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Melanie Wells, Business Affairs/CFO
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Pegasus Utility Locating Services



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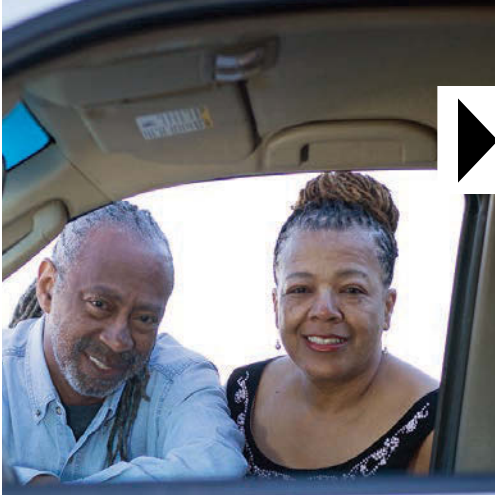
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Pegasus Utility Locating Services uses state-of-the-art technology to find what its clients are seeking.

By Dan Heim

ON THE COVER: Colission Wells, owner and CEO of Pegasus Utility Locating Services, and his wife, Melanie, business affairs and CFO, stand next to one of their trucks at their facility in Phoenix. Colission Wells founded the company in 1994 and has grown the company to several support vehicles and state-of-the-art locating equipment. The company serves all of Arizona. (Photography by Mark Henle)

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Look Before You Dig

UTILITY LOCATING IS A CRITICAL STEP IN EXCAVATION. USE THE PROPER TOOLS TO FIND LINES, OR CONSIDER NONDESTRUCTIVE DIGGING METHODS.

BY CORY DELLENBACH, EDITOR

Paying attention to what you are doing and making sure you know what is belowground where you are working will not only save your company money and extra work — it could save lives, too.

Locating water, power, fiber optic and other lines before digging seems like plain common sense. And yet, statistics from a 2012 OSHA report showed that every three minutes a utility line was damaged by excavation. The federal statistics also showed that more than a third (34.1 percent) of all serious pipeline incidents between 1991 and 2010 resulted from excavation damage.

Calling in hydro- or air-excavation equipment to expose utilities can prevent crews from damaging lines — unlike an excavator bucket, these methods are nondestructive. But not every contractor has access to these machines. Contractors using trenchers, boring machines and directional drills to get to where they need to go must take other precautions.

LOOKING DOWN

Utility locating devices are an important tool in avoiding strikes. Whether you have your own equipment on hand or can call in a utility locating services company, it's important to find out what you are digging near.

Pegasus Utility Locating Services, profiled in this issue, has been serving contractors and homeowners since 1994 when Colission Wells founded the company in Phoenix. Wells has kept the company's equipment as up-to-date as possible: "Having the latest and best technology available is important. It gives us the ability to find just about anything at typical scanning depths."

Pegasus has several locators capable of everything from doing 3-D models to hearing the sound of leaks from a lateral distance of 150 feet.

With the construction industry bouncing back from the 2008 recession, Wells now plans to expand his company with branch offices as needed.

THE STANDARD

Before starting excavation work, there are several standards OSHA recommends, including:

- Determine the approximate location of utility installations such as sewer, telephone, fuel, electric and

waterlines, and other underground installations.

- Contact the utility companies or owners involved to inform them of the proposed work.
- Ask the utility companies or owners to find the exact location of underground installations. If they cannot respond within 24 hours or cannot find the exact location of the utility installations, you may proceed with caution.

Another tool for contractors who may not have their own utility location equipment are services such as 811 — sometimes called Diggers Hotline or One Call. With 811 services, contractors can call three working days before digging and have the lines marked to show where these utilities are located.

Each state has its own set of rules and regulations. To learn more about those, go to www.call811.com.

USING CAUTION

Our Safety First feature this month focuses on predicting safe outcomes. Think ahead to the excavation you are about to do and consider what dangers could be ahead and what you can do to help eliminate them.

The feature recommends using safety observations rather than actual incidents to predict the future. You've been in this business a long time, and you probably have seen your share of accidents — so you have a pretty good idea what to expect. Now put that experience to use and create a safe working environment for yourself, your crews and the general public.


WHAT HAVE YOU SEEN?

As you read through this issue, we want you to think about jobs you've been on. What is the most complicated job you've tackled where you've had to use a locator? What made it complicated?

Email me at editor@digdifferent.com or call me at 800/257-7222 with your story. ▼

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STATISTICS FROM A 2012 OSHA REPORT SHOWED THAT **EVERY THREE MINUTES A UTILITY LINE WAS DAMAGED BY EXCAVATION.**



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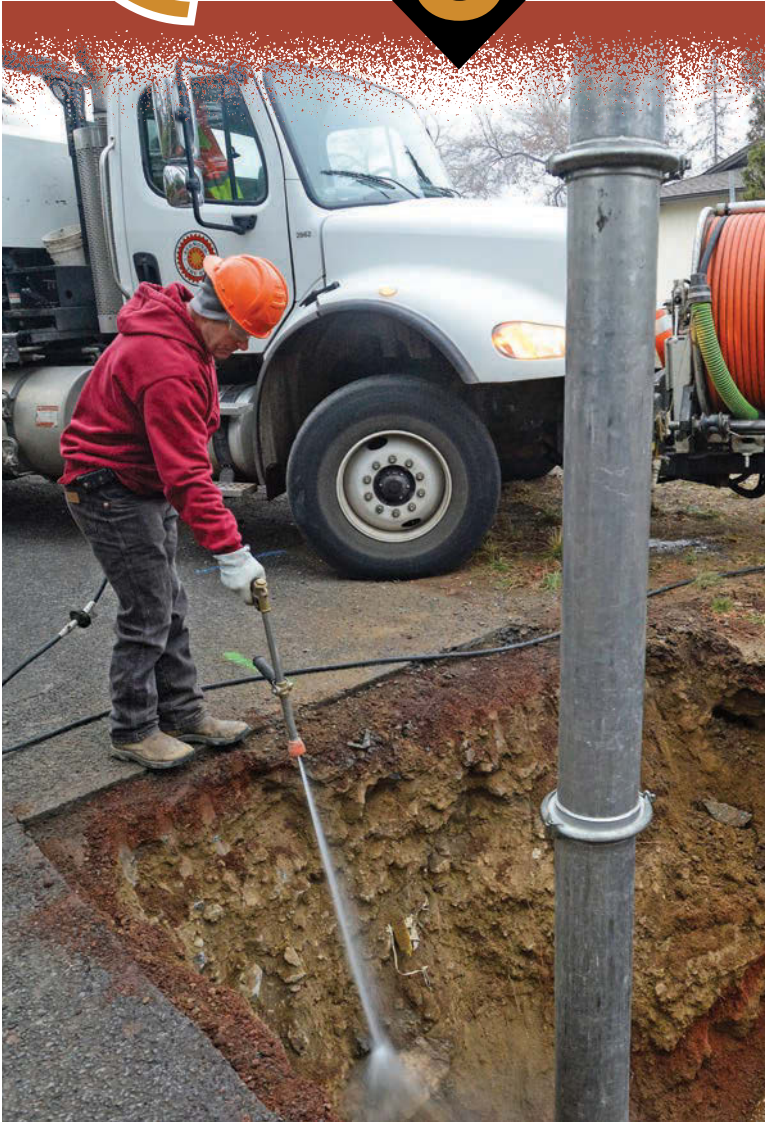
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TOUGH JOB

Pipe Bursting at Glacier National Park

“This was the company’s Super Bowl,” says John Galligan. That’s how the Pipeshark co-owner describes a project that led the Elverson, Pennsylvania, contractor 2,300 miles to Montana’s Glacier National Park for a tough pipe bursting job. Galligan shares his story how the crew battled cold weather, undocumented obstructions and stringent park environmental rules in rehabilitating 2,000 feet of 6-inch sewer lines.

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GAINING TRACTION

Alternative Forms of Excavation On the Rise

The move toward trenchless is rapidly growing in popularity as more contractors in the U.S. seize the opportunity. Beyond the benefits of safety and efficiency, trenchless solutions from hydroexcavation to directional drilling continue to grow as knowledge and new technologies become increasingly accessible.

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TUNNELING TRIO

Inside DC’s Clean Rivers Project

The District of Columbia will soon have three monster tunnel boring machines doing work beneath the ground as its Clean Rivers Project marks the halfway point in its 20-year plan. DC Water has contracted with three design-build teams to design, procure and operate the machines to complete each of their respective projects. Learn more about these TBMs, which project director Carlton Ray calls “amazing pieces of equipment.”

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BACK TO THE FAMILY

WHEN A FAMILY SAWMILL BUSINESS ENDED, FOUR SIBLINGS WENT SEPARATE WAYS. YEARS LATER, THEY REJOINED TO BUILD A SUCCESSFUL HYDROEXCAVATION FIRM WITH DIVERSE CLIENTS.

