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Operator
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ON THE COVER:

John Rodarte, an operator with 4 Warriors Hydro Excavating, works the high-pressure water jet on an excavation near Gonzales, Texas. 4 Warriors, owned by Mitch, Sherrye, Blaine and Samantha Louis, has four Foremost hydrovac trucks and serves oil and gas customers throughout Texas. (Photography by Mark C. Greenberg)

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Seeking New Customers

EXPANDING SERVICES AND COVERAGE AREA ARE JUST SOME OF THE EASIER WAYS YOUR COMPANY CAN CONTINUE TO GROW

BY CORY DELLENBACH, EDITOR

Growth and expansion are key goals for most business owners and entrepreneurs. Finding ways to grow in the utilities construction industry can be a challenge — there are only so many services you can offer.

Jordan Graham, owner of Ontario-based Graham Utility, has found a way to keep his company growing. The company, profiled in this issue, was started just two years ago and serves primarily commercial clients.

It's a competitive market in the Ontario region when it comes to vacuum excavation, but Graham wanted a way for his company to stick out. Looking at what his competitors offered, he found one market that wasn't being served: residential.

The area the company serves, Belleville, has several farms and rural homes that have wells. In 2017, Graham began offering clean-out services for those wells with his Tornado Global Hydrovacs and Rival Hydrovac hydroexcavation units. His crews will remove the dirt and silt from inside the wells to give the property owners cleaner water.

The service caught on quickly, and toward the end of last year, he was getting one service call a week related to wells. This year, he's doing more advertising of that service and hoping it will keep the company growing.

Here are other ways you can grow your company:

SELL MORE

How many services do you sell? Most of you will only say "hydroexcavation," but you should go beyond that generic answer. When a potential client asks you what you do, tell them that you can locate utilities, dig or even clean out areas using vacuum excavation. If your company is working for a utility pole company, offer your services not only for locating existing utilities but also to dig the holes for the poles. Always look for different ways you can serve one customer. You could locate utilities for a municipality, clean out its sewer system, or dig the trenches for new utilities. Upsell your company!

GO INTO MORE TERRITORIES

You might serve a 50-mile area around your shop, but could you expand that? Find out what type of customers might be beyond the 50 miles (or whatever distance you currently serve) and see if it would be beneficial to serve a 100-, or 150-mile radius.

TARGET NEW CUSTOMER MARKETS

This is what Graham did with his company. While still serving commercial customers, he found untapped potential on the residential side he could take advantage of. When going this route you want to make sure you advertise what markets you offer clearly. Without advertising, no one would've known that Graham Utilities was moving into the residential market.

ACQUIRE ANOTHER BUSINESS

This can be the fast way to grow and expand, but it can also be one of the riskier ways. Merging with or acquiring another business can double the size of your business overnight, growing your sales and revenue exponentially. Before going this route, do your due diligence: What is the company's financial condition? The strength and depth of its management team? What is its client base, and what is the soundness of existing contracts?

Graham found his own way to grow by offering more services, but that might not be for you. Talk to other contractors at trade shows who do the same type of work as you, talk to other business owners in general, or look through past *Dig Different* profiles and get ideas of what you can do.

HEARING FROM YOU

I would like to hear how you grew your company. What worked for you and what didn't? Email me at editor@digdifferent.com or call 800-257-7222.

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ALWAYS LOOK FOR DIFFERENT WAYS YOU CAN SERVE ONE CUSTOMER.



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SOLO ACT

Running a One-Person Business

Operating as the entire company — management all the way down to field worker — has its challenges, but also its rewards. Three years in that's how Dave Marzio of Spearhead Locating Services, profiled in the May/June issue, is still running his business. He does it all and is in no hurry to add employees. Read more about the pros and cons of being a one-person show in this online exclusive.

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SAVING GREEN

Hydrovac Company Improves Efficiencies With Recycling Facility

New highway weight restrictions and extensive travel to dumping facilities made Canada's Ontario Excavac rethink how it was handling its spoils. It decided to open its own recycling facility, and the move has proven beneficial. Learn more about how the company set up its spoils recycling operation in this online exclusive.

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BUSINESS ADVICE

Avoiding Traps of the Credit Card Industry


There are several benefits to making regular use of a credit card in your day-to-day business operations. But like any other business tool, effective use means careful analysis and firm control. This online exclusive provides some tips on what to consider when shopping for a business credit card.

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A WARRIOR'S MENTALITY

TEXAS FAMILY FENDS OFF OIL FIELD SLUMP TO KEEP HYDROVAC COMPANY IN OPERATION AND GROWING

STORY: GILES LAMBERTSON PHOTOS: MARK C. GREENBERG

Mitch Louis has worked in and around Texas and Oklahoma oil fields for three decades. When the industry “took a pretty good hit” 10 years ago, he temporarily ran a small Colorado manufacturing company. Its product? Hydroexcavation trucks.

“The company owner was my friend and was in the process of buying a patent to help his business,” Louis recalls. “He wanted me to come out and sort of be CEO for nine months while he was off chasing the patent. It allowed me to see how the trucks were built and the logic behind them.”

Louis liked what he saw, and it set off a chain of events that would eventually lead him to starting Texas-based 4 Warriors Hydro Excavating with his family.

A HYDROVAC START

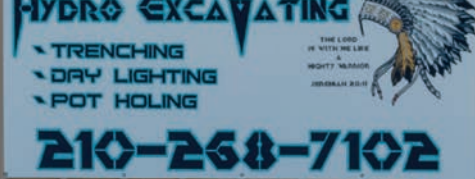
Louis and another friend started a hydrovac company in 2010 called PLJ Enterprises. It was dedicated to oil field cleanup tasks like flushing mud pits. To keep busy, the company's hydroexcavators ranged across a 200-mile radius of the Texas Panhandle and adjacent Oklahoma territory. After three years, Louis sold the company to a Canadian firm, Lonestar West Hydro-Excavation Services, and stayed on with the new organization for a year to assist with the transition.

Juan Lopez, a technician with 4 Warriors Hydro Excavating, works the high-pressure water jet as operator Salvador Rodríguez looks on during an excavation near Gonzales, Texas.



"I MADE MY DAD SWEAR
WE WOULD **JUST USE**
THE TRUCKS FOR WHAT
THEY WERE DESIGNED
TO DO: DIG."

Blaine Louis



The 4 Warriors Hydro Excavating team includes, from left, Sherrye and Mitch Louis, co-owner/president; Samantha Louis, office manager, with son Forrest Louis; Blaine Louis, co-owner/vice president; and Rocky Johnson, regional sales manager.



A FAMILY VENTURE

The Louis family calls North Texas home, though Mitch and his wife, Sherrye Louis, live today in Elk City, Oklahoma. He is a native of Shamrock, Texas, situated between Amarillo, Texas, and Oklahoma City. In the early 1980s, he attended ag classes at West Texas A&M in Canyon to broaden his career horizons. But with a family to support, he shortly returned to work, signing on as a Shamrock-area pipeline construction worker. It was the Eagle Ford shale formation that finally drew Mitch deeper south into Texas.

Eagle Ford oil and gas development is centered on a swath of 15-30 counties (depending upon who’s counting). Investors poured \$30 billion into the development in 2013. In March of this year, nearly 90 rigs were drilling horizontal wells there, 77 of them looking for oil.

After Mitch sold out to Lonestar West, his son was hired on with Lonestar and moved to San Antonio to join the Eagle Ford scrum. Blaine, who had worked part time with his father since high school, had built relationships with drilling companies in South Texas and Lonestar West took advantage of his connections. Blaine started a Lonestar West

branch in the area with a fleet of three trucks, which he built up to six.

“It was a first big opportunity for me,” Blaine says, calling it a life-changing experience. That’s saying something for a guy who at age 18 began a seven-year stretch of riding bulls in professional rodeos. He admits to breaking plenty of bones in the rodeo ring but also says it taught him to hold nothing back when competing, in business or anything else. Blaine stepped up to shoulder increased responsibility with Lonestar West, and when he and his father launched 4 Warriors two years later, he was ready to be a full partner in the work.

DEPENDABLE TRUCKS

The men decided the new company would target oil fields in south and west Texas. They have found plenty of work there.

“We have a variety of clients today,” Mitch says. “Ninety-nine percent are pipeline contractors. I’m proud to say we have 30 to 40 companies we work for on a regular basis.”

To serve all those customers, 4 Warriors operates 10 hydroexcavators, up from three in 2015. They are all Foremost vacuum units manufactured in Calgary, Alberta, and introduced to Mitch by Lonestar West. Most of the units are Foremost 1600 models fitted to a chassis with triple rear axles and a 425 hp engine. The trucks feature a 1,600-gallon water tank and a 13-cubic yard debris containment body. Rear-mounted 8-inch booms are wireless-controlled.

(continued)

**4 Warriors Hydro Excavating
Marion, Texas**

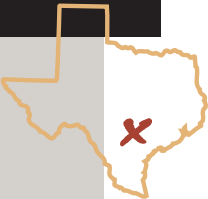
OWNERS: Mitch and Sherrye Louis, Blaine and Samantha Louis

EMPLOYEES: 23

SERVICES OFFERED: Potholing, trenching

SERVICE AREA: Throughout Texas

WEBSITE: www.4warriorshydroexcavation.com



Then it was on to something else for Louis — specifically, starting up another company. Louis admits to being “an entrepreneur at heart,” which means he likes to start and grow companies, not necessarily grow old with them. “My ultimate goal in starting PLJ was to build the business and sell it,” he says, a sure indicator of entrepreneurial genetics.

His second company, ML Services, was an oil field work-for-hire firm that cleaned drilling rigs, pressure-washed equipment, broke down and moved rigs, and performed general roustabout tasks. Entrepreneurial restlessness led him to close ML Services in 2015 and launch yet another firm, 4 Warriors Hydro Excavating. This time, his son Blaine Louis and other family members became part of the entrepreneurial team. Consequently, 4 Warriors feels more permanent.



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Mitch Louis



Salvador Rodríguez works the boom arm controls during an excavation.

The rest of the fleet are 1200 models with 1,200-gallon water capacity and 10 1/2-cubic-yard debris capacity. Asked why he went with the Canadian manufacturer, Mitch says it was a consequence of both technology and relationships.

“The Foremost trucks are a little bit more expensive than some, but they’re a better-made truck, more durable than a lot of hydrovac trucks out there,” Mitch says. He adds that the trucks are not necessarily superior “but they are the only units I’ve ever really run, so I understand them. I can work on them myself. The thing we like most is the design. A chassis is just a chassis, but the working end of the Foremost truck works really well.”

The relationship with Foremost began with a good friend who was involved in the trucks’ manufacture. Mitch has since built other friendships in the company. “What sets Foremost apart in my mind is the relationships I have with the guys who build the trucks. Those guys are personal friends.”

POISED FOR GROWTH

4 Warriors is exclusively an excavation company — no power-washing. Blaine insisted on it. “I made my dad swear we would just use the trucks for what they were designed to do: dig,” Blaine says. “There is just a lot of hours in cleaning, and it’s hard to keep hired hands.”

(continued)

The company exclusively potholes, trenches, and daylights; and any given job might include one or more of these services, and most jobs do.

The \$5 million-a-year company has 23 employees, with Mitch as president and operations manager and his son as vice president and sales manager. Because Blaine has built up relationships across the region, he can cultivate sales and market the company mostly over the phone. “It hasn’t meant a lot of travel for me, so I can stay close to home and be with family,” Blaine says.

Rocky Johnson, an ex-bull-riding rodeo buddy of Blaine’s, was hired a year

Surviving during the recession

4 Warriors Hydro Excavating became a company in early 2015, starting with the purchase of two big Foremost hydroexcavators. A third truck was added in July of that year. And then the national slowdown in shale oil field work caught up with the company.

Fracking and horizontal drilling in the U.S. had challenged the ascendant position of OPEC oil countries, which responded by pushing a low-pricing strategy. The North Dakota shale range was perhaps hardest hit in 2015 when oil prices slipped, but Texas was hurt, too. Only fracking companies in the Permian Basin of West Texas continued to produce in volume, and that area could not by itself support all the state’s auxiliary companies.

“Everything went south in a hurry,” says Mitch Louis, company president. “We had just picked up our third truck a month before, and we felt like if we were going to survive, we needed to diversify.”

The company looked for work with utility companies. In November of that year, 4 Warriors landed a contract with a major telecom company in the state capital, Austin.

The potholing and trenching work for the company proved difficult, however, partly because the big rigs that were intended for use in wide-open oil field situations were far less suitable for Austin’s congested primary and residential streets.

“It was very challenging operating our big trucks around the city’s oak trees,” Louis says.

The money wasn’t really there either, Louis says, and sometimes wasn’t quickly forthcoming.

“But the Austin work did keep us above water during a time when there really wasn’t anything else going on,” Louis says. “We maintained our employee numbers for eight months and kept all our equipment. When the oil field work finally came around again, we went back to it. Any hydroexcavation company that made it through that slump had a head start when the work returned.”

Today, 4 Warriors is once again busily supporting the fracking industry. When the oil field economy recovered, the Louises left utility work behind. Blaine Louis, Mitch’s son, says the diversion into utilities was a worthwhile experience because it taught the company something about working the trucks in different situations. Yet he agrees with his father, who says, “Utilities wasn’t our niche.”

Nevertheless, utility hydroexcavation work will remain an option during tough economic times. The Louises say the company will return to the urban work or to some other commercial activity if the oil business slumps again. “If the industry slows down, we will diversify again,” Mitch says, reluctantly.

