYTIME THERE’S ANY KIND OF CHANGE IN CONDITIONS, WHETHER IT’S EQUIPMENT OR WHATEVER IT MIGHT BE, THEY HAVE TO STOP AND REDO THE JHA. THAT’S ONE OF OUR POLICIES.”

Mike Fisher

seven safety specialists working under Fisher. They are involved in all safety planning, especially with hazardous tasks.

“The safety department needs to be involved in the planning. Specifically, when we talk about confined space, the safety department has to be involved and actually present at entry; they supervise the work,” Fisher says. “It’s kind of like a ‘go/no-go’ checklist: Have you identified the safety department; have you done your proper notifications for our policy and procedure?”

Outside of JSAs and JHAs, like many other large contractors, Therma requires reporting of accidents and near-miss incidents. These reports are then consulted and referenced in JSAs/JHAs for similar job conditions.

BREAKING IT DOWN

Fisher says the first thing to analyze is if there is a safer way to perform that particular work step. If a piece of pipe needs to be cut, what tool is being used? Are you using a power tool, or can you use a hand cutter for cutting copper instead of a reciprocating saw?

“That would be an example of identifying a safer way to do something,” Fisher says. “Do you really need to go into this space at all? If you need to visualize something, can you drop one of our robotic cameras down there and do the inspection rather than putting somebody in the space?”

Beyond simply avoiding the hazard, there are three categories of hazard mitigation: engineering, administrative and equipment.

“We always look at other ways to control those hazards that don’t involve just adding PPE,” Fisher says.

For example, if there is an atmospheric hazard, one way of controlling it would be putting a crew member in a respirator. Fisher, however, says the company doesn’t take that approach.

“We look at any engineering controls we can apply first, because they are going to be the most reliable,” he says. “Like providing ventilation of that space, so you engineered the hazard out of it. If you can’t use an engineering control, then we look at an administrative control.”

OSHA identifies the following administrative controls:

- Written operating procedures, work permits and safe work practices
- Exposure time limitations (used most commonly to control temperature extremes and ergonomic hazards)
- Monitoring the use of highly hazardous materials
- Alarms, signs and warnings
- Buddy system
- Training.

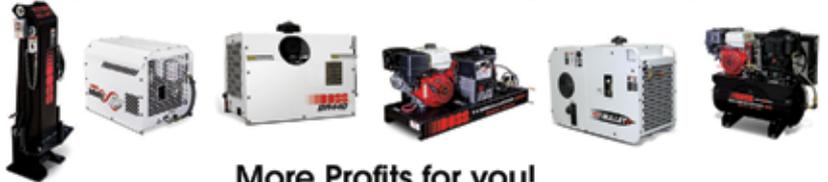
“Can we maybe schedule the work for where that hazard isn’t present when we perform the work? That

would be kind of the administrative control when it comes to scheduling,” Fisher says. “And then lastly would be PPE.”

Putting all these steps to paper may seem like just another bureaucratic hassle, but employers have an obligation to ensure workers make it home after every job, and a little due diligence is a small price to pay for peace of mind. ▼

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Going Through the Paperwork

LOOKING AT ALL THE PAPERWORK THAT COULD BE REQUIRED WHEN OPENING A NEW BUSINESS CAN BE OVERWHELMING, BUT NECESSARY

BY JOAN KOEHNE

Contractors don't just wake up one day and say, "Surprise! I'm open." Before they hang up their shingle, they need to attend to a host of details. These details include the state and federal legal documents that establish the company's identity, organizational structure and taxation.

Attorney Devin Shanley, principal of Shanley Law in Green Bay, Wisconsin, recommends a two-step approach to making legal decisions for a new business. On day one, you determine how to get into business and address problems you may encounter as a business owner. On day two, you decide how to get out of business and create a way to ease the transition.

"This goes beyond the documents and into a legal strategy," Shanley says. "This is where a lawyer is going to be more than a document vending machine and a little bit more of a planning guide."

It's inadvisable to skip the legal paperwork because it puts you in a vulnerable position. You'll be operating as a sole proprietorship without the protections of the law. "It's the most classic form of business. You just go out there and do it," Shanley says.

This arrangement is problematic on a number of levels. Liability is one concern. If you're taken to court, you face the potential of losing not just your business, but your personal property and assets, too.

"There's zero protection," Shanley says. "You're totally exposed."

LIMITED LIABILITY COMPANY

A limited liability company provides better protection for owners. An LLC establishes a business as a legal entity. With an LLC, business and personal finances are separated, and personal finances are protected from lawsuits, business debts and losses. An LLC can be created for a partnership or a corporation.

"In Wisconsin, it's stupid-easy to form an LLC," Shanley says. "The Department of Financial Institutions literally puts the form as a fill-in-the-blank on its website. Individuals enter their information and pay a fee.

"Suddenly, you're an LLC. Isn't that grand?" Shanley adds. Yet there's more to consider.

The articles of organization used to form an LLC require the name of the organizer (essentially, the person filling out the form) and the registered agent (the person who accepts the official correspondence and is publicly associated with the company). Filling in these blanks may be as simple or sophisticated as an owner wishes, handled with or without an attorney.

LIMITED LIABILITY PARTNERSHIP

If two or more owners decide to form a partnership, an LLP or a limited liability partnership is recommended. The LLP is like the LLC, but it is spe-

cifically designed for partnerships. In addition to their LLC or LLP agreement, partners should negotiate an operating agreement. This agreement sets guidelines for how the business will operate.

"It's going to say how people vote, how decisions are made, who's in control, who represents the business and how to sell," Shanley says.

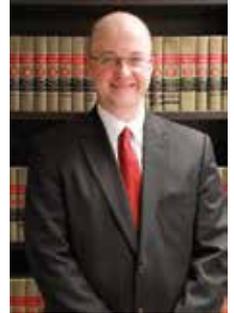
Incorporation requirements vary by state, and business owners should check with a local attorney or their secretary of state to see what other documents are necessary. On the federal level, the IRS issues Employer Identification Numbers (EIN) to new businesses. Small-business owners quickly learn that obtaining an EIN is a necessity.

"Most independent business owners are going to hit this wall when they go to open a bank account," Shanley says. Visit the IRS portal at www.irs.gov to apply for free.

SETTING UP CORPORATIONS

While some contractors operate as partnerships, others form corporations instead. Corporations require their own set of documents.

"Instead of forming articles of organization, you file articles of incorporation," Shanley says. "Instead of an operating agreement, you're going to set up bylaws. Instead of setting up ownership interest, you are going to be selling stock."



Devin Shanley

"A LAWYER'S JOB IS TO THINK THROUGH TERRIBLE SITUATIONS ALL DAY. WE NATURALLY ASSUME THE WORST THING IS GOING TO HAPPEN, AND WE TRY TO STEER YOU SO IT DOESN'T." Devin Shanley

Consulting with an accountant can help you determine which type of organizational structure makes sense for your business based on tax implications and state requirements. For instance, some states require an annual meeting.

OTHER DOCUMENTS

Contractors also need specific licenses and certifications, which vary depending on the municipality and state. Government officials and seasoned contractors can help you determine what licenses are necessary in your region.

Once you hire employees, a new set of legalities surface. You'll want to set up a payroll system to withhold taxes, obtain workers' compensation insurance, post the required notices and abide by other state labor laws.

Working with business consultant, attorney or accountant can help you form the foundation necessary for a successful business.

"A lawyer's job is to think through terrible situations all day," Shanley says. "We naturally assume the worst thing is going to happen, and we try to steer you so it doesn't." ▼



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Play the Field With Rental Agreements

DISTRIBUTORS OFFER A WIDE ARRAY OF RENTAL OPTIONS — LEARN THE INS AND OUTS BEFORE COMMITTING

BY JARED RANEY

Renting is often a win-win situation for contractors and distributors. While a contractor may pay a little bit more over the long run, the ability to space out payments on a truck over time can be well worth it.

But there are considerations to make before jumping on the rental bandwagon.

A recent-year model piece of equipment with customization can easily run upward of a half-million dollars. Fortunately, with the increasing demand and focus on alternative excavation methods, options for renting and purchase have grown significantly.

“We work outside the box — it’s not all black and white,” says Smiley Rich, executive vice president of the rental division for Custom Truck One Source. “We lay rental agreements out to how the customer would like to do it.”

While Custom Truck One Source does sell trucks, they are willing to rent out any piece of equipment in their \$300 million inventory. The company has nearly 4,000 Tornado Global Hydrovacs vac units in rotation, along with a plethora of support equipment and Cusco DOT-code sewer jetters.

ALL ABOUT THE DOLLARS

The main consideration for any contractor between rental and purchase is obviously cash flow, but Rich makes clear that it’s not a this-or-that decision.

“If a company doesn’t have the capital expenditure money to spend right now, but they need units because they landed a big job, we’ll put the unit on a rental purchase option,” Rich says. “At the end of that period, we apply a per-

“YOU CAN BUY AT ANY POINT: IF YOU DECIDE AFTER THE SECOND MONTH THAT YOU WANT TO BUY IT, YOU CAN BUY IT — THERE’S NO PENALTY.”

Smiley Rich

centage of their rental expenditures toward the purchase, so they didn’t just throw away that rental money.”