STORY: CORY DELLENBACH PHOTOS: BRYON GLATHAR

Family has always been important for Kenny Baker and his three siblings. They were close growing up and eventually worked together as well. Now, the brothers and sister are running their own hydro-excavation company.

Baker, his two brothers and one sister started Baker Hydro-Excavating after leaving the family logging business where they had worked for most of their lives.

“As a family we started in the logging business thinking that was going to be our career,” says Baker. “My dad had a sawmill with my grandpa, and after my grandpa passed my dad and another family member became partners.”

Kenny and his brother Kevin worked at the sawmill along with their dad, while younger siblings Wendy and Allan grew up around it.

Their father passed away in 2000, and the family lost control of the sawmill the next year. The four siblings were forced to find other work, but after 10 years in separate jobs, they joined forces again to start Baker Hydro-Excavating, based in Mountain View, Wyoming.

The company started doing work in the oilfields with just one hydroexcavator, but by mid-2012 there were five trucks in the inventory. Now, the company also does utility and construction work and the fleet includes 11 hydroexcavators and 13 support trucks.



Baker Hydro-Excavating operator Felix Campos is shown daylighting, or using pressurized water to uncover buried electrical lines that need to be repaired or replaced on a job site in southwestern Wyoming.

"WE DECIDED AS A FAMILY THAT WE WOULD GET ONE TRUCK AND SEE HOW THE BUSINESS WENT. WITHIN A MONTH, THE **DEMAND WAS SO HIGH** THAT WE PURCHASED OUR SECOND HYDROVAC. WE **HAD TO STAY AHEAD** OF THE WORK."

Kenny Baker



Baker Hydro-Excavating Mountain View, Wyoming

FOUNDED:	2011
OWNERS:	Kenny Baker, Kevin Baker, Allan Baker and Wendy Gerrard
EMPLOYEES:	31
SPECIALTY SERVICES:	Cleaning hydrocarbons off of structures; culvert and line cleaning
SERVICE AREA:	Western United States
WEBSITE:	www.bakerhydroex.com

Felix Campos looks on as mechanic and maintenance man Marcus Baker prepares to fill one of the company's trucks with water.

They purchased their first hydroexcavator in November 2011, and business took off from there. "We decided as a family that we would get one truck and see how the business went," Baker says. "Within a month, the demand was so high that we purchased our second hydrovac. We had to stay ahead of the work."

The company steadily expanded to 11 trucks and now has a second location. Besides its headquarters in Mountain View, Baker Hydro-Excavating has a satellite office in Casper, Wyoming, run by Kelly Webb. The company works throughout Wyoming, Colorado and Utah.

OILFIELD TO UTILITIES

At startup, Baker Hydro-Excavating found itself in the middle of an oil boom, making that industry an obvious focus.

"Oil and gas are still our biggest industries served, but we go to a lot of the mines and do a little work there," Baker says. "We work with utility companies and we do work for the local highway department."

In the oil and gas industry, Baker Hydro-Excavating does jobs such as rig cleaning, pit cleaning, pressure washing, oilfield tank cleaning, waste removal, remote digging and hot-oil services.

"I found more and more as we worked in oil and gas that we needed to diversify," Baker says. "Oil prices just tanked out, a lot of people are struggling and oil companies are holding off on projects. We wanted to diversify a little bit more so we didn't have to rely totally on the oil and gas industry."

In utility work, the company does slot trenching, daylighting and culvert

FINDING NEW WORK

After the passing of their father, Baker and his siblings — Kevin, Allan and Wendy — had to relinquish control of the mill to another family who also had ownership in the business.

The family members picked up new jobs — Kenny and Allan in nearby mines, Wendy as a certified nursing assistant and Kevin with several hydro-excavation companies.

In late 2010, Kevin approached Kenny with an idea to start a hydroexcavation business. He talked it over with the rest of his siblings and wheels went into motion. "It was scary starting something new," Baker says. "Our mom had received a settlement from the sawmill business, and she allowed us to use a portion of the money to start this business. It takes a lot of money to get started in this work."

and cattle guard clean-outs. Cattle guards are obstacles used to prevent livestock from passing along a road that cuts through fencing surrounding a piece of land. The cattle guards consist of a depression in the road covered by a grid of bars or tubes, normally made of metal.

“Throughout the year, water and dirt accumulate in the culverts and cattle guards, blocking the flow of water or filling in under the cattle guard,” Baker says. “We get called out to clean the debris that has settled in the pipe. We have a rotating head that propels itself through to clean out the pipe.”

Baker has seen the popularity of hydroexcavation in utility work grow over the years as a safer option than conventional digging: There are so many lines underground that it is more efficient to use the hydroexcavators.

“I FOUND MORE AND MORE AS WE WORKED IN OIL AND GAS THAT WE NEEDED TO DIVERSIFY. OIL PRICES JUST TANKED OUT, A LOT OF PEOPLE ARE STRUGGLING AND OIL COMPANIES ARE HOLDING OFF ON PROJECTS.”

Kenny Baker

“Every day, more and more contractors are striking lines when they dig with a backhoe or shovel, and the lines break,” Baker says. “That will cost the contractor a lot of money. With us, we use pure water pressure, and it won’t break the line if it’s done properly.”

Hydroexcavators also enable crews to use the hose to get in where backhoes and other large equipment can’t reach. On a typical workday, the company has all of its hydroexcavators in the field with two-man crews in each truck. The number of units in the field does depend on the client demand.

“Lately with the oil and gas prices the way they are, we’ve been running four to six crews out there a day,” Baker says.

FINDING TOUGH JOBS

A focus on hydroexcavation can bring some challenging jobs. Recently at a compressor station company crews were hired to expose 32 natural gas lines running into the station and find the main power line to it. “We were asked to get this done in two days because it was where all the lines from the wellheads were running into,” Baker says. “They didn’t want it down very long because it would shut down the wellhead then.”

Another problem at the site was mobility: The site was fenced in with barely enough room for trucks to move around. The company had five trucks digging, each one taking a section and exposing the lines within it.

“The debris was clay with some hard shale that we dug through to expose the lines,” Baker says. “We were able to get it all done in time and it took a lot of teamwork.”

Another recent job had the company digging holes for cement pillars. The client couldn’t get a drill inside the location where the pillars were to go. Baker Hydro-Excavating crews remotely dug the holes using the hydroexcavator’s hoses.

(continued)



Family members and share-owners of Baker Hydro-Excavating include, from left, Kevin Baker, Wendy Gerrard and Allan Baker.

A family affair

Working with family in a business can bring stress, but the Baker family has found a way to move past that.

“It has its ups and downs at times, but in the end we work together as a united team,” Kenny Baker says.

Kenny, Allan and Kevin Baker and their sister Wendy Gerrard have worked together since they were young, first alongside their dad at a family-owned sawmill and now as share-owners of Baker Hydro-Excavating.

While there can be struggles in working with family, the four find that it can also make their business stronger: They know each other’s strengths and weaknesses and keep lines of communication open.

“We all have the same goal in mind to make our business the best it can be: Providing good service to our clients and knowing that our father

would be proud of what we have built,” Baker says.

They each have their own duties. Kenny handles the office, Allan handles maintenance, Wendy runs the safety program and Kevin works in the field running a hydroexcavator. Kenny and Allan have kept their jobs at a local mine.

Plenty of other family members are involved in the business. Kenny’s wife, Stephanie, and Kevin’s daughter, Halie, serve as secretaries. Gerrard’s husband is a laborer. Kenny’s sons also work for the company, Russell as an electrician and Marcus as a mechanic.

Says Baker, “We work through the tough decisions that in the end make us a better business.”

“The pillar holes had to be precise so they could pour in the cement,” Baker says.

SAFETY BRINGS WORK

A big part of landing clients for Baker Hydro-Excavating is the use of services such as ISnetworld, Veriforce and PEC Premier — companies that track contractors’ safety compliance certifications. Potential clients can look up contractors through those services’ websites.

“A lot of the companies we work for require us to have one of those three services,” Baker says. “These companies are a resource for prospective clients, informing them about your company.”

Employees who work in the field must undergo Safeland training before even stepping foot on a hydroexcavator. The company also requires employees to take part in weekly safety meetings and conducts daily job safety analysis reports on each job.

“We take the safety of our workers and the others on location very seriously,” Baker says. “Safety is our top priority.”

The company puts new employees through several weeks of field training with experienced crews.

“If a greenhorn comes in with no experience, he will go with a crew of two and work with them for two weeks until he feels comfortable running that whole truck and knowing the safety

“IN THIS LINE OF WORK THERE ARE GOING TO BE A LOT OF CHANGES WITH HOW HYDROEXCAVATORS ARE USED. THERE ARE A LOT OF UTILITY LINES AND PIPELINES GOING IN THE GROUND, WHICH MAKES IT PERFECT FOR HYDROEXCAVATION WORK.”