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Buddy Husted, left, technician, looks on as operator John Rodarte works the high pressure water jet (vacuum truck from Foremost).

ago as the company's first salesman and covers West Texas oil and gas operations. Samantha Louis, Blaine's wife, is the company's office manager at the headquarters in Marion, Texas, taking care of payroll and other paperwork. "Really, she takes care of the headaches," Blaine says.

With key positions filled, the company is poised for expansion.

"I honestly think the oil industry will be pretty good for another five years anyway," Mitch says. "I look forward to the growth of the company. I think a good round number for the truck fleet is 12. When we get to a dozen trucks, we'll sit back and contemplate what's next."

The expansion of the truck fleet has been more customer-driven than planned, according to Mitch. "If our customers have to wait for us to show up — if we have to tell them 'No, we can't get to you right now' — we feel like it's time to look at adding another truck. If you tell a customer no too many times, you begin to hurt the relationship."

At this point, 4 Warriors has enough trucks and manpower to answer all calls. "That's so important," Mitch says. "Utilization is huge in our business. We're not making any money when we're sitting around."

4 Warriors is a lean operation, with company executives taking turns operating the hydrovac trucks as needed. In the course of the interview, Mitch notes that he had just gotten off one of the trucks. "I ran it for a week," Mitch says. "We're not blessed with paying a lot of extra people to sit around. Last week was spring break and a couple of operators took a week off, so we filled in."

ABOVE AND BEYOND

The 52-year-old company president clearly is a people person. His personal driving force might be entrepreneurial in character, but it is predicated on doing right by people. Blaine says relationships indeed are central to how his father conducts business, but so is doing things the right way.

his business partner, he says, partly because his son is of a younger generation.

"The oil and gas industry as a whole is under new management, and new management brings new technology," Mitch says. "It takes someone like Blaine and his generation to relate to those changes. Let's face it, most of the time the younger generation doesn't really appreciate what us old-timers think anyway."

He believes the hydroexcavation business is somewhat handicapped by being so young. He cites the difficulty he has in finding qualified truck operators.

"EVERYBODY HAS TRUCKS. IT'S THE PEOPLE YOU EMPLOY TO RUN THOSE TRUCKS WHO ARE THE DIFFERENCE."

Mitch Louis

"We are still a new industry. We don't have 15-year veterans we can hire," Mitch says. "I'm afraid if the industry doesn't pay attention, some of us old guys will retire without passing along the business knowledge we should have."

Mitch says he won't be selling 4 Warriors. He equates starting a company to birthing a child, and he didn't enjoy watching how one of his "children" was treated after being sold to Lonestar West.

"I want to continue to help build it, and someday it will be Blaine's and maybe his son's — they have a 2-year-old boy and a girl on the way," Mitch says. "I hope it is a family-run operation for years and years."

As for him retiring after his son takes over, Mitch isn't sure he can. "I say I am going to retire, but I don't know. There's no telling what I'll get into next." ▼

"He does it the honest way, not under the table," Blaine says. "He learned early on that the honest way of doing business is the better way."

The people-focus is unmistakable. The choice of hydrovac trucks was keyed to good relationships with the people building them. People are behind the Louises' service mantra.

"If you tell a customer you are going to do something, you produce and those relationships become stronger and stronger," Mitch says. "As long as you are a service company, and that's all we are, I believe you have got to provide service that goes above and beyond everybody else."

Still another set of people is considered the key to 4 Warriors' success: employees. "We basically all do the same thing in the industry," Mitch says. "Everybody has trucks. It's the people you employ to run those trucks who are the difference. We recognize that the people who run our trucks are the ones who sell our work."

FOR THE FAMILY

But the most important people to Mitch clearly are his family members. He wouldn't have started 4 Warriors if his son hadn't wanted to be

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TARGETING NEW MARKETS

CONTRACTOR VENTURES INTO RESIDENTIAL SERVICES AS A WAY TO EXPAND HYDROEXCAVATION COMPANY

STORY: CORY DELLENBACH PHOTOS: BRUCE BELL

Starting up a company can take a lot of hard work and dedication, something Jordan Graham was used to already with his background as a mixed martial arts fighter.

What started off with only Graham, one other individual and one hydroexcavator two years ago has now turned into five hydroexcavators and 16 employees.

“It was a lot of knocking on doors at the start, but we have contracts now and some handshake agreements,” Graham says. “We have great employees who back us up. It’s a team effort for sure.”

He now has goals to grow his Belleville, Ontario-based company, Graham Utility, in the next few years by offering services to residential customers — something many hydroexcavation companies don’t approach with all the utility and commercial work available.

AN OPPORTUNITY ARISES

Having worked at his parent’s construction company, Unes Poleline Maintenance & Construction, Graham was familiar with hydroexcavators.

“We would always sub in hydrovacs, and I always found them interesting,” Graham says. “When we did sub them in, I would be on site working with them or watching them work.”

Through his work with Unes Poleline Maintenance & Construction, Graham was introduced to Brett Newton, who owned a hydroexcavation company with 13 trucks in Ontario. Graham learned that Newton was looking to become a partner with manufacturer Rival Hydrovac and wanted to off-load his hydroexcavators.

Graham worked out a profit sharing plan with Newton, with Graham managing a hydrovac

"YOU GET A PERSONAL FEEL WITH US. WE'RE A FAMILY; WE'RE A SMALL BUSINESS DRIVEN BY A **GREAT GROUP OF EMPLOYEES WHO WEAR OUR HEARTS ON OUR SLEEVES** — FROM OFFICE STAFF ALL THE WAY TO SUPERVISORS ON SITE."
Jordan Graham



Graham Utility operators Jake McCardle (right) and Josh Van Koughnett operate the boom and digging wand on a job site near Belleville, Ontario. The company offers potholing, well clean-out and catch basin clean-out services in an area around Belleville, Ottawa and Toronto suburbs.

Graham Utility
Belleville, Ontario



FOUNDED: 2015
OWNER: Jordan Graham
EMPLOYEES: 16
SERVICES: Potholing, well clean-out, catch basin clean-out
SERVICE AREA: Belleville, Ottawa and Toronto suburbs
WEBSITE: www.grahamutility.com

John Foster, Graham Utility operator, uses one of the company's four Rival Hydrovacs for locating utilities.



PHOTO COURTESY OF GRAHAM UTILITY

for Newton out of Belleville, and Newton would take a percentage of what Graham got paid.

Eventually Graham also ended up taking on a second hydroexcavator from Newton. Graham saved up his portion of the pay until he had enough to buy one truck completely. A short time later, he purchased the second.

"Once I had one truck in my name, I was happy," Graham says. "I knew this was going to be a prosperous business for myself, and I love doing it."

A GROWING FLEET

The company now has five hydroexcavators — four are Rival Hydrovacs, while the fifth is a Tornado Global Hydrovacs F4 with a 13-cubic-yard debris tank and 2,150-gallon water tank. The Tornado has a 5,400 cfm, 27-inch Hg blower for the bigger jobs.

The Tornado also comes in handy for the jobs where 400-plus feet of remote

hose is needed. "That's hard on any truck, but we can do it on the Tornado," Graham says. "It's a monster."

The Rivals have a 7-cubic-yard debris tank and are capable of holding only 800 gallons of freshwater. The trucks have a Robuschi USA RBDV105 blower capable of 2,800 cfm. The smaller hydroexcavators come in handy when Graham Utility crews are working jobs in urbanized areas, such as Ottawa.

"Every truck has different applications, but with the weight restrictions in Ontario, you can only put about half a load on some of these big tri-axle units," Graham says. "The Rivals you don't have to worry about that. You could be full all day and have a quarter tank of water to wash out and not even have to worry."

"I like to diversify the fleet and not have all of your eggs in one basket."

GOING RESIDENTIAL

Most of the work the company handles is daylighting and clean out of catch basins, but Graham saw a gaping hole in the residential market. "I looked at the residential areas around here and thought about what our hydrovacs could do for these people," he says. "I kept getting told by other companies that there wasn't much we could do."

Then he saw his opportunity — they all had dug wells servicing their homes.

"They have settlement in the bottom of those wells, and they aren't getting the cleanest water through, or it smells funny, or it's not coming out fast enough," Graham says. "It seems to be an ongoing issue with a lot of homes. I knew the vacuum trucks would be a perfect tool to clean those."

Graham Utility averages about one well clean-out a week now and plans to advertise that service more in the coming year.

"You just look at the market and wonder why nobody has hit this," Graham says. "I asked about four or five hydrovac companies and they didn't know. Another company that we work back-and-forth with is now starting to do the same thing in the area they serve."

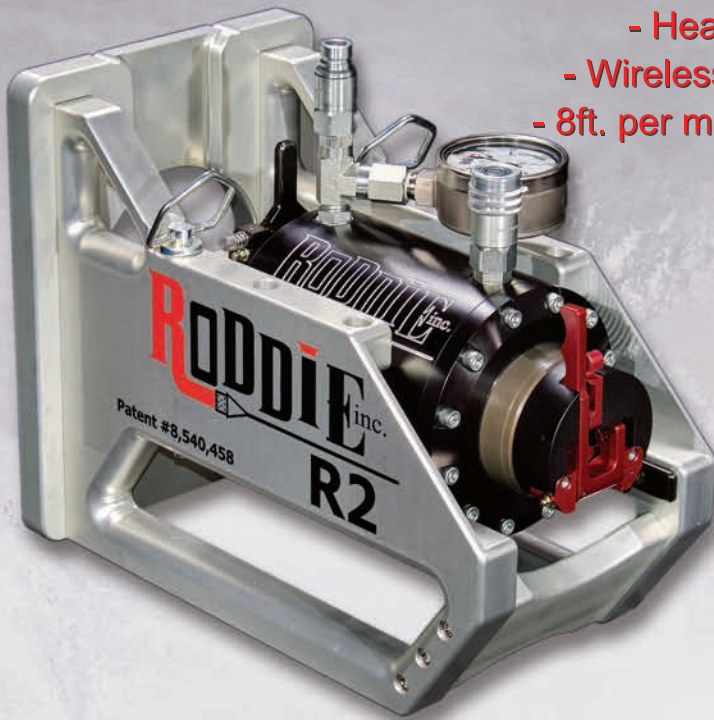
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Josh Van Koughnett (center) and Jake McCardle (right) locate utilities while a directional drilling crew (at left) prepares to put in cable in Belleville, Ontario.

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The Canadian Phenom

Being Canadian almost guarantees that a kid is going to play hockey. Jordan Graham did, but he realized in his teens that he wasn't going to go anywhere in that sport.

The 23-year-old owner of Graham Utility, based in Belleville, Ontario, wanted something more: "I wanted something where I could be a professional athlete."

That's when he discovered mixed martial arts and fell in love with the sport. He had his first fight in 2013 and is now signed with TKO MMA, Canada's largest promoter. Graham has a 2-1 record and is ranked No. 3 in Canada in the flyweight class.

"It's grueling and you may not love it in the moment, but it's so rewarding after you get your hand raised," Graham says.

The 124-pound Canadian, who goes by the name "The Canadian Phenom" when fighting, says being an MMA fighter has helped him succeed as owner of a company. "Fighting takes an always-focused, never-give-up mentality, just like owning a company," he says. "If something needs to be done, we like to get it done and as good as our clients want it and need it."

It takes a time commitment to operate the company and be a professional fighter — appearing in fights throughout Canada and the U.S., including New York and Las Vegas. Graham has also traveled to Italy, Thailand, Malaysia and Panama for fights.

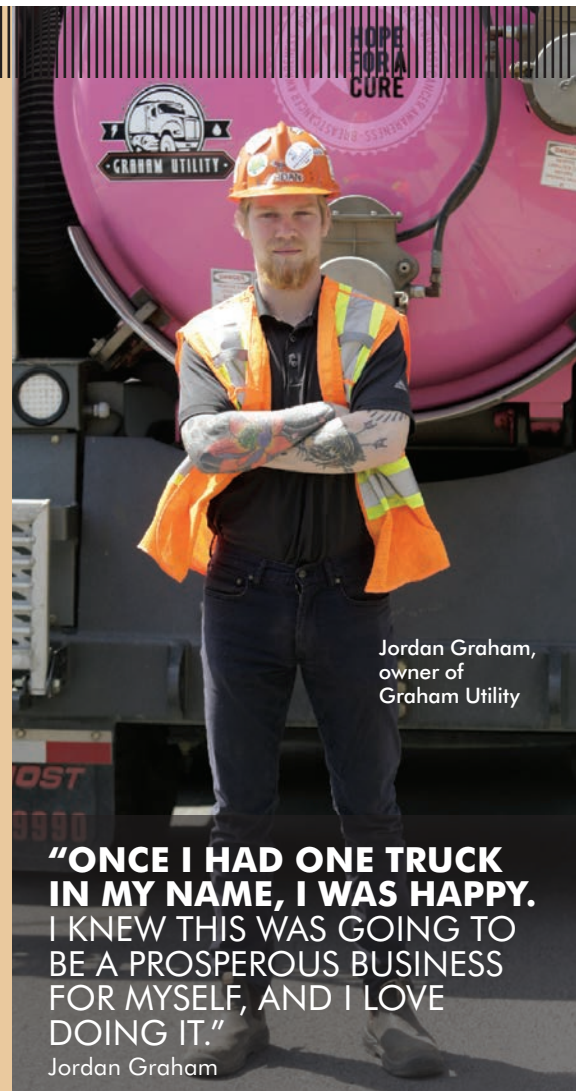
"It's tough, but I've been doing it a couple years now," Graham says. "You have to delegate. If I'm in Ottawa working, there's great gyms up there I'll train at. If I'm in Toronto or that area for work, then I'll be up there training."

