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Familylike atmosphere drives
success of hydrovac company

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Shawn Emsley
Operator
Northstar Hydrovac

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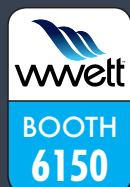
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- Profile: S&S Directional Drilling (Norco, California)
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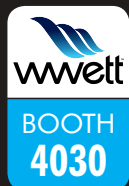


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'Tis the Season

ATTENDING A TRADE SHOW WILL BOOST YOUR KNOWLEDGE OF THE INDUSTRY AND GIVE YOU A GLIMPSE OF WHAT YOUR COMPANY COULD BE

BY CORY DELLENBACH, EDITOR

Now that the holidays are past us, it's time to think about the next big season. That's right, show season!

The next few months bring some of the biggest shows in our industry, starting this month with the Underground Construction Technology International Conference, followed by the Water & Wastewater Equipment, Treatment & Transport (WWETT) Show in February and then the No-Dig Show in March.

It starts at the end of this month with UCT from Jan. 29-31 in Fort Worth, Texas. Nearly 200 exhibitors will be showcasing equipment and technologies used to maintain utility piping systems. The show markets itself for individuals representing water, sewer, gas, telecom and electric.

Less than a month after that, the WWETT Show will be taking place in Indianapolis from Feb. 20-23 at the Indiana Convention Center. More than 600 exhibitors will be displaying the latest in technologies in over 350,000 square feet of exhibit space.

Some of the markets covered at the WWETT Show include hydroexcavation, industrial vacuuming, utility location, safety equipment and confined space. If you're looking for a way to diversify your company, this is the show to attend to see other industries such as septic pumping, sewer cleaning and onsite installation, just to name a few.

While those shows have an educational component, one of the bigger shows when it comes to education and case studies comes in March with the North American Society for Trenchless Technology's No-Dig Show from March 17-21 in Chicago.

Last year 2,047 attendees were at the No-Dig Show, which dubs itself the largest trenchless technology conference in North America, where professionals attend to learn new techniques that will save money and improve infrastructure.

FINDING WAYS TO GROW

If you can't attend all three shows — which I would highly recommend — then you should at least pick one. Attending any of these shows will broaden your knowledge of the industry and even help you grow your own company with new technologies or methods of doing the same work.

Speaking of growing the business, both of the contractors featured this month — Ontario-based Fairway Utilities and Alberta-based Northstar Hydrovac — have both seen growth, but they achieved it in completely different ways.

Northstar Hydrovac grew by focusing solely on hydro-excavation work and not swaying from that service. Fairway Utilities, however, transitioned from a commercial electrical contractor into a more diversified underground-utilities company, with an emphasis on hydrovac work.

YOUR OTHER OPTIONS

If going to a show isn't your thing, there are plenty of other places where you can go and see what the newest technologies are in the industry. One of those places is right here in *Dig Different* in the Product Focus and The Latest Products features.

Flip through those pages to see if there is something that can help your company.

WHERE ARE YOU GOING?

So, where are you going to bring your company this year? I'd like to hear what your goals or plans are for 2019. Feel free to email me at editor@digdifferent.com. I look forward to hearing from you.

Enjoy this issue! ▼



TEACHING MOMENTS

Trenchless Technology Education is Ongoing

As far as trenchless technologies have come over the years to become routinely used methods for rehabbing and replacing underground infrastructure, there are still many people who automatically think only of an opencut approach. In this online exclusive, read about what a couple of contractors do to get potential clients up to speed on trenchless methods.

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BEING PROACTIVE

Top Equipment Care Tips

Equipment is worked hard out in the field and breakdowns can be costly to the bottom line, so proactive maintenance is a no-brainer in this industry. Still, it remains something that can get overlooked, especially when a machine is humming along with no obvious signs of trouble. This online exclusive provides some maintenance tips for an array of equipment, from hydroexcavators to pipe bursting systems.

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ORIGIN STORY

Family Rediscovered Hydrovac That Started It All

Chris Angelo was 8 years old when he traveled cross-country with his father to pick up an old Vactor truck that launched the elder Angelo's hydroexcavation business. Today, Chris and his brother run their own hydrovac company, J. Angelo Industries, which was featured in the August 2018 issue. Not long ago, the brothers stumbled upon the old Vactor that first introduced them to the industry.

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UNWAVERING FOCUS

ALBERTA HYDROVAC COMPANY BUILDS
FAMILYLIKE ATMOSPHERE AND DEDICATES
ITSELF TO SAFETY WHILE CONTINUING TO GROW

STORY: KEN WYSOCKY PHOTOS: KEITH WINSOR

Buoyed by an emphasis on employee safety and a sharp focus on nothing but hydroexcavating, Northstar Hydrovac has grown into a multimillion-dollar-a-year company with a fleet of 30 hydrovac trucks rumbling daily throughout western Canada, primarily in the sprawling oil fields of northern Alberta.

From its headquarters in Grande Prairie, as well as strategically located satellite operations in Fort Saskatchewan, Valleyview and Whitecourt, the company services more than 300 different clients a year, primarily oil field- and construction-related companies. More than 70 percent of the work centers on exposing underground pipelines and wires in preparation for building or maintaining oil pipelines.

The remainder revolves around commercial infrastructure, municipal projects, highway and road construction, and electrical-power projects, says Ken Wittig, the company's business development manager. He also co-owns the company along with founder Wilf Rast and three silent partners.

The privately owned company has built its reputation in Alberta's oil fields. And Wittig maintains that one of the keys to the company's success since it was established in 1998 is an unerring focus on only hydroexcavating.

"We stick to what we know and strive to excel at that one thing," he explains. "That allows us the best opportunity to keep our clients satisfied on an ongoing basis."

KEYS TO SUCCESS

Two other factors heavily contribute to the company's success. The first revolves around creating a familylike atmosphere for employees, which aids retention efforts in an industry known for high employee turnover.

"We really value our employees," Wittig says. "Everyone is unique, and Northstar tries to accommodate individual needs and family situations as they arise. We support our employees whenever possible, whether they have a last-minute family emergency, require time

off, or need financial help for, say, a flight home to deal with personal circumstances.”

The other factor is comprehensive training and safety programs. “It’s extremely important that all of our employees are able to do the job required by the customer in a safe and competent manner, then return home safely at the end of the day to their families,” Wittig says. At the time this article was written, the company had compiled a streak of 2,098 days without a recorded lost-time incident.

A reputation for safe work practices and safety is extremely important in the oil patch, Wittig says, noting that the company employs a team of experienced safety professionals, including a health and safety manager, field-safety personnel and office administrators who stay on top of this complex part of the industry. “If your employees operate in an unsafe manner and are a liability to your customers on their work sites, no one will hire you,” he says. “And with no work, you’re out of business in a hurry.”

FROM OPERATOR TO MANAGEMENT

Wittig, 39, was operating a bulldozer for a highway-construction company in the fall of 1998 when a neighbor told him that Northstar Hydrovac was looking for employees. “That’s how my career at Northstar got started,” he says.

After putting in time as a swamper on hydrovac trucks, Wittig became a truck operator before moving up the ranks in several management positions. The company owners recognized his dedication four years ago by offering him a stake in the company — an offer he gladly accepted.

“I love the work because it’s something different every day,” he explains. “One day I’m out in the oil fields and

“WE STICK TO WHAT WE KNOW
AND **STRIVE TO EXCEL AT THAT
ONE THING.** THAT ALLOWS US
THE BEST OPPORTUNITY TO KEEP
OUR CLIENTS SATISFIED ON AN
ONGOING BASIS.”

Ken Wittig

Northstar Hydrovac crew members Stewart Caldwell, Lorn Caldwell, Ken Wittig, Shaun Donavon, and supervisor Trevor Toyle discuss progress on a pipeline excavation while operator Shawn Emsley uses a pressure wand to hydroexcavate using one of the company’s Foremost FVS 2000 units.



Playing in the mud can be a challenge

Northstar Hydrovac's slogan is "We like to play in the mud." And its primary clients — the owners of oil field pipelines — give employees ample opportunity to do so.

While some of job sites where employees work are just minutes away from one of the company's four facilities in northern Alberta, others are hours away in remote locations, accessible only via narrow and winding dirt-and-gravel roads. These crude roadways quickly become treacherous and muddy quagmires when it rains or snows.

"You need a good set of tires and chaining up is a must," says Ken Wittig, the company's business development manager. He also is a co-owner of the company.

Some of the roads are radio-controlled. Because the roads are so narrow and include blind corners and single-lane bridges, drivers are required to use a specific radio channel to broadcast their location, kilometer by kilometer. "That way other people on the road know what to expect as they come around a corner or a blind spot," Wittig explains. "You just go slow. You're definitely not passing other trucks."

Wittig drove a hydrovac truck for years and says winter driving in remote locations can definitely be a "white-knuckler." Sometimes drivers must traverse 50 or 60 miles of unpaved roads to get to job sites. "It definitely can be challenging," he says.

Sometimes these unpaved roads include 30- to 45-degree hills, known as mandatory-pull hills, where a large tractor or bulldozer winches vehicles up hills and lowers them down the other side. "That's definitely interesting with a truck that weighs more than 30 tons," Wittig says.

All of Northstar Hydrovac's trucks are equipped with electronic logs and GPS systems. That ensures that dispatchers always know where trucks are — an important safety consideration in areas so remote that cellphone service might range from poor to even nonexistent. "We can keep an eye on them and know how to get to them if they're stranded or broken down," Wittig says.

Drivers also usually take along a backpack with extra food, plus an extra pair of socks, and wear one-piece Helly Hansen suits and underwear. "You never know how long you're going to be out in the bush," Wittig notes. "It could be a short day or a really long day."



Ken Wittig, business development manager



Operator Shawn Emsley (left) and swamper Shaun Donavon use one of Northstar's Foremost FVS 2000 hydrovac units to expose a buried pipeline.



Stewart Caldwell, left, operator; Shaun Donavan, swamper; and Trevor Toyle, back, supervisor, expose a buried pipeline.