Kenny Baker

procedures,” Baker says. “Before he can go out on his own, he must demonstrate to us that he can handle it.”

SLOWING DOWN

Now that the company has grown so fast in just four years, Baker says it’s time to slow down: “We don’t want to grow too fast. We want to settle down, and the goal is to get everything paid down.”

The company was scheduled to get three or four new trucks in the near future, but decided to wait until the market settles — especially on the oil and gas side. In the meantime, Baker plans to implement a “How’s My Driving?” incentive for the employees. If they receive a good review from a customer, they’ll receive an award.

“Our employees are a big part of our growth,” Baker says. “They do their job in a timely manner while keeping safety in mind.”

Baker believes the hydroexcavation industry is still in its infancy in the U.S., and he’s excited to see what it becomes: “In this line of work there are going to be a lot of changes with how hydroexcavators are used. There are a lot of utility lines and pipelines going in the ground, which makes it perfect for hydroexcavation work.” ▼



The team at Baker Hydro-Excavating includes, from left, Felix Campos, Lacey Bernard, Kevin Baker, Wendy Gerrard, Kenny Baker, Stephanie Baker, Russell Baker, Marcus Baker, Kallan Gerrard and Allan Baker.



Marcus Baker, mechanic, works on one of the company’s hydroexcavators at its shop in Mountain View.



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BY ED WODALSKI AND CRAIG MANDLI

Brand-new to the North American market, the HX-4000 hydroexcavator from LMT, in partnership with Smart-Dig of New Zealand, is designed on a rigid subframe that can be mounted to a variety of truck chassis. The unit garnered plenty of attention at the 2015 Water & Wastewater Equipment, Treatment & Transport (WWETT) Show.

“The customer gets to choose the chassis they want. We don’t lock them into a particular make or model,” says Mike Fenneman, owner of LMT. “If they have a brand preference or local truck dealer, they can select something — new or used — that they are comfortable with. It is compatible with any 33,000 GVW chassis. A lot of people were pretty excited to see a unit that provides full hydroexcavation functionality on a smaller scale.”

FEATURES OF THE UNIT

The complete unit on display at WWETT was available on a Freightliner M2 106 day cab with 300 hp Cummins engine and Allison 3000 RDS automatic transmission. It has an auxiliary 83 hp Kubota diesel engine, 1,500 cfm Tuthill 6015 blower with exhaust silencer, 3,000 psi, 7 gpm Udor waterblaster with retractable reel, 50 feet of 3/8-inch hose and 6-cubic-yard debris tank with side-mounted level indicator.

“THESE HAVE BEEN EXTREMELY POPULAR IN NEW ZEALAND, AND THE END USERS THAT HAVE HAD THE CHANCE TO LOOK AT IT BELIEVE IT WILL BE A GREAT FIT FOR THE U.S. MARKET.”

Mike Fenneman

components, the HX-4000 is one of three models (HX-3000 and HX-5000) offered by Smart-Dig, but the only one currently available in North America.

“These have been extremely popular in New Zealand, and the end users that have had the chance to look at it believe it will be a great fit for the U.S. market,” says Fenneman. “It will be the fourth quarter of 2015 or early 2016 that we’ll have the other models available here.”

The wireless, remote-control telescoping boom rotates 270 degrees horizontally and 25 degrees vertically. It extends to a working range of 31 feet with two floodlights on the end of the boom. The hydraulic rear door with sight glass lifts 90 degrees, while auto-hydraulic locking, adjustable plates ensure

Other features include four side-mounted, rotary-molded water tanks totaling 396 gallons. The water filter includes an in-line, 80-gauge stainless steel strainer with 1-by-50 micron 10-inch pleated cartridge filter. The 2,200 cfm full-flow filtration system is housed in a .98-cubic-yard pressure-drop unit and has four washable, PTFE-coated, pleated vacuum discharge filters. Assembled in the U.S. by LMT using New Zealand components,



Mike Fenneman, left, owner of LMT Inc., discusses the features of the HX-4000 hydroexcavator with a WWETT Show attendee. The modular unit can be mounted on chassis options from a variety of makers.

an optimal seal. The 5-inch rubber main dig hose has an over-center clamp-lock fitting. A 30-foot, 4-inch suction hose provides extended digging access. Safety features include an automatic vacuum release and an internal stainless steel float ball with seal that shuts off the vacuum when the tank is full, preventing debris or liquid from entering the filtration system. Roller doors on both sides of the unit provide access to the engine, blower, filter unit, silencer and storage area. Accessories include a digging wand and head. Options include a 400,000 Btu Aqua Blast fuel-oil-fired water heater for cold-weather operation or breaking up hard soil.

GROWING MARKET

Fenneman says he decided to feature the HX-4000 in Indianapolis to help determine where the U.S. market would develop. “Hydroexcavation is obviously a growing market, especially with younger businesses,” he says. “I see this unit as a fit for public utilities and municipalities, and private contractors that perform potholing. In New Zealand, they are being used a lot for running underground fiber-optic cable.”

Fenneman says that the market reaction to the HX-4000 will help the company determine the target market for their modular hydroexcavator line in the coming years.

“They are using the HX-5000 in New Zealand, and that is more of a larger, traditional-sized hydroexcavator that’s still a modular unit,” he says. “We’re excited for the HX-4000, and you’ll be seeing the larger model next year.”

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PHOTO BY CRAIG MANDLI



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Understanding Locators 101

HOW THEY WORK AND HOW THEY CAN BENEFIT YOUR COMPANY

BY GREG EHM

Locating underground utilities is becoming more of a challenge as the vast array of lines in the ground continues to increase. As the ground under our feet becomes more congested with utility lines, it's vital to identify the location of utilities — gas, fiber, water, telecommunications and sewer — to ensure the safety of your crew and protect your bottom line.

HOW LOCATORS WORK

Basically, locating underground lines is similar to tuning into your favorite radio station, according to Matt Manning, locating equipment product manager for McLaughlin.

“Each station transmits a different signal, and locators are like a radio designed to pick up those signals,” says Manning. “These signals help identify the exact location of an underground utility.”

Many utilities transmit a signal, and in some cases each line can have a different signal just like radio stations. However, some lines do not transmit a signal. In these cases, a transmitter can be used to induce a signal onto a metal line, which allows the locator to pick up the signal.

UNDERSTANDING LOCATING METHODS

There are basically two locating methods — active and passive.

Active locating involves searching for a specific line using either the direct connection or inductive method. The locator is either attached directly to the line or, if you cannot make a direct connection to the line, a frequency is selected and induced into the ground and reradiated by the utility.

Passive locating is a method used by contractors to check the area for unknown lines. The contractor will simply sweep the area with the receiver looking for utilities that radiate or reradiate frequencies, but this method does not allow the operator to distinguish between the types of lines.

WHERE TO START

The industry offers two types of locators — single- and multiple-frequency units — to accomplish active and passive locating. Each unit has its advantages and limitations.

IF A CONTRACTOR IS CONDUCTING THE ACTIVE METHOD OF LOCATING, THERE ARE DIFFERENT WAYS TO PUT THE LOCATOR SIGNAL ON THE LINE OR PIPE. DIRECT CONNECTION IS THE MOST COMMON CONNECTION METHOD IN THE INDUSTRY.

Single-frequency locators have been around for decades. These systems consist of a transmitter that is placed on the ground and induces a single high-frequency signal. The signal is picked up by the underground line and then radiated back up to the receiver. Single-frequency systems work well on lines and pipes in non-congested easements, but putting a high frequency into the ground has the tendency to light up everything underground and may produce a distorted signal. In other words, you cannot distinguish whether it is a power, gas or communications line.

The other limitation is that single-frequency locators cannot determine the depth of the line.

Since lines and pipes are constructed of different materials (copper, aluminum, iron, steel, etc.), a higher or lower frequency may do the best job of locating them. Multi-frequency systems allow you to tune the frequency you are putting into the ground to the type of line or pipe you are trying to locate. The lower the frequency, the better it will stay on the line you are trying to locate, thus making the job of distinguishing a gas from a waterline easier.

Some locators offer a current measurement index that measures the current you are putting onto the line. This helps distinguish the line, especially



A utility contractor searches for buried lines with the Verifier G2 digital locator from McLaughlin. A Vermeer vacuum excavator is sitting behind him.

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if it crosses over another line, and helps ensure you are staying on the original line to be located and are not jumping to other lines in the area. Most modern receivers today can also estimate the depth of the line or pipe at the push of a button. The locator measures signal strength and uses an algorithm to convert this information into an estimated depth. However, interference can distort the depth estimate. Despite the possible inaccuracy, the estimated depth gives the contractor an idea of the location of the line or pipe as they hand dig or excavate the area with a vacuum.