Custom Truck One Source, like most distributors, will work with customers on a variety of rental periods.

“It depends on the company as to how they structure, whether they want to rent or lease, or just purchase outright,” Rich says. “They can customize the agreement as much as they want; they can structure it pretty much any way they want; they can do rent to rent or rent to purchase.”

CONSIDER MAINTENANCE

One of the biggest differences between renting, rental purchase and straight purchase is maintenance. Most distributors will remain in charge of maintenance during a rental agreement, but not so for rental purchase or straight purchase.

That might seem like a clear-cut benefit: Why take on the responsibility of maintenance if you don’t have to? But there again, it’s a matter of preference. There are inherent speed bumps when you’re not in charge of maintaining your own equipment. It may limit your ability to control when and how maintenance is done or even whom it is done by.

On the other hand, it can be a serious benefit for small operations that might not have their own mechanics or infrastructure to make repairs anyway.

“One of the chief concerns about having your own vacuum truck is if you’ll be able to properly maintain it,” says an article on Haaker Equipment’s website. Haaker Equipment also offers a wide range of rental options in addition to selling. “Owning the truck also means being saddled with the responsibility to repair anything that breaks and looking for a temporary replacement truck when necessary. This can prove to be a highly tedious task, especially if you do not have the staff to deal with it.”

GET WHAT YOU NEED

Another consideration is customization. For many vacuum excavation contractors, customization is the key to a profitable rig. Renting a unit limits your options. But if you make a commitment upfront to purchase the unit, most distributors will work with you and build to spec.

Be wary, though — these are binding legal commitments that have serious financial consequences when shirked.

“If it’s a signed RPO (rental purchase option) agreement and there’s a minimum term, there is no getting out of it,” Rich says. “In many cases, there are minimum terms.

Here’s how that works: Let’s say you come in and sign an

RPO agreement clearly stating that you’re responsible for repairs and maintenance. So we say, ‘You have to give us a 12-month guarantee,’ which means if you don’t buy the truck, you have to keep it for 12 months.

“You can buy at any point: If you decide after the second month that you want to buy it, you can buy it — there’s no penalty. If you don’t buy it, then you still have to keep it 12 months. It keeps people from saying, ‘Hey Smiley, I want this vac unit in the rental fleet,’ so I drop in a half-a-million-dollar unit, and then they return it after two weeks. That’s not a good business plan.”

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Smiley Rich

A MATTER OF PREFERENCE

In the end, whether to rent or buy often comes down to personal preference.

"Some people just want to rent, and in some cases, they rent it until it's totally paid out and off they go," Rich says. "Small companies starting out typically just want to rent. They have a job that may last three or four months, so they rent. At the end of the four months, if the job is over and they don't have a next job for it, they return the unit. If they have a next job, they may decide at that point they want to put it on RPO. If they want to put it on RPO after they've had it three months, that's fine."

Rich says typical rental agreements run anywhere from three to 36 months, but they will even go out to 40 months or more in some cases. The last consideration to make is how flexible your distributor will be. See what changes they will allow down the road, and always make sure you know exactly what you're getting into before signing on the dotted line.

"It's simply a choice by the customer as to how they want to do things," Rich says. "Some people don't want to own things; some people don't want to pay rent. But it's always an option. We just try to structure the agreement based around the customer's needs." ▼



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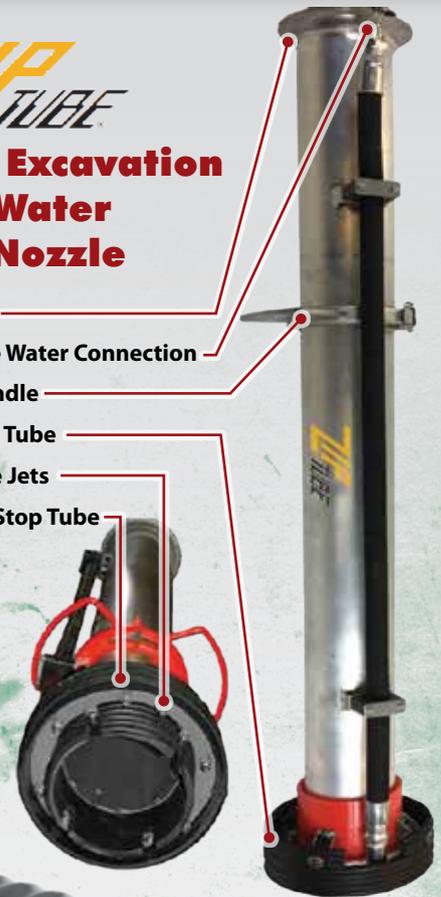
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MANUFACTURERS DIRECTORY

		MODEL NAME	TYPE	Style	Debris Body Capacity (cu. yards)	Debris Door (dimensions)	Debris Door (dump angle)	Water Tank Capacity (gallons)	Standard Water Pump (gpm & psi)
 Ditch Witch 1959 W. Fir Ave. Perry, OK 73077 tf: 800-654-6481 f: 580-336-3458 www.ditchwitch.com info@ditchwitch.com <i>See ad page 7</i>	FXT30 Air	Air	Chassis	2.5 or 4		45 degrees	200 or 400 gal	4.2 gpm, 3,000 psi	
	FXT50 Air	Air	Chassis	2.5 or 4		45 degrees	200 or 400 gal	4.2 gpm, 3,000 psi	
	FXT65 Air	Air	Chassis	2.5 or 4		45 degrees	200 or 400 gal	4.2 gpm, 3,000 psi	
	FX20	Hydro	Trailer	0.75		45 degrees	80 gal	2.6 gpm, 3,000 psi	
	FX25	Hydro	Trailer	2.5		45 degrees	80 or 200 gal	4.0 gpm, 3,000 psi	
	FX30	Hydro	Trailer	2.5 or 4		45 degrees	80, 200 gal, or 300 gal	4.2 gpm, 3,000 psi	
	FX50	Hydro	Trailer	2.5, 4, or 6		45 degrees	200, 300, or 500 gal	5.1 gpm, 3,000 psi	
	FX65	Hydro	Trailer	2.5, 4, or 6		45 degrees	200, 300, or 500 gal	5.5 gpm, 3,000 psi	
	MV800	Hydro	Trailer	4		45 degrees	100 gal	4.0 gpm, 3,000 psi	
	FXT30	Hydro	Truck	2.5 or 4		45 degrees	200 gal or 400 gal	4.2 gpm, 3,000 psi	
	FXT50	Hydro	Truck	2.5 or 4		45 degrees	200 gal or 400 gal	5.1 gpm, 3,000 psi	
	FXT65	Hydro	Truck	2.5 or 4		45 degrees	200 or 400 gal	5.6 gpm, 3,000 psi	
	HX30	Hydro	Trailer	2.5 or 4	48 "	45 degrees	200 or 400 gal	4.2 gpm, 3,000 psi	
	HX50	Hydro	Trailer	4	48 "	45 degrees	200 or 400 gal	5.3 gpm, 3,000 psi	
HX75	Hydro	Trailer	4	48"	45 degrees	200 or 400 gal	5.5 gpm, 3,000 psi		
<i>See ad page 31</i> Fast-Vac 21209 Durand Ave. Union Grove, WI 53182 tf: 800-558-2280 p: 262-878-0756 f: 262-878-4019 www.Fast-Vac.com sales@Fast-Vac.com	Fast Vac	Hydro	Chassis & Trailer	20+ Gross		50 degree	1500	Variable flow 3,000 psi	
 Foremost 1225 64th Ave. NE Calgary, AB T2E 8P9 tf: 855-742-9990 p: 780-485-1567 f: 403-295-5810 www.foremost.ca sales@foremost.ca <i>See ad page 6</i>	Foremost FVS 1200	Hydro	Chassis	10.5	48" x 44" 6" and 4" heated decant valves		1200	25 gpm 3,000 psi	
	Foremost FNS 1600	Hydro	Chassis	13	48" x 58" 8" and 6" heated decant valves		1600	25 gpm 3,000 psi	
	Foremost FVS 2000	Hydro	Chassis	13	48" x 58" 8" and 6" heated decant valves		1600	25 gpm 3,000 psi	