"WE'RE JUST A PIECE OF THE PUZZLE ON JOB SITES, SO IF WE BREAK DOWN, IT CAN HOLD BACK EVERYONE ELSE ON THE JOB SITE. SO WE NEED TO GET UP AND RUNNING AS FAST AS POSSIBLE."

Ken Wittig

shaking hands with customers and potential new customers, and the next day I could be managing a project, taking care of the fluid and mud management."

To service its customers, the company owns 30 hydrovac trucks, most of them tri-axle units built out by Foremost on Western Star 4900 series truck chassis. Most of the trucks feature a 13-cubic-yard debris tank, a 2,000-gallon water tank, a water pump manufactured by Cat Pumps (3,500 psi at 18 gpm) and a blower made by Robuschi USA.

The tri-axle units boost productivity because they can carry more water and debris. That allows them to work longer in between disposal and water runs and still comply with road weight restrictions. "Smaller trucks can't carry as much water, so then you require a water truck or a water source nearby," Wittig points out. "It's just more economical to use tri-axle trucks, especially considering the distances that many of our work sites are from a freshwater supply and dump sites."

To handle expected growth in municipal markets, the company has recently invested in a smaller and lighter tandem-axle hydrovac truck made by Rival Hydrovac. It features a 7-cubic-yard debris tank, an 800-gallon water tank, a

Northstar Hydrovac Grande Prairie, Alberta

FOUNDED:	1998
OWNERS:	Wilf Rast, Ken Wittig, plus three silent partners
EMPLOYEES:	60 to 70
SPECIALTIES:	Hydroexcavating for oil field, municipal and commercial customers
SERVICE AREA:	Primarily northern Alberta
WEBSITE:	www.northstarhydrovac.com

water pump made by Cat Pumps and a blower manufactured by Robuschi USA.

In addition, the company owns several water trucks, both tri-axle and tandem-axle units built out on Western Star chassis. The tank sizes range from 4,400 to 5,400 gallons.

To keep such a large fleet running, the company employs four full-time mechanics. Most repairs are made in the shop, though there are times when mechanics travel out to job sites, depending on the complexity of the repair. "In either case, the mechanics are vital to the company's overall operations," Wittig notes.

"Downtime is one of the worst things for our clients," he explains. "We're just a piece of the puzzle on job sites, so if we break down, it can hold back everyone else on the job site. So we need to get up and running as fast as possible."

OVERDEPENDENCE NOT AN ISSUE

Wittig says company owners aren't particularly concerned about how much

Operator Shawn Emsley uses a remote control to position the boom and hose from one of the company's Foremost FVS 2000 hydrovac units.

the business relies on oil field work. There have been ups and downs in the oil industry since the company's inception 20 years ago, but efficient cost controls and planning have helped the company avoid downsizing or layoffs, he says.

"We significantly reduced capital expenditures during hard times and closely managed our employee costs," he explains. "We kept very close track of everyday expenditures."

"We also pursued different avenues of work, focusing more on maintenance-type jobs instead of new-construction pipeline jobs," he adds. "For example, integrity digs are a big thing right now. When pipelines get old, oil companies are required to check the thickness of their walls in order to confirm the integrity of the line. Sometimes we have to expose these pipelines so appropriate repairs can be made."

In addition, the company doesn't immediately hire new employees when work increased. Instead, Northstar Hydrovac asks existing employees to step up and shoulder the extra load when necessary. "In particular, our field supervisors have picked up the extra workload in different areas," he says.

Asking existing employees to do more work is easier when companies treat them well, which is why Northstar Hydrovac managers and supervisors reward workers and ensure they're properly trained.

"We have strict hiring practices and enforce a tough drug-and-alcohol-use policy," Wittig says. "We try our best to hire standup people with good work ethics and attitudes. We also invest in them — train them up to our standards at a considerable cost to the company each year."

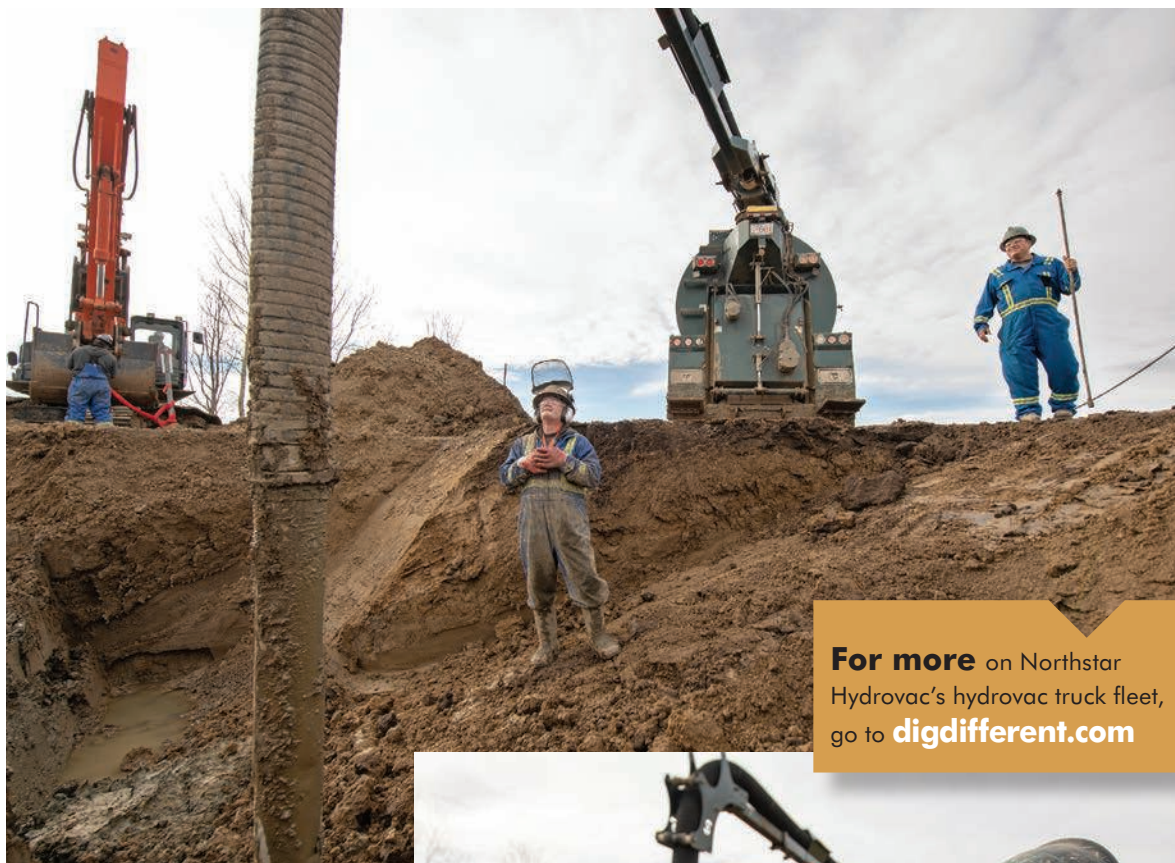
To show its appreciation for employee loyalty and minimize turnover, the company implemented a retention-based bonus program that rewards long-term employees. "We like to keep our key senior guys because they mentor the new guys — teach them the way Northstar does business," he explains.

GOOD GROWTH POTENTIAL

Looking ahead, further growth is on the owners' agenda, prompted by slowly increasing oil prices that are spurring oil companies to consider expanding facilities and pipelines. That growth could include investing in more hydrovac trucks in 2019 and expanding into neighboring provinces, Wittig says.

"Our goal is to be the best hydrovac company out there, providing excellent service at a good value to our customers," he says.

As for service diversification, it remains unlikely. "We've seen a lot of other companies succeed when they diversify, but we've also seen a lot of companies fail," he says. "We have a lot of families to look out for, so we're going to keep sticking to what we're good at." ▼



RIGHT: Ken Wittig looks at progress of a pipeline excavation project in Valleyview, Alberta.



For more on Northstar Hydrovac's hydrovac truck fleet, go to digdifferent.com

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Profile

A photograph of two workers in orange safety suits and hard hats performing vacuum excavation on a lawn. One worker is bent over, using a long metal rod to guide a black hose into the ground. The other worker stands nearby, holding a black device. A large tree trunk is in the background.

SCOURING FOR PROFITS



CANADA'S FAIRWAY UTILITIES EMBRACES HYDROEXCAVATION, QUICKLY BUILDING BIG REVENUE AND VALUABLE ADDED SERVICES FOR ITS CUSTOMERS

STORY: **KEN WYSOCKY** PHOTOS: **BRUCE BELL**

Investing in expensive equipment in an effort to diversify services and enter new markets poses a calculated risk, especially when it involves purchasing hydroexcavators that cost \$450,000 or more. But when done strategically, it can pay big financial dividends, as evidenced by Fairway Electrical Services, an Ontario-based contractor.

During the last three years, the company — based in Ancaster, about 40 miles southwest of Toronto on the western end of Lake Erie — has gradually transformed from a commercial electrical contractor into a more diversified underground-utilities company, with an emphasis on hydroexcavating (branded under the name Fairway Utilities). In doing so, it provides a rough blueprint for any pumping professional who's ever considered getting into the emerging market for hydroexcavation.

So far, the change in direction at Fairway has been successful, as evidenced by the purchase of three hydroexcavating trucks since 2015 (two made by Vacall and one by Transway Systems). The business also has invested in a horizontal directional drilling machine (Vermeer), says Jason Herd, vice president-director of business development and a co-owner of the company.

In 2017, hydroexcavating work — mostly daylighting to expose underground utilities or complex excavating in and around sensitive underground utilities — accounted for about \$1 million in gross revenue, about 5 percent of the company's \$20 million in sales. But Herd says he expects that percentage to increase in the coming years.