If a contractor is conducting the active method of locating, there are different ways to put the locator signal on the line or pipe. Direct connection is the most common connection method in the industry. This allows workers to connect cable leads, similar to jumper cables, to the line or pipe to be located and generate an alternating current down the cable or pipe. The only issue with this method is gaining access to facilities. If you are not a contract locator or subcontractor for the telephone company, you cannot legally open up a telephone pedestal and clip onto the line.

To overcome this challenge, contractors can use a locator with good inductive capabilities. Inductive locators induce the signal into the product. The inductive method requires the user to set the transmitter on the ground. A signal radiates down through the ground onto the cable and eliminates the need to connect clamps or coils to the line or pipe.

NEW CHANGES ON THE HORIZON

While locator technology has not changed much in the past five years, several manufacturers are adding enhancements to help provide a clearer signal and tie the locates to GPS coordinates.

Virtually all manufacturers are putting more power into their utility locators. While this extra power does not enhance the accuracy of the unit, it does provide a clearer and higher-quality signal. Many manufacturers have also made advancements in their receiver software to help filter out the extra noise in the ground and air, helping to provide a more accurate signal and reading.

WHILE LOCATOR TECHNOLOGY HAS NOT CHANGED MUCH IN THE PAST FIVE YEARS, SEVERAL **MANUFACTURERS ARE ADDING ENHANCEMENTS** TO HELP PROVIDE A CLEARER SIGNAL AND TIE THE LOCATES TO GPS COORDINATES.

The other trend occurring in the industry is linking the locator with GPS devices and mapping the utility line with latitude and longitude coordinates, thus providing an accurate location of the line for future reference.

A basic single-frequency unit will range in price from \$1,000 to \$2,500, while a multi-frequency unit with a digital screen and depth measurement capabilities will range in cost from \$2,500 to \$4,500, depending on the number of frequencies purchased.

While this may seem like a lot of money, you can lose more in one day on one simple bad mistake.

"I always tell contractors to look at it from a couple of viewpoints," says Manning. "If having that utility locator on your job site speeds up the locating and potholing process by 30 minutes a day, that's giving you two and a half hours in a week to do something else. That's money in your pocket."

ABOUT THE AUTHOR

Greg Ehm is a technical writer for Two Rivers Marketing. ▼



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HIGH-TECH HIDE AND SEEK

PEGASUS UTILITY LOCATING SERVICES USES STATE-OF-THE-ART TECHNOLOGY TO FIND WHAT ITS CLIENTS ARE SEEKING

STORY: DAN HEIM PHOTOS: MARK HENLE

PPeople have long searched for things underground: Water, food, metals, minerals, gems and fuel were early targets. Divining rods, aka dowsing rods, were the first “technology” employed in the search. These devices date back to around 6000 BCE, according to archaeologists. Dowsing still has its advocates, but most scientists challenge its efficacy.

Fast forward to the early 1900s, when the invention of metal detectors added a real tool to the arsenal. Radar, invented in WWII, was the next. It opened a window that worked as well for underground locating as it did on aircraft. In this century, ground penetrating radar (GPR) has reached an amazing level of sophistication. And acoustic systems have opened yet another window.

Colission Wells, founder, owner and CEO of Pegasus Utility Locating Services, knows a lot about underground locating technology. He’s an expert in this field with more than 33 years of hands-on experience.

“The technology is constantly evolving,” says Wells.

“To stay ahead of the competition, we do upgrades as needed, ensuring we’re current with the best technology out there. It’s a significant capital investment, but it pays off.”

THE EARLY DAYS

Wells got his start in the locating business in 1980 doing seismic surveying in Louisiana. In 1984 he moved to Arizona and joined Mountain Bell where he did underground phone line locating. He founded Pegasus in 1994, headquartered out of his home. Pegasus is now in an industrial park in central Phoenix. Wells says he chose the Pegasus name and logo because “the symbol suggests speed, power and mobility.”

“I sensed the locating industry was kind of fragmented back then with some companies providing some services, but none that could do it all,” Wells says. “So that was my goal with Pegasus. I wanted to be the one-stop shop for locating services in Arizona.”

Initially a sole proprietorship and since then incorporated, his company has grown to nine employees, including wife Melanie, business affairs and CFO. Pegasus now wields an impressive arsenal of the latest locating technology. Past clients include municipalities, developers, utilities, airports, hospitals, commercial properties, public sites and private property owners throughout the state of Arizona.

“I SENSED THE LOCATING INDUSTRY WAS KIND OF FRAGMENTED BACK THEN WITH SOME COMPANIES PROVIDING SOME SERVICES, BUT NONE THAT COULD DO IT ALL. SO THAT WAS MY GOAL WITH PEGASUS.”

Colission Wells

When asked why the Blue Stake program was insufficient and why companies like his were even needed, Wells responds, “Easy question. Blue Stake helps, but it’s not always current, and it doesn’t locate private utilities. Many contractors and property owners make changes to what’s underground and never report it to Blue Stake. So if you really need to be sure, give us a call.”

And Pegasus is still growing. “We do have plans to expand beyond the state of Arizona,” Wells says, smiling. “But I can’t talk specifics there — would hate to have the competition beat us to the punch, you know?”

EQUIPMENT ARSENAL

“Having the latest and best technology available is important,” says Wells. “It gives us the ability to find just about anything at typical scanning depths. It helps us live up to our performance claims and legitimizes the Pegasus mission statement.”

To that end, Wells has amassed an impressive arsenal of locating technology, all portable, and all capable of single-user operation. The GPR units can interface with com-

Colission Wells, owner and CEO of Pegasus Utility Locating Services, and his wife, Melanie Wells, business affairs and CFO. The Pegasus symbol was chosen because it suggests speed, power and mobility.



Pegasus Utility Locating Services, Inc.

LOCATION: Phoenix, Arizona

OWNER/CEO: Colission Wells

FOUNDED: 1994

EMPLOYEES: 9 full-time

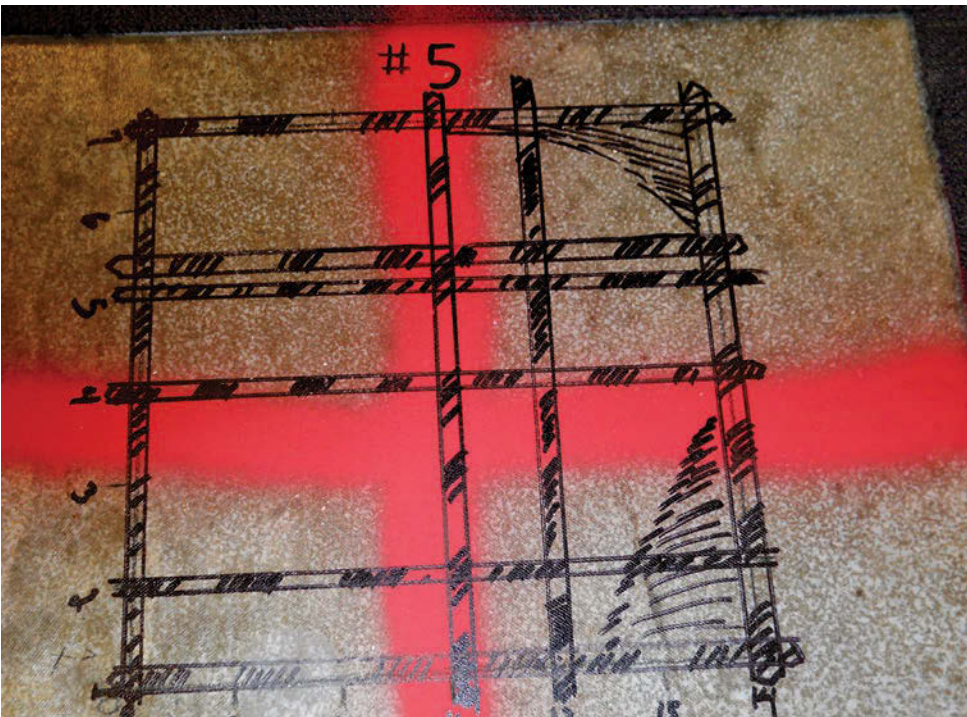
SERVICE AREA: Arizona statewide

SERVICES: Base locating, fault locating, metal detection, leak detection, sewer camera, ground penetrating radar, smoke testing, potholing

WEBSITE: www.pegasusutility.com



The staff of Pegasus, front row, from left: Ledell Harris, Melanie Wells, Collision Wells and Mike Eakins. Back row, Kevin Barton, Jeff Mortenson, Archie Brown, Kenneth Kardell, Billy Brown and Jeff Williams.



Located rebar is sketched on the concrete surface, providing guides for later drilling. Steel rebar will badly damage a concrete drill bit.

puters to create 3-D models of subsurface infrastructure. Most units are GPS/GIS compatible. As of this writing, the Pegasus arsenal includes the following:

GSSI (Geophysical Survey Systems) SIR 3000 GPR: The radar frequency is user-selectable, up to 100 kHz. Specific frequencies provide better results,

depending on the soil type and what you're looking for.