Graham also trusts his 16 employees at the hydroexcavation company to help when he is out of town for fights: "They're very supportive of this, and they're not guys you have to babysit."

In March, Graham thanked his employees by bringing them along with him to a fight.

"We pretty much shut everything down, and we worked out subs for all of our clients that needed a truck and let them know our plan," Graham says. "Almost every crew came, and it was a lot of fun. That's the family atmosphere that we have here."

Graham isn't ready to slow down yet, he has goals to move into the UFC within the next two years: "I'm a pretty go-, go-, go-type of person," he says. "I'm never sitting around. I'm always doing something."



Jordan Graham,
owner of
Graham Utility

**"ONCE I HAD ONE TRUCK
IN MY NAME, I WAS HAPPY.
I KNEW THIS WAS GOING TO
BE A PROSPEROUS BUSINESS
FOR MYSELF, AND I LOVE
DOING IT."**

Jordan Graham

FINDING A WAY

Not all of the well clean-out jobs are easy. On the company's second well job, it found out just how tough they can be.

"The homeowner didn't know how deep his well was," Graham recalls. "We get to his property and his has a pond near a bottom of a hill where we think the natural spring is, but then you look up and his house is at the very top of the hill."

At the top of the hill, the Graham Utility crew of three lifted the cover off the well and discovered that it was 70 feet deep.

"We had our big Tornado unit there and we're having to go down 70 feet and it has to suck straight up," Graham says. "Then you have a 26-foot boom reach, so we're almost at 100 feet of hose into the well."

The company used a 6-inch hose as the remote hose, having to put ropes on each side of the boom to help lift it because it was heavy when filled with water and debris. "Two guys were on the ropes and the third guy was on the controls," Graham says.

Even with two guys on the ropes, the boom could still barely lift that much hose.

"We ended up having to hook a rope from the hose to the ball hitch of our pickup truck, put it in four-wheel drive and, without ruining the homeowners groomed lawn, go a little bit at a time to take the pressure off the hose," Graham says. "It was a stressful job."

During the job, the remote hose snapped in half and got stuck in the well. Crews were able to remove it and start over. At the end, about 7 feet of settlement was vacuumed out.

"I don't know if I ever want to see a 70-foot dug well again in my life," Graham says. "But we got it done and I was happy."

FOR THE CUSTOMER

That dedication to getting any job done for the customer is what Graham takes pride in with his company. It's something, he says, that separates Graham Utility from competitors.

"You get a personal feel with us," Graham says. "We're a family; we're a small business driven by a great group of employees who wear our hearts on our sleeves — from office staff all the way to supervisors on site."

That's something that Graham doesn't want to see go away as his company continues to grow: "We're going to keep that feel and provide a great service for all of our customers."

Graham hopes to expand into combo units and add sewer flushing in the near future.

"More than doubling the company would be nice and to have us at 20-plus employees," Graham says. "I love the business in general, and I love seeing clients happy and working with them to accomplish their jobs." ▼

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Maintaining Hydraulic and Electrical Systems

FIVE TIPS FOR CONTRACTORS TO FOLLOW WHEN IT COMES TO KEY SYSTEMS ON VACUUM EXCAVATORS TO KEEP THEM OPERATIONAL

BY BRENDA SILVA

One of the most versatile pieces of equipment on a construction site is the vacuum excavator. Like most heavy equipment, this hard-working machine has many moving parts that require routine maintenance.

If a vacuum excavator is a vital powerhouse in your construction fleet, consider these five tips for keeping the hydraulic and electrical systems humming smoothly.

1 KEEP IT SIMPLE

When evaluating the selection of vacuum excavators on the market, there are many features to consider, but choosing a machine that is simple to maintain should top the list.

“A contractor should look for a machine that is ultimately easy to service,” says Kevin Hewitt, warranty and service manager at GapVax, located in Johnstown, Pennsylvania. “Lack of routine maintenance will greatly shorten the life span of a hydroexcavator.”

He adds that when looking at a machine, you want to be able to have easy access to the grease and adjustment points. “If a mechanic or repair person has to fight to gain access to the grease points, you can bet that nine out of 10 times it won’t be greased.”

2 LESS IS MORE

Keeping equipment options to a minimum can reduce maintenance costs and increase productivity.

“It is important to remember that any option you add to the equipment must simplify the operation and reduce the maintenance expense,” says Daniel Coley, president at Hi-Vac of Marietta, Ohio. “Adding an iPad to the truck may be trendy, but it doesn’t make life easier for the operator or maintenance personnel.”

If the electronics provide reliable operator interface that allow them to do more with the truck, such as save water or fuel, then it’s useful, Coley says.

“IT IS IMPORTANT TO REMEMBER THAT ANY OPTION YOU ADD TO THE EQUIPMENT MUST SIMPLIFY THE OPERATION AND REDUCE THE MAINTENANCE EXPENSE.”

Daniel Coley

Wireless controls can also enhance the operation and control. Coley suggests that if a feature or option doesn’t bring value by enhancing productivity or simplifying the operation or maintenance of the equipment, then the contractor should consider an alternative.

Making selections that keep the hydraulic system less complex is also important. “The more complicated the hydraulic system, the more advanced



Contractors can maintain the chassis fluids without moving the boom on a GapVax unit.

the cooling and filtration systems must be,” Coley says. “Some of the complicated or advanced hydraulic systems can provide additional operator controls, but it’s best if systems are configured with a less complicated system.”

3 PERFORM ROUTINE MAINTENANCE

Performing routine maintenance and inspections can add resale value, minimize downtime, lengthen the life of the equipment, help control costs, decrease risks, and improve operator safety.

Referring to the recommended guidelines in the operator’s manual and establishing regular daily, weekly, monthly, semiannual and annual maintenance can go a long way in keeping equipment in peak operation.

“When you hesitate to provide regular maintenance, that’s when things get missed and these mistakes can be very costly,” Hewitt says.

4 MAINTAIN ACCURATE RECORDS

Keeping complete and accurate maintenance records, and tracking inspections and repairs, can help preserve the life of the vehicles in your fleet.

Gary Robinson, general manager of Transway Systems, located in Hamilton, Ontario, suggests setting up a scheduled checklist for drivers and mechan-

(continued)



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Preventive maintenance key to optimal vacuum excavator performance

Due to the highly abrasive nature of vacuum excavators, it's vital to establish a comprehensive maintenance regimen that includes daily, weekly, monthly, semiannual and annual inspections to keep the equipment operating properly and ensure operator safety.

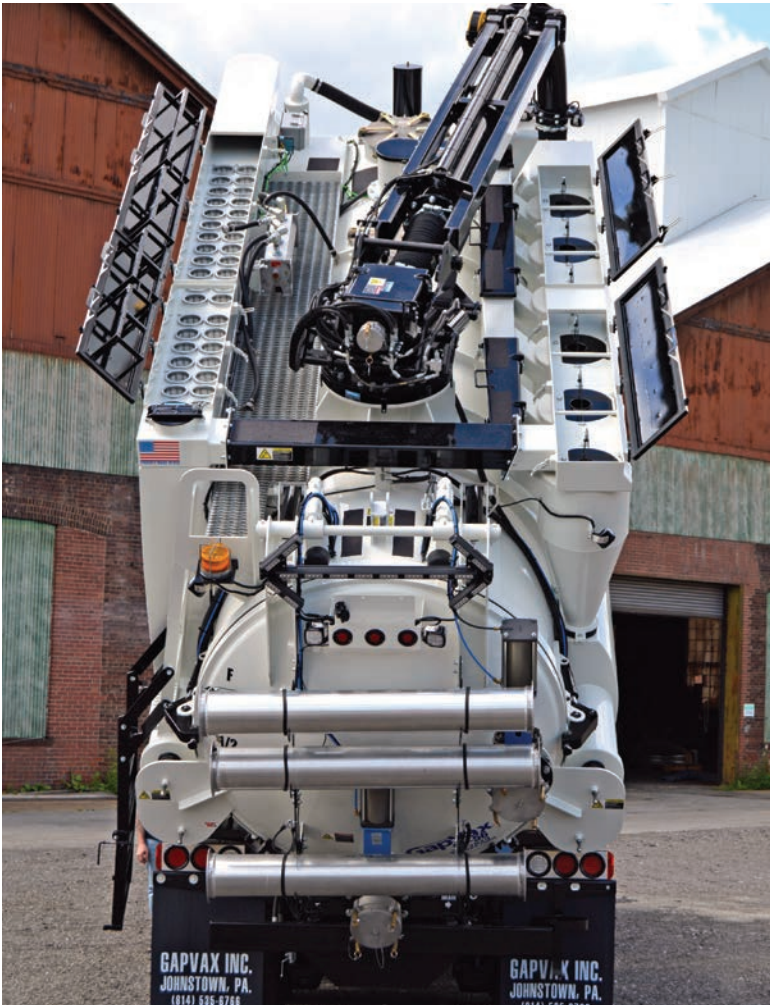
Keeping equipment in top working condition can also increase productivity, prolong the life of its components, and help retain its value. The operator and safety manuals are a great place to start to determine the best maintenance regimen.

In general, daily checks should include inspecting any components that might impact the safety of the vacuum excavator, such as guards and vacuum protection devices. Drain points, oil levels, hose fittings and common wear items — like vacuum hoses and tubes — should also be inspected every day. Additionally, each moving joint needs to be periodically cleaned and greased to prevent binding. Semiannual inspections should include examining probes, sensors, belts and bolts, while annual preventive maintenance may involve flushing the hydraulic system.

Other major components that require routine maintenance include the hydraulic and filtration systems. The hydraulic system powers the unit's moving parts, so it should be regularly cleaned and well-maintained. Filters should routinely be inspected, cleaned and replaced to keep foreign materials from entering and damaging the blower.

When in doubt, always refer to the operator and safety manuals. They are important tools that should be routinely referenced to establish the right maintenance regimen that's specifically tailored for your equipment.

A contractor should check hydraulic components on vacuum excavators, such as this hydraulically powered tailgate on GapVax MC and HV Series units.



“LACK OF ROUTINE MAINTENANCE WILL GREATLY SHORTEN THE LIFE SPAN OF A HYDROEXCAVATOR.”

Kevin Hewitt

ics to check oil levels; observe the condition of filters by looking at the gauge on the filter when it's operating and replacing it as needed; monitor the hydraulic oil for odor, viscosity and color; test all lights for proper operation; and inspect visible wiring for any pinch points or damaged wires.

Documenting every repair with the exact time and date of servicing and keeping a comprehensive record of scheduled and unscheduled repairs not only protects your investment, but it also helps to process warranty claims, reduces unscheduled repairs, and minimizes machine downtime.

5 CONTACT THE MANUFACTURER

No one knows your equipment like the manufacturer who made it. It's important to recognize when equipment is in need of routine maintenance and when it's time to call a pro for repairs.

Coley explains that replacing hose seals and other routine maintenance is relatively easy and can be done in the field, while servicing transfer cases and hydraulic pumps might need to go to a dealer or experienced service professional.

All three industry professionals agree that if any question or concern cannot be answered in the operator or safety manual, contractors should never hesitate to reach out to the manufacturer. ▼

A GapVax HV unit has its doors open for contractors to access bags and cyclones. A catwalk is located on top for added safety.

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3D Printing of Construction Equipment: 3 Things You Should Know

MAKING REPLACEMENT PARTS COULD CHANGE WITH 3D PRINTING

BY ASSOCIATION OF EQUIPMENT MANUFACTURERS

If you were at CONEXPO-CON/AGG and IFPE (International Fluid Power Exposition) 2017, you may have seen the unveiling of the world's first 3D-printed excavator at the event's inaugural Tech Experience.

It was more than just an attention-getter.

3D printing has slowly but surely developed into a disruptive technology poised to have far-reaching effects on the equipment industry.

The Association of Equipment Manufacturers (AEM) was part of the team effort that developed that 3D-printed excavator. AEM relays three things to keep in mind when looking at 3D printing and its potential for equipment manufacturing.



The 3D excavator under development at Oak Ridge National Laboratory.



The 3D excavator on display and in action at CONEXPO-CON/AGG and IFPE 2017 in Las Vegas.

GROWING AND EVOLVING

The consensus right now among leading additive manufacturing experts is that the technology's immediate potential can be most readily found in smaller-scale deployments, according to Dr. Lonnie Love, corporate research fellow at Oak Ridge National Laboratory.

"(3D printing) is not going to change all of manufacturing overnight," Love says. "It's not going to displace casting. It's not going to displace welding."

One key hurdle to adoption is that 3D printing is not yet fast enough.

"When you make these great parts at low volumes, you don't care that it takes a week or a month, but we've got to go faster because it drives the productivity up and the costs down (for manufacturers)," Love says.

"[THIS MAY MAKE TOOLING] TAKE DAYS AND NOT MONTHS. IT COSTS THOUSANDS INSTEAD OF HUNDREDS OF THOUSANDS. WE'VE ALREADY PROVEN THIS ON THE AUTOMOTIVE AND AEROSPACE SIDES. NOW IT'S TIME TO TAKE A LOOK AT CONSTRUCTION AND SEE WHERE IT FITS."

Dr. Lonnie Love

VALUE FOR MANUFACTURERS

Love and his colleagues at Oak Ridge National Laboratory can attest to both the technology's incredible capabilities and its value proposition for manufacturers.

They were involved in building the world's first operational 3D-printed excavator unveiled at the Tech Experience at CONEXPO-CON/AGG and IFPE 2017.

Known as Project AME (Additive Manufactured Excavator), the excavator was 3D printed using a variety of machines to create and assemble three components: a cab, a boom and a heat exchanger. The excavator's boom was fabricated using a cutting-edge free-form additive manufacturing technique to print large-scale metal components.