"The first year (2015), we didn't even do \$200,000 in sales," says Herd, pointing out that the company's first hydroexcavating truck was a used Vacall built on a 2012 Freightliner chassis. Because a typical new hydroexcavating truck costs \$400,000 to \$500,000, he figured it would be more prudent to buy a reliable used truck and see how things panned out.

"At that point, I really wasn't thinking about a second truck," says Herd, who co-owns the company with his father, Cal Herd, and three long-time business colleagues:

Andrew Bush, Peter Langdon and Thomas Waite. "But 14 months later, we rented a second truck because we had so much work coming in. The work didn't let up, so we eventually bought a second truck in January 2017," he continues. "And in March, we took delivery of our third truck."

NEW TERRITORY

Herd led the business-diversification effort in 2015, after he became a co-owner of the company his father founded in 1991. After earning an electrical-engineering technician's degree, Herd worked full time for his father starting in 2004.

Two primary considerations spurred the market shift. For starters, the commercial electrical-contracting industry keeps getting more and more competitive, which drives down profit margins and makes it increasingly difficult to win contracts. Moreover, Herd realized the company's reliance on either renting equipment or hiring subcontractors to do HDD or hydroexcavating work was hurting the company's bottom line.

Fairway Utilities technicians Scott Langdon (left) and Justin Levert operate a Vacall AllExcavate hydroexcavator with a blower from Howden Roots.

Fairway Utilities Ancaster, Ontario



FOUNDED: 1991

OWNERS: Cal and Jason Herd, Andrew Brush, Peter Langdon, Thomas Waite

EMPLOYEES: 80

SPECIALTIES: Hydroexcavating, horizontal directional drilling, electrical contracting

SERVICE AREA: Southern Ontario

WEBSITE: www.fairwayelectrical.com



"IF NEED BE, WE'LL CALL A COMPETITOR AND GIVE THEM THE BUSINESS, JUST TO ENSURE WE DON'T LET OUR CUSTOMERS DOWN. AND IT WORKS BOTH WAYS — SOMETIMES THEY CALL US WHEN THEY'RE IN THE SAME SITUATION."

Jason Herd

"We were spending obscene amounts of money subcontracting out those services, plus it's inefficient if you have to wait for them to arrive on a job site," he explains. "In the electrical trade, it's always better to run a wire from A to B without joints. ... With joints, you introduce a point of failure. You also can apply that concept to subcontracting. So we decided to avoid that point of failure and keep as many services in-house as possible.

"Dad was on board," adds Herd, a self-described risk-taker. "Sure, there was a little bit of apprehension. It was a big risk, investing about \$700,000 in a drill and a used hydrovac truck. But it felt right to me."

Ironically enough, the significant investment in equipment was a positive as well as a risk. Why? It presented a high barrier to market entry by more competitors. Sure, there were already other local companies doing hydroexcavation work. But there aren't many who are so diversified, Herd explains.

"We are somewhat unique because we can offer services from A to Z —

Jason Herd, vice president-director of business development and a co-owner of Fairway Utilities, is shown with a Vermeer horizontal directional drilling machine.

serve as a one-stop shop for our clients," he says. "When we worked on streetlighting projects, we found that not only were we calling subcontractors to help us out with daylighting or excavating holes for streetlights, so were the general contractors for whom we worked. We thought that was silly. Now we have the best of both worlds because we can work in-house or get hired as subcontractors for hydrovac work."

MEETING CUSTOMERS' NEEDS

So what's the takeaway here? Always be on the lookout for ways to not only work more efficiently, but provide better service for customers, too, Herd suggests. Furthermore, when making investments in equipment, don't expect growth to occur overnight.

"It took time for our business to develop," he explains. Getting the word out to general contractors the company already knew, plus leveraging contacts developed from memberships in different professional organizations, helped generate business. "Or contractors would see the truck rolling down the road," he adds. And hydroexcavating jobs sometimes led to electrical-contracting work, too — another benefit of offering diverse services, he notes.

Another key to success: strategically timing the purchase of additional trucks. "It was a challenge to navigate growth on the utility side of the business — ensure we didn't get too far ahead of ourselves and buy equipment before we had enough need for it," Herd says. "You get excited about this one job and expect you're going to get five others right after it, but that's usually not how it works."

To avoid buying expensive hydrovac trucks and then watching them sit idle, Fairway typically rents equipment when increased demand starts to outstrip the company's capacity. The purchase of additional trucks and other equipment comes only after company officials determine as best they can that the increased workload is sustainable.

"Sometimes we also hire subcontractors," Herd adds. "It can make you grind your teeth a little bit because you're handing over a check when you could be making a payment, but sometimes that's the best short-term strategy."

FRIENDLY COMPETITORS

The use of subcontractors raises another point: Good relationships with competitors can pay off in unexpected ways. For instance, if a hydrovac truck breaks down or Fairway is so busy it can't take on a project for a good customer, it helps to have friendly competitors who can pick up the slack.

"If need be, we'll call a competitor and give them the business, just to ensure we don't let our customers down," Herd notes. "And it works both ways — sometimes they call us when they're in the same situation."

To bolster customer service, the company hired Eric Langdon, a dedicated hydroexcavating and HDD operations manager who is customers' go-to contact for service. Langdon has a wealth of experience, and having him as a sole point of contact makes it easy for customers to get what they need with one phone call. "He has a dedicated extension on our phone system and customers know that whatever they need, they can call him practically 24/7," Herd says.



A Fairway Utilities crew member unloads a Vermeer horizontal directional drilling machine at a job site.

"IT WAS A BIG RISK, INVESTING ABOUT \$700,000 IN A DRILL AND A USED HYDROVAC TRUCK. BUT IT FELT RIGHT TO ME."

Jason Herd

Scoring big on stadium project

It's not unusual for a small and growing company to land a big project that becomes its signature achievement and serves as a springboard for more large jobs. At Ontario-based Fairway Electrical Services, that particular job involved installing all the lighting plus the underground civil work for electrical and telecommunication lines at the \$145 million Tim Hortons Field, home of the Hamilton Tiger-Cats in the Canadian Football League.

The company was awarded the \$13 million contract in 2013, and it posed challenges from the start. The first hurdle: The field was scheduled to host the soccer portion of the Pan American Games in summer of 2015. In addition, the company had to hire roughly 110 new employees, bringing its staff to around 150 people at the peak construction period, says Jason Herd, vice president-director of business development and a co-owner of the company, based in suburban Hamilton.

"It was an insane amount of pressure to get that project done," Herd says. "We never dreamed of competing on such a large project. But we put in a bid and got lucky, and the rest is history. ... We did about three years' worth of work in 18 months."

The scope of the work included installing all the field-of-play and parking lot lights, plus all the excavating for underground electrical and

telecommunications infrastructure. The company's hydroexcavators were utilized to expose underground lines to place new electrical lines. Employees laid more than 20 miles of telecommunication and electrical wiring for the underground wiring alone, Herd says.

"We scrambled to find people wherever we could, and we also had to keep up with our work for our regular clients," Herd points out. "We only had 40 employees when we won the bid. It was wild. I moved my office down to the stadium along with a couple of our other project managers.

"It was controlled chaos," he adds. "But on the other hand, it really spoke to our company's capabilities. Not every company could jump on a project like that. We ultimately got the job done, thanks to a very good on-site project management team and the tremendous skills of our workforce."

Herd says the company's success on the project led to other big contracts, such as a \$3.5 million contract to wire a train-layover facility in Kitchener in 2015; a \$13 million streetlighting retrofit project for the region of Waterloo, which involved changing over 42,000 streetlights from conventional lights to LED lights in just 10 months in 2017; and a \$1.2 million LED streetlighting retrofit project for the city of Hamilton (converting 27,000 lights in 10 months) in 2017 and 2018, he says.

"I'D BE LYING IF I TOLD YOU FIVE YEARS AGO I WAS EXPECTING THE GROWTH WE'VE HAD. ... IT'S VERY REWARDING TO BE ABLE TO LOOK BACK AND SAY, 'REMEMBER WHEN WE WERE THAT SMALL?'"

Jason Herd

To provide great customer service also requires investments in reliable equipment. For hydroexcavating, the company relies on two Vacall AllExca-vate models, built out on Freightliner and Western Star chassis with a 12-cubic-yard debris tanks, a 1,300-gallon water tank and a blower from Howden Roots. The third hydrovac unit is a Transway Systems Terra-Vex 125 built on a 2018 Western Star chassis.

The company also owns a Vermeer 20x22 HDD machine with 20,000 pounds of thrust and pullback force; 15 mini-excavators made by Bobcat; two rubber-tire backhoes made by Caterpillar and John Deere; five Bobcat skid-steers; two digger-derrick utility trucks built on International and Freightliner chassis and outfitted with Altec Industries augers; seven dump trucks with dump bodies made by Voth Truck Bodies: six GMC 3500s; one Freightliner M2 that doubles as a dump truck and roll-off truck; and four Ford F-550 bucket trucks, each outfitted with a 37-foot Altec Industries articulating boom lift.

MORE GROWTH AHEAD

Herd says the company's exponential growth — from \$6 million in gross revenue in 2013 to \$20 million in 2017, just four years later — was a pleasant surprise. "We're very happy to be where we are," he observes. "I'd be lying if I told you five years ago I was expecting the growth we've had. ... It's very rewarding to be able to look back and say, 'Remember when we were that small?'"

Looking ahead, Herd says he expects further growth. If business continues as it has, he says buying a new hydrovac truck every year isn't out of the question. Along the way, company officials also are discussing hiring a full-time mechanic to cut the turnaround time on repairs, which the company currently outsources.

"In five years, I see our company becoming even bigger and better than we are today," he says. "Now that we've hit \$20 million in sales, I'd like to hit \$25 or even \$30 million. It's totally doable as long as we continue our focus on diversification and niche markets — develop a customized book of services that's aimed at suiting whatever our clients need." ▼

The company's newest hydroexcavation unit, a Transway Systems Terra-Vex 125 built on a 2018 Western Star chassis, stands ready to work at a job site.