GSSI StructureScan Mini HR: The HR stands for high resolution. It also uses GPR, but with a fixed 2,600 MHz radar system. Higher frequencies provide higher resolution both vertically and horizontally. This unit can precisely locate multiple layers of rebar, post-tensioning cables and conduit at depths down to 16 inches. It can also measure the slab thickness.

Goldak Triad 2310 ULS pipe and cable locator: The Triad can target specific utilities by frequency selection, ranging from 50 Hz (acoustic mode) to 200 kHz. Settings are stored internally and cataloged for specific targets. It does not interface with a CAD program. Rather, its operation is much like a traditional metal detector. When the operator is over the correct spot, the Triad provides an acoustic signal via speaker or headset.

3M Dynatel 2573 pipe and cable locator: The Dynatel also has a selectable range of operating frequencies, from 577 Hz to 200 kHz, for finding specific targets. It can work in trace or induction mode. Dynatel's latest model, already on the Pegasus wish list, will include an upgrade allowing computer interface.

Metrotech HL 400 Leak Detector: This is an amazingly sensitive acoustic device, capable of hearing the sound of leaks from a lateral distance of 150 feet. After detection, a lateral sweep to the point of maximum decibels puts you right over the leak.



Jeff Mortenson, field supervisor, uses the Goldak Triad pipe and cable locator near the service entrance on a client's building.

Wells demonstrated the Metrotech in the conference room at Pegasus. Conversations in adjoining rooms were clearly audible. And that required a reduction in gain to avoid hearing damage. The headset is a tightly fitting isolation design.

FINDING THE TARGET

Arizona soils contain large amounts of metals, as well as caliche — a calcium carbonate aggregate that, when wet, is highly conductive. Both components interfere with the high-frequency RF used in GPR, making locating in this state more difficult than others.

Few manufacturers provide specs for the maximum depth at which their units can locate infrastructure. There are just too many variables.

One variable is target size: Larger targets can always be detected at greater depths, whatever equipment you use. So there are no industry standards for reporting “depth of operation.”

Despite these caveats, Pegasus almost always finds their target. Their success is grounded in years of experience augmented by technological expertise. They can accurately locate cables, conduit and pipes delivering cable TV, electric, natural gas, irrigation, sewer and water, fiber optics, and phone service. And they could probably find that special ring you dropped somewhere on your lawn, even if it's been stepped into the soil.

But every once in a while, the standard technology comes up a bust. You can dig blind and accept the risk, or you can go to Plan B. Wells says, “Sure, I carry a copper dowsing rod in my truck. When my technology fails me, which isn't very often, I try dowsing. And I can tell you, on many occasions it has worked.”



Small but powerful

Colission Wells, owner and CEO of Pegasus Utility Locating Services in Phoenix, likes to keep his locating equipment up to date. When asked if there is one particular piece of equipment he is especially proud of, he disappeared briefly into the storage room, returning with what looked like a small RF controlled 4WD toy — except for the digital display on its “roof.”

“This is the GSSI [Geophysical Survey Systems] StructureScan Mini HR,” Wells proudly states. “The HR stands for high resolution. It's our latest acquisition. Cost close to \$18,000, but let me show you what this thing can do.”

Wells set it down on the carpeted floor of the conference room at Pegasus HQ, turned it on and rolled it manually over a distance about 2 feet. The digital display was near instantaneous. An image of the rebar in the slab under the carpet was clearly visible.

“When you're drilling through concrete you really don't want to hit steel rebar,” Wells says.



TOP PHOTO: The GSSI StructureScan Mini HR (High-Res) being guided by laser along a pre-drawn grid on the floor. INSET: The screen displays rebar beneath the carpeted concrete slab floor in Pegasus headquarters.

“That stuff will trash a drill bit.” The image can be transferred manually, drawn on the floor like a grid, and the excavators will know exactly where they should drill.

The StructureScan Mini also provides depth data and can interface with a computer if the client wants a 3-D model of what's under the surface. It can also print a graph that is then mapped to the floor, drawn by hand for later reference by excavators or drillers.

THE PEGASUS FLEET

Pegasus Utility keeps one Ditch Witch FX60 in their fleet. The FX60 is capable of either dry or wet vacuum excavation. It has a spoil tank capacity of 800 gallons and can pump and excavate at a rate of 950 cfm.

Wells notes, “Depending on the job, sometimes you need to get that excavated fill back in the hole the same day. Dry vac lets you do that. In other cases, you really need a wet vac. It's good to have both options.”

Wet vacuuming offers several advantages over dry vacuuming. Specifically, water:

- Is more efficient when working in tough soils.
- Helps control the buildup of static electricity.
- Avoids the “sandblasting” effect of high-speed air.
- Acts as its own lubricant, speeding the removal of fill.



Pegasus technicians Billy Brown (left) and Jeff Williams on a vacuum excavation job with their Ditch Witch FX60, which is capable of either dry or wet excavation.

- Can be heated for excavation through frozen topsoil.

Pegasus can also deploy their Guzzler NX (on an International chassis) for dry-vac jobs. With a capacity of 16 yards (about 3,200 gallons) and an excavation rate of 6,000 cfm, it's used when more capacity or excavation speed is required. Those needs sometimes trump the hydrovac's greater versatility, but the two units are nicely complementary.

Their fleet of Nissan Frontier pickups is used for transporting equipment and crews to job sites. They're capable of off-road use, too, and provide comfortable climate-controlled cabs — a nice perk in Arizona where, in an average year, 100 days see temperatures in excess of 100 degrees F. After a long, hot day on the job with all targets successfully located, the crew's ride home is a welcome and well-deserved respite.

COMMITMENT TO THE INDUSTRY

"It's all about damage prevention," says Wells. "We'll find whatever's down there and report on it in detail, providing 3-D CAD drawings if needed. Failure on our part to locate accurately presents a hazard to the people on the job and potential damage to expensive infrastructure.

"Unfortunately, once we turn the info over to the excavators, it's often out of our hands. Sometimes damage still happens. Diggers are tempted to go for one more bucket with the backhoe before getting in there with shovels. Nobody likes to dig the old way. So they go for that last scoop, and that's how the damage almost always happens."

The Pegasus mission statement, proudly displayed on the wall of their main office, sums up their attitude toward safety and customer service:

We are committed to making the construction industry safer by providing a high-quality and accurate Subsurface Utility Engineering (SUE) product to map and locate underground utilities, thereby helping construction companies prevent damages.

We strive to make contractors' and utility owners' environments safe for excavation and rehab, by performing our high-quality and accurate service with prompt response, at an affordable price.

To that end, all hires receive extensive training. New technicians undergo four weeks of classroom and field training, and must pass both written and field tests to obtain their locating certification. Every new technician is closely monitored by field supervisors for an additional month.

Further, all technicians undergo retraining and testing each year. Some is done in-house. Other more specialized training, such as for work in mines and confined spaces, is done via offsite certification programs. The Pegasus training program meets or exceeds the standards established by the National Underground Locating Contractors Association.

STAYING AHEAD OF COMPETITION

Pegasus is looking to expand to the international market, establishing branch offices as needed in the near future. The underground locating business is effectively driven by the construction industry, with its usual ups and downs. But Wells claims things have been steadily improving, long term, since the crash of 2006-2007.