Standard Blower (hg & cfm)	Filtration Type	Boom Size (ft.)	Degree of Rotation	Offloading Type	Controls Location	Wireless Y/N	Vacuum (cfm/psi)	Power Source	Compressed Air Flow	Compressed Air Pressure	Accessories Available	Other
500 cfm	washable polyester	14 feet	270	full open rear door and tank lift	Curbside	Yes			300 cfm or 200 cfm	250 psi/100 psi or 200 psi/100 psi		
1,020 cfm	washable polyester	14 feet	270	full open rear door and tank lift	Curbside	Yes			301 cfm or 200 cfm	251 psi/100 psi or 200 psi/100 psi		
1,215 cfm	washable polyester	14 feet	270	full open rear door and tank lift	Curbside	Yes			302 cfm or 200 cfm	252 psi/100 psi or 200 psi/100 psi		
543 cfm	washable polyester	N/A		tank mounted at angle for gravity dump	Curbside	No						
543 cfm	washable polyester	14 feet	270	full open rear door and tank lift	Curbside	Yes						
500 cfm	washable polyester	14 feet	270	full open rear door and tank lift	Curbside	Yes						
1,027 cfm	washable polyester	14 feet	270	full open rear door and tank lift	Curbside	Yes						
1,215 cfm	washable polyester	14 feet	270	full open rear door and tank lift	Curbside	Yes						
543 cfm	washable polyester	N/A		full open rear door and tank lift	Curbside	Yes						
500 cfm	washable polyester	14 feet	270	full open rear door and tank lift	Curbside	Yes						
1,020 cfm	washable polyester	14 feet	270	full open rear door and tank lift	Curbside	Yes						
1,215 cfm	washable polyester	14 feet	270	full open rear door and tank lift	Curbside	Yes						
15" hg 512 cfm	washable polyester	12.5 feet	330	full open rear door and tank lift	Curbside	Yes		Kubota D1105			Lighting Tool Boxes	Water Heaters
16" hg 1,005 cfm	washable polyester	12.5 feet	330	full open rear door and tank lift	Curbside	Yes		Kubota D1803			Lighting Tool Boxes	Water Heater
16" hg 1,315 cfm	washable polyester	12.5 feet	330	full open rear door and tank lift	Curbside	Yes		Kubota V3307			Lighting Tool Boxes	
28" hg 6,600 cfm	80 dry and 8 wet bags	15+ ft.	330	gravity with optional auger	In cab and outside enclosure and 40 ft. pendant	Yes					winterization lighting tool boxes racks cabinets	
28" hg @3,800 cfm 28" hg @6,400 cfm	Cyclone and Cartridge	8" x 26 ft.	340	Sloped debris floor and centrifugal pump tank flush	Passenger side	Yes					tool boxes racks cabinets	
28" hg @3,800 cfm 28" hg @6,400 cfm	Cyclone and Cartridge	8" x 26 ft.	340	Sloped debris floor and centrifugal pump tank flush	Passenger side	Yes					tool boxes racks cabinets	
28" hg @3,800 cfm 28" hg @6,400 cfm	Cyclone and Cartridge	8" x 26 ft.	340	Sloped debris floor and centrifugal pump tank flush	Passenger side	Yes					tool boxes racks cabinets	

(continued)

Vacuum Excavation 2019

MANUFACTURERS DIRECTORY

		MODEL NAME	TYPE	Style	Debris Body Capacity (cu. yards)	Debris Door (dimensions)	Debris Door (dump angle)	Water Tank Capacity (gallons)	Standard Water Pump (gpm & psi)
 <p>GapVax Inc. 575 Central Ave. Johnstown, PA 15902 tf: 888-442-7829 p: 814-535-6766 f: 814-539-3617 www.gapvax.com Inquiry@gapvax.com</p> <p>See ad page 51</p>	HV33 HydroVax	Hydro	Chassis	6	Fully Opening	90 degree	600	12 gpm 3,000 psi	
	HV55 HydroVax	Hydro	Chassis	12 1/2	Fully Opening	90 degree	400-1,400	5-40 gpm 2,000-5,800 psi	
	HV56 HydroVax	Hydro	Chassis	15	Fully Opening	90 degree	400-1,200	5-40 gpm 2,000-5,800 psi	
 <p>Kaiser Premier 2550 East Bijou Ave. Fort Morgan, CO 80701 p: 970-542-1975 http://www.kaiserpremier.com sales@kaiserpremier.com</p> <p>See ad page 29</p>	CV Series	Hydro	Chassis	13	36" x 48"	22 degree floor	1,850 - 2,250	20 gpm 3,000 psi	
 <p>McLaughlin Group 2006 Perimeter Rd. Greenville, SC 29605 tf: 800-435-9340 p: 864-277-5870 www.mclaughlinunderground.com info@mightymole.com</p> <p>See ad page 23</p>	VX30	Hydro	Trailer	1.5, 2.5, 4 or 6	48" diameter	45 degrees	250 or 410	4 gpm 3,000 psi	
	VX50	Hydro	Trailer	2.5, 4 or 6	48" diameter	45 degrees	125 or 205	5.6 gpm 3,000 psi	
	VX75	Hydro & Air	Trailer	2.5, 4 or 6	48" diameter	45 degrees	125 or 205	8 gpm 3,000 psi	
	ECO30	Hydro	Chassis	1.5, 2.5, 4 or 6	48" diameter	45 degrees	125 or 205	4 gpm 3,000 psi	
	ECO50	Hydro	Chassis	2.5, 4 or 6	48" diameter	45 degrees	125 or 205	5.6 gpm 3,000 psi	
	ECO75	Hydro & Air	Chassis	2.5, 4 or 6	48" diameter	45 degrees	125 or 205	8 gpm 3,000 psi	
	ECO75 MEGA Vac	Hydro & Air	Chassis	4, 6, 8, 10, 11, 13 or 15	48" diameter	45 degrees	410 or 935	8 gpm 3,000 psi	
	Vermeer MEGA Vac VXT8	Hydro & Air	Chassis	8	66" diameter	60 degrees	600	10 gpm 3,000 psi	
 <p>OX Equipment Inc. 11-B 680 Tradewind Dr. Ancaster, ON L9G 4V5 tf: 888-209-0783 f: 905 296 6348 www.ox-equipment.com info@ox-equipment.com</p> <p>See ad page 11</p>	MTS Dino 12	Air	Chassis	15	Side Tipping	138 degrees	Optional	Optional	
	MTS Dino 8	Air	Chassis	10.5	Side Tipping	138 degrees	Optional	Optional	
	MTS Dino 4.5	Air	Chassis	6	Side Tipping	138 degrees	Optional	Optional	
	MTS Dino 4.5 High Rail	Air	Chassis with High Rail Kit	6	Side Tipping	138 degrees	Optional	Optional	
	MTS City Dino	Air	Chassis	4.5	Rear Tipping to Bag Bins	138 degrees	Optional	Optional	

Standard Blower (hg & cfm)	Filtration Type	Boom Size (ft.)	Degree of Rotation	Offloading Type	Controls Location	Wireless Y/N	Vacuum (cfm/psi)	Power Source	Compressed Air Flow	Compressed Air Pressure	Accessories Available	Other
27" hg 4,000 cfm	wet/dry single mode	14-18 ft. reach 18 ft. 10" up 4 ft. 6" down	270	Decant and fully opening tailgate. Auger and sludge pump options available	Curbside	Yes					winterization lighting tool boxes racks cabinets	On-board scales with digital readout stops loading when set target is reached (optional); 26 Filter bags; inverted tailgate to reduce length; 200 cfm air pump; 4,500 cfm, 18" hg blower
28" hg 5,250 cfm	wet/dry single mode	17-25 ft. reach from center of truck	270	Decant and fully opening tailgate. Auger and sludge pump options available	Driver's side curbside controls vary depending on options	Yes					winterization lighting tool boxes racks cabinets	34 Filter bags, 5 cyclones for superior filtration; safe working area on top of truck; various options available
28" hg 5,250 cfm	wet/dry single mode	17-25 ft. reach from center of truck	270	Decant and fully opening tailgate. Auger and sludge pump options available	Driver's side curbside controls vary depending on options	Yes					winterization lighting tool boxes racks cabinets	200 cfm air pump, 6,600 cfm, 28" blower optional
28" hg 6,600 cfm	3 stage	8" x 26 ft.	340	Fixed, end dump, mechanical assist	Rear, curb side	Yes					winterization lighting tool boxes cabinets	Air Compressor, Extreme weather package, 700K BTU boiler, trash pump, towing package, steam package, dual digging package, rear steps, custom dump door porting, extended van bodies
15" hg 575 cfm	3-Stage Cyclonic	N/A	N/A	Reverse flow standard. Full open rear door and tank lift.	Curbside	N/A	15" hg 575 cfm	Kubota Die- sel Engine	N/A	N/A	Strong Arm, Hot Box, Winterization	
15" hg 1,025 cfm		4" x 14 ft	270		Curbside	Yes	15" hg 1,025 cfm	Kubota Die- sel Engine	N/A	N/A	Hydraulic Boom, Strong Arm, Hot Box, Winterization	
15" hg 1,200 cfm		5" x 14 ft	270		Curbside	Yes	15" hg 1,200 cfm	Duetz Diesel Engine	Optional 185 CFM	100 psi	Hydraulic Boom, Strong Arm, Hot Box, Winterization	Optional Sewer Jetter - 12 gpm @ 3,000 psi
15" hg 575 cfm		N/A	N/A		Curbside	N/A	15" hg 575 cfm	Kubota Die- sel Engine	N/A	N/A	Strong Arm, Hot Box, Winterization	
15" hg 1,025 cfm		4" x 14 ft	270		Curbside	Yes	15" hg 1,025 cfm	Kubota Die- sel Engine	N/A	N/A	Hydraulic Boom, Strong Arm, Hot Box, Winterization	
15" hg 1,200 cfm		5" x 14 ft	270		Curbside	Yes	15" hg 1,200 cfm	Duetz Diesel Engine	Optional 185 CFM	100 psi		Optional Sewer Jetter - 12 gpm @ 3,000 psi
15" hg 1200 cfm or 23" hg 1,200 cfm		5" x 14 ft	270		Curbside	Yes	15" hg 1,200 cfm or 23" hg 1,200 cfm	Duetz Diesel Engine	Optional 185 CFM	100 psi		Optional Sewer Jetter - 12 gpm @ 3,000 psi
18" hg 3,500 cfm			6" x 19 ft		270	Full open rear door and tank lift	Wireless CAN Controls	Yes	18" hg 3500 cfm	Chassis Driven PTO	Optional 185 CFM	100 psi
Twin Fan @ 24,000 CFM	Automatic Self-Clean- ing System Polyester	10" x 21 ft. Power Arm	180	Side Tipping	Driver's Side	Yes	24,000	PTO/OMSI Transfer Case	320 CFM	116 psi	lighting tool boxes	Hydrostatic ground drive system, ladders, storage, air spade, pneumatic power shovel, jackhammer, boom vibrator system, emergency tool kit
Twin Fan @ 24,000 CFM		10" x 21 ft. Power Arm	180	Side Tipping	Driver's Side	Yes	24,000	PTO/OMSI Transfer Case	320 CFM	116 psi	lighting tool boxes	
Twin Fan @ 24,000 CFM		10" x 21 ft. Power Arm	180	Side Tipping	Driver's Side	Yes	24,000	PTO/OMSI Transfer Case	320 CFM	116 psi	lighting tool boxes	
Twin Fan @ 24,000 CFM		10" x 21 ft. Power Arm	180	Side Tipping	Driver's Side	Yes	24,000	PTO/OMSI Transfer Case	320 CFM	116 psi	lighting tool boxes	
Twin Fan @ 16,000 CFM		8" x 16 ft. Power Arm	180	Rear Tipping into Bags	Driver's Side	Yes	24,000	PTO/OMSI Transfer Case	320 CFM	116 psi	lighting tool boxes	