Technician Matthew Krznaric reviews details of a directional drilling project as he completes a job hazard analysis.

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Cold No More

HEATED WORKWEAR CATEGORY GROWING IN TRADE INDUSTRIES AS A WAY TO KEEP WORKERS SAFE, AND INCREASE PRODUCTIVITY

BY JARED RANEY

For many contractors in North America, working in the cold is a way of life. It's not fun, but it's something that needs to be done.

"For a better part of the year, we contend with the cold weather," says Eric Aune, co-owner of Mechanical Hub and owner of Aune Plumbing in central Minnesota. "It's about seven months of the year."

Aune has made working in the cold a little more bearable for his workers by offering cold-weather gear to them. Not just regular jackets and gloves, but heated workwear from Milwaukee Tool, a Wisconsin manufacturer.

A START IN COLD WEATHER

Milwaukee Tool offers a series of jackets, hoodies and vests. Other manufacturers like DeWALT Tool and Ergodyne also offer heated jackets and hoodies.

"We started back in 2010 with a singular red, heated jacket, really not knowing what we were stumbling into," says Kaue Cavalcante, product category manager for lifestyle products with Milwaukee Tool. "Since then, we've gone through many different generations of heating technology."

The expansion of construction-grade heated clothing is an extrapolation from the broader market of civilian heated clothing, but the caliber of durability sets these products apart.

"If you look at heated gear in North America today, there are many, many competitors in this space," Cavalcante says. "I think the appreciation for how

"WE WILL FIND OURSELVES ON JOB SITES WHERE THERE'S NO HEAT — THERE'S NO BREAK FROM THE ELEMENTS — AND ONE OF THE HARDEST THINGS TO GET OVER IS JUST YOUR BODY FEELING COLD."

Eric Aune

durable and well-built these garments are — that's really what appeals to our audience doing work on job sites."

Milwaukee Tool's clothing is powered by M12 REDLITHIUM battery technology, using carbon fiber heating elements to create and distribute heat to the chest, back and front pockets. This year, the manufacturer also added a



PHOTO COURTESY OF MILWAUKEE TOOL

Milwaukee Tool's series of jackets, hoodies and vests are capable of warming up a contractor using built-in batteries.

new Quick-Heat function that helps deliver heat faster than before, fully heating up the jacket in 2.5 minutes.

Cavalcante notes that company officials are constantly going on research trips all over the country in order to understand what customers need and what users are currently frustrated with.

DURABLE GEAR

Aune's favorite piece of heated clothing is the hoodie, for its flexibility. The hoodie has a waffle-weave thermal lining to help keep the heat in.

"The sweatshirts take probably the biggest beating because they'll be worn in the fall and the spring, and then also through the winter," Aune says. "I wear my sweatshirt as a coat probably three-quarters of the time, so I'd say that they take a lot more abuse than I would have imagined. You've got these heating elements inside, and you just think that it's not something that's going to be able to take abuse but I would say that's not true at all."

The heated gear can be washed like normal clothes after removing the battery, which has its own pocket and simple hookup. After about three years, the equipment Aune bought for his team is still holding up, despite consistent day-to-day use, though he's considering purchasing a new set for his guys.

"They've got a three-in-one style," Aune says. "It's about double the cost, but it'll be worth it because you've got a sweatshirt, vest and outer parka-style coat, which is probably more suitable for a wider range of temperatures."

The jackets and vests are equipped with reinforced high-wear zones to protect from abrasion and tears, feature polyester insulation that keeps heat in but doesn't add bulk, and are wind- and water-resistant.

"IF I CAN KEEP [MY EMPLOYEES] WARMER, THEN I FEEL LIKE THEY'RE GOING TO BE MORE SAFE. THEY'RE NOT GOING TO MAKE MISTAKES THAT MIGHT CAUSE PERSONAL HARM."

Eric Aune

SAFETY AND PRODUCTIVITY

Heated gear isn't cheap, with a price tag often at least double that of similar nonheated garments. For example, the heated hoodie is around \$100 and the jacket is about \$150 from most dealers. They say you can't put a price on comfort, and Aune says for contractors who deal with cold, that saying holds true.

"It brings higher productivity," Aune says. "We will find ourselves on job sites where there's no heat — there's no break from the elements — and one of the hardest things to get over is just your body feeling cold. A lot of what we do can be done in those cold temperatures; the materials we're using will allow for it, but the limitations are comfort. If we can be more comfortable, then we can produce more through the day."

Aune adds that it's about safety as well, feeling more confident with some of his workers who may not want to take a break to warm up.

"If I can keep them warmer, then I feel like they're going to be more safe," Aune says. "They're not going to make mistakes that might cause personal harm."

This year, Milwaukee Tool made its first foray into heated accessories with a heated work glove complement to its line of gear, and officials say there's more ahead for this segment of the industry.

"We're not going to slow down in this category at all," Cavalcante says. "If anything, you're going to see a ton more solutions and innovation in the years to come." ▼

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How Will Tax Reforms Impact Your Business?

IF YOU HAVEN'T TALKED TO YOUR ACCOUNTANT ABOUT NEW FEDERAL TAX RULES, MAKE AN APPOINTMENT TO DO NECESSARY ADJUSTMENTS

BY ERIK GUNN

As the new year begins, once again it's time to put your books in order for the tax season.

And with the sweeping federal tax bill Congress passed and President Donald Trump signed late 2017, there may be some changes to your routine for your 2018 federal taxes.

The new law has implications both for your business and your personal finances, points out Gregory J. Sell, tax attorney at the Milwaukee business law firm Davis & Kuelthau.

As always, this column is no substitute for consulting with your financial advisor, who can give you guidance based on your specific circumstances. But when the time comes to have that conversation, here are some things to keep in mind.

PASS-THROUGH INCOME

Let's talk about the effects on business first — although, as you'll see, they might show up on your personal tax return too.

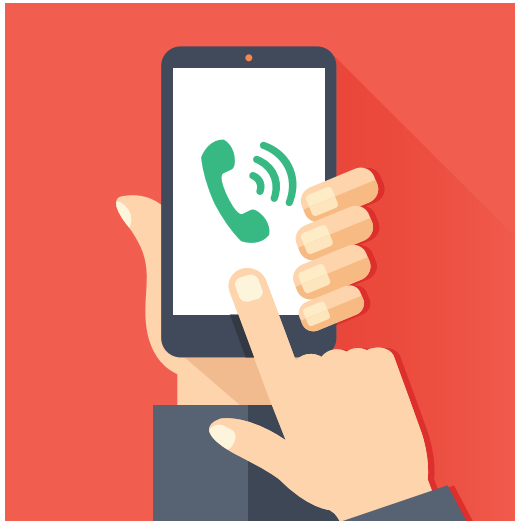
We assume that your business is either formally incorporated, probably as a limited liability corporation or an S-corporation, or possibly set up as a partnership.

As a partnership, a sole proprietorship, or an S-corporation, your business is what is commonly called a "pass-through" entity. For tax purposes, the income flows entirely through to the owner, and the tax liabilities are factored into your overall personal tax filing.

Under the previous law, the top income tax rate business owners paid on their business-related earnings was 39.6 percent. The new law sets the top income tax rate at 37 percent. In addition, it provides a deduction for the taxable portion of the business income of 20 percent.

That deduction, Sell explains, has other potential calculation limits phasing in when taxable income exceeds \$315,000 for joint returns and \$157,500 for all others. (And if taxable income exceeds \$415,000 for joint returns and \$207,500 for all others, specified service professions, including lawyers, doctors, accountants, and others, are denied the deduction entirely.)

Another important thing to remember is that the deduction applies only for income tax purposes, Sell points out. It doesn't affect how other income-related liabilities — such as Social Security and Medicare tax — are calculated.



CORPORATE QUESTIONS

The net effect of the lower pass-through tax rate under the new law puts the overall rate for their income at about 30 percent, Sell explains. While that's certainly lower than they enjoyed up to now, consider that the old-time traditional C-corporation — usually associated with much bigger companies — got an even bigger break. Their top tax rate, which had been 35 percent, dropped to 21 percent, Sell points out.

With that change, "being a C-corporation is more attractive than it used to be," Sell acknowledges. "Some S-corporations are thinking of switching to becoming C-corporations."

Sell cautions that will be more complicated and require careful evaluation to decide whether it's right for you.

First of all, it's simply too late to do that for 2018, he says. If you might want to consider that for this year, you will need to start exploring the idea

right now, whether in the end you want to go through with that change or not.

IRS rules allow such corporate-classification changes only in the first 2 1/2 months of the new year, according to Sell. That means you need to study it now, and you'll need to get it done before the middle of March. That may not be anywhere near enough time to think through all of the implications of such a change and whether it's really best for your business in the long run.

One reason to look more closely at such a conversion might be if you are contemplating selling your business in the near future.

Sell points out that the complexity of the process and the need to carefully examine all potential ramifications argues against making a hasty decision. Not only that, but once you make such a change, you're stuck with it for at least five years under federal regulations.

In short, this is definitely a question you don't want to consider without a detailed conversation with your business financial and legal advisors.

FASTER BUSINESS DEDUCTIONS

Another change in the new federal law may affect how you think about equipment purchases, Sell observes. Simply put, new provisions make it even easier for you to realize big tax breaks faster when you make new capital expenditures.

The main benefit is that bonus depreciation rules under the new law let you

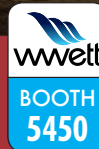
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SO IF YOU'RE ALREADY IN THE MARKET FOR A MAJOR NEW PIECE OF EQUIPMENT, AND YOU KNOW YOUR BUSINESS CAN SUSTAIN THE PURCHASE, **CHECK WITH YOUR ACCOUNTANT TO SEE WHETHER THIS IS THE TIME TO MAKE THE MOVE.**

deduct 100 percent of the expense right away — instead of 50 percent under the old law — rather than spread the depreciation deduction out over time.