It was an incredible undertaking, and the success of Project AME proved the sky really is the limit in terms of what 3D-printing technology can do.

CREATING EFFICIENCIES

The costly and time-consuming process of tooling is a prime example of an opportunity for manufacturers to leverage 3D printing to create efficiencies.

According to Love, the production of molds, jigs and fixtures used in the mass production of heavy equipment can take months, run six-figure costs and

"THE ADVANTAGE OF THIS TECHNOLOGY IS YOU COULD ACTUALLY PRINT A REPLACEMENT PART WITHOUT HAVING TO HAVE THAT INVENTORY."

Dr. Lonnie Love

very often involve tooling companies based overseas. However, Love believes that the widespread adoption of additive manufacturing could change all that.

"This may be a mechanism to rapidly get tooling back in the U.S.," Love says, "To make it take days and not months. It costs thousands instead of hundreds of thousands. We've already proven this on the automotive and aerospace sides. Now it's time to take a look at construction and see where it fits."

The equipment industry has earned a well-deserved reputation for designing and building machinery that stays in use for decades. But manufacturers spend heavily to keep massive inventories of spare parts on hand to meet customer needs.

According to Love, companies are now combating that challenge by cutting back on the overhead costs of warehouse space through 3D printing.

"The advantage of this technology is you could actually print a replacement part without having to have that inventory," Love says. "That, to me, has tremendous potential." ▼



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The underworld can be a dirty place, but Cusco's new Sewer Jetter obliterates blockages to keep you up and running when you need it most. This industry-leading truck performs major cleanups by excavating debris with a 26 ft. boom reach and a 270° boom rotation to reach every clog, every time. Outfitted with quality components and reverse engineered for optimal weight and payload with a superior operator control system, the Sewer Jetter is packed with features and benefits to outlast the competition.



Going Lean

CONSTRUCTION INDUSTRY NEEDS TO START LOOKING AT DIFFERENT WAYS OF SAVING MONEY IN ORDER TO MAKE MORE MONEY

BY CORY DELLENBACH

Sometimes a good, long look at how your company is operating, and what you could eliminate, can lead to more business.

Barry Wood, CEO of Toronto-based hydroexcavation company Ontario Excavac, has found that out. Wood, who has a manufacturing background, got involved in lean thinking a number of years ago with the U.S.-based Association for Manufacturing Excellence.

“In a nutshell, it’s about flow and value-added removal of waste,” Wood says. “You look across your operations and you start by asking yourself: What is value in the eyes of the customer? Look across your processes, flowchart them, and evaluate where there are opportunities to eliminate nonvalue-added activity.”

Wood looked at his company using lean thinking and found several areas he could eliminate. While scary at first, the moves proved to be profitable as the company earned more business because of it.

FINDING THE WASTE

Things to eliminate by applying lean thinking include duplication of services and transportation wastes, but it shouldn’t stop there.

“There are sources of waste that are epidemic in the construction sector,” Wood says. “Wait time for example is rampant. People are waiting for the preceding steps to be done before someone starts to work.”

Wood points to his own company as an example. While working with one

“WE WERE DEFINITELY TAKING A CHANCE TO DO IT BECAUSE YOU CAN JUST SIT THERE AND BE FAT AND SASSY AND SAY THEY CAN PAY FOR ALL THE TRAVEL TIME AND WE’LL JUST KEEP BILLING THEM, BUT AT SOME POINT, THAT WAS GOING TO CHANGE. SOMEBODY WAS GOING TO CHANGE THAT MODEL, AND WE DECIDED IT HAD TO BE US.”

Barry Wood

of its largest customers, his crews would go out at the same time as the customer’s crews did. Ontario Excavac crews would excavate and then move aside and watch as the customer’s crews did their work. After the crew was done, Ontario Excavac crews would then start restoration work.

That was one of the first and easiest things for the customer and Ontario Excavac to change.

“Instead of us going out on a job site along with a customer’s crew, we now go to the job site the day before and do the excavation work then,” he says. “The next day, the customer’s crew comes along and does their work, and then we’ll go back after they’re done and do the restoration. There is no waiting around at the job site anymore.”

Both companies are increasing productivity just by sequencing operations that way.

“We dealt with that time waste by changing the order of steps and disconnecting a successive step from the previous one,” Wood says. “We no longer have people that are just standing around and waiting.”

Several other wastes in the construction industry can be eliminated by applying lean. Here are some Wood found in his own company:

- **Defects** — Improper installation or repair, billing errors, change orders.
- **Overproduction** — Requesting too many locates to complete in a given time. Multiple forms with same information.
- **Waiting** — Equipment failure, missing work tools or personal protective equipment, not sequencing work and resources effectively.
- **Nonutilized or underutilized resources and talent** — Journeymen being used to operate a backhoe or dump truck.
- **Transportation** — Disposal of hydrovac debris many miles from both the site and the vac shop.
- **Inventory** — Field and office supplies, items stored on vehicles, email.
- **Motion** — Trying to find tools, misplaced items, wrong order of work steps.
- **Excess processing** — Insufficient use of alternate locate agreements. Failure to use keyhole technology.

“You can save a ton of money if you focus on applying lean practices,”

Wood says. “We’re putting a big focus on eliminating waste and optimizing processes. The whole nature of moving more centrally into the city that we did a year and half ago, then putting the soil recycling facility here, it’s all about eliminating waste transportation travel time and wait time.”

APPLYING LEAN THINKING

Wood admits that when he and other company officials began applying lean thinking, what they found was a little shocking.

“When we were analyzing billings to customers, we saw that on some days as much as 40 percent of what the customer was being billed was related to traveling to the site, to the disposal site, and then back to the shop,” Wood says. “We saw that as probably the biggest initial opportunity for eliminating waste.”

By adding a hydroexcavation recycling facility in a centralized location, Ontario Excavac knocked out over 30 percent of that travel time.

“We’ve taken four hours out of a bill and put it down to like two hours for travel to and from,” Wood says. “Those are the type of savings we’re seeing. It’s substantial.”

Lean Applied to the Utilities Sector — Examples from Ontario Excavac

TASK	LEAN IMPROVEMENT(S) IMPLEMENTED	BENEFITS OBTAINED
Ordering locates	Alternate locate agreements, preliminary inspections tightened locate area and dig zone	Quicker access to field, less locate fieldwork, bigger execution time window improves planning opportunities
Work planning and scheduling	Sequential work planning based on task cycle-time, self-directed excavation (done without utility crew in attendance, e.g., day prior)	Elimination of wait time, more optimized usage of equipment, level-loaded work schedule
Vehicle daily inspection	Standard two-copy inspection form, use of Vehicle Maintenance Request Form, air brake and wheel lug nut visual status flags	Consistent, documented completion of inspection, prioritization and tracking of repairs; accurate and quick indicators of brake/wheel compliance
Work equipment and tools	Crewman's checklist to verify personal protective equipment, traffic controls, equipment and tools on board	"Ready to dig" when arrive at site
Site setup	Site hazard checklist, tailgate checklist, use of green cones for overhead wires/overhead wire signs	Consistent, thorough evaluation of site potential hazards and how risks are being mitigated, visual reminder of overhead wire risk
Fieldwork — hydroexcavation, working on underground plant, restoration services	Standard operating procedures documented. Use of keyhole tools	Consistent order of steps, use of best technique to reduce cycle-time, smaller excavations, no need to get into excavation, consistent paperwork, safer operations, easier to train new people
Travel each day to and from work site to disposal site	Move to more central greater Toronto area site, build and operate a hydrovac soil recycling facility at the shop	Elimination of significant nonvalue-added transportation saving labor and fuel costs, reduction in carbon footprint, reuse and recycling of soil and water materials.
Inventory control and usage	Use of kanban/vendor managed inventory (VMI) via vending machine for PPE	VMI vending machine controls min/max inventory levels, tracks usage by employee
Fuel cost and air/noise pollution	Reduction in gearing on PTO has engine running at lower revolutions per minute, use of acoustic cabinets	Lower operating cost, less air and noise pollution
Hydrovac vehicle design and layout	Storage cabinets designed for ease of access, auto-lube feature	Cycle-time reduction for setup, work execution, cleanup, ease of maintenance

FOR THE CUSTOMER

It was a leap of faith for Wood and his company, not knowing how their major customer would take the news of applying lean practices.

"We told them we know they pay us for every minute that we're out from door to door, but in the long-term best interest for their business and ours, it just made sense to remove this nonvalue-added time," Wood says.

Wood hoped that on seeing the reduction in bills, their customer would reward Ontario Excavac with more work. "That's exactly what happened," he says. "We just executed an extended alliance agreement with this customer. They've been pleased with our active efforts to contain costs."

Wood says other company owners and managers have to trust that customers will reward them for applying lean thinking.

"I was pretty confident because we've worked with many customers for years," he says. "We were definitely taking a chance to do it because you can just sit there and be fat and sassy and say they can pay for all the travel time and we'll just keep billing them, but at some point, that was going to change. Somebody was going to change that model, and we decided it had to be us."

MAKING IT A COMMITMENT

Any utility construction company can make the changes Ontario Excavac made — it just takes the right mindset.

"It starts with a mindset that you're going to examine your business and

"THERE ARE SOURCES OF WASTE THAT ARE EPIDEMIC IN THE CONSTRUCTION SECTOR. WAIT TIME FOR EXAMPLE IS RAMPANT."

Barry Wood

eliminate waste," Wood says. "It can be employed by service industries, manufacturing and construction. Construction is just a slow adopter. The industry is slow to adopt new practices and new ways of doing things, and lean is just one of them.

"You have to realize it's easy to talk about, but doing it is harder than talking about it. We have our own struggles here. It's change and a shift in culture and how we do things; and it takes time and effort and discipline and commitment to do it." ▼



Fourth Time Is a Charm

CONTRACTOR FINDS A UNIQUE APPROACH FOR CLEANING OUT A STONE-FILLED PIPE WHILE ALSO INSTALLING A NEW PIPE

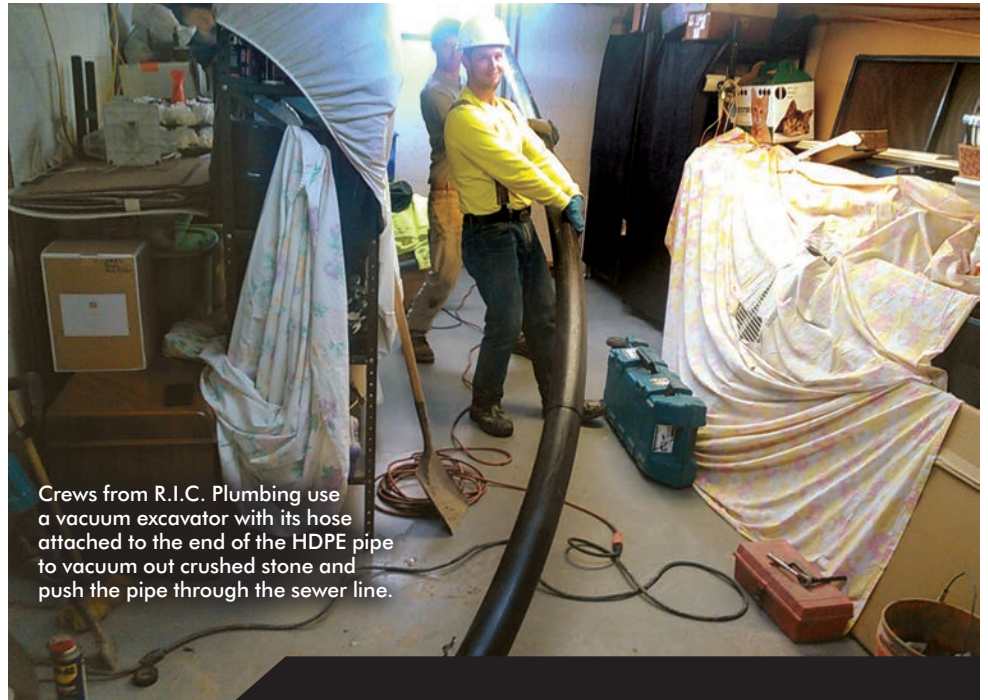
BY CORY DELLENBACH

Scott Kuhns knew it wouldn't be a normal run-of-the-mill job when he found out his company was the fourth one called in to try and find the cause of a sewer lateral blockage.

"We were referred to the customer by the third plumber who had been there," says Kuhns, co-owner of R.I.C. Plumbing in Lockport, New York. "Two other companies tried to snake it. One guy got his jetter stuck, cut it off and left it in there. Another guy tried it and couldn't get it open. The third guy came in, looked at it and referred the customer to us."

R.I.C. Plumbing, which Kuhns owns with his brother, focuses on underground construction, including pipe bursting, lining, sewer jetting and vacuum excavation.

Using their experience and not being afraid to try something new, the team from R.I.C. Plumbing took on the challenging job and used a combination of a vacuum excavation trailer, HDPE pipe and cameras to repair the line for the customer in only one day.



Crews from R.I.C. Plumbing use a vacuum excavator with its hose attached to the end of the HDPE pipe to vacuum out crushed stone and push the pipe through the sewer line.

GETTING IN QUICK

After meeting with the property owner, it was determined that the sewer was full of water and the break was in the street.

The line had an inside trap with no clean-out after it. Kuhns told the customer that his crew would need to remove the trap, then jet and vacuum the debris that was in the sewer in order to get the cameras in for an inspection. The customer agreed but wanted the work done quickly.