(continued)

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MANUFACTURERS DIRECTORY

		MODEL NAME	TYPE	Style	Debris Body Capacity (cu. yards)	Debris Door (dimensions)	Debris Door (dump angle)	Water Tank Capacity (gallons)	Standard Water Pump (gpm & psi)
 Presvac Systems 4131 Morris Drive Burlington, ON L7L 5L5 tf: 800-387-7763 p: 905-637-2353 f: 905-681-0411 www.presvac.com sales@presvac.com	Presvac HydroX Mini	Hydro	Chassis	7	Full Diameter Full Opening		800	18 gpm 3,500 psi Adjustable Flow and Pressure	
	Presvac HydroX	Hydro	Chassis	15	78" Full Opening	90 degree	1,000	18 gpm 3,500 psi Adjustable Flow and Pressure	
 Rival Hydrovac Inc. Box 5 Major, SK S0L 2H0 tf: 844-467-4825 p: 403-550-7997 www.rivalhydrovac.com tdell@rivalhydrovac.com See ad page 2	Rival T7	Hydro	Chassis	8	54" Full Opening Rear Door Two Stage Hoist	70 degree	800	10 gpm 3,000 psi	
	Rival T10	Hydro	Chassis	10	54" Full Opening Rear Door Two Stage Hoist	70 degree	1,200	10 gpm 3,000 psi	
 Super Products LLC 17000 W. Cleveland Ave. New Berlin, WI 53151 tf: 800-837-9711 p: 262-784-7100 f: 262-784-9561 www.superproductsllc.com info@superproductsllc.com	Mud Dog 1600	Hydro & Air	Chassis	16	full diameter full opening		2,000	18 gpm 3,000 psi	
	Mud Dog 1200	Hydro & Air	Chassis	12	full diameter full opening		1,500	18 gpm 3,000 psi	
 Tellus Underground Technology 200 Hester St., PO Box 157 Portland, PA 18351 tf: 866-579-9911 p: 570-234-0325 f: 570-245-0026 www.tellusunderground.com frusso@tellusunderground.com See ad page 25	TUT-5500	Air	Chassis	1.5	25" Diameter	55 degree	70	3.5 gpm 1,500 psi	
	TUT-6500	Air	Chassis	2	25" Diameter	55 degree	70	3.5 gpm 1,500 psi	
	TUT-2001	Air	Trailer	1			70	3.5 gpm 1,500 psi	
 Tornado Global Hydrovacs Ltd. 7015 Macleod Trail S, Ste. 510 Calgary, AB T2H 2K6 tf: 877-340-8141 p: 403-742-6121 www.tornadotrucks.com media@tghl.ca See ad page 9	F3 ECO-LITE	Hydro	Chassis	10	48" x 52" Hydraulic Door With Hydraulic Latch		1,250	20 gpm 4,060 psi	
	F4 ECO-LITE	Hydro	Chassis	12			1400	20 gpm 4,060 psi	
	F5 ECO-LITE	Hydro	Chassis	12			2000	20 gpm 4,060 psi	
	T-70 Twister	Hydro	Trailer	5.6			720	5.6 gpm 3,500 psi	

Standard Blower (hg & cfm)	Filtration Type	Boom Size (ft.)	Degree of Rotation	Offloading Type	Controls Location	Wireless Y/N	Vacuum (cfm/psi)	Power Source	Compressed Air Flow	Compressed Air Pressure	Accessories Available	Other
28" hg 2,650 cfm	Cyclone and Inlet Filter	6" x 20 ft.	340	45 Degree Dump and optional pressure off-load	passenger	Yes					winterization lighting tool boxes racks cabinets	Can be built to DOT/TC Code
28" hg 4,000-6,400 cfm	Two large Cyclones and Inlet Filter	8" x 25 ft.	340	45 Degree Dump and optional pressure off-load	passenger	Yes					winterization lighting tool boxes racks cabinets	Can be built to DOT/TC Code
27" hg 2,650 cfm	cyclone and cartridge	6" x 20 ft.	342	Tilt and Pressure off	curbside	Yes	2650 CFM	PTO/ Hydraulics			winterization lighting tool boxes racks cabinets	All Accessories are Included. Weights displayed on Wireless Remote.
27" hg 4,000 cfm	cyclone and cartridge	8" x 25 ft.	342	Tilt and Pressure off	curbside	Yes	4000 CFM	PTO/ Hydraulics			winterization lighting tool boxes racks cabinets	All Accessories are Included. Weights displayed on Wireless Remote.
28" hg 6,000 cfm	Single Final Filter	8" x 27 ft.	335	Ejector and Dump	passenger side Inside heater cabinet	Yes	6000 CFM	Truck engine			winterization lighting	Air excavation option
28" hg 6,000 cfm	Single Final Filter	8" x 27 ft.	335	Ejector and Dump	passenger side Inside heater cabinet	Yes	6000 CFM	Truck engine			winterization lighting	Air excavation option
15" hg 1,100 cfm	Self Cleaning 1.0 Micron	4"	270		Rear of Truck	No	1,100 cfm @ 7.5 psi	Diesel Engine	185 CFM	150 PSI	winterization lighting tool boxes racks cabinets	Operates both dry and wet, 200 psi compressed air available
15" hg 1,100 cfm	Self Cleaning 1.0 Micron	4"	270		Rear of Truck	No	1,100 cfm @ 7.5 psi	Diesel Engine	185 CFM	150 PSI	winterization lighting tool boxes racks cabinets	Operates both dry and wet, 200 psi compressed air available
15" hg 1,100 cfm	Self Cleaning 1.0 Micron	4"			Rear of Truck	No	1,100 cfm @ 7.5 psi	Diesel Engine	185 CFM	150 PSI	winterization lighting tool boxes racks cabinets	Operates both dry and wet, 200 psi compressed air available
27" hg 3,800 cfm	Three Stage System	8" Topgun 26 ft.	342	Tornado Concave and Sloped Floor Design	Multifunction Wireless Remote With Auxiliary Levers	Yes					winterization lighting tool boxes racks cabinets	Water Heater: 690,000 BTU. 12 Volt with full diagnostics
27" hg 3,800-6,400 cfm	Three Stage System	8" Topgun 26 ft.	342	Tornado Concave and Sloped Floor Design		Yes						Water Heater: 690,000 BTU. 12 Volt with full diagnostics
27" hg 3,800-6,400 cfm	Three Stage System	8" Topgun 26 ft.	342	Tornado Concave and Sloped Floor Design		Yes						Water Heater: 690,000 BTU. 12 Volt with full diagnostics
15" hg 1,200 cfm	Three Stage System	5" with 14 ft. reach over	342	Tornado Concave and Sloped Floor Design	Multifunction Wireless Remote w/Passenger Side Controls	Yes						Water Heater: 300,000 BTU. 12 Volt with full diagnostics. Glycol with recirculation port.