Changes to Section 179 raise the limit on capital expenses that can be deducted under that portion of the code to \$1 million in a year, but only for companies that spend \$2.5 million or less on all such expenses in a year. So if you're already in the market for a major new piece of equipment, and you know your business can sustain the purchase, check with your accountant to see whether this is the time to make the move to acquire it before the end of the year.

Neither of these federal changes alter how states may treat such expenses, so you'll need to make sure you understand what those implications are as you weigh these sorts of decisions.

ON THE HOME FRONT

Finally, there are a few implications for your personal income taxes, too.

For many taxpayers, the new law does seem likely to reduce some of the paperwork at year's end. The big reason: The federal standard deduction is now at a whopping \$24,000 per household.

Coupled with that is that deductions for real estate and local and state taxes are now capped at a total of \$10,000 per household, Sell explains.

So when you add up the other personal deductions — contributions to charity, mortgage interest, health care costs, and all the rest — and then add no more than \$10,000 in the deduction for state and local taxes, if the total still falls below \$24,000, you will no longer need to itemize for those deductions.

Sell suggests that the change in state and local tax deductibility is likely to end one strategy some taxpayers use: double-paying their property taxes every other year to boost their itemized deductions in those years, then taking the

standard deduction in the alternating years. "Once they hit that \$10,000, they don't get any additional benefit," he says.

Of course, if other deductible expenses that aren't capped, such as charitable contributions and mortgage interest, can bring their overall deductions above the \$24,000 standard deduction in a given year, some taxpayers might still opt for that play under the new law.

Even with that strategy, though, "If you're under \$24,000 in itemized deductions, you're not going to get any extra benefit by prepaying anything."

WHAT'S NEXT?

So as the new year begins, consider what implications all these changes have for your business and your family's taxes. Pick up the phone and make some time with your accountant for a quick review and an understanding of the law to guide you in any important decisions.

And once you've considered your 2018 tax moves, take a moment to think ahead and decide what you might want to do differently this year. ▼

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SHOP TALK

There are two questions a contractor should ask when deciding if they should hire a mechanic for their shop. The first is, how large is the fleet? The owner of the company also needs to consider how old it is on average. The older the equipment, the more demand there likely is to be for a mechanic's services, whether you contract out for the work or do it in-house.

PHOTOGRAPHY BY KEVIN BLACKBURN



Is Your Business Ready for a Full-Time Mechanic?

WEIGH MANY IMPORTANT FINANCIAL FACTORS BEFORE HIRING AN IN-HOUSE WRENCHER TO CARE FOR YOUR FLEET OF VEHICLES AND EQUIPMENT

BY ERIK GUNN

There are several essentials in your underground utility construction business — skilled workers, appropriate licenses, a sharp front office staff. And then there's your heavy equipment.

You have at least one truck, and chances are you've got several — vacuum trucks, directional drills, service vans and pickups, perhaps a backhoe or other excavating machine, and more.

If yours is a small operation, you probably take equipment to an outside shop for maintenance and repairs. But at what point is it a better deal to staff up and hire a full-time mechanic as your direct employee?

COMPLEX DECISION

It's not a simple decision, says Bob Rudolf, who teaches future diesel mechanics at Milwaukee Area Technical College in Wisconsin. The first question — how large is your fleet? — is really only half of the question, Rudolf points out. You also need to consider how old it is on average. The older your equipment, the more demand you're likely to have for a mechanic's services, whether you contract out for the work or do it in-house.

"You have to do a little bit of a balancing act," Rudolf says.

Start with the fact that in the typical service shop, you could pay as much as \$100 an hour for repairs and maintenance for your vehicles. It's one thing if they're new and just go in and out for routine maintenance. It's another if they're starting to age and need new parts and more frequent attention.

But new or old, federal law requires commercial trucks to go through an

inspection every year, Rudolf points out. And new or old, your vehicles need a thorough checkup every 10,000 miles, including an oil change and a grease job. As a fleet grows, that mandate alone could justify hiring a licensed mechanic of your own to conduct the inspections and provide the routine upkeep.

"If I'm a business guy and I've got one or two trucks, and they're relatively new, I'm not interested in hiring a technician," Rudolf says. "I would consider a full-time technician with a fleet of 10 trucks or more." If the fleet is older, that threshold might be lower.

COMPETITION FOR LABOR

If you decide to hire an in-house mechanic, it's important to know the reality of the industry these days. "Right now the truck world is very competitive, and there's a huge shortage of diesel technicians," he says. By the next decade, the shortage could be critical.

Chances are you've already faced similar hiring challenges and for similar reasons. "Baby boomers are retiring," Rudolf points out. "The young people have been conditioned to go to school to become a doctor or lawyer or businessperson, and the trades are getting neglected."

So if you think you don't have 40 hours a week of work for a mechanic but will just hire someone part time, forget it. "You're probably going to have to go full time or nothing," he says.

Something else to remember is that most, if not all, of your equipment is what the trade calls "vocational," special purpose, not general purpose vehi-

cles. The exception might be pickup trucks that have been turned into basic service trucks, mostly used for hauling tools and supplies.

But chances are most of your trucks come with a lot of additional parts, such as pumps, tanks, perhaps a built-in jetter, and they all need specialized mechanical care. So your mechanic needs at least a beginning familiarity with those machines, and the capacity to learn a lot more, and fast.

OFFER GOOD WAGES

When it comes to hiring, don't try to skimp, either. Starting wages in the Midwest for automotive technicians have climbed to between \$17 and more than \$20 an hour. They're likely to be higher in some parts of the country.

"If you're going to hire a master technician, you're talking \$25-\$30 an hour, maybe \$35 in some cases," Rudolf says.

It's possible you could strike up an arrangement with another business that has needs for mechanic's services similar to your own, and work out a deal to jointly hire a full-time technician. But that might be a lot more complicated than simply waiting until you're big enough to hire a full-timer yourself.

And don't skimp on the actual cost of repairs, either, even if you're doing them in-house.

"You don't want to hire a technician and have to make them make do with Band-Aids and bailing wire," Rudolf says. The job is too critical to the health and safety of your employees and the general public for that. "If the truck is

"FOR ME PERSONALLY, A MOM AND POP SHOP IS THE BEST. THERE'S A FAMILY ATMOSPHERE. YOU HAVE A LOT MORE FREEDOM AS A TECHNICIAN THAN YOU DO IN A LARGE SHOP. YOU'RE NOT A NUMBER. YOU'RE ACTUALLY A NAME."

Bob Rudolf

in a collision and there's a fatality, they might be looking at a manslaughter charge," he says.

And then there are the costs you take on in addition to employee compensation.

Just like your personal car, more and more your heavy equipment is filled with sophisticated, computer-controlled systems. Just like your car's mechanic, your equipment mechanic will need diagnostic computer software to analyze problems that crop up. That software might run on a \$1,500 laptop computer, but it probably will cost you up to \$10,000, Rudolf says.

And just as your other specialized workers need periodic training as technology changes, your automotive technician will too. Upgrading their skills with proper training and certification is just as much your responsibility as it is with the rest of your staff.

On the plus side, some of that training may be free or at relatively low cost. Machine manufacturers may provide factory training to their customers at little or no charge; parts suppliers might, too. For other training needs, check out your local technical education offerings.

OTHER CONSIDERATIONS

Also, you'll have to take responsibility for the environmental impact of a vehicle repair facility on your property. Preventing contamination of dangerous chemicals is a top concern.

You need to properly take care of everything from waste oil every time you service your trucks to other chemicals and cleaners that are essential to

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automotive repair. Handling those will require special licenses from regulatory authorities and special equipment to make sure everything is handled and disposed of safely.

"You want to make sure you're not creating a mess, or otherwise you

could be into some fines," Rudolf says.

You might be wondering whether an operation like yours would attract a full-time mechanic. After all, unless you're a huge operation, there's probably not going to be a long career path.

Don't sell yourself short. Not everyone goes into a job expecting to climb some promotional ladder that leads to an office with a vice president's nameplate on the door.

"For me personally, a mom and pop shop is the best," Rudolf says. "There's a family atmosphere. You have a lot more freedom as a technician than you do in a large shop. You're not a number. You're actually a name. If you're in a dealership, you might not have some of that camaraderie."





So is it worth it to hire your own mechanic instead of taking your vehicles to an outside dealership? In the end, of course, only you can make that decision. But as your fleet grows, and as it gets older, it might be worth it to at least sit down and work out the detailed costs and benefits.

After all, without solid, dependable equipment, what future would your business have? ▼

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COMPANY		CENTRIFUGAL	DEWATERING/BYPASS	DIAPHRAGM	DUPLEX	HIGH PRESSURE
Boerger, LLC 2860 Water Tower Pl., Chanhassen, MN 55317 612-435-7300 Fax: 612-435-7301 america@boerger.com www.boerger.com			Yes			
 Buckhorn Pumps, Inc. 1786 CR 490, Stephenville, TX 76401 855-362-2326 254-965-2555 Fax: 254-695-8833 sales@buckhornpumps.com www.buckhornpumps.com			Yes			Yes
 Foremost See ad page 25 12225 64th Ave. NE, Calgary, AB T2E 8P9 800-661-9190 403-295-5800 Fax: 403-295-5810 sales@foremost.ca www.foremost.ca/vac trucks		Yes				Yes
 GapVax Inc. See ad page 39 575 Central Ave., Johnstown, PA 15902 888-442-7829 814-535-6766 Fax: 814-539-3617 inquiry@gapvax.com www.gapvax.com						
 Gorman-Rupp Company See ad page 7 600 S Airport Rd., Mansfield, OH 44903 419-755-1011 Fax: 419-755-1251 grsales@gormanrupp.com www.grpumps.com		Yes	Yes	Yes	Yes	Yes
 John Brooks Company Limited 2625 Meadowpine Blvd., Mississauga ON L5N 7K5 888-881-6667 905-867-4642 Fax: 905-567-4330 jthomson@dynablast.ca www.dynablast.ca						Yes
Transway Systems Inc. See ad page 2 314 Lake Ave. N, Hamilton ON L8E 3A2 800-263-4508 905-578-1000 Fax: 905-561-9176 sales@transwaysystems.com www.transwaysystems.com						Yes
Vac-Con See ad page 21 969 Hall Park Rd., Green Cove Springs, FL 32043 888-491-5762 904-493-4969 Fax: 904-284-3305 vns@vac-con.com www.vac-con.com		Yes				
Water Cannon, Inc. See ad page 15 4300 W Lake Mary Blvd., Units#1010-424, Lake Mary, FL 32746 800-333-9274 Fax: 888-928-9274 sales@watercannon.com www.watercannon.com				Yes		Yes