"They asked that we try and do it soon because it was an active property with a barbershop in the front and a two-unit apartment in the back," Kuhns says. "We were able to move things around and got back out there the next day."

After clearing the water and debris from the sewer line, the R.I.C. Plumbing crew of four inspected the line using one of the company's four Vivax-Metrotech cameras. The camera got in about 100 feet before running into the problem. A 4-foot section of the original 6-inch clay tile sewer was missing and filled with clean No. 1 round stone. The bad spot was under a new 16-inch water main and 120 feet away from the exit of a new roundabout that the state had just built.

NO DIGGING ALLOWED

Upon discovering the problem, Kuhns went to the state Department of Transportation to see what options there were for correcting the situation.

"They said absolutely no digging could take place in that area," Kuhns says. "We showed a copy of the break to state officials and they said the problem is that of the property owner. The sewer main was also across the street in the right of way."

- PROJECT:** Clearing a sewer lateral that had crushed stone about 100 feet in
- CUSTOMER:** Private property owner with front barbershop and two-unit apartment in back of building
- CONTRACTOR:** R.I.C. Plumbing, Lockport, New York
- EQUIPMENT:** FX30 vacuum trailer, Ditch Witch, 800-654-6481, www.ditchwitch.com
Fusion equipment, Gorlitz Sewer & Drain, 562-944-3060, www.gorlitz.com
PipePatch, Source One Environmental, 810-412-4740, www.s1eonline.com
Camera system, Vivax-Metrotech Corp., 800-446-3392, www.vxmt.com
- RESULTS:** After a full day on the job twice vacuuming crushed stone out of the line, crews were able to install new HDPE pipe into the lateral, saving the customer money by entering through the basement and avoiding the pipe bursting route

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Kuhns went back to the homeowner with the news and began brainstorming ideas of how to repair the break.

The first idea was to dig pits on both sides of the roadway and pipe burst a new pipe in. The second idea was to try and enter through the property owner's basement on that side of the street. "If we could get it from the homeowner's location it would be a lot less costly, and it would only be a day rather than a few days on the job," Kuhns says.

Kuhns and the property owner decided to go with the second option.

VACUUMING THE STONE

The R.I.C. Plumbing crew excavated where the sewer exited the house in the basement. Right after the trap, the crew was met with 6-by-4-inch clay tile reducer, which then moved into 6-inch clay tile pipe. The reducer was broken off to make it 6-inch the entire way. Crews then inserted the tube from the Ditch Witch FX30 vacuum trailer into the pipe and pushed it through to where the break was and started to pull out the crushed stone.

"We did that for an hour or two and got a ton of stone out," Kuhns says.

A camera was then put back into the pipe to check on progress and crews could see the other side of the break. They then fused 120 feet of 4-inch HDPE pipe, using fusion equipment from Gorlitz Sewer & Drain and pushed it through the sewer line.

"When we got to the bad spot, we found that the stone had caved back in again," Kuhns says.

Not giving up, the R.I.C. Plumbing crew hooked up the vacuum to the new HDPE pipe. They then turned on the vacuum and began clearing the stone again until they could see a shot.

"Once we did that, we just started hammering and spinning the HDPE pipe until we got it to go through," Kuhns says. "We got it into the other side of

the pipe, but the main was still another 15 feet beyond that, so we just kept hammering until we got about 4 feet from where the drop was down to the main."

STEERING THE PIPE

A combination of a camera and a 1-inch steel rod were used to help steer the HDPE pipe through the old pipe.

"If we ran into snags or hung up on anything, we would check on the camera to see what we were hitting and then we would steer around it," Kuhns says.

"TWO OTHER COMPANIES TRIED TO SNAKE IT. ONE GUY GOT HIS JETTER STUCK, CUT IT OFF AND LEFT IT IN THERE. ANOTHER GUY TRIED IT AND COULDN'T GET IT OPEN. THE THIRD GUY CAME IN, LOOKED AT IT AND REFERRED THE CUSTOMER TO US."

Scott Kuhns

To help steer, the pipe crews hole-sawed a piece of 1-inch steel through the end of the pipe horizontally on the end not in the pipe. They then used that as a steering wheel. For the end in the pipe, crews cut a 45-degree angle on the pipe to help spin it around the joints in the clay tile. For the camera, R.I.C. Plumbing technicians cut a slit in the HDPE pipe to put the camera reel in and just left the camera in the pipe instead of inserting and removing the camera constantly.

"We were looking at a lot of alternative ways to do this job," Kuhns says. "Sometimes you have to think out of the box."


WRAPPING UP THE JOB

After getting the HDPE pipe to the main sewer line, a PipePatch from Source One Environmental was used to seal of the end of the pipe and grout was pumped in to seal the void in the road.

"We hung the sewer in the basement and installed a sump pump to finish off the job," Kuhns says. "It was a challenging job, but one we are all very proud of." ▼

Vacuum Excavation

MANUFACTURERS DIRECTORY 2018

		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)
See ad page 31	Cusco Fabricators LLC 305 Enford Rd Richmond Hill, ON L4C 3E9 tf: 800-490-3541 p: 905-883-1214 www.wastequip-cusco.com	Cusco Hydro Excavator	Hydro	Chassis	15			1,000 gal	20 gpm, 3,000 psi
		Cusco Sewer Jetter/ Hydro Excavator SJ-X	Hydro	Chassis	12.5	Half Door Full Dump		1,400 gal	18 gpm, 2,900 psi
 Ditch Witch 1959 W. Fir Ave. Perry, OK 73077 tf: 800-654-6481 f: 580-336-3458 www.ditchwitch.com info@ditchwitch.com See ad back cover	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	
See ad page 57	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

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 5,184 cfm	Dual 20" Cyclones 30" Final Filter	8" x 25 ft. Extended	270	Non-Pressure	Driver's Side	No	5,184 cfm 27" Hg	Chassis Driven			winterization lighting tool boxes cabinets	
27" hg 3,800 cfm	30" Final Filter with 20" Cyclone and 12" Drop Box	8" x 26 ft. Extended	270	Optional - Pressure Off-Load	Passenger Side and Front Panel	Yes	3,800 cfm 27" Hg	Chassis Driven Split Transfer Case			winterization lighting tool boxes cabinets	
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	

(continued)

Vacuum Excavation

MANUFACTURERS DIRECTORY 2018

		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)
 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 See ad page 53	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	
 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 See ad page 59	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	
 Kaiser Premier 2550 East Bijou Ave. Fort Morgan, CO 80701 p: 970-542-1975 http://www.kaiserpremier.com sales@kaiserpremier.com See ad page 51	CV Series	Hydro	Chassis	13	36" x 48"	25 degree floor	1,600 - 2,400	20 gpm 3,000 psi	
	Urban X	Hydro & Air	Chassis	6	24" x 27"	47 degree floor	600	10 gpm 3,000 psi	
See ad page 17	McLaughlin Group 2006 Perimeter Rd. Greenville, SC 29605 tf: 800-435-9340 p: 864-277-5870 f: 864-235-9661 www.mclaughlinunderground.com info@mightymole.com	Vermeer MEGA Vac VXT Series	Hydro & Air	Chassis	6, 8, 10	66" diameter	60 degrees	VXT 6: 410 VXT 8 & 10: 800	10 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
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	
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 6,200 cfm	3 stage	8"	340	Fixed, end dump, mechanical assist	Rear, curb side	Yes					winterization lighting tool boxes cabinets	Extreme weather packages, 700k BTU boiler, trash pump, towing packages, steam packages, dual digging packages, rear steps, custom dump door porting, extended van bodies
28" hg 2,400 cfm	4 stage	5" or 6"	270	Fixed, end dump, vibrator assist	Mid rear, curb side	Yes					winterization lighting tool boxes cabinets	Sullair air compressor dual setting 200 cfm 120/200 psi, 500w inverter, 380k BTU boiler, all hydraulic drive, simultaneous operation of all systems, legal when loaded, optional active scale systems available, short wheel base
18" hg 3,500 cfm	3-stage cyclonic	19 ft.	270	Contact McLaughlin	Wireless CAN Controls	Yes	3,200 cfm	Roots Blower			winterization lighting tool boxes cabinets	Dynablast 420FLS Hot Water Heater, Special Paint

(continued)

Vacuum Excavation

MANUFACTURERS DIRECTORY 2018

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)
 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	TS Dino 12	Air	Chassis	15	Side Tipping	42 degrees			
	MTS City Dino	Air	Chassis	4	Rear Tipping	42 degrees			
	MTS Dino 4.5	Air	Chassis	6	Side Tipping	42 degrees			
	Dino 8	Air	Chassis	10.5	Side Tipping	42 degrees			
	MTS Track	Air	Chassis	6	Side Tipping	42 degrees			
 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 <i>See ad page 2</i>	Rival T7	Hydro	Chassis	8	54" Full Opening Rear Door Two Stage Hoist	70 degree	800	13 gpm 2850 psi	
	Rival T10	Hydro	Chassis	10	54" Full Opening Rear Door Two Stage Hoist	70 degree	1200	13 gpm 2850 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 <i>See ad page 11</i>	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	

	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
	Twin Fan @ 24,000 CFM	Automatic Self Cleaning	10" Power Arm	180	Side Tipping	Driver's Side	Yes	24,000	OMSI Transfer Case	320 CFM	116 PSI	lighting tool boxes racks cabinets lighting	Hydrostatic Drive
	Twin Fan @ 18,000 CFM	Automatic Self Cleaning	10" Power Arm	180	Rear Tipping into Bags	Driver's Side	Yes	24,000	OMSI Transfer Case	320 CFM	116 PSI		Hydrostatic Drive
	Twin Fan @ 24,000	Automatic Self Cleaning	10" Power Arm	180	Side Tipping	Driver's Side	Yes	24,000	OMSI Transfer Case	320 CFM	116 PSI		Hydrostatic Drive
	Twin Fan @ 24,000	Self Cleaning Polyester	10" Power Arm	180	Side Tipping	Driver's Side	Yes	24,000	OMSI Transfer Case	320 CFM	116 PSI		
	Twin Fan @ 24,000	Automatic Self Cleaning	10" Power Arm	180	Side Tipping	Driver's Side	Yes	24,000	OMSI Transfer Case	320 CFM	116 PSI		Track Driven/Off-Road
	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
	27" hg 4,000 cfm	cyclone and cartridge	6" x 20 ft.	342	Tilt and Pressure off	curbside	Yes	4000 CFM	PTO/ Hydraulics			winterization lighting tool boxes racks cabinets	All Accessories are Included
	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

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Vacuum Excavation 2018

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>Tornado Global Hydrovacs Ltd. #510, 7015 Macleod Trail SE Calgary, AB T2H 2K6 tf: 877-340-8141 p: 403-742-6121 www.tornadotrucks.com media@tghl.ca</p> <p>See ad page 35</p>	F3 ECO-LITE	Hydro	Chassis	10	48" x 52" Hydraulic Door With Hydraulic Latch		1250	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			
 <p>Transway Systems Inc. 314 Lake Ave. N. Hamilton, ON L8E 3A2 tf: 800-263-4508 p: 905-578-1000 f: 905-561-9176 www.transwaysystems.com sales@transwaysystems.com</p> <p>See ad page 5</p>	Transway Terra-Vex HV38	Hydro	Chassis	12	Half Door	45 degree	700	10 gpm 3,600 psi		
 <p>Vac-Con Inc. 969 Hall Park Rd. Green Cove Springs, FL 32043 p: 904-284-4200 www.vac-con.com vns@vac-con.com</p> <p>See ad page 29</p>	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		
 <p>Vac-Tron Equipment LLC 27137 South Hwy 33 Okahumpka, FL 34762 tf: 1-888-VAC-TRON p: 352-728-2222 www.vactron.com cori@vactron.com</p> <p>See ad page 6</p>	HTV PTO 573	Hydro	Chassis	2.5	48"	60 degree	300/400	4 gpm 4,000 psi		
	HTV PTO 873	Hydro	Chassis	4	48"	60 degree	300/400	4 gpm 4,000 psi		
	LP 573 / 873 SGT	Hydro	Trailer	2.5 / 4	48"	60 degree	200/300	4 gpm 3,500 psi		
	LP 573 / 873 XDT	Hydro	Trailer	2.5 / 4	48"	60 degree	200 / 300	4 gpm 3,500 psi		
	LP 573 / 873 SDT	Hydro	Trailer	2.5 / 4	48"	60 degree	200 / 300	4 gpm 4,000 psi		
	AIR 573 / 873 SDT	Air	Trailer	2.5 / 4	48"	60 degree	200 / 300	4 gpm 4,000 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
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
27" hg 3,800 cfm	Two stage with cyclone and washable polyester final filter	8" x 26 ft.	320	Interior stainless liner	curb side	Yes					winterization lighting tool boxes racks cabinets	Full enclosure for blower and water system
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/ 1200 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	
16 hg 1,000 cfm vacuum pump	pleated poly fabric washable & reusable	optional 6 way hydraulic boom	270	reverse pressure to offload	end cap	Yes					winterization lighting tool boxes racks cabinets	
16 hg 1,000 cfm	pleated poly fabric washable & reusable	optional 6 way hydraulic boom	270	reverse pressure to offload	end cap	Yes						
15 hg 1,000 cfm	pleated poly fabric washable & reusable	optional 6 way hydraulic boom	270	reverse pressure to offload	curbside	Yes						
15 hg 580 cfm	pleated poly fabric washable & reusable	optional 6 way hydraulic boom	270	reverse pressure to offload	curbside	Yes						
15 hg 1,000 cfm	pleated poly fabric washable & reusable	optional 6 way hydraulic boom	270	reverse pressure to offload	curbside	Yes						
15 hg 1,000 cfm	pleated poly fabric washable & reusable	optional 6 way hydraulic boom	270	reverse pressure to offload	curbside	Yes						