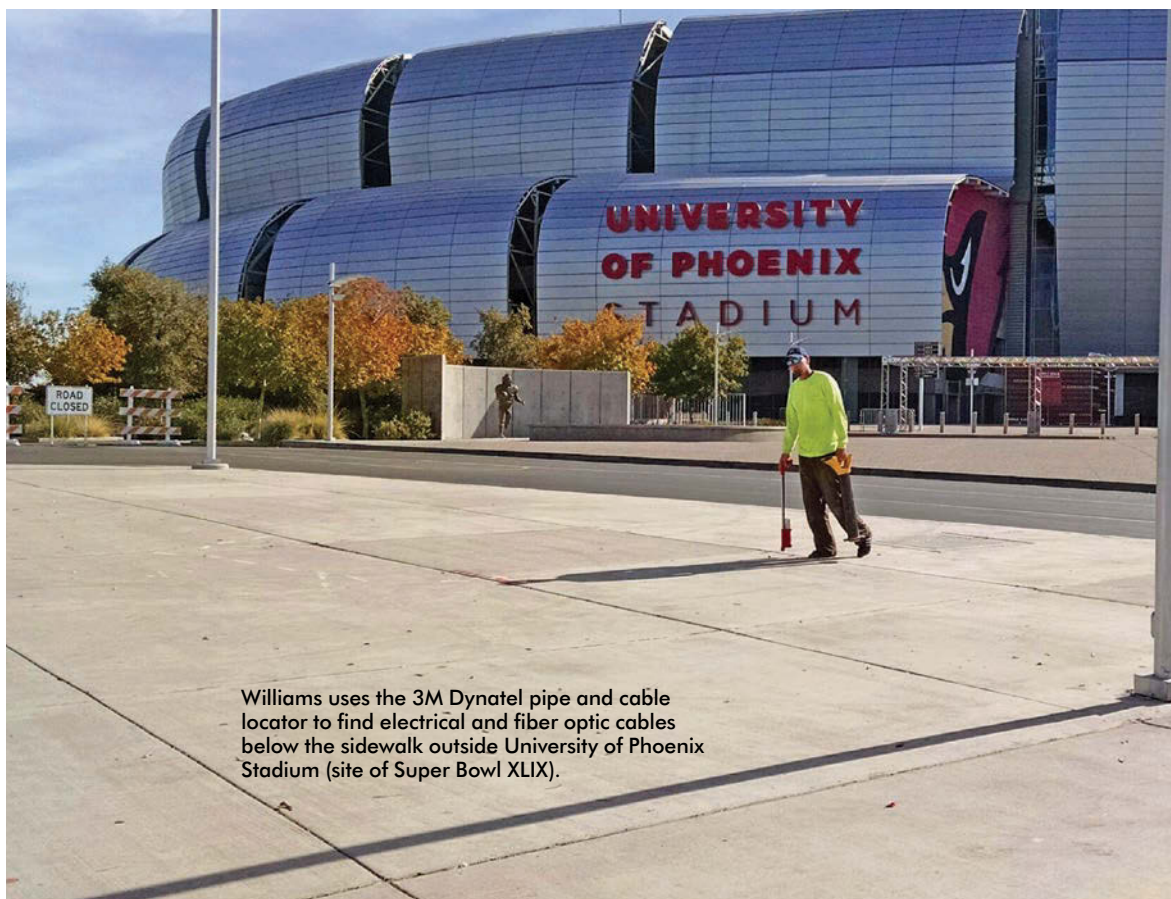
Always looking for better ways to do the job and never content with what the vendors have to offer, Wells is developing a new "tool" for smoke testing, now in its third prototype, and eventually to be patented. Details at this time are, of course, proprietary.

Wells, smiling again, says, "Can't tell you much more about that either, sorry. But this could revolutionize the process of smoke testing. Once I've got my patent, come back for another interview. Like I said earlier — it's all about staying ahead of the competition." ▼



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Colission Wells



Williams uses the 3M Dynatel pipe and cable locator to find electrical and fiber optic cables below the sidewalk outside University of Phoenix Stadium (site of Super Bowl XLIX).

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BY ERIK GUNN

How many hats do you wear? General contractor, site director, head mechanic, substitute driver, payroll manager — for many of you, that’s just before lunch.

What would happen to your business if something happened to you?

Or maybe you’re lucky enough to have a couple of indispensable people on your payroll: the mechanic who understands the machinery better than the people who made it; the salesperson who always knows the perfect way to close a sale and who knows every potential customer in your community.

How do you preserve what you’ve worked so hard to build? How do you keep the whole works from collapsing if you, or a miracle worker on your payroll, die suddenly? As with other potential disasters, the first line of defense is insurance — in this case, key person insurance.

According to the Insurance Information Institute, a “key person” in a business is someone whose special knowledge and skills contribute significantly to the income of the business. Key person insurance (or key employee insurance) is designed to compensate your business when a key person, whether that person is an owner, partner or employee, dies. It is, in essence, a form of life insurance for your business.

KEY PERSON INSURANCE IS DESIGNED TO COMPENSATE YOUR BUSINESS WHEN A KEY PERSON, WHETHER THAT PERSON IS THE OWNER, PARTNER OR EMPLOYEE, DIES. IT IS, IN ESSENCE, A FORM OF LIFE INSURANCE FOR YOUR BUSINESS.



HOW IT WORKS

For most of us, a life insurance policy is meant to provide funds to pay off the mortgage, send children to college and maybe give the surviving spouse a financial cushion for a few months or a year or two. For your business, a key person insurance policy can pay for:

- Searching for and hiring a replacement, whether that means a general manager, a crack technician or a top-notch salesperson.
- Temporary expenses incurred while you (or the people you leave behind) figure out what happens next: an office manager and job scheduler to keep the crews working, or a part-time accountant to deal with invoicing and payroll.
- Compensating the business for lost goodwill, sales contacts or income when it suddenly finds itself without the insured’s name recognition.
- Buying back shares in the business from a shareholder’s family member who has inherited a piece of the business but not the interest or business acumen.
- Extra outside repair costs when machinery isn’t running and can no longer be quickly repaired in-house, as well as lost income for every day the vacuum truck isn’t on the road.

All of that translates into cash that a key person policy can provide. A life is still being insured, but the business owns the insurance, pays the premiums and is typically the beneficiary.

KEY THINGS TO KNOW

Most commonly, key person insurance is *life insurance* in the usual forms — term or permanent — with the usual considerations: Term insurance is usually cheaper, doesn’t build cash value and can’t be borrowed against; permanent (or whole life, or universal life, or variable life) insurance builds cash value and can be used as security for a loan, but has higher premiums.

Key person insurance can also be *disability income insurance*, which pays if the insured becomes disabled and is unable to perform his or her job. Work with your insurance broker to carefully balance the cost of the insurance premiums with the covered conditions — if the policy pays when the insured is unable to perform usual and customary duties for the position (rather than being unable to perform any job), the premiums will likely be higher, but your peace of mind will be greater.

You, for example, might be able to sit in a chair and make phone calls, but if you need to be on job sites and talking to customers and crews in order to be effective, you’ll want a policy that pays if you can’t be active. A disability income insurance policy will pay a percentage of the disabled person’s earned income; if that person is a partner or a sole proprietor, the policy can pay office expenses (rent, utilities, salaries, depreciation).

INDEPENDENT ADVICE

By the way, about that insurance broker: Make sure the broker works with

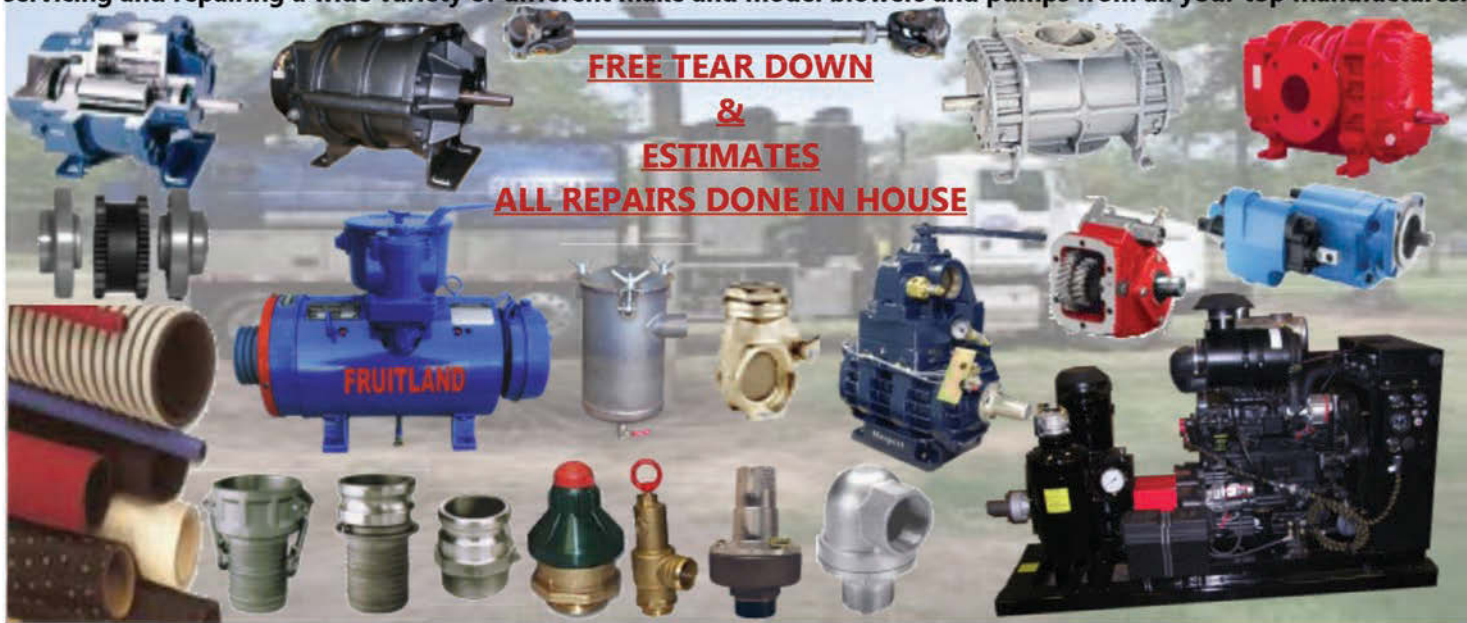


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more than one company (and thus can shop your policy around). You're more likely to get a better deal. It's also helpful to ask for the ratings on the policies you're offered (that is, the assessment from one of the rating agencies – Fitch, Moody's, A.M. Best or Standard & Poor's) as well as asking the agent exactly what the ratings mean.