	HYDRAULIC	MUD/SLURRY	PORTABLE	PUMP CONTROLS	PUMP PARTS/ COMPONENTS	PUMP REPAIR/ SERVICE	QUINTUPLEX	SLUDGE/SOLIDS	SUBMERSIBLE	TRANSFER	TRIPLEX/ PLUNGER	VACUUM	WASHDOWN	WATER
								Yes	Yes					
		Yes			Yes	Yes	Yes			Yes	Yes		Yes	Yes
	Yes	Yes								Yes	Yes	Yes		
		Yes						Yes				Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes			Yes	Yes
				Yes	Yes						Yes		Yes	Yes
	Yes										Yes	Yes	Yes	Yes
		Yes			Yes		Yes	Yes			Yes	Yes	Yes	Yes
	Yes		Yes		Yes					Yes		Yes	Yes	Yes

Rights to Safety

EMPLOYEES REPORTING SAFETY CONCERNS HAVE WAYS TO PROTECT THEMSELVES IF THE EMPLOYER RETALIATES. PATIENCE NEEDS TO BE HAD WHEN REPORTING.

BY JARED RANEY

Everyone in the industry has heard at least one horror story about someone getting fired or demoted for reporting a safety violation.

In fact, OSHA's whistleblower department investigates approximately 3,000 such cases a year. Reporting a safety violation is rarely easy. Employees don't want to get their company in trouble and may be afraid of bringing the issue to superiors.

When employees notice a safety concern, it's not uncommon that the fear of blowback results in a reluctance to bring it to the attention of supervisors. But repressive atmospheres that discourage employees from reporting can lead to much bigger problems for employers and employees.

If an employer takes what could be considered retaliatory action against an employee for protected activity like reporting safety issues, the best-case scenario is months of investigation, most likely legal fees and headaches, without even taking into account the potential penalties if an employer is found to be at fault. This can also result in decreased productivity.

That's why OSHA requires an anti-retaliation culture among employers to reduce these instances. The agency recently issued recommended practices to help employers establish an anti-retaliation program in workplaces.

"The idea is that if we educate an employer about its responsibilities under the law and the benefits of having an effective program that allows employees to raise concerns without fear of retaliation, there's less likelihood of having to hire an attorney or legal team to defend itself against an allegation of retaliation or an unreported hazard that causes a serious injury or death," says Anthony Rosa, deputy director of OSHA's Directorate of Whistleblower Protection Programs.

Though employers often feel compelled to do everything they can to suppress reports of safety violations, creating an atmosphere that supports employees in raising those concerns can make them feel more comfortable to deal with the problem in-house, potentially avoiding OSHA involvement altogether. Moreover, it allows the employer to address the safety or health concern before an incident occurs, which could result in greater loss to the company.

The most important component for developing a safety-first culture is making sure that employees understand their right to a safe workplace and their right to report any violations without repercussions.

SAFETY AND HEALTH VS. WHISTLEBLOWING

There are two relevant offices within OSHA that come into play in these circumstances.

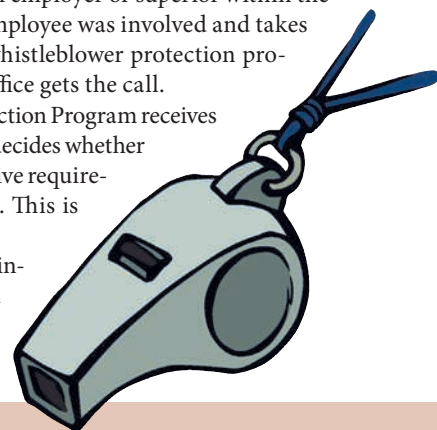
The safety and health program is actually separate from the whistleblower protection program. If an employee notices a safety issue on a work site that their employer cannot or will not resolve, they have an absolute right to report that violation.

In that instance, the employee would call the nearest OSHA area office.

If, after reporting that violation, an employer or superior within the company finds out that a particular employee was involved and takes retaliatory action against them, the whistleblower protection program in the nearest OSHA regional office gets the call.

When OSHA's Whistleblower Protection Program receives a report of retaliation, an initial review decides whether the case meets the minimum investigative requirements to proceed through the system. This is known as a prima-facie allegation.

Over half of the complaints are administratively closed without investigation based on the initial evaluation, such as being filed late, lack of jurisdic-



"I HAVE A LOT OF EMPATHY FOR PEOPLE THAT BRAVELY COME FORWARD BECAUSE THEY'RE GOING THROUGH SOME STRIFE, THEY'RE GOING THROUGH ECONOMIC HARDSHIP, AND OUR INVESTIGATIONS CAN TAKE A LONG TIME."

Anthony Rosa

tion, or lack of a prima-facie case. About 7,000 reports are filed with the whistleblower protection program each year, and only 3,000 are docketed for investigation.

"One of the things I ask employees, and it's probably the hardest thing, is to have patience with us," Rosa says. "I have a lot of empathy for people that bravely come forward because they're going through some strife, they're going through economic hardship, and our investigations can take a long time."

Patience and cooperation are important, as many cases are dropped simply because the employee gives up or doesn't respond by the time OSHA is able to reach out to them.

MANY TECHNICALITIES

OSHA has many resources available on its website, by contacting an OSHA office, or by calling OSHA at 1-800-321-OSHA (6742). If you are unsure whether there is a safety issue or have questions about your rights or about the limits on the reporting process, it's always best to check.

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Timing can be a factor. For example, with environmental complaints, there is a 30-day window to file a report with the whistleblower protection program after the retaliation.

Employees should also be aware that the circumstances around suspected retaliation can have an impact.

Say an employee notices an unshored trench on a work site. If they simply walk off the job site and are fired, that will most likely not be considered a protected work refusal. There are precipitating factors that OSHA looks for in determining valid work refusals.

Work refusal requirements:

- **Imminent Danger:** In order for OSHA to consider a protected work refusal, the urgency of the situation must be so unsafe that serious injury or death could occur and there is not enough time to call OSHA.
- **Notify Employer:** The field supervisor or other relevant management must be aware of the danger before work can be refused. Where possible, the employee must have sought the employer but have been unable to obtain correction of the dangerous condition.
- **Good Faith:** Refusals must be made in good faith, which OSHA defines as "a reasonable person would agree that there was imminent danger."
- **Alternative Work:** Employees who believe a situation is too unsafe to proceed should ask the employer if there is another job or work duty they could perform while the issue is addressed.

When all of these boxes are checked, the employee should still not leave the work site until directed to by the employer. If that is the case, it is possible OSHA will find merit to the complaint, especially if the employee is subsequently disciplined or fired after the work refusal.

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After the whistleblower protection program investigates a complaint it finds to be meritorious, they will forward it to the court system for litigation or issue a merit determination, depending on the whistleblower statute. Most merit cases are settled, but if not, then the court or the Secretary's Findings can order a number of compensatory and punitive damages, again depending on the whistleblower statute.

In the case of an investigation, it is important for both employer and employee to keep records, as these are crucial pieces of evidence in OSHA's evaluation and determination.

"... IF WE EDUCATE AN EMPLOYER ABOUT ITS RESPONSIBILITIES UNDER THE LAW AND THE BENEFITS OF HAVING AN EFFECTIVE PROGRAM THAT ALLOWS EMPLOYEES TO RAISE CONCERNS WITHOUT FEAR OF RETALIATION, THERE'S LESS LIKELIHOOD OF HAVING TO HIRE AN ATTORNEY OR LEGAL TEAM TO DEFEND ITSELF AGAINST AN ALLEGATION OF RETALIATION OR AN UNREPORTED HAZARD THAT CAUSES A SERIOUS INJURY OR DEATH."

Anthony Rosa

"Our job is to investigate whether the allegations hold water. If the parties want to get together and settle, we absolutely entertain the settlement," Rosa says. "In fact, we have an Alternative Dispute Resolution program that actually can halt the investigation while the parties try to settle the case. That's our goal — that we always look for opportunities to settle the case." ▼



Felling Trailers co-owners, Brenda Jennissen (CEO) and Bonnie Radjenovich (vice president of human resources), with bid winners Jon and Laurie Stein of Centre Dairy Equipment & Supply.

Felling Trailers holds sixth annual Trailer for a Cause Auction

Felling Trailers held its sixth annual online auction of an FT-3 drop-deck utility trailer to benefit a nonprofit organization. Minnesota Ovarian Cancer Alliance was the chosen organization for this year's auction. The winning bid of \$3,400 was placed by Jon Stein, owner of Centre Dairy Equipment and Supply in Sauk Centre, Minnesota. Stein's wife, Laurie, is an ovarian cancer survivor.

Komatsu announces plans for new customer support and service center

Komatsu Equipment Co. announced plans to build a 189,000-square-foot service center on 30 acres in Elko, Nevada. The new building is planned to include a six-bay, full-service construction equipment and mechanical rebuild shop; a heavy welding and fabricating shop large enough for the rebuild and manufacturing of large shovel and truck structures and the manufacturing of truck bodies; a heavy machine shop with large, horizontal milling and boring machines, plus vertical lathe capability; and a construction equipment and rental machine yard. It is planned for completion in early 2020 and will combine the staff and functions of three existing buildings.

CUES launches redesigned website

CUES announced it launched a newly designed website, featuring a new look and feel with less text and more imagery. Streamlined menus and simplified navigation make it easier to use, and it has a responsive layout for all platforms, including smartphones and tablets.