(continued)

Vacuum Excavation 2019

MANUFACTURERS DIRECTORY

		MODEL NAME	TYPE	Style	Debris Body Capacity (cu. yards)	Debris Door (dimensions)	Debris Door (dump angle)	Water Tank Capacity (gallons)	Standard Water Pump (gpm & psi)
 TRUVAC by Vector Manufacturing, Inc. 1621 S. Illinois St. Streator, IL 61364 p: 815-672-3171 ff: 800-627-3171 www.truvac.com sales@truvac.com See ad page 5	Paradigm	Air	Chassis	3.342		50 Degree	300 Air only = 100 gallons	8 gpm 2,500 psi Air only = 4 gpm @ 2,500 psi	
	Prodigy	Hydro	Chassis	9		50 Degree	600	10 gpm 2,500 psii	
	HXX Hydro Excavator	Hydro	Chassis	12		50 Degree	1,200	10 gpm 3,000 psi	
	HXX Mid-Size	Hydro	Chassis	12		50 degree	1,200	10 gpm 3,000 psi	
 Vac-Con 969 Hall Park Rd. Green Cove Springs, FL 32043 p: 904-284-4200 www.vac-con.com vns@vac-con.com See ad back cover	X-Cavator	Hydro	Chassis	3, 5, 9, 11, 12, 14, 16		60 degree	1,300	10 gpm @ 4,000 psi optional 20 gpm @ 4,000 psi	
	XX-Cavator	Hydro	Chassis	16	Flat Industrial Style, Hydraulically Opening		1,300	20 gpm @ 4,000 psi	
	Mudslinger	Hydro	Trailer	4	Full Opening Hydraulic door	55 degree	325	4 gpm @ 4000 psi	
 Vac-Tron Equipment LLC 27137 S Hwy 33 Okahumpka, FL 34762 ff: 888-822-8766 p: 352-728-2222 www.vactron.com sales@vactron.com See ad page 23	Vac-Tron CV 573/873/1273 GT	Hydro	Trailer	2.5, 4 or 6	48" diameter	60 degree	100, 200 or 300	4 gpm 3,000 psi	
	Vac-Tron CV 573/873/1273 SGT	Hydro	Trailer	2.5, 4 or 6	48" diameter	60 degree	200 or 300	4 gpm 3,000 psi	
	Vac-Tron LP 573/873/1273 SGT	Hydro	Trailer	2.5, 4 or 6	48" diameter	60 degree	200 or 300	4 gpm 3,000 psi	
	Vac-Tron LP 573/873/1273 XDT	Hydro	Trailer	2.5, 4 or 6	48" diameter	60 degree	200 or 300	4 gpm 3,000 psi	
	Vac-Tron LP 573/873/1273 SDT	Hydro	Trailer	2.5, 4 or 6	48" diameter	60 degree	200 or 300	4 gpm 3,000 psi	
	Vac-Tron AIR 573/873/1273 SDT	Hydro & Air	Trailer	2.5, 4 or 6	48" diameter	60 degree	200 or 300	4 gpm 3,000 psi	
	Vac-Tron MC 573/873/1273 SDT	Hydro	Trailer	2.5, 4 or 6	48" diameter	60 degree	200 or 300	15 gpm 2,200 psi	
	Vac-Tron HTV PTO 573	Hydro	Chassis	2.5	48" diameter	60 degree	300 or 400	4 gpm 3,000 psi	
	Vac-Tron HTV PTO 873	Hydro	Chassis	4	48" diameter	60 degree	300 or 400	4 gpm 3,000 psi	
	Vac-Tron JTV PTO 873	Hydro	Chassis	4	48" diameter	60 degree	300 or 400	15 gpm 3,000 psi	

Standard Blower (hg & cfm)	Filtration Type	Boom Size (ft.)	Degree of Rotation	Offloading Type	Controls Location	Wireless Y/N	Vacuum (cfm/psi)	Power Source	Compressed Air Flow	Compressed Air Pressure	Accessories Available	Other
15" 2,200 cfm	Dual Cyclone and 5 micron polyester final filter	6" diameter 5 ft. extension	225	dumping, tilting debris body	right side	Yes					winterization lighting tool boxes racks cabinets	
16" hg 3,200 cfm	Cyclone and polyester final filter	6" diameter	320	dumping, tilting debris body	right side	Yes						
28" hg 5,250 cfm or 6,176 cfm	Dual Cyclone and polyester final filter	8" Diameter 7 ft. extension	320	dumping, tilting debris body	right side	Yes						
PD= 18" hg 4,970 cfm	PD=Cyclone and final filter/fan=cyclone	8" Diameter 7 ft. extension	320	dumping, tilting debris body	right side	Yes						
3 stage fan or PD blower	hurricane separator	6 ft. or 10 ft. front or rear mount telescopic boom w/optional PowerFlex	270	Hydraulic opening rear door with 60 degree dump angle Optional hi-dump	curb side operator's station	Yes	18" Hg 3600 cfm	Chassis Engine Hydrostatically Driven	185	150	winterization lighting tool boxes racks cabinets	
Twin Roots 721 DVJ Blowers	Filter Element	8" x 10 ft.	270 to 310	Debris body tilt 50 degree dump angle	curb side operator's station	Yes	28" Hg 7000 cfm	Chassis Engine	185	150	winterization lighting tool boxes racks cabinets	
PD Blower 16" Hg/ 1,200 cfm	Dry filter package	9 ft. with 24" of Hydraulic extension to 11 ft.	270	Water and air tight quick dump	Passenger side fender	No	16" Hg 1200 cfm	66.8 h.p. Kubota diesel engine with shutdowns			winterization lighting tool boxes racks	
14" hg 580 cfm	pleated poly fabric washable & reusable	optional 6 way hydraulic boom	270	Reverse pressure to offload	Curbside		14" hg 580 cfm	Kohler Gas			winterization, lighting, tool boxes, racks, cabinets	
15" hg 1,000 cfm					Curbside		15" hg 1,000 cfm	Kohler Gas				
15" hg 1,000 cfm					Curbside	Yes	15" hg 1,000 cfm	Kohler Gas				
15" hg 580 cfm					Curbside	Yes	15" hg 580 cfm	Kohler Diesel				
15" hg 1,000 cfm					Curbside	Yes	15" hg 1,000 cfm	Yanmar Diesel				
15" hg 1,000 cfm					Curbside	Yes	15" hg 1,000 cfm	Kohler Diesel	185 CFM	150 psi		
15" hg 1,000 cfm					Curbside	Yes	15" hg 1,000 cfm	Kohler Diesel				
16" hg 1,000 cfm					End Cap	Yes	16" hg 1,000 cfm					
16" hg 1,000 cfm					End Cap	Yes	16" hg 1,000 cfm					
16" hg 1,000 cfm					End Cap	Yes	16" hg 1,000 cfm					

(continued)

Vacuum Excavation 2019

MANUFACTURERS DIRECTORY

		MODEL NAME	TYPE	Style	Debris Body Capacity (cu. yards)	Debris Door (dimensions)	Debris Door (dump angle)	Water Tank Capacity (gallons)	Standard Water Pump (gpm & psi)
 <p>VACMASTERS 5879 W 58th Ave. Arvada, CO 80002 tf: 800-466-7825 p: 303-467-3801 f: 303-420-3971 www.vacmasters.com cbell@vacmasters.com</p>	Vacmasters SpoilVac	Hydro	Chassis & Trailer	1, 2.5, 4, 5, 6	19" Posi-Seal	45 degrees	200 Additional Water Available	4 gpm 3,000 psi	
	Vacmasters System 1000	Hydro & Air	Chassis & Trailer	1.5 or 2.5	19" Posi-Seal	45 degrees	85 Additional Water Available	4 gpm 3,000 psi	
	Vacmasters System 3000	Hydro & Air	Chassis	1.5	19" Posi-Seal	45 degrees	110 Additional Water Available	4 gpm 3,000 psi	
	Vacmasters System 4000	Hydro & Air	Chassis	2.25	19" Posi-Seal	55 degrees	85 Additional Water Available	4 gpm 3,000 psi	
	Vacmasters System 5000	Hydro & Air	Chassis	2.75 or 3.5	48" Full Opening Hydraulic	45 degrees	85 Additional Water Available	4 gpm 3,000 psi	
	Vacmasters System 6000	Hydro & Air	Chassis	4.75	60" Full Opening Hydraulic	30 degrees	85 Additional Water Available	4 gpm 3,000 psi	
 <p>Vector Technologies Ltd 8301 W Parkland Ct. Milwaukee, WI 53223 tf: 800-832-4010 p: 414-247-7100 f: 414-354-4314 www.vector-vacuums.com inquiry@vector-vacuums.com</p> <p>See ad page 45</p>	Mudslinger MS800	Hydro	Trailer	4	Full Opening Hydraulic Door	55 degree Hydraulic Dump	325	4 gpm 4,000 psi	