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Vacuum Excavation

MANUFACTURERS DIRECTORY 2018

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>Vacall/Gradall Industries, Inc. 406 Mill Ave. New Philadelphia, OH 44663 tf: 800-382-8302 p: 330-339-8428 www.vacall.com mtnorman@gradall.com</p>	AE 1213	Hydro	Chassis	12		42 degrees	1300	10 gpm @3000 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	3.5 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	3.5 gpm 3,000 psi
	Vacmasters System 3000	Hydro & Air	Chassis	1.5	19" Posi-Seal	45 degrees	110 Additional Water Available	3.5 gpm 3,000 psi
	Vacmasters System 4000	Hydro & Air	Chassis	2.25	19" Posi-Seal	55 degrees	85 Additional Water Available	3.5 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	3.5 gpm 3,000 psi
	Vacmasters System 6000	Hydro & Air	Chassis	2.75 or 3.5	60" Full Opening Hydraulic	30 degrees	85 Additional Water Available	3.5 gpm 3,000 psi
 <p>Vactor Manufacturing 1621 S. Illinois St. Streator, IL 61364 tf: 800-627-3171 p: 815-672-3171 f: 815-672-2779 www.vactor.com sales@vactor.com</p>	Vactor HXX Paradigm	Hydro	Chassis	3.342		50 Degree	300 Air only = 100 gallons	8 gpm 2,500 psi Air only = 4 gpm @ 2500 psi
	Vactor HXX Prodigy	Hydro	Chassis	9		50 degree	600	10 gpm 2,500 psi
	Vactor HXX Hydro Excavator	Hydro	Chassis	12		50 degree	1,200	10 gpm 3,000 psi
	Vactor HXX Mid-Size	Hydro	Chassis	12		50 degree	1,200	10 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>	Mudslinger MS800	Hydro	Trailer	4	Full Opening Hydraulic Door	55 degree Hydraulic Dump	325	4 gpm 4,000 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
27" hg 2,812 cfm	Double cyclone	6" x 8 ft.	330	42 degrees Dump	Enclosed cabinet	Yes	27" Hg 2812 cfm	OMSI air-shift Transfer Case			winterization lighting tool boxes racks	
15" hg 780 cfm	Cyclonic/ Cartridge	Hose Assist Arm	360	Hydraulic Dump	curb side	No	780 cfm	36 hp Kubota	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	1000 cfm	99 hp John Deere	150 cfm	185 psi		
15" hg 1,000 cfm		Hose Assist Arm	180	Hydraulic Dump	curb side	No	1000 cfm	155 hp John Deere	300 cfm	220 psi		
15" hg 1,400 cfm		Hose Assist Arm	180	Hydraulic Dump	curb side	Yes	1400 cfm	155 hp John Deere	300 cfm	220 psi		
15" hg 1,866 cfm		5" Hose Extends 22 ft.	270	Hydraulic Dump	curb side	Yes	1866 cfm	155 hp John Deere	350 cfm	250 psi		
15" hg 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	Back fill debris body, hitch, upgraded air compressor, air only, hydroexcavation only, and combination hydroexcavation and air
16" hg 3,200 cfm	Cyclone and polyester final filter	6" diameter	320	dumping, tilting debris body	right side	Yes					winterization lighting tool boxes racks cabinets	Air excavation available, 6 yd. debris body
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					winterization lighting tool boxes racks cabinets	Fan in lieu of positive displacement, telescopic boom, upgraded water pump, 15 yd. debris body
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					winterization lighting tool boxes	Telescopic boom, 15 yd. debris body, upgraded water pump
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	

BY CRAIG MANDLI

Air Excavation

VACMASTERS SYSTEM 6000

The VACMASTERS SYSTEM 6000 is the first air-vacuum excavation system with the power to trench, as well as pothole. It is designed from the ground up to lower costs, reduce injuries and eliminate damage claims. The system uses supersonic air to penetrate, expand and explode the soil from within while keeping it dry for easy vacuuming and quick backfilling. In turn, this will also increase revenues and profitability by doing more work in less time.

800-466-7825; www.vacmasters.com



Blower

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

Kuriyama of America Tigerflex Amphibian Solarguard AMPH-SLR

Tigerflex Amphibian Solarguard AMPH-SLR hose from Kuriyama of America is made to resist the cracking that can result from exposure to damaging UV light. Testing has shown that the specially formulated material retained 97 percent of its original tensile strength after prolonged UV exposure. The safety-yellow color provides high visibility on job sites. The heavy-duty polyurethane-lined hose will handle wet or dry material-handling applications. A static wire is available in the 6- and 8-inch I.D. sizes.

847-755-0360; www.kuriyama.com



Hose Reel

Reelcraft Industries Series L NM400

Series L NM400 cord reels from Reelcraft Industries are NEMA 4-rated and designed for indoor and outdoor use. The reels include a guide arm that is adjustable every 5 degrees over a 270-degree arc, allowing for the exact configuration to suit a wide range of applications. The containerized drive spring allows for safer, easier handling during maintenance. The heavy-duty cast aluminum design and yellow powder-coat finish combine to produce a durable, corrosion-resistant product.

800-444-3134; www.reelcraft.com



Hydroexcavation Equipment

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 reliable, efficient and install-ready for vacuum trucks and hydroexcavators. A full range of heater options are available, such as 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 that is ready to install. They are CSA- and ETL-approved.

800-315-5533; www.easykleen.com



John Brooks Company Limited (Dynablast) CAB420FLS-12V

The John Brooks Company Limited (Dynablast) CAB420FLS-12V hydrovac water heater produces 420,000 Btus with an output temperature of 175 degrees F at 5 gpm, making it ideal for colder climates and improved digging in clay-filled areas. It is designed to fit most municipal-size hydrovac trucks with its 24-by-24-inch footprint. It is ETL-certified, making it consistent in components used in the build and improved heat transfer between the Schedule 80 pipe and water. It comes with two service access panels and two momentary override controls, which increase the serviceability resulting in less downtime. The cabinet is designed with a reversible door for a variety of truck configurations and is built out of 14-gauge steel with polyester UV-protected, powder-coated paint with an aluminum discharge cap and stainless steel hardware.

905-867-4642; www.dynablast.ca



Soil Surgeon hydroexcavating tool

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

949-363-1401; www.soilsurgeoninc.com



Suttner America 1/2-inch Inline Hydro Excavation Spray Gun

The 1/2-inch Inline Hydro Excavation Spray Gun from Suttner America has a horizontal flow-through design and an impact-resistant trigger guard. It offers flow ratings up to 16 gpm and pressure ratings up to 3,200 psi.

800-831-0660; www.suttner.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 270-degree boom rotation. Outfitted with quality components and reverse engineered for optimal weight and payload with a superior operator control system, the unit is focused on the need for simpler regular maintenance and durable and uncomplicated sys-

tems, resulting in fewer repairs and less downtime. It can be paired with a Cusco SJX hydroexcavator to provide growing 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 for performance and productivity on any midsized potholing, soft-excavation or cleanup task. The low-profile machine reduces unit height without compromising ground clearance. It is available with a choice of a 500- or 800-gallon debris tank, and is available in a light or heavy version. Also available are advanced optional boom designs to enhance ease of use. It is designed for ideal airflow and increased efficiency. With advanced sound-reducing technology, it creates minimal disturbance in noise-sensitive areas. An optional reverse-flow feature allows quick and easy spoil off-loads for improved productivity.



800-654-6481; www.ditchwitch.com

GapVax HV33

Designed for city use, the GapVax HV33 is shorter, smaller and more compact than its predecessor. It is designed to safely transport water and debris in urban areas. It is 30 feet long overall on a medium-duty chassis and includes a 600-gallon water tank, 6-cubic-yard debris body, a 14- to 17-foot 6-inch boom in 8 or 6 inches, 4,000 cfm of power, and an inverted fully opening tailgate.



888-442-7829; www.gapvax.com

Imperial Industries Hydro 3600 Hybrid Excavator

The multi-purpose Hydro 3600 Hybrid Excavator from Imperial Industries offers a short chassis and high payload, capable of hauling 3,600 gallons with a 215-gallon onboard water capacity that can be easily connected to a nurse tank. An optional 16-function remote control feature makes for easy operation of the boom, jetter, blower and vacuum. It is built on a 2018 Peterbilt Paccar MX13 body with a three-stage lift hoist with built-in vibrator to ensure dumping ease. It is made to minimize time spent on the job site.



800-558-2945; www.imperialind.com

McLaughlin Vermeer MEGA VAC VXT

The Vermeer MEGA VAC VXT PTO truck series from McLaughlin is a highly productive vacuum excavator ideal for utility and distribution contractors. The 6-inch, PTO-driven series comes in three standard spoil capacities ranging from 1,200 to 2,000 gallons. It is powered by an OMSI Gearbox and a ROOTS 3,200 cfm blower. A CAN Remote Control system allows for two-way communication between the remote control and the vacuum excavator, helping contractors increase job site productivity.



800-435-9340; www.mclaughlinunderground.com

Presvac Systems Hydrovac

The versatile Presvac Systems Hydrovac is designed for 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 knock-out features in the debris tank minimizing carryover. Modular filtration configured to blower size provides blower protection and minimal maintenance. 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

Ramvac by Sewer Equipment HX-12

The HX-12 hydroexcavator from Ramvac by Sewer Equipment has a 12-yard debris tank and a temperature-controlled environmental chamber that contains the entire water system, including water tanks. A directional discharge system allows the operator to off-load debris back into the excavation site when finished, without the mess of dumping the tank. This system also allows operators to blow any obstructions out of the dig hose. It includes a long-range wireless remote, NEMA 4 electrical system, a 900,000 Btu water boiler and a three-stage cyclonic filtration system. The standard 4,400 cfm blower delivers fuel economy. It is available with a RamAir air excavation system touting a 185 cfm at 150 psi air compressor for when the operator can't risk adding water to the problem area.



877-735-4640; www.ram-vac.com

Rival Hydrovac

The Rival Hydrovac unit has the ability to pressure off loads, as opposed to the conventional dumping of each load. This allows for a more rapid and, when required, controlled off-loading of slurried loads. A hose can be connected to the rear valve, and the load can be forced into another container, truck, trailer, or wherever it needs to be moved. As off-loading becomes more of a challenge, the unit allows for a more versatile approach to getting the debris to a secondary location or vehicle in a controlled manner quickly. The process is accomplished by moving a lever, closing the boom valve and opening a valve on the rear of the truck. The truck can be hoisted while the pressure-off process is occurring, allowing for a more complete dump cycle. It allows the unit to remain on site and pressure each load to a waiting tank or vehicle.



844-467-4825; www.rivalhydrovac.com

Schwing America VX115

The VX115 vacuum excavator from Schwing America is an all-in-one unit with air and water systems onboard. Roll-off vacuum boxes can be changed out on site while work continues. It offers 115 feet of horizontal and 110 feet of vertical reach, which allows more than 1 acre to be covered from one setup. It is based on a proven four-section, 39-meter roll-and-fold boom. The VE115 vacuum extension can connect to any vacuum excavator with a minimum 5,000 scfm positive displacement blower. High-pressure water and air connections are on the rear of the chassis with plumbing to the boom tip.



888-724-9464; www.schwing.com

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Super Products Mud Dog 1200

The Mud Dog 1200 12-yard-debris-capacity hydroexcavator from Super Products has a rear-mounted boom capable of a 19- to 27-foot reach, 335-degree rotation, 45-degree upward and 25-degree downward pivot. This range of boom motion allows crews to achieve greater work area access and deeper digging without halting production to reposition the trunk. Easy-to-use ejector plate unloading technology provides fast, thorough and safe debris removal. A tilt-unloading feature ensures liquids in the debris tank are cleared quickly and efficiently, even when unloading in an up-slope/nose-down position. Options include the Acculevel load-sensor system for precise debris tank level measurement.

800-837-9711; www.superproductsllc.com



Supervac Atlas

At 33 feet, the Atlas hydroexcavation trailer from Supervac offers the compact versatility of a



regular vacuum truck, with a high payload capacity of 45,000 pounds. It is easy to maneuver with its tight turning radius and solves road weight limit issues. It comes equipped with a flashing arrow and LED working light, full-opening rear door, protection arm and LED light, a hydraulic door lock, 3,600-gallon carbon-steel debris tank and baffle, and a catwalk access ladder and handrail. Its six side-mounted and evenly distributed plastic water tanks (three on each side) have a total capacity of 1,500 gallons. It runs off the chassis engine of the tractor being used to haul the trailer. The unit's top-loading boom offers 320-degree rotation, extension of 25 feet, an 8-inch flex hose, top access door and protection elbow. A winterization package is available.

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 1,400 gallons of freshwater. This unit is over 7,000 pounds lighter than the company's older models and offers nearly triple the payload. The boom has a 342-degree rotation and a 26-foot reach. The F3 ECOLITE is a 10-cubic-yard, 1,200-gallon water tandem-axle unit that also more than doubles older payload capacities. With an 8-inch boom and a 3,800 cfm blower, although smaller, it's still robust and powerful.

877-340-8141; 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

Vector HXX QX

The Vector HXX QX vacuum excavator offers improvements in payload capacity, weight distribution, operation and performance. The truck maximizes legal payload for customers and improves operational efficiency. The placement of the debris body and water tank on the chassis ensures equal distribution of the payload on the axles, regardless of how much water is in the tanks. Each component is purposely placed to ensure the entire chassis gross vehicle weight rating is used. A PrecisionFlow water pump features a single-piston design. The truck comes with a QuietPak sound-damping system with a Robuschi USA positive displacement blower rated for 6,176 cfm and 28 inches Hg. The system delivers higher airflow and quieter operation, with a decibel rating of less than 90 dBA throughout the revolutions per minute range. It has a Park-N-Dig quick operation design, which reduces setup and tear-down time between jobs, and a 7-inch display with real-time operational and performance information feedback.