Valley Industries names new Comet product manager

Pete Gustin was named Valley Industries' new Comet product manager. He will be responsible for managing sales and product development for Comet pumps and accessories in North America. Gustin started working with Comet pumps in 1995 while working for his family's business, UNICO Spray Products. UNICO merged with Valley Industries in 2010 and provided the support for Gustin to expand Comet diaphragm pumps into new industrial applications such as carpet cleaning, softwash and liquid rubber.



Pete Gustin

Tornado Global Hydrovacs announces strategic alliances

Tornado Global Hydrovacs announced that its wholly-owned subsidiary Tornado China entered into a five-year strategic partnership agreement with Anhui Jianghuai Yangtian Automobile to manufacture Tornado's lineup of hydrovac trucks. The trucks are customized to satisfy all the Chinese regulatory

requirements for sale and operation in China.

Tornado also announced that Tornado China executed a strategic partnership agreement with Daqing Haotian Xinda Technology for an initial term of one year to assist Tornado China with developing a client base in the excavation market in the Heilongjiang province.

Utilicor Technologies welcomes new manager of field operations

Utilicor Technologies announced the appointment of Jody Robles as the company's manager of field operations. He will be responsible for working with the network of Ditch Witch dealers to provide sales teams and service technicians with enhanced product knowledge on keyhole coring technology.



Jody Robles

GPS Insight announces new CEO and executive promotions

GPS Insight announced the promotion of Gary Fitzgerald to CEO. Rob Donat, former CEO and founder, will remain with the company as chairman of the board. Wayne Holder, the company's controller, moves to the chief financial officer role; and Jason Walker, vice president of sales, becomes chief revenue officer. Fitzgerald joined the company in November 2016 from General Electric, where he served as an enterprise architect for 10 years. He served as vice president of technology for almost two years and led the company's product development efforts, technical teams and security practice.



Andrew Burland



Dave Amato

Andrew Burland, Dave Amato promoted within Parker Filtration Group

Parker Filtration Group announced the promotion of Andrew Burland and Dave Amato. Burland was promoted to director of sales – engine mobile aftermarket filtration. In this role, he will lead the sales team focused on the mobile aftermarket space and represent a variety of brands, including Baldwin Filters. Amato assumed the position of director of marketing – engine mobile aftermarket division. He will be responsible for leading the inside sales and marketing departments.

McLaughlin Group adds Neville Missen as application engineer

McLaughlin Group added Neville Missen as application engineer for the company's auger boring equipment, On Target steering systems and steerable rock systems. A native of Australia, he owned and operated Boretac Microtunneling, managed Bullseye Microtunneling, and served as equipment sales representative for Vermeer Australia.



Neville Missen

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Lippmann-Milwaukee announces staff appointments

Lippmann-Milwaukee announced three key appointments for the company in the wake of the recent acquisition by McCloskey International. Kevin Kiesgen was reappointed to the role of vice president of sales. He has been with the company for nine years. Bob Meyers was named vice president of business development and was most recently vice president of sales and marketing at TelSmith. Gary Guthrie is now the senior vice president and will lead and integrate Lippmann-Milwaukee into the McCloskey Group.



Kevin Kiesgen



Bob Meyers



Gary Guthrie

Happenings

CALENDAR

Jan. 20-25

Underground Contractors Association of Illinois Annual Convention, Casa de Campo, Dominican Republic. Visit www.uca.org

Jan. 29-31

Underground Construction Technology (UCT) International Conference & Exhibition, Fort Worth Convention Center, Fort Worth, Texas. Visit www.uctonline.com

Feb. 20-23

Water & Wastewater Equipment, Treatment & Transport (WWETT) Show, Indianapolis Convention Center, Indianapolis. Visit www.wwettshow.com

March 14-16

National Utility Contractors Association (NUCA) Annual Convention, Naples Grande Beach Resort, Naples, Florida. Visit www.nuca.com/convention

March 17-21

North American Society for Trenchless Technology's No-Dig Show, Donald E. Stephens Convention Center, Chicago. Visit www.nodigshow.com

March 19

Association of Equipment Management Professionals (AEMP) 37th Management Conference & Annual Meeting, Rosen Plaza Hotel, Orlando, Florida. Visit www.aemp.org

March 26-28

Common Ground Alliance (CGA) Excavation Safety Conference & Expo, Tampa Convention Center, Tampa, Florida. Visit www.cgaconference.com

March 28-29

National Heavy Equipment Show, International Centre, Mississauga, Ontario. Visit www.nhes.ca

March 28-30

Mid-America Trucking Show, Kentucky Exposition Center, Louisville, Kentucky. Visit www.truckingshow.com

May 3-9

4th ITA-AITES General Assembly and World Tunnel Congress (WTC), Mostra d'Oltremare, Naples, Italy. Visit www.wtc2019.com

May 21-23

National Utility Contractors Association (NUCA) Washington Summit, Holiday Inn Capitol, Washington, D.C. Visit www.nuca.com/summit

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. ▼

How'd you handle that **tough excavation problem?**

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Pumps and Blowers

Success Stories:

BY CRAIG MANDLI



Pump set goes 69,000 operating hours before first engine change

PROBLEM

After 69,000 operating hours, it was deemed time to replace the diesel engine on a PT series pump at Geverinck, a Dutch wellpoint dewatering company. "It was still working, but we did not want to risk it further for longer-lasting projects," says Clemens Geverinck, owner.

SOLUTION

The philosophy — pump and motor perfectly balanced — was always central to the design of BBA Pumps' diesel pump sets. "We already had a few PT pumps with a lot of operating hours on the Hatz. We just change the oil and filters in time, make sure that the valve clearance is good and occasionally fit a new injector," Geverinck says. At an engine speed of 1,500 rpm, the engine crankshaft has turned more than 6 billion times without the bearings being replaced. Unlike current DriveOn pump sets, the service interval with this Hatz 1D81Z was every 500 hours. This engine had more than 130 maintenance intervals.

RESULT

The engine was replaced with a new model Hatz, which Geverinck expects to provide similar longevity.

843-849-3676; www.bbapumpsusa.com ▼

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BY CRAIG MANDLI

Blowers

Kaeser Compressors CBS and HBS Series

CBS and HBS Series rotary screw blowers from Kaeser Compressors combine the energy efficiency savings of the Sigma Profile rotary screw airend with the convenience of a complete blower package. Designed to ensure reliable operation for even the most demanding wastewater treatment plant applications, the blowers arrive ready for use and include a premium efficiency TEFC motor, inlet/outlet silencers, full sound enclosure, starters/drive, a full complement of sensors, and an onboard controller. Units are available with wye-delta start or variable-speed drive. Models include Sigma Control 2, which monitors all pressure, temperature, and other sensors, and includes expanded communication features. The Ethernet port and built-in web server enable remote access and seamless integration into wastewater treatment plant control/monitoring systems. Modbus, Profibus, Profinet and Devicenet industrial communication interfaces are available. **877-596-7138; www.us.kaeser.com**



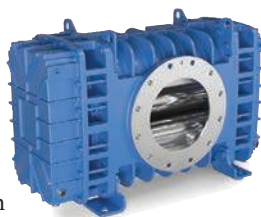
National Vacuum Equipment Challenger 1600

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 change-over valve and a powder-coated skid. **800-253-5500; www.natvac.com**



Robuschi USA Tri-Flow 825

The Robuschi USA Tri-Flow 825 vacuum blower is capable of continuous operation at 18 inches Hg. The open-airflow bearing housing allows more air circulation and additional cooling, which allows it to run continuously at deep vacuum. The tri-lobe design combined with helical gears allow it to run quieter, enabling use of smaller silencers and freeing up available payload and space, while keeping noise complaints to a minimum. It offers 4,805 cfm free air capacity and the ability to hit 18 inches Hg. **866-428-4890; www.gardnerdenver.com/robuschi**



Centrifugal Pumps

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 model sizes, 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**



ScreenCo Systems Patz Shaft Drive Pumps

Patz Shaft Drive Pumps, distributed by ScreenCo Systems, are vertical pit pumps that can be used in above-ground or underground storage tanks and include choices of single- or three-phase electric motors. They have high solids and grit capacities with large centrifugal pumps and hardened steel impellers. High capacities include the 3333 series up to 500 gpm, and the 4444 series up to 1,580 gpm. They can be deployed in depths from 3 feet to 12 feet 8 inches. The 6000 and 8000 series have a three-point hitch with PTO drive and can offer up to 3,500 gpm at depths from 6 to 12 feet. They can be used with an agitator nozzle to mix and pump fast. The 616 vertical prop agitator is capable of mixing at 9,000 gpm, keeping grit and solids mixed at pit depths of 6 to 16 feet. **208-790-8770; www.screencosystems.com**



Submersible Pump

Hydra-Tech Pumps S4VHL

The S4VHL 4-inch hydraulic submersible sludge/slurry pump from Hydra-Tech Pumps offers 3-inch solids handling and head capabilities up to 210 feet. This heavy-duty slurry pump is designed to handle wastewater and sewage and will fit through a 20-inch-diameter manhole. Its primary applications are sewer bypass into force mains and general transfer of solids-laden fluids. Combined with HT25 to HT60 power units, it is capable of flows up to 750 gpm. This safe and variable-speed hydraulic drive submersible pump can be used where electric power is hazardous or impractical. **570-645-3779; www.hydra-tech.com**



Transfer Pump

Boerger BLUEline Rotary Lobe Pump

The BLUEline Rotary Lobe Pump from Boerger is a self-priming, valveless, positive displacement pump used to convey viscous and abrasive materials. There are 21 pump models in six series with pulsation-free operation, fully reversible rotation, dry-run capabilities and flow rates up to 7,500 gpm. The pumps are stable and wear-resistant with a maintenance-in-place design that allows for all wetted parts to be easily replaced through the front cover without the removal of pipe or drive systems. **612-435-7300; www.boerger.com**



Vacuum Pumps

Elmira Machine Industries / Wallenstein Vacuum 753 Series

The 753 Series vacuum pump from Elmira Machine Industries / Wallenstein Vacuum incorporates extra-wide vanes that allow up to an inch of wear, designed for longer service life and lower maintenance costs. It provides 422 cfm airflow at 1,200 rpm and is precision-machined to provide vacuum levels up to 28 inches Hg. Options include air, liquid or dual cooling systems where air injection is combined with liquid cooling. A pump-flushing port is included on the top valve for convenient routine maintenance. The



quick-access housing end plate allows for easy internal inspection with no bearings to pull. Oil lubrication is via a mechanical piston pump driven by shaft rotation or available with a sight-feed valve oil regulator system using vacuum/pressure to draw oil with no moving parts.