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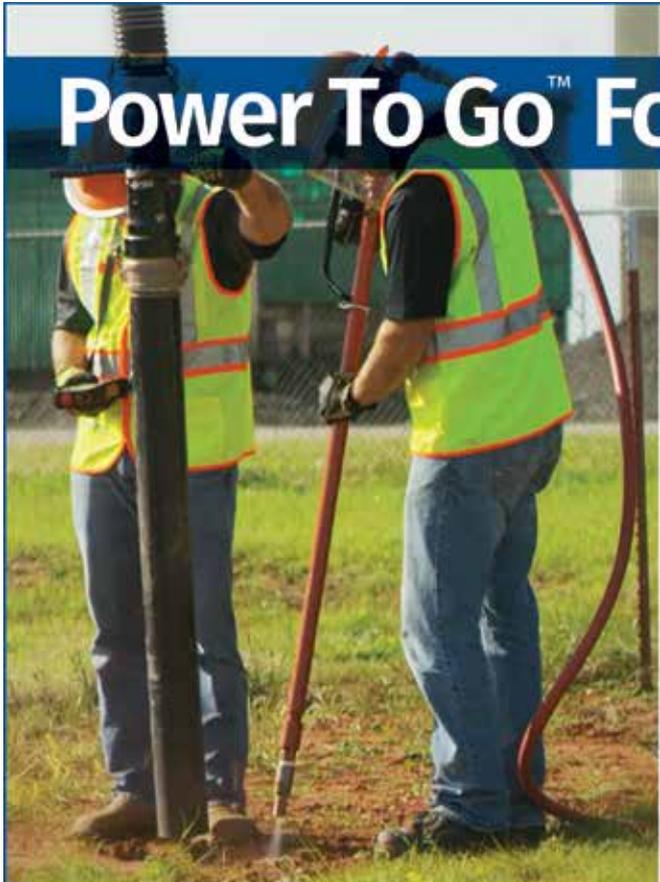
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Standard Blower (hg & cfm)	Filtration Type	Boom Size (ft.)	Degree of Rotation	Offloading Type	Controls Location	Wireless Y/N	Vacuum (cfm/psi)	Power Source	Compressed Air Flow	Compressed Air Pressure	Accessories Available	Other
15" hg 780 cfm	Cyclonic/ Cartridge	Hose Assist Arm	360	Hydraulic Dump	curb side	No	780 cfm	49 hp Kubota T-4 Final	N/A	N/A	winterization lighting tool boxes racks	
15" hg 780 cfm	Cyclonic/ Cartridge	Hose Assist Arm	360	Hydraulic Dump	curb side	No	780 cfm	74 hp John Deere	100 cfm	150 psi		
15" hg 1,000 cfm	Automatic Purge/ Cyclonic/ Cartridge			Hydraulic Dump	curb side	No	1,000 cfm	99 hp John Deere	165 cfm	185 psi		
15" hg 1,000 cfm		Hose Assist Arm	180	Hydraulic Dump	curb side	No	1,000 cfm	155 hp John Deere	300 cfm	220 psi		
15" hg 1,400 cfm		Hose Assist Arm	180	Hydraulic Dump	curb side	Yes	1,400 cfm	173 hp John Deere	300 cfm	220 psi		
15" hg 1,866 cfm		5" Hose Extends 22 ft.	270	Hydraulic Dump	curb side	Yes	1,866 cfm	250 hp John Deere	350 cfm	250 psi		
16 hg 1,200 cfm	Dry Filter Package	9 ft. with 24" of hydraulic extension to 11 ft.	270	water and air tight quick dump	passenger side fender	No					winterization lighting tool boxes racks	

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 [Youtube.com/VanairManufacturing](https://www.youtube.com/VanairManufacturing)

BY CRAIG MANDLI

Air Excavation

Ramvac by Sewer Equipment AX-4000

The AX-4000 air excavator from Ramvac by Sewer Equipment offers a simple, single-engine design with 12-volt electrical controls and manual hand valves for ease of use while also providing operators the ability to excavate with both air and water effectively using only one truck. This series offers payload capacities from 5,000 to 12,000 pounds while the hydraulic rear door allows operators to dump spoils quickly and easily. It allows you to customize your blower to achieve the results you need in any applications, with capacities of 18 or 27 inches Hg, 1,400 or 3,000 cfm and hose diameter of 4 or 6 inches. All water systems are contained within a single heated enclosure for cold-weather applications while also offering a large amount of standard tool storage.

888-477-7638; www.ram-vac.com



Vanair PTO shaft driven air excavation kit

The Vanair PTO shaft driven air excavation kit is housed under the chassis. It doesn't use a hitch, reduces weight and is easy to navigate. It saves space, solving the problem of reduced bed space because of spoil tanks and water tanks. Durable and compact, units are available in a standard PTO shaft-driven air excavation kit (200 cfm at 200 psi and 300 cfm at 250 psi) or as engine-driven cross mount air compressors (185 to 260 cfm and up to 150 psi).

800-526-8817; www.vanair.com



Blowers

Gardner Denver Robuschi Tri-Flow 825

The Gardner Denver Robuschi Tri-Flow 825 blower for combination sewer jetter trucks achieves 19 inches Hg vacuum and delivers 4,311 cfm at 18 inches Hg while weighing less than 1,500 pounds, making it suitable for jetting and excavation work. When paired with the company's product-tuned silencer, this unit is quiet and consumes 70% less space than a traditional silencer. For greater work site efficiency, it provides 6% higher flow and 7.2% more fuel efficiency at 18 inches Hg.

866-428-4890; www.gardnerdenver.com/robuschi



National Vacuum Equipment Challenger 1600

The Challenger 1600 high-vacuum blower from National Vacuum Equipment is a 1,600 cfm tri-lobe blower designed for continuous duty at maximum vacuum. It is available in ready-to-install hydraulic or belt-drive packages using corrosion-resistant stainless steel internal components. Available packages include silencers, check valves, moisture trap, cyclone, four-way vacuum/pressure changeover valve and a powder-coated skid.

800-253-5500; www.natvac.com



Hose and Hose Accessories

Kuriyama of America Alfagomma T704HA Series THE BOOMER

The Alfagomma T704HA Series THE BOOMER industrial sewer vacuum hose from Kuriyama of America is made with a 1/4-inch-thick red gum rubber tube for abrasion resistance. The corrugated black conductive SBR/NR blend cover provides abrasion- and ozone-resistance. It is a suitable hose for dry or wet abrasive materials and can be grounded. It is an ideal hose for the vacuum truck industry where a rugged and durable hose product is needed. It is available in 2-, 3-, 4-, 5-, 6-, 8- and 10-inch I.D. sizes.

847-755-0360; www.kuriyama.com



Pressure Lift Power Booster

The Power Booster from Pressure Lift has Versa-Flow technology to help minimize man-hours and allow the user to combine multiple pieces of equipment, allowing them to provide time to increase workloads and reduce job expenses. The user can combine pressure washers or jetters with any vacuum equipment, providing manpower needed for other jobs. Versa-Flow technology not only breaks up soils, assists in decreasing load times and completing each job quickly, it streamlines projects and helps minimize maintenance cost.

866-504-6596; www.pressurelift.com



Hose Reels

Hannay Reels VAC Series

VAC Series reels from Hannay Reels are designed to store and handle vacuum hose up to 4 inches I.D. and 150 feet long. The series is available in a variety of configurations, including the heavy-duty VAC-5000. This reel is equipped to handle longer length and large-diameter vacuum hose. Constructed with a sturdy steel channel frame and spoked discs for weight savings, it provides easy and fast winding of vacuum hose. It offers a single-wrap configuration and is best used where width dimension is minimal, such as between cab and tank or mounted transversely to the frame of the truck. Other reels in the series include the VAC-9000, which allows for multiwrap solid disc configuration, as well as the vacuum hose storage-only VAC Series Storage Reel.

518-797-3791; www.hannay.com



Reelcraft Industries Series 3000

Reelcraft Industries Series 3000 reels are all-steel construction and ultracompact for a wide range of bench mount or mobile applications with critical space requirements. These compact reels fit within a 1-by-1-foot space. The reels incorporate multiple slotted mounting holes to accommodate many configurations. An optional guide arm accessory is available for multiple adjustment positions of the hose or cord. Hose reels are available with up to 25 feet of 1/4-inch or 20 feet of 3/8-inch air/water hose. The cord reel models are available with 30 feet of 12/3 cord with multiple cord ending options including a new quad box receptacle.

800-444-3134; www.reelcraft.com



Hot Water Boilers

Dynablast HV420F-12VRED

The Dynablast HV420F-12VRED hydrovac water heater produces 420,000 Btu with an output temperature of 175 degrees F at 5 gpm, making it suitable for colder climates and improved digging in clay-filled areas. All models come with ETL certification for safety, which also includes certification on the coil for higher efficiency and heat transfer, a stainless steel target plate for increased coil life and a design with serviceability in mind with momentary override control. A 19-by-19-inch footprint makes it suitable for compact installations.

905-867-4642; www.dynablast.ca



Easy Kleen Pressure Systems 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 install-ready for vacuum trucks and hydroexcavators, according to the maker. 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.easyleen.com



Hydroexcavation Equipment

Fruitland RCF870

The RCF870 vacuum pump from Fruitland is available in clockwise and counterclockwise rotation with top- and side-mount, four-way valve locations. The pump is available with hydraulic, angle (gearbox) and belt-drive options. It can be mounted on all Eliminator-style packages. It is a true 4-inch pump with 4-inch pipe connections producing 512 cfm and weighing 575 pounds. It is fan-forced air-cooled with an available air injection cooling system for continuous duty at higher vacuum. It includes an integral oil reservoir with low-consumption oil pump, an integral final filter and vane-wear test ports.

800-663-9003; www.fruitlandmanufacturing.com



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.soilurgeoninc.com



Hydroexcavation Trucks and Trailers

Cusco Sewer Jetter

The Sewer Jetter from Cusco can help perform major cleanups by excavating debris with a 26-foot boom reach and a 600-foot 3,000 psi jetting system.

Outfitted with quality components and reverse engineered for optimal weight and payload with a superior operator control system, the unit is designed for simple regular maintenance and features durable and uncomplicated systems to reduce repairs and downtime. It can be paired with a Cusco SJX hydroexcavator to provide municipalities and contractors 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



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



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, 14- to 17-foot 6-inch boom in 8 or 6 inches, 4,000 cfm power and an inverted, full-opening tailgate.