The ratings aren't uniform either in application or appearance — a "superior" from Moody's is Aaa, while a "superior" from A.M. Best is A++, and the agencies may differ in their evaluations.

If your business has a board of directors, you may need a resolution from your board to purchase key person insurance for a principal or employee. As with any matters involving board resolutions, consult a lawyer familiar with your corporate structure and business plan.

Ask the broker how your business interruption policy dovetails with key person insurance. The fire that destroys your office and records might also injure or kill someone, but you want to be able to get up and running as soon as possible. Find out what the short-term cash prospects would be under those kinds of circumstances and which policy will help you the most in specific situations.

TAX CAUTIONS

Two tax policies to keep in mind:

- Key person premiums, like any life insurance premiums, are not tax deductible.
- Key person death benefits paid to a business are typically not taxable, as long as certain conditions are satisfied. The business must give the employee written notice that the policy is being purchased and that the business is the beneficiary; the employee must also give written consent for the purchase. Make sure there's a form, separate from the policy, for notice and consent; your insurance broker or your accountant should be able to help here.

Before you pick up the phone to call your insurance broker, though, plan

a session with your accountant for an overview of your business affairs to guide your conversation with the broker. You're looking for answers to questions such as:

- How much is the business bringing in now?
- How do things look in the next six months, next year, next five years?
- Do you expect close competition (making a good salesperson vital), or are you in a safe market with reliable customers? (Congratulations!)
- What are the salaries of the people you depend on most heavily? Are they expecting healthy raises in the next couple of years? If you had to hire someone from a competitor, would you have to pay more than you're paying your employee?

You probably have a good sense of the answers to these questions, but having the most accurate numbers on a piece of paper in front of you will be necessary.

These conversations can help you think about how to value not just the business as a whole, but your contribution to the business: your time, your talent, the goodwill that's built into your presence, as well as the contributions from important employees. You're looking for the answer to "How much money does the business lose if something happens to this person?"

Conversations with an insurance broker can result in additional expenses, and no one likes to reduce their bottom line. No question here, though, that a small bite of expense now can save major expense (and real business loss) later. Consider the premiums an insomnia cure. Needless to say, we hope that no readers (or business heirs) ever need the proceeds of those policies.

As always, seek advice from your own accountant, banker or insurance broker, particularly where tax consequences are concerned.

ABOUT THE AUTHOR

Erik Gunn is a magazine writer and editor in Racine, Wisconsin. ▼

Triple Play

PIPE BURSTING AND CUSTOM EQUIPMENT ENABLE A UTAH CONTRACTOR TO SEPARATE A COMBINED LATERAL IN A PRESTIGIOUS HISTORIC DISTRICT

BY SCOTTIE DAYTON

A contractor lowering the basement floor of a historic mansion in Ogden, Utah, inspected the 6-inch clay lateral as part of dropping the plumbing. The pipe was broken.

Most properties on the block are listed on the National Register of Historic Places. The state historical society mandated minimal disruption and no trenching to replace the line.

“The homeowner shared his lateral with two other properties, all equally responsible for what is called a combined lateral,” says Jay Garrett, owner of Utah Pipebursting in Ogden. Garrett, who developed a procedure to replace combined laterals with two separate lines, promised to split this run into three individual lines.

“THE JOB OFFERED MANY CHALLENGES, BUT THE GREATEST WAS KEEPING MY NERVES IN CHECK WHILE TRYING SOMETHING I’D NEVER DONE.”

Jay Garrett

“The job offered many challenges, but the greatest was keeping my nerves in check while trying something I’d never done,” he says. “The first time I tested my new plate design was during the burst.” It pulled a combined 360 feet of 4-inch HDPE pipe flawlessly and saved the homeowners \$23,000 over traditional repairs.

DUE DILIGENCE

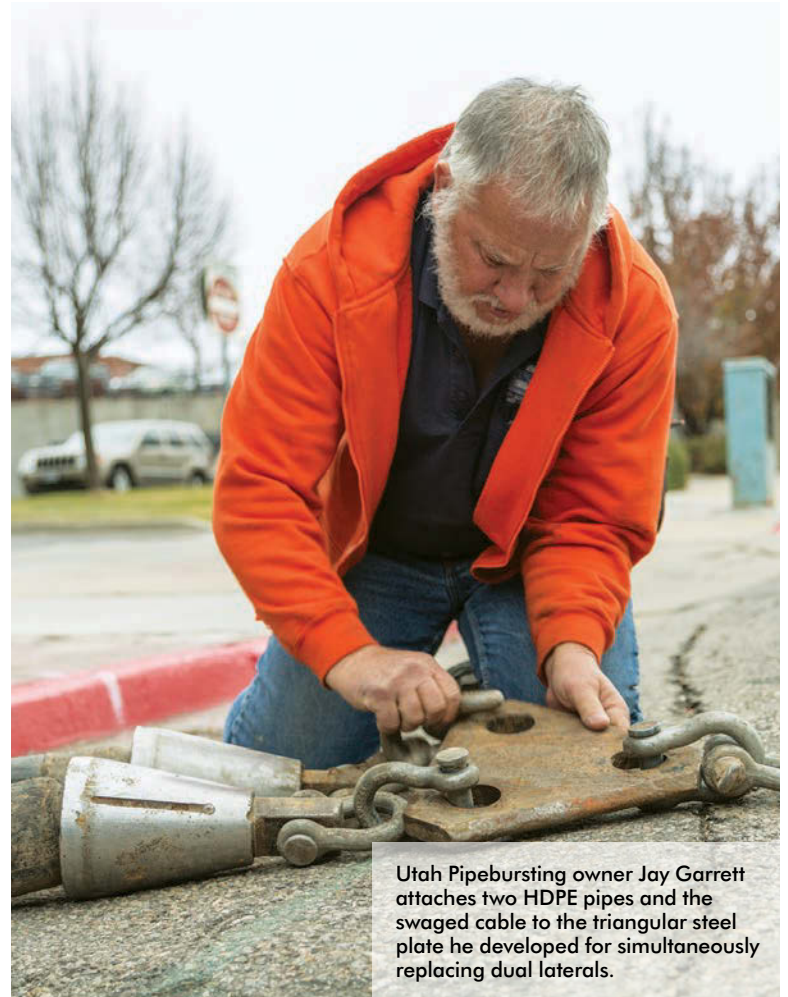
Garrett’s three workers used a Rausch camera system to trace the client’s single lateral south under the driveway to a double wye in front of the neighbor’s detached garage. The wye connected to the 6-inch clay combined lateral. It ran west under the garage, the retaining wall behind it and another neighbor’s patio before picking up his lateral at 140 feet.

The pipe then ran 120 feet under home C’s driveway to the sewer in the street, dropping 20 feet in elevation along its total length. The inspection also revealed many cracked or broken sections and root intrusion.

The client’s house and adjacent property — homes A and B — were on the east side of the block, but home C with the third lateral was on the west side of the block. Reaching home C via the backyards was impossible. “Even with the best planning, we still loaded and moved equipment around the block every few hours,” says Garrett. “It stretched prepping to three days.”

The clients also requested that no work be done in their absence. The traveling couple was home for seven to 10 days, then left on business for two to 10 days. “Working within their schedule resulted in three postponements, and bad weather caused another delay,” says Garrett. “It put us almost a month behind schedule.”

The other absent homeowners granted permission for Garrett’s crew to work at will. “Having just one house to keep in service overnight was a big plus,” he says.



Utah Pipebursting owner Jay Garrett attaches two HDPE pipes and the swaged cable to the triangular steel plate he developed for simultaneously replacing dual laterals.

PROJECT: Replace combined lateral in historic district
CUSTOMER: Homeowners, Ogden, Utah
CONTRACTOR: Utah Pipebursting, Ogden, Utah
EQUIPMENT: M50 pipe bursting system, TRIC Tools, 888/883-8742, www.trictools.com
RESULT: Combined lateral separated

READY, SET ...

Using a KX161-3S Kubota compact excavator, Garrett broke through concrete driveways and excavated 3- by 5- by 8-foot-deep pits where laterals left homes A and B and at the wye. Another operator using a KX41 Kubota mini-excavator with a variable-width undercarriage eased the machine through the security gate and around the side of home C to dig a pit in the back lawn. He also excavated a 5-foot-deep pit at the connection to the combined lateral. All pits required hydraulic shores in the cobble and clay soil.