800-801-6663; www.wallenstein.com

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



Washdown Pump

Water Cannon RG Series Pump

The RG Series Pump from Water Cannon Inc. - MWBE is rated for either 3.96 or 5.5 gpm at 1,450 rpm, and it has a nickel-plated manifold rated for 3,600 psi. It takes the best parts from the RK, XW and SHP Series pumps and combines them into an all-around heavy-duty pump, according to the maker. The footprint is the same as the RW and XW Series ARNA pumps, as well as the General 47 Series pumps.

800-333-9274; www.watercannon.com



Water Pump

Moro USA DC

Heavy-duty Moro USA DC water pumps offer 20 gpm maximum flow to provide quick restroom fills, while 42 psi maximum pressure makes for quick high-pressure cleaning. Available with cast iron or stainless steel pump body, both models offer a stainless steel impeller and Viton elastomers. Its 12-volt (83-amp maximum draw) fan-cooled motors are epoxy-coated for durability. These continuous duty pumps come solenoid- and pressure-switch standard for easy installation. They have 1 1/4-inch suction and 1-inch discharge ports. The discharge can be mounted in four different positions.

800-383-6304; www.morousa.com



Pump Parts/Components

Cat Pumps hydraulic motor bell housings

Hydraulic motor bell housings from Cat Pumps offer a fast and convenient way to mount hydraulic motors to high-pressure pumps in a direct-drive configuration. Cast from lightweight, high-strength aluminum alloy, these bell housings are suitable for hydroexcavation, jetting, wash-



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down, and other hydraulic motor applications that require an easy-to-assemble, compact solution. The bell housings are designed to accept SAE A and SAE B mounts to fit a variety of pumps rated to 10.5 gpm and 5,000 psi, and they are available as individual components or assembled as complete pump/motor assemblies.

763-780-5440; www.catpumps.com

Dynablast HV690F-12V

The Dynablast HV690F-12V hydrovac water heater produces 690,000 Btus with an output temperature of 190 degrees F at 9 gpm, with wet steam option, making it ideal for colder climates and improved digging in clay-filled areas. It comes with ETL certification for safety, which also includes certification on the coil for higher efficiency and heat transfer, stainless steel target plate for increased coil life, and a design with serviceability in mind with momentary override control. Its Pratissoli KT28ASPF water pump package offers 18.4 gpm at 2,900 psi and 1,450 rpm. It is available with a T13 female spline shaft input and SAE B 2/4 bolt flange for direct mounting the hydraulic motor, which reduces weight and creates more space on the truck.

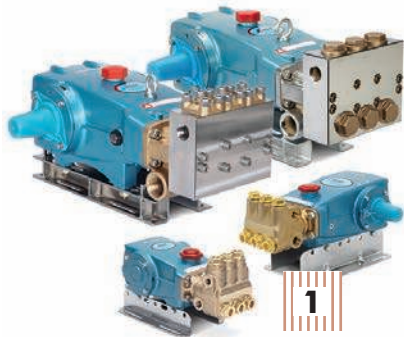
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THE LATEST: Products



1. Cat Pumps hydroexcavating pumps

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

2. Vac-Tron Equipment LP 873 SDT vacuum excavator

The LP 873 SDT vacuum excavator from Vac-Tron Equipment includes a Yanmar 49 hp Tier 4 Final diesel engine with a 1,000 cfm vacuum blower for both wet and dry applications. The LP (low profile) series of excavators are available with gas or diesel engines and high or low cfm. The series starts with 300-gallon debris tanks and goes up to 1,200-gallon tanks. The units come standard with the patented Big Red CVS filtration system, a reverse pressure system and a heavy-duty I-beam trailer with Dexter torsion axles. The low-profile trailers are hand built at the Florida factory, and the components of the unit are easily accessible, providing great ground clearance for right-of-way maneuverability. **352-728-2222; www.vactron.com**

3. Water Cannon electric clutch series of pressure washers

The heavy-duty, 12-volt electric clutch series of pressure washers from Water Cannon Inc. - MWBE are designed to mount on front of a diesel engine for high-pressure washing on location. It is available in three different pressures from 2,000 to 4,000 psi and flow rates from 4 to 8 gpm. Other features include a continuous-duty hydraulic coupling drive system, an in-line serviceable stainless steel mesh water filter, stainless steel unitized valves, forged brass manifold and a heavy-duty triplex

plunger pump. The thermo-pump protector engages at 140 degrees F, and the adjustable pressure regulator is from 150 psi to the max pressure. **800-333-9274; www.watercannon.com**

4. CUES QuickZoom III video inspection pole camera

The QuickZoom III from CUES is a lightweight, portable, wireless digital video inspection pole camera that can be operated by one person. It is designed to provide cable-free safe viewing in industrial or environmental areas with no-man entry, such as pipelines, wet wells, manholes, steam generators, tanks and vessels. The camera can also be used to locate lateral services or to identify blockages at manholes, access ports or other entry points without entering the line or structure. The QZIII is mounted on a carbon fiber adjustable telescopic pole that can extend up to 30 feet. The 1080 pixel digital camera features a 360-to-1 zoom with built-in image stabilization, automatic focus and can be operated using a tablet. It also includes distance-to-defect with laser and is powered by batteries that last over five hours on a charge. **800-327-7791; www.cuesinc.com**

5. Case Construction Equipment TV450 compact track loader

Case Construction Equipment's TV450 compact track loader is a 10,610-pound vertical lift machine with a rated operating capacity of 4,500 pounds at 50 percent tipping load. It features 9,188 pounds of breakout force and optional high-flow and enhanced high-flow hydraulics for high-power attachments such as mulching heads, stump grinders and cold planers. It is available in either standard mechanical H pattern controls, or optional electrohydraulic controls with H and ISO pattern interchangeability, as well as optional mechanical hand and foot controls. CASE electrohydraulic controls provide adjustable speed and control sensitivity settings that can adjust to meet the needs of each application and attachment. Operators are able to switch between H and ISO patterns via a simple rocker switch. **866-542-2736; www.casece.com**



6. Warrior Trenchless Solutions Thermoform pipe lining system

Thermoform pipeline rehabilitation products from Warrior Trenchless Solutions is a PVC-A pipe lining system designed for the rehabilitation of existing underground pipes. There are no harmful emissions, and it does not rely on any chemical reaction during installation. The factory-controlled production process creates a unique, patented PVC alloy compound. The highly flexible material allows it to expand and fit tightly into the host pipe, regardless of any imperfections in the pipe. Available sizes range from 4 to 36 inches in diameter. Warrior Trenchless Solutions also provides technical and product support to Thermoform installers. www.thermoformliner.com

7. John Deere onboard grade indication for G-Series

John Deere added an onboard grade indication option for its G-Series skid-steers and compact track loaders for jobs that involve leveling and slope work. The option provides readout of the cross slope and main-fall slope of the machine in real time through the main display monitor in either percentage or degrees. The option is available as a factory install or as a field kit for field installation. 800-503-3373; www.johndeere.com ▼

This Issue's Feature: Controlling the grade of your dig

BY CRAIG MANDLI

When you operate heavy equipment for a living, time is money. Needing to leave the cab of the excavator to get an accurate bottom measurement, while important, isn't efficient. The **ExcaVision excavator depth monitor** solves that issue, as it is suitable for any job requiring accurate bottom measurement.

The digital system shows the arms of the excavator, as well as the desired bottom, and gives an audible alarm when the bottom is reached. It also has multiple options that make it suitable for different jobs.

"With ExcaVision, you can dig to exact grade using the tip of the bucket, a rotating laser or a GPS as reference," says Kristjan Ingvarsson, the company's president. "It is easy to install and operate and allows you to dig quicker and more accurately, which saves you time and money."

The unit is suitable for any excavation job requiring accurate bottom measurements, such as basements, footings, sloping trenches, and foundations. The multilingual device also eliminates the need for an assistant, whose duty is to measure the depth of the excavation.

It allows the operator to monitor the depth, slope and width of the work, producing proper excavations and eliminating the safety hazard of working around deep holes, and reducing overcuts and undercuts, all from the comfort of the operator's seat.

"Our system is ideal for contractors with multiple machines, needing timesaving, flexible tools — including excavators, backhoes and minis. The same system also works on bulldozers and scrapers," Ingvarsson says. "ExcaVision is user-friendly and can be moved from machine to machine in matter of minutes. Installation and operation is made easy with a built-in, step-by-step guide."

The system consists of three wireless inclinometers installed on the boom, stick and bucket. They send the angle information to a touch-screen display inside the cabin. The display shows the arms of the excavator as well as the desired bottom and gives an audible



ExcaVision

alarm when the bottom is reached. An automatic laser receiver mounts on the front arm of the excavator and keeps the user on grade with the help of a rotating laser. According to Ingvarsson, rebenching the system take only two to three seconds, wasting no time when moving the machine. When used on a dozer, the laser receiver is mounted on a rod attached to the blade and one of the three sensors is mounted on the blade to monitor its lateral tilt.

"ExcaVision allows you to dig quicker and to exact grade," Ingvarsson says. "It virtually eliminates the need for a helper and allows you dig all day in the comfort of your cab."

800-344-4788; www.excavision.com



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