800-627-3171; www.vector.com



Vector Technologies Mudslinger

The Mudslinger line of powerful, compact trailer-mounted hydroexcavation vacuums from Vac-Con, in cooperation with Vector Technologies, uses a 66.8 hp Kubota diesel engine with a 1,200 cfm at 16 inches Hg positive displacement blower and comes 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 inches of 3/8-inch hose and comes with a 225- or 325-gallon HDPE water tank. A 9-foot boom with 24 inches of hydraulic extension, hydraulic up/down and 270 degrees of manual rotation is also available. It is mounted on a heavy-duty welded tube steel trailer.

800-832-4010; www.vector-vacuums.com



Westech Vac Systems Wolf

The Wolf noncode hydrovac truck from Westech Vac Systems is ideal 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 percent, lowering the overall cost of the truck. The 1,500-gallon capacity ensures ample water storage capacity 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.enzusainc.com



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.hydralflexinc.com



Nozzle Dynamics Vortex-DigJet

Vortex-DigJet hydroexcavation nozzles from Nozzle Dynamics are designed for locating buried utilities. The swirling action of the fluid from the nozzle creates a drilling action into the ground that never stops, even if the nozzle hits into the ground. It offers pressures up to 5,000 psi and flows from 5 to 14 gpm. It has Jet Intensification Technology, with a compact, lightweight design that has predictable wear and a long tool life. There are no seals to replace or rebuild.

833-669-9537; www.nozzledyne.com



NozzTeq MANTA Bottom Cleaner

The MANTA Bottom Cleaner from NozzTeq is recycled-water-friendly with interior surfaces and interchangeable rear jetting plates made of stainless steel and ceramic parts to stand up to hard water and grit. It is very heavy at more than 50 pounds, and it slides on wide runners that are replaceable, keeping it on the bottom of large-diameter pipes where it will do the most good. The nozzle's bottom surface will never wear out. Its jetting plate is interchangeable and replaceable, and the plates come in 8-, 10- and 12-jet configurations.

866-620-5915; www.nozzteq.com



StoneAge HXR-300 Rotary Hydro-X

The HXR-300 Rotary Hydro-X nozzle from StoneAge uses an angled rotating jet pattern that's designed to decrease jet dwell time and reduce undercutting for effective work around utilities. Users can save labor hours and heavy-equipment costs, all while avoiding the risk of damage to buried utilities. It is fully rebuildable, allowing the operator to reduce cost of ownership by extending the life of the tool with minimal, low-cost maintenance. There are three jetting options available for a variety of applications: higher flow for harder surfaces, intermediate flow for general use, and lower flow for water savings. It handles pressures up to 5,000 psi and flow rates from 3.5 to 10 gpm.

866-795-1586; www.stoneagetools.com



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Sludge Pump

Gorman-Rupp ValuPrime

The ValuPrime priming-assisted centrifugal pump from Gorman-Rupp is a compact and powerful pump ideally suited for the dewatering needs of the construction, industrial and agricultural markets. It is available in 4-by-4-inch and 6-by-6-inch models, with flows to 1,520 gpm, total dynamic head to 150 feet, and solids-handling capabilities up to 3 inches.

It comes standard with a 34-gallon fuel tank, programmable control panel and an Environmental Protection Agency-compliant Isuzu Final Tier 4 diesel engine. It is ideal for flood and stormwater standby, general job site dewatering, dust control, and water and street department applications.

419-755-1011; www.grpumps.com



Vacuum Pump

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



Not Worth the Risk

BASIC PROTECTIVE EQUIPMENT IS SIMPLE, INEXPENSIVE, AND OFTEN THE DIFFERENCE BETWEEN GOING HOME AND TAKING A TRIP TO THE HOSPITAL

BY JARED RANEY

Disease, blindness, trauma, death — these are the risks for service industry workers when they fail to use basic personal protective equipment.

Some of the simplest protective gear costs mere dollars, yet are frequently discarded or treated with disdain by operators who see them as an unnecessary hassle.

A COSTLY PROSPECT

Take the simplest PPE of all: safety glasses. They are a perfect demonstration of unnecessary risk.

Each year, more than 20,000 eye injuries occur in service industries, adding up to a cumulative cost of \$300 million. On the flip side, ANSI-rated safety glasses can be purchased for around \$1.

Here's something else to consider: According to an article by *Inverse*, the cost of emergency eye care is on the rise, with emergency ocular surgery costing upward of \$20,000 — in 2015.

The potential for eye injuries is vast in service industries, with blunt trauma, penetrative injury from grinding or cutting debris, as well as contact with hazardous substances or chemicals all common risks.

CHEAP DOESN'T EQUAL UNIMPORTANT

Other safety gear, like disposable gloves and earplugs, literally cost cents, and while the danger isn't quite as significant, lack of both can cause big problems.

Service workers of all stripes have to deal with loud sounds. Without proper ear protection, some level of hearing loss is all but inevitable, and while this may not result in lost time or emergency care, it certainly decreases quality of life for workers.

There are many levels of hand protection, but the basic disposable glove is often the most overlooked. That's probably because it doesn't generally protect against visible threats — trauma or impact danger.

However, protecting against pathogens and bacteria is incredibly important, especially in the water and wastewater industries. A hand injury can result in a lot of time off, but how many days might you lose from repeated illnesses over time, when the solution could be as simple as taking an extra minute to don a pair of rubber gloves?

That's the best case: Not all pathogen-related illness is as benign as stomach flu. Failing to protect against this most fundamental danger can result in significant risk to worker health: There are reports of wastewater workers in Ohio, Alaska, and Canada contracting hepatitis A, according to Cornell University's *Health Hazard Manual: Wastewater Treatment Plant and Sewer Workers*.



EACH YEAR, MORE THAN 20,000 EYE INJURIES OCCUR IN SERVICE INDUSTRIES, ADDING UP TO A CUMULATIVE COST OF \$300 MILLION.

SAFETY IS TOP TO BOTTOM

The danger of not wearing a hard hat seems to go without saying, yet many workers still manage to find trouble in this regard. Though they have been in use since 1931 (ORR Safety) and are required in many situations by OSHA, every year there are fines and accidents to show that workers don't always wear them when they should.

Though not the cheapest item on this list, basic hard hats can cost less than \$10 and are perhaps the most essential. Unlike eye injury, hearing loss or even pathogen-borne illness in most cases, head trauma can have life-altering effects; the biggest risk, of course, is death.

Incidence of workers in water and wastewater work may not be as common as, say, construction industries, but they are not unheard of. Take for example the case cited by a University of Iowa health report, where a 29-year-old public works employee was killed after being struck in the head by a 1-inch jetting nozzle.

If that's not convincing enough, consider that there were 65,000 head injury cases in 2012 involving days away from work, according to *Safety and Health* magazine. They also reported that in 2015, over 1,000 workers died from head injuries sustained on the job.



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GAS MONITORS

Speaking of bigger dangers, this last item — possibly the most underutilized safety item — is the only one whose specific goal is to prevent loss of life: gas monitors.

A portable gas monitor isn't a throwaway expense, running anywhere from around \$100 into the thousands, but compared to the alternative, it's a bargain.

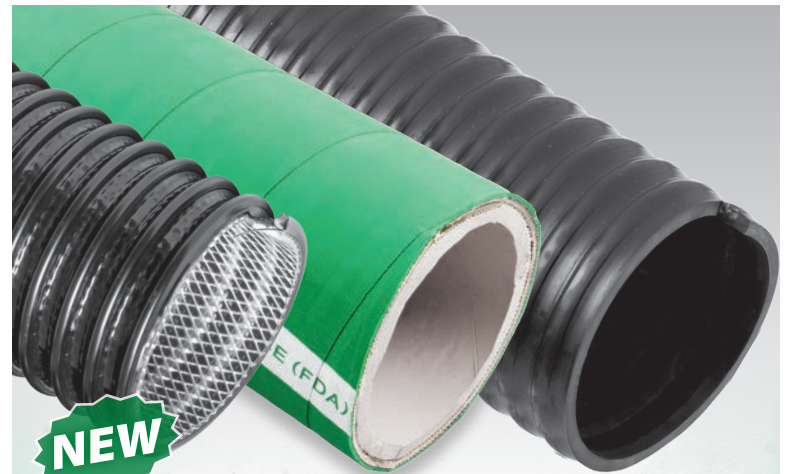
Stories abound of workers who went into a sewer or tank without a monitor — or worse, had a monitor and failed to use it — and quickly met their demise.

Case in point: OSHA recently finished an investigation into the death of a father and son in Mississippi who were killed while working in a lift station last June. The 20-year-old son lost consciousness due to hydrogen sulfide gas, and the father died trying to pull him out.

Though worker safety is obviously the biggest concern, situations like this bring home the cost-effectiveness of providing workers with the proper safety equipment. The company that hired the father and son were charged with nine serious violations and over \$27,000 in fines.

CONSIDER ALL THE COSTS

All these dangers are costly: Between medical costs, lost work time and workers' compensation, companies collectively lose hundreds of millions per year. When the solution is often a simple piece of plastic, why take the risk? ▼



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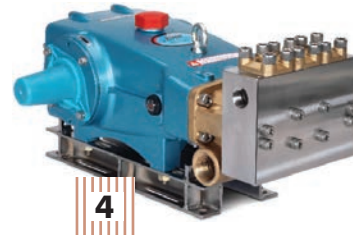
THE LATEST: Products



1



3



4



2



5

1. Baldwin Filters EnduraPanel air filters

EnduraPanel air filter technology from Baldwin Filters combines high efficiency and maximum capacity in a rugged, compact design that is 50 percent smaller than conventional air filters. The filters can withstand extended periods of vibration and high temperatures without rips, tears or other structural failures. They provide effective protection for heavy-duty equipment throughout the entire service interval. The proprietary horizontal pleat formation allows the media to be solidly embedded into the end cap, reducing the number of possible leak paths. A high-strength injection-molded frame and expanded metal support provide superior strength to prevent structural failure or media pack collapse. **800-822-5394; www.baldwinfilter.com**

2. Felling Trailers EZ Tilt Technology

Felling Trailers EZ Tilt Technology allows for ground-level loading with its rotating torsion suspension, providing a 5-degree load angle. The low load angle makes it possible to load and unload low-clearance equipment such as floor sweepers, scissor lifts and rollers. The EZ Tilt has an 18.5-foot deck length, including a 3.5-foot approach plate at the rear of the deck. The electric/hydraulic lift system, with corded remote and 12-volt battery in a lockable enclosure, gives the operator the ability to load and deliver two scissor lifts at a time. **800-245-2809; www.felling.com**

3. MB Crusher's drum cutters line

MB Crusher offers a line of drum cutters with a direct-drive twin-motor system that allows for the differential distribution of power to the two rotary cutting heads. The MB-R drum cutter line can handle job sites where standard excavation systems are underpowered and hammer systems are ineffective. They are compact, powerful tools that can be attached to a range of heavy machinery. The cutters are manufactured to increase

stability and reduce stress on the machine arm. Power comes from the hydraulic system of the machine it is attached to. MB Crusher's drum cutters have a hydraulic control system that automatically manages calibration and hydraulic cooling during operations. There are several different models to choose from, depending on the operating weight of the machinery. **855-622-7874; www.mbamerica.com**

4. Cat Pumps Model 3560 water pump

The Cat Pumps Model 3560 is a high-pressure water pump with two performance ratings: 25 gpm at 3000 psi and 20 gpm at 4000 psi. The pump is ideal for equipment operating in high-duty cycle/remote applications, such as hydroexcavating and jetting. It can be direct-driven hydraulically or pulley-driven from motor or engine. Other features include V-packings and low-pressure seals completely lubricated and cooled, which greatly increase pump life. No external oilers are required. The discharge manifold is constructed from 316 SS for high-strength and long-life in demanding applications. The manifold is easily serviced without entering the crankcase. It is available from stock for immediate shipment. **763-780-5440; www.catpumps.com**

5. Super Products Camel Maxxx 1200 sewer cleaner

The Super Products Camel Maxxx 1200 sewer cleaner offers 1,500-gallon water and 12-yard debris capacity and a large, 7-inch display at the front control panel. It utilizes a heavy-duty transfer case with a hot shift blower control at the front operator's station, eliminating trips back inside the cab to turn the vacuum pump on and off. An extreme transfer case and hydraulic cooling system allow for continuous work without the fear of overheating. The front-mounted hose reel extends 18 inches and is capable of 270-degree rotation, including when fully retracted, and is lockable in any position. **800-837-9711; www.superproductsllc.com** ▼

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DESIGN. BUILD. PERFORM.
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This Issue's Feature: Keeping an eye on your business

BY CRAIG MANDLI

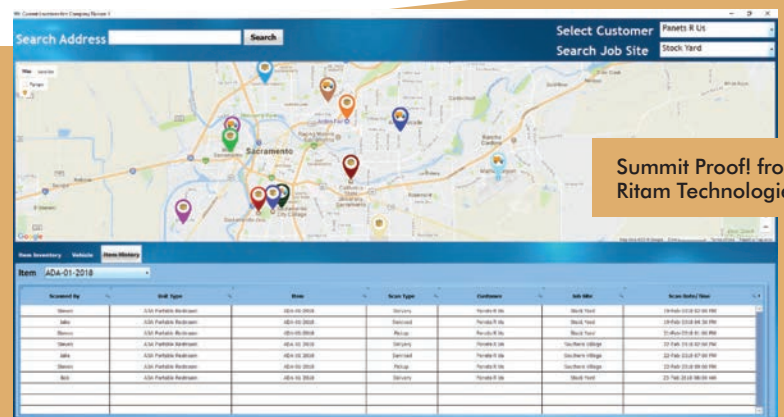
Running a business can be a challenge. While many software programs can aid an owner in different parts of their business, doing so requires the owner to not only purchase, but also familiarize themselves with these different programs. Fortunately, **Ritam Technologies** has a program designed to consolidate these services into one easy-to-use, intuitive package — **Summit Proof!**

"It allows a company owner to know where their assets are at all times," says Mark Billings, the company's senior software engineer. "That can be a big timesaver and money saver in the long run for most businesses."