888-442-7829; www.gapvax.com



Hot Jet USA Vac 'n Jet Series

The Hot Jet USA Vac 'n Jet Series of vacuum trailer jettors are rugged and compact; are engineered to haul equipment and spoils load; and can clean valve boxes and storm drains, and hydroexcavate and/or clean drain/sewer lines. They offer hot- and/or 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



Imperial Industries Hydro 3600 Hybrid Excavator

The Hydro 3600 Hybrid Excavator from Imperial Industries offers compact power and versatility, with capabilities that include digging trenches for locating fiber optic cables and clearing debris. It provides direct applications for septic hauling, utilities maintenance and emergency response situations. It can be operated by one person. Units are available in code and noncode.

800-558-2945; www.imperialind.com



(continued)

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 when off-loading by avoiding the need to raise the tank. Rather than using gravity alone, it applies its mechanical advantage to quickly off-load compacted tank debris. To release hot high-pressure water, the vehicle can be equipped with a 700,000 Btu boiler. The transfer case is specifically designed for vacuum excavation trucks requiring a highly configurable and easily serviceable gearbox. **970-542-1975; www.kaiserpremier.com**



Presvac Systems Hydrovac

The Presvac Systems Hydrovac is designed for versatility and cold-weather operation with optional full compliance with Department of Transportation specifications for collection or transportation of hazardous materials. The high-vacuum blower allows extraction of all types of soils, gravel, rock, clay, water and silt material, with knockout features in the debris tank minimizing carryover. Modular filtration configured to blower size provides blower protection and minimal maintenance, according to the maker. It comes with a heavy-duty, 8-inch boom that extends up to 25 feet, with six-way hydraulic power and wireless controls for all boom functions, soft-start water pump, vacuum breaker and truck engine speed. **800-387-7763; www.presvac.com**



Rival Hydrovac T10

The T10 from Rival Hydrovac is a larger version of the initial Rival T7 unit, which has become a suitable choice for many urban contractors who are aware of the trending weight restrictions on these types of trucks and realize the need to bring these trucks into compliance when driving on roads to disposal sites. It operates in the same manner as the T7, as it is fully hydraulic, eliminating the need for a transfer case; and aside from engaging one PTO, the entire truck is operated from the remote and rear panel. This unit features the same "pressure off" feature as the smaller units and has essentially the same controls. **403-550-7997; www.rivalhydrovac.com**



Supervac Hercules XL

At 37 feet long, the Hercules XL from Supervac is suitable for applications where weight is not as much of a concern. It can carry 18 cubic yards of debris, and it has available a payload capacity of 25,000 pounds. The 3,600-gallon debris tank is mounted as close as possible to the truck's cab. Its 3,800 cfm, 27-inch Hg blower is more compact than its predecessors and mounted directly over the truck's second axle. In addition, more equipment, including its 30-ton hydraulic dump hoist and 400,000 Btu boiler are compactly situated near the



cab to allow for more even weight distribution. The unit's 185 cfm air excavation compressor, Webasto diesel fuel heater, 3,000 psi high-pressure water pump, controls, aluminum toolboxes and six 250-gallon (1,500-gallon total capacity) plastic water tanks are evenly distributed along the sides of the unit, adding to the even weight distribution.

866-839-5702; www.supervac.co

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



Transway Systems Terra-Vex HV38

The Transway Systems Terra-Vex HV38 has a 12-yard debris tank with onboard scales, which allows a driver to load the tank worry-free. It includes a large debris tank for those light loads, saving time and money, complete with a 26-foot-by-8-inch telescopic boom. It has a simple one-touch-operated hydraulic half-door with a 3,800 cfm at 27 inches Hg hydraulically driven blower. Water pressure is achieved with a hydraulically driven triplex pump, delivering 10 gpm at 3,600 psi from a 1,000-gallon HDPE baffled water tank. The water is heated with a 420,000 Btu diesel-fired burner for cold-weather operation.

800-263-4508; www.transwaysystems.com



TRUVAC 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 versatile TRUVAC Paradigm subcompact vacuum excavator 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 the time between arriving on the job site and excavation, including the ability to dig up to 6 feet in depth without additional pipe and hose. The air compressor powers utility tools such as jackhammers and tampers that may be used on the job. The truck offers substantial storage space for these tools, including a long-handle toolbox. The truck can also tow up to 20,000 pounds. **800-627-3171; www.truvac.com**



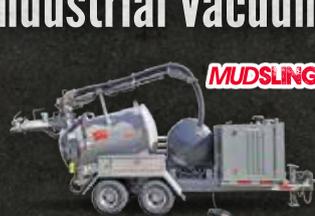
Vac-Con X-Cavator

The X-Cavator from Vac-Con is designed to be powerful, durable and easy to operate. It features a hydrostatic drive using the chassis engine for vacuum, creating a more efficient system that eliminates the need for PTO, clutch and gearbox operation. It is available with water systems up to 4,000 psi and a mobile, wireless remote-control system controlling chassis engine revolutions per minute, boom, automatic vacuum breaker, dump controls and hydraulic door locks from up to a half-mile away. The boom rotates 270 degrees. **904-284-4200; www.vac-con.com**





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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 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



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 available, with an 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,



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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

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 spot of the chassis to ensure the payload is proportionately distributed across all axles simultaneously, 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



Nozzles

Enz USA Rotodrill

The Rotodrill nozzle from Enz USA has a rotating front jet for improved cutting performance. It's effective at clearing blocked or frozen pipes and moving heavy debris. It has ideal



propulsion but can also be used in hydroexcavation by plugging off the thrust jets. This versatile nozzle is available in 1/2-, 3/4- and 1-inch systems.

877-369-8721; www.enz.com/en-us/home

Hydra-Flex Ripsaw

The Ripsaw rotating turbo nozzle from Hydra-Flex blasts a 0-degree water stream at up to 3,200 psi while rotating at a high speed to provide an 18-degree cone of coverage. Its cone-shaped flow pattern is ideal for potholing applications. The heavy-duty, high-impact nozzles are constructed with stainless steel housings and tungsten carbide wear surfaces to withstand harsh environments and provide long life. Repair kits are available for extended life and lower operating costs. Select from traditional coating (blue) or upgrade to the heavy-duty coating (green), a formulation designed for use in extreme environments. Greater impingement allows users to complete jobs faster or use a smaller nozzle size while getting the same impact as nozzles with higher flow rates.

952-808-3640; www.hydrflexinc.com



NozzTeq MONRO-JET

The MONRO-JET hydroexcavation nozzle from NozzTeq combines the power of a solid-stream pencil jet with the large coverage of a fan jet. An orbital design increases performance at a lower gallons-per-minute rate and pressures as high as 36,250 psi, allowing the operator to move faster



when hydroexcavating and cleaning surfaces or sewer lines. It can be used for other types of surface cleaning such as concrete, steel, castings and large surface areas including line removal from runways. It can be modified for internal cleaning of sewers and pipes of all types.

866-620-5915; www.nozzteq.com

Water Pump

Cat Pumps 5SP30HU

The Model 5SP30HU from Cat Pumps is designed for applications like hydroexcavating and portable washdown systems and is suitable for use in mobile applications in remote locations and demanding environments. This direct-drive pump attaches to hydraulic systems with SAE A mounting standards. The compact size fits small trailer units to full-size trucks and provides ranges of 2 to 4 gpm and 100 to 3,000 psi.

763-780-5440; www.catpumps.com ▼



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Happenings

Send contributions to
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CALENDAR

Aug. 21-22

Water Finance Conference, Washington Court Hotel, Washington, D.C. Visit www.waterfinanceconference.com

Sept. 9-11

Breakthroughs in Tunneling Short Course, Knoebel School of Hospitality Management, University of Denver, Denver. Visit www.tunnelingshortcourse.com

Sept. 21-25

92nd Annual Water Environment Federation Technical Exhibition and Conference (WEFTEC), McCormick Place, Chicago. Visit www.weftec.org

Oct. 1-3

International Construction & Utility Equipment Exposition (ICUEE), Kentucky Exposition Center, Louisville, Kentucky. Visit www.icuee.com

Nov. 6-7

Pipeline Leadership Conference, Hyatt Regency Houston Intercontinental Airport, Houston. Visit www.plconference.com

Nov. 11-13

WJTA - IMCA Conference and Expo, Ernest N. Morial Convention Center, New Orleans. Visit www.wjta.org

THE LATEST:

News

Legacy Building Solutions adds design and project consultant

Legacy Building Solutions announced Pat Hamilton joined the organization as a design and project consultant for the military industry. Hamilton comes to Legacy Building Solutions with 18 years of tactical sales experience in military and pub-

lic sector services. In his new role, he will work with customers in the military sector to provide them with engineered fabric structures on a rigid steel frame. ▼