Using the program is easy. A bar code tag is secured on equipment inventory and technician vehicles. By scanning the bar code (via smartphone, iPhone, tablet, or iPad), the company owner can track job sites, current driver locations, service completion, and inventory movements. The program can be used as a stand-alone product, meaning there is no need to change existing software, and since most technicians already have smartphones, there are no special bar code readers to buy.

"It's really going to be a benefit to growing businesses," Billings says. "Instead of taking all that time on the phone trying to track assets, this does it automatically."

The core of the system is the desktop app, which allows the user to set up abbreviated information related to customers, job sites, contact info, email



addresses, text and voice numbers, warehouse and inventory information, technicians, supervisors, vehicles, and mobile devices. For the second facet of the program, a technician scans units as they are delivered, picked up, and serviced, or to notify of reasons service could not be performed.

Data is sent to email and text manager automatically and then to the customers and job contacts, as necessary, according to customer preferences. The supervisor feature has the same capabilities as the technician-based portion, plus additional features to manage the business operations, including inventory management, a mapped view of jobs and current truck locations, and a service and delivery history of inventory usage throughout its life.

The customer-based portion of the program senses any new scans that come from the technician and supervisor apps and automatically sends emails and texts to either the customer contact, the job site contact, or both. A customer web portal allows them to view their own history.

800-662-8471; www.ritam.com

BY CRAIG MANDLI



Dry excavator enables easy trenching for pipeline client

PROBLEM

A large Ontario pipeline client required a trench (250 feet long by 10 inches wide by 2 1/2 feet deep) and two anode holes (12 inch depth) to be excavated at an isolated, secure pumping station while avoiding all buried utility lines. The top layer of the site consisted of coarse granular material; however, the underlying soil structure was clay, typically a difficult soil for excavation. Due to potential site contamination, using a traditional hydrovac was undesirable considering projected high costs of offsite disposal based on third-party processing fees, additional operational charges due to significant travel distances, and reduced productivity rates overall. Reusing the original excavated material was the desired method of spoils treatment.

SOLUTION

Utilizing the **OX Equipment MTS Dino 8 dry suction excavator**, the excavation contractor, Super Sucker, was able to safely excavate between and around existing boundaries, structures, and utilities without the use of water. Powerful, onboard twin compressors producing over 300 cfm quickly and safely broke the clay, and 24,000 cfm of suction removed the material. While in full suction mode, the operators were able to continuously dig safely while remotely moving the unit forward or backward with the hydrostatic drive. All excavated material was off-loaded directly into bins on site via the side-tipping hopper.

RESULT

The excavation contractor was able to stay on site and complete the project by removing over 30 cubic yards of material in a single nine-hour workday. Excavated material was reinstated later when installation work was completed, eliminating both disposal and new fill material costs. Keeping the site dry allowed the client to perform work immediately, in ideal conditions, ahead of original timelines. **888-290-4044; www.ox-equipment.com**



Vacuum excavator a fit on college campus

PROBLEM

Some of the initiatives that University of Central Florida utility workers handle daily include identifying and mapping the location of utility lines. “We have a lot of old utility lines in the ground that haven’t been located in many decades,” says Anthony Lugo, University of Central Florida utility supervisor. “They have never been marked properly, and it is our job to find them, mark them, and put them on the map. Finding those lines can be time-consuming and intrusive to the property. But the biggest obstacle, when you are part of the utility crew, is safety. You don’t want to hit electrical lines with a shovel.”

SOLUTION

The university purchased a **Vac-Tron Equipment AIR 373 SDT vacuum excavation unit**. The unit is powered by an 83 hp Yanmar diesel engine and comes standard with a 300-gallon debris tank, air pressure of 150 cfm at 170 psi, hydraulically operated full-open rear door with auto engage safety latch, and one 100-gallon water tank. Its remote debris tank collects the dry material and then can be positioned back over the hole to put back into place without causing much disruption to the surroundings.

RESULT

Upgrading from traditional methods of excavation, an excavator or hand shovel, to a Vac-Tron Equipment unit has greatly increased efficiency for the University of Central Florida utility crew. “It made things faster; it made things safer,” Lugo says. “It saves us a lot of time: What used to take four to six hours, now only takes one to two hours. We aren’t spending any unnecessary time doing a job.” **352-728-2222; www.vactron.com**

(continued)

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Hydroexcavator works around distance and difficult landscape

PROBLEM

ADP Group was tasked with a site investigation at a former gasworks post to obtain data on soil and groundwater conditions in North Yorkshire, U.K. The workload included drilling and installation of monitoring boreholes, a full site utility survey and clearance of services including an hydrovac service along the front of the site, and hydroexcavation to avoid buried lines and apparatus before advancing boreholes with a rotary drill. The work site was located at the end of a small footpath not large enough for vehicular access. The closest locale to place equipment was approximately 65 yards from the furthest exploratory tract. In addition, the overall work site was 11 yards lower than the vehicle compound.

SOLUTION

With all of the environmental challenges taken into account, the **Vac-Con X-Cavator** was selected for the operation. The 8-foot boom of the X-Cavator was used in the placement of pipework toward the foot access, and the 6-foot boom laid out the remainder of the work site. The water system of the X-Cavator was used to excavate the site, while the vacuum system easily pulled the material back to the tank on the machine, based on the compound.

RESULT

“Our flagship hydroexcavator showcased the benefits of hydro-vacuum excavation at a complicated job site,” according to the ADP Group foreman. “The Vac-Con X-Cavator has been safely excavating predrill pits working 65-plus meters from the work site, reducing manual handling and costs, all while ensuring that any underground services encountered were not damaged.” 904-284-4200; www.vac-con.com



Hydroexcavator a fit for wind farm work

PROBLEM

Based in Southfield, Michigan, Barton Malow is Consumers Energy’s lead contractor for the Tuscola County Cross Winds Energy Park 105 MW wind farm — designed to capture and convert wind to electricity. The infrastructure plan included 62 wind turbines in an electrical generation system involving easements on 51,300 acres for the underground electrical collections system. To create safe pathways through the project for heavy equipment and to plot the future location of collection lines, Barton Malow crews found it necessary to verify the location and depth of underground gas, utility and fiber optic lines shown on existing maps.

SOLUTION

Barton Malow chose to use **Vacall - Gradall Industries’ AllExcavate** models for Cross Winds. “It’s got a lot of power,” says Bob Angell, operator, who was digging holes to install ports where the utility lines could be viewed. He especially liked the AllSmartFlow control system that’s standard on all Vacall machines. Using a color LCD screen and a wireless remote-control device, he says he can locate the boom properly and dial in the jetting and vacuum forces that he wants. “It’s very precise, and when you dial it in, you’ll get exactly what you want all day long,” he says.

RESULT

Daniel Ortega, safety coordinator on the site, says the company is especially sensitive to job site safety, so the job performed with the Vacall machines at the Cross Winds project to create safe pathways for machine travel and transmission lines is critical to its success. 330-339-2211; www.vacall.com ▼

THE LATEST: News

Case Construction Equipment names new vice president

Case has named Michel Marchand as vice president for North America, replacing Scott Harris, who has taken a similar role at Case IH. Marchand, who previously served as the regional sales director for Canada, will now oversee all Case Construction operations in North America.



Michel Marchand

Komatsu America moving North America headquarters to Chicago

Komatsu America announced plans to move company headquarters to Chicago in 2020. The new site at Triangle Plaza, 8770 W. Bryn Mawr Ave., will feature an open floor plan designed to foster more collaboration and cross-functional team communication. Komatsu Ltd., parent company of Komatsu America, established a permanent presence in the U.S. in 1970, with the first headquarters in San Francisco. Since then, Atlanta and other Illinois locations including Libertyville, Lincolnshire, Vernon Hills, and for past 11 years Rolling Meadows, have all served as headquarter cities.

LTA launches new website

LTA launched a new website for its LoadMaster line of products. The main page of www.4loadmaster.com features easily clickable links to guide customers to the products with pho-

tos. LoadMaster products are in-bed cargo management solutions for pickup owners, capable of holding varying weights.

East Mfg. celebrates 50 years

East Mfg. celebrates 50 years with special 50th Anniversary Trailer Packages, standard on each of its four aluminum trailer lines. The flatbed, drop-deck, dump and refuse trailer packages include gold East Mfg. nameplates along with 50th Anniversary logo mudflaps. In addition, gold anodized flat hook tie-downs are included on flatbed and drop-deck trailers.

American Augers' Dan Heath elected president, GTLA

Dan Heath, product support manager for American Augers and Trenchor, was elected president of the Great Lakes Trenchless Association at its annual membership meeting. He has been with American Augers since January 2007 and will be the first noncontractor president of the contractor-focused organization.



Dan Heath

Accepting the position, Heath says, "One of my primary focuses as acting president for the GLTA will be to put a spotlight on our industry as a viable option for future employment. The GLTA has a good mix of contractors and equipment manufacturers, all of which need good quality employees." ▼



Seeing Red?

Do you have a question about maintenance on a piece of equipment? Dig Different can track down the answer for you in our **Machine Shop** feature. Send us your question and it could be a future column.

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HEAVY-DUTY, HIGH-IMPACT HYDRO-EXCAVATION NOZZLES



ROTATING TURBO NOZZLE



"The Ripsaw HD that I have been currently using is amazing! I now have over 700 hours on it, and the cover still looks great. I was operating this nozzle at winter's end, so it has been through all conditions from thick frost, road pack, and very rocky conditions."

Terry Rawn, Owner - Hydrovac Nation

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Happenings

CALENDAR

Aug. 28-29

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

Sept. 10-12

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

Sept. 29-Oct. 3

91st Water Environment Federation Technical Exhibition and Conference (WEFTEC), Ernest N. Morial Convention Center, New Orleans. Visit www.weftec.org

Oct. 23-26

EquipmentSHIFT, Renaissance Columbus Downtown Hotel, Columbus, Ohio. Visit www.aemp.org/page/shift2018

Nov. 1-2

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

Nov. 7-8

Pipeline Leadership Conference, Hyatt Place Houston/The Woodlands, Houston. Visit www.plconference.com

Nov. 28-29

Risk Management in Underground Construction Course, Hotel Mdr Marina del Rey, Marina del Rey, California. Visit www.undergroundriskmanagement.com

Dig Different welcomes your contributions to our Happenings column. To recognize members of your team, please send notices of new hires, promotions, service milestones, certifications or achievements. We also invite your national, state or local associations and organizations to post notices, news items and learning opportunities. Send contributions to editor@digdifferent.com. ▼

CLASSIFIEDS

EQUIPMENT & TOOLS

2007 Sterling Vactor 2100PD tandem-axle combination cleaning truck. Ex-city owned, well maintained, and equipped with California Carb Compliant DPF System. See details of this unit and other cleaning and CCTV inspection units at www.empireequip.com. Contact Craig at 714-639-8352. (CBM)

1999 International Guzzler vacuum excavator: Totally refurbished, purchased new for Big Dig Project. 27" blower, CAT engine, auto remote. Special noise-suppression equipment. Tri-axle. High-pressure wash-down system - 300-gallon water tank. \$59,500 OBO. Also available 1997 Ford Guzzler vacuum excavator - same features as 1999 International. No washdown system. \$59,500 OBO. 617-908-1629, MA (PBM)

Frac Tanks from Geneva Equipment. Financing available! Delivered to your door! Perfect for: Portable sanitation storage; Dewatering; Wastewater storage and treatment; Hydroexcavation; Stormwater runoff. Geneva Equipment has 1,000+ frac tanks available, epoxy lined and EPA compliant. Call 855-202-7872 or sales@genevaequipment.com. www.genevaequipment.com (P07)

Recycle Jet Vac for Sale: 2015 Kenworth T880 w/Cummins ISX15 engine, 32,900 miles. 1,500-gallon stainless steel water tank, 10-yard stainless steel debris tank. 590 ft. 1-1/4 hose on rotating reel; 325 ft. 1/2 lateral hose. Uraca P3-45-70 Triplex water pump, 125gpm/2,175psi. Email MHughes@gapvax.com or call 888-442-7829. (C07)

2005 GapVax HV56 Hydroexcavator, wet/dry, Volvo VHD, 10-speed, pre-emissions, 12k miles on new engine. 28" Hibon blower, Giant water pump. Omnex remote, vibrator, powered extendable boom. 15-yard debris, 1,200-gallon water. Ready to work.. \$85,000 OBO. Call 317-773-7996, IN (C07)

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

RENTALS

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

What's Your Story?

Dig Different welcomes news about a tough excavation, pipe bursting, trenching, boring or tunneling job you just completed for the Down & Dirty column.

Send your news to editor@digdifferent.com or call 800-257-7222

DOWN
& DIRTY

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