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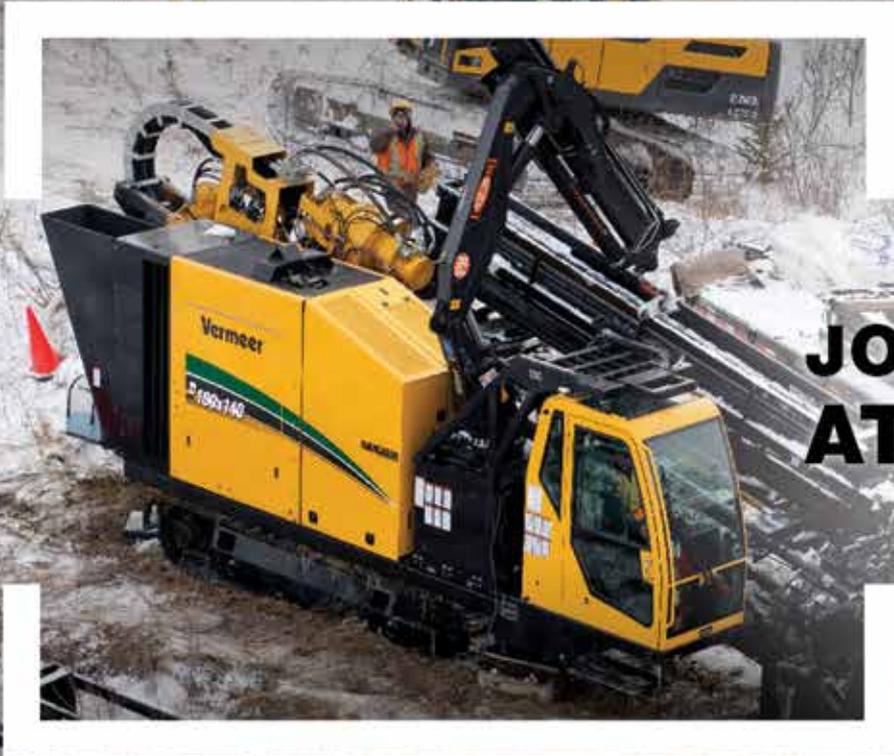
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1. Sewer Equipment GENESIS water recycling sewer cleaner

The GENESIS water recycling sewer cleaner from Cappellotto by Sewer Equipment employs a passive separation approach, which includes a true five-stage separation process. Using gravity, it separates water from sludge. The GENESIS is able to work effectively and efficiently in grease and lines containing water with any size impurities, as there are no filters to become clogged. It has a 13-yard stainless steel debris tank, a 1,500-gallon stainless steel water tank, a 90 gpm at 2,500 psi water pump designed specifically for recycled water, a positive displacement blower with 3,000 cfm at 27-inch Hg with 6-inch system and 800 feet of 1-inch sewer hose. With a boom reach that is adjustable from 15 to 21 feet from the center of the truck, the Smart Boom assembly has 65 feet of vacuum tube, providing the ability to vacuum 30 to 37 feet below grade without adding additional tubes. **800-323-1604; www.sewerequipment.com**

2. Cat Pumps hydroexcavating pumps

For over 50 years, Cat Pumps has been manufacturing long-lasting and low-maintenance triplex pumps. With dedication to zero-defect manufacturing, ease of service and availability from stock, Cat Pumps designs and builds high-pressure pumps and systems to the highest quality standards for the hydroexcavation industry. Popular models include the Model 3560 with 25 gpm, 3,000 psi or 20 gpm, 4,000 psi; Model 3570 with 30 gpm, 3,000 psi; the Model 660 with 10 gpm, 3,000 psi; and the Model 56 with 5.5 gpm, 3,500 psi or 8 gpm, 2,500 psi. **763-780-5440; www.catpumps.com**

3. Myers Seth Pump DD-6 pump

The DD-6 pump from Myers Seth Pump pulls the best attributes of four different types of pumps — double diaphragm, centrifugal, piston and rotary lobe — into one solution. The DD-6 is capable of being used for the six most common methods of dewatering that are typically encountered on a job site, from simple to complex. The 6-inch, high-volume, double-diaphragm pump has a HATZ 1D81Z, 10 hp air-cooled diesel engine, enabling 140 max cfm. It features high head pressure and 3/8-inch steel construction to make it reliable and durable. It can pump 700 gpm, deliver 28 feet of vertical lift and move 4 1/2-inch solids, making it a great sludge and slurry pump as well. The Sound Attenuated Fully Enclosed version reduces noise output by up to 50%, making it ideal for metropolitan and urban environments. **904-389-6114; www.myerssethpumps.com**

4. MB Crusher MB-L160 crusher bucket

The MB-L160 crusher bucket is designed to meet the needs of skid-steers and backhoes while maintaining the power and productivity of MB products. The MB-L160 crusher bucket is suitable for skid-steers starting from 9,900 pounds and backhoes between 15,400 to 22,000 pounds. The compact size makes it effective and easy to use. With a maximum output of 26 cubic yards per hour dependent on output settings, the MB-L160 S2 is an efficient and mobile crusher perfect for demolition, recycling, road-work and excavation segments. **855-622-7874; www.mbamerica.com**

5. Vermeer MX300 mixing system

Vermeer's MX300 mixing system offers customizable mounting configuration options and is equipped with a 23 hp Kohler ECH 7300 EFI gas engine that outputs 350 gpm of flow. The system can be paired with up to two tanks at once to help decrease time spent mixing and refilling drilling fluid tanks. The unit's narrow rectangular tank design also helps maximize fluid volume, and a small footprint can help with convenient transporting and storage. It comes with a 16-gallon fuel tank and is easy to service with access to the roll jets through the top of the tank and two valve drainage points. **800-837-6337; www.vermeer.com**

6. John Deere construction simulators

The new construction simulators from John Deere outfit to one of six machine types: backhoe, crawler dozer, excavator, wheel loader, joystick-controlled motor grader and fingertip control motor grader. Based on actual John Deere equipment, the simulators feature swappable controls that allow for quick interchange of joysticks and foot pedals to multiple machine types. The software offers highly detailed, realistic virtual environments designed to cover basic and advanced operator duties through multiple job site tasks. A performance function provides metrics to measure student progress to help build proficiency and confidence. **800-503-3373; www.johndeere.com**

7. Leica Geosystems MC1 software for excavators

The Leica Geosystems MC1 software for excavators from Leica Geosystems uses quick accesses and smart navigation to keep the operator in the run screen and assure longer uptime. This one-for-all software infinitely connects heavy machinery on site, providing guidance and auto-



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mation for operations across construction projects. The latest version of the software enables tool recognition for excavators, enabling the automatic detection of any construction tool connected to the excavator. This decreases the chance of using improper buckets that could cause over-digging, increasing efficiency and productivity for operators on site. **800-367-9453; www.leica-geosystems.com**

8. Brokk Hydraulic Breaker series

The new Brokk Hydraulic Breaker series is matched with the company's full range of remote-controlled demolition robots. Each robot is designed from the attachment backward, providing the exact amount of flow, pressure, backpressure and downward force that the hammer requires. The BHB series includes eight breaker models, starting with the 110-pound BHB 55 breaker for the compact Brokk 60 remote-controlled demolition machine. The range goes all the way up to the 1,543-pound BHB 705 for the recently introduced Brokk 500 and Brokk 520D. The hammer bodies are machined from a solid casting, eliminating side and through bolts, and an integrated, side-mounted accumulator holds a nitrogen gas charge for as long as a year. **800-621-7856; www.brokk.com** ▼

This Issue's Feature:

Dry suction creates cleaner excavation

BY CRAIG MANDLI

Air excavation has been popular in Europe for decades, and now an Ontario-based company is optimistic that it will gain a foothold in North America. The **MTS Dino Series, distributed by OX Equipment**, uses the power of air to efficiently excavate the ground safely.

"With a twin fan system — which generates over 24,000 cfm, powered through a 10-inch-diameter suction tube — the ability to excavate material dry is unmatched," says Colin Donoahue, the company's business development manager. "Due to increased restrictions on both allowable weight limits for loaded wet vacuum equipment, as well as issues and costs surrounding proper disposal of slurry that is generated by hydrovac, there is an increasing industry need to source productive dry vacuum equipment."

The unit's wirelessly controlled four-point power arm makes operation both simple and safe and allows the user to precisely position the suction tube at all times, eliminating worker fatigue when compared to typical vacuum equipment. The side-tipping hopper is able to



MTS Dino Series, distributed by OX Equipment

MTS Dino Series, distributed by OX Equipment

off-load the dry excavated materials into a roll-off bins or directly on the site for use in backfilling procedures. Powerful onboard twin compressor systems generate over 300 cfm of compressed air to allow excavation in even the toughest clay soils.

"Productivity levels for the MTS dry suction equipment rivals that of a typical hydrovac in most instances, and all without generating any wet spoils," Donoahue says.

The remote drive feature gives the operator the option not only to control the boom, but also to move the truck from a remote that is worn on the operator. The driver and operator now have more options in terms of safety and functionality on the job site because they can both maintain

their position at the excavation site while repositioning the truck for maximum productivity. An Auto Stop Feature uses built-in sensors on the front bumper that will immediately stop the remote drive feature from moving the truck if anything is detected within 3 feet of the front of the truck, ensuring safety while maintaining efficiency.

On-site disposal allows for the freedom to reuse excavated material. Since there is no water involved in the excavation, users can dispose of the materials directly on site to be reused as backfill.

"Customers also see efficiencies and savings due to the equipment staying on site all day excavating, and not incurring the costs, or downtime, disposing of wet slurry," Donoahue says.

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