Home C's driveway was long enough to fuse seven 20-foot sticks of 4-inch HDPE SDR 17 pipe. With the excavator's help, workers moved two lengths of 140 feet east over the retaining wall, around the garage and into the backyard of home A.

The next day the men set up the cribbing, 1-inch-thick resistance plate and M50 ram (TRIC Tools) with 48 tons of pulling force in the third connection pit. The hydraulic system on the KX161 excavator powered the ram at 6 gpm/3,000 psi.

"We've been doing double pulls for years," says Garrett. "My inspiration for it came from watching horizontal directional drillers. They use a disc with holes for mounting multiple pipes, then the reamer pulls back the assembly."

Garrett designed a 1-inch-thick triangular steel plate with three holes: one for the burst head with pipe, another for the second HDPE pipe and the third for attaching the 7/8-inch swaged cable rated at 48 tons.

"The raised excavator arm supports the pipes as they must be level with each other at the beginning of the pull," says Garrett. "After that, the hole created by the burst head holds the pipes in position."

DOUBLE THE PLEASURE

Garages A and B blocked the workers' line of sight to the pits, so instead of communicating with hand signals they relied on two-way radios.

"That elevated the risk of something going wrong during the delay between sending and receiving transmissions," says Garrett. "The ram was yanking in a combined 320 feet of pipe at 7 to 8 feet per minute." The burst required 30 to 35 tons of force.

Once the pipes were in the pit, the crew disconnected the triangular plate and sent the cable upstream to pull in the individual 20-foot-long laterals for homes A and B. They sleeved the 4-inch HDPE pipe inside the original 6-inch clay lines, then connected the runs with PVC wyes.

A bypass wasn't necessary. "We completed the pulls in two hours and made the connections in four hours," says Garrett. "Then I went home and tried to sleep."

He worried about his untested 9-inch circular steel plate design for mounting the triple pipes and if he had calculated the critical elevation change correctly to prevent bellies from forming in the run as the bundle twisted.

"Based on research, I determined a 4.5-foot drop in 120 feet would compensate for one full rotation every 50 feet," he says. "For that distance, the combined lateral fell 5 feet."

SPLITTING THE ARROW

The 1.5-inch-thick steel plate had three holes for mounting pipe and a center hole for bolting it to the burst core. "Experience said a 1-inch-thick plate would be sufficient, but I overengineered it in case the pipe had some drag on it," Garrett says.

The city wanted the 7-foot-square by 8-foot-deep pit at the sewer excavated and backfilled on the same day. "Considering this burst was the pilot test of new equipment, the deadline was additional stress," Garrett says.

After he exposed the sewer connection with the KX161 excavator, the crew set up the ram while Garrett transported the machine to the third connection pit. As others fused three 120-foot lengths of HDPE pipe, Garrett staged them in the backyard of home C. The pipes, pull plate and burst head assembly weighed 300 pounds. To handle the weight, the men wrapped a chain around the bundle to help lower it into the pit.

"WE'VE BEEN DOING DOUBLE PULLS FOR YEARS. MY INSPIRATION FOR IT CAME FROM WATCHING HORIZONTAL DIRECTIONAL DRILLERS."

Jay Garrett

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Garrett positioned the pipes over the top of a 6-foot ladder using the excavator. With the bundle supported, he lined up the burst head before moving the machine to power the ram. This time everyone had an unobstructed line of sight.

Despite the addition of a larger plate and third pipe behind the bursting head, the ram used the same amount of force to pull in a combined 360 feet of pipe at 7 feet per minute. The pipes remained together until the ends passed over the ladder, then they fanned out slightly. During the pull, the bundle rotated 1.5 times.

HOME STRETCH

"Because there was very little flow in the 8-inch clay sewer, we removed a 6-foot length rather than drill and tap it for the two new connections," says Garrett. "We installed three 8-inch PVC wyes, connected all the

pipes, backfilled and met the city's deadline."

The following morning, the crew sleeved home C's 60-foot lateral and connected it. "The bursts went well, but I didn't like the bundle rotating," says Garrett. "I'm modifying the original design to correct it." ▼



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Keep Your Trencher Engine Humming

FOLLOW THESE TIPS TO HELP AVOID BREAKDOWNS IN THE FIELD AND EXPENSIVE REPAIRS

BY KYLE ROGERS

You may think you're practicing proactive maintenance by removing your trencher's air filter after a job and knocking it on the side of a tire or blasting it with a high-pressure hose to remove dirt and debris. In fact, you're putting yourself at risk of experiencing a severe engine failure, says Phil Holcomb, senior service specialist with Vermeer, manufacturer of trenchers and other off-road equipment.

"All our machines have air filter indicators," Holcomb says. "We tell our customers not to remove that air filter until the indicator tells you to. You don't want to take it out and knock the dirt off or blow the dust off with a high-pressure hose. If you do that, you run a big risk of possibly putting a hole in the filter, which would let unfiltered air through and cause serious engine damage eventually. It's probably not going to fail that day, but it's going to affect the life of that engine pretty dramatically."

The bottom line is that your trencher is not going to be able to get the job done unless the engine is functioning properly. A few regular habits — like proper care of the air filter — can help achieve that, as well as ultimately prevent expensive engine repairs down the road.

ESTABLISH A ROUTINE

Good engine maintenance practices begin with a routine, Holcomb says. "Before a job, do a walk-around. Establish a routine and a starting place. Try to start in the same place every time."

Contractors will want to look for things that have changed since the last time a walk-around was performed — damp areas caused by oil or coolant leaks for example. The walk-around should also be conducted after a job is completed as well.

"You don't necessarily have to do this in extreme detail," Holcomb says. "Once you have your routine, you kind of know what you are looking for and you'll notice things that have changed."

Oil and coolant levels are some of the most important areas to check regularly to ensure optimal engine performance.

"The engine oil and coolant, that's the lifeblood of the engine," Holcomb says. "Keeping those full is really cheap insurance. I've seen \$10,000 engine repair bills that are caused by \$25 worth of oil."

Another engine component that should be carefully monitored is the fan belt.



Lexington Belyeu guides the Vermeer trencher through heavy Georgia soil.

PHOTOS COURTESY OF PHILIP MCCREANOR

"That's easy to check and adjust or replace, if necessary," Holcomb says. "Look for strings or chunks. If it breaks, the machine has to sit until it's repaired."

As far as service intervals, the best practice doesn't have to be any more complex than adhering to the recommendations of the operator's manual, says David Campbell, director of engine and industrial design for Ditch Witch.

"The maintenance schedule that is in our manuals is broken down into a 10-hour, a 50-hour, a 100-hour, etc.," Campbell says. "Typically, the daily — or 10-hour — check includes things like checking all the fluids, the tire pressure, the air filter restriction indicator, and then doing the daily lubrication, which would primarily be on the digging chain and boom."

An example of a longer service interval would be changing out the engine oil. For most Ditch Witch equipment that recommendation is 500 hours. A contractor's specific operating conditions should still be taken into account though.

"In places like Arizona, Texas or Southern California, for example, that quite frequently have a combination of hot and dusty conditions — or even places with extremely cold conditions — we don't necessarily recommend servicing more frequently, but it certainly does make following the recommended service intervals more critical," Campbell says.

AIR FILTER TIPS

Dusty working conditions come into play especially for maintenance of the air filter. That's why the filter restriction indicator on many machines should be used as the gauge for replacement rather than an hourly interval.

"In really dusty conditions, you'll probably have to do it more frequently than the oil change," Campbell says. "The filter might be good for about 200 to 300 hours. But in a less dusty environment, it could last significantly longer than the normal oil change."

The most important thing to remember about the air filter is to leave it alone until the indicator signifies that it's time for replacement. Campbell says to keep an eye on the air filter indicator on a daily basis, but don't worry about replacing the filter until you've been given the official warning.

"That doesn't mean it has to be changed immediately, but it probably needs to be changed at the next convenient service time," Campbell says.

Angel Delmoral uses a Ditch Witch trencher as part of site preparation for a new sewer line for a job in Cookeville, Tennessee.



"THE ENGINE OIL AND COOLANT, THAT'S THE LIFEBLOOD OF THE ENGINE. KEEPING THOSE FULL IS REALLY CHEAP INSURANCE."

Phil Holcomb

And always replace it with a new filter. Don't attempt to clean it.

"By cleaning the filter, you run the risk of poking or tearing a hole in it," Holcomb says. "You should always replace it with a new filter. Getting unfiltered air into the engine is a big deal. It doesn't take long to 'dust' an engine."

OUTSIDE THE ENGINE

Maintenance on other parts of the trencher can be just as important to good engine health. The digging chain is one example. If it's worn, the engine will have to work harder to achieve a certain level of production.

"It's like using a chain saw with a dull chain," Holcomb says. "You're just putting extra strain on it trying to make it work right."

"Bad bearings caused by lack of maintenance is another one. If you don't do your daily greasing there, as the bearings go out they're going to put more load on the engine in order to keep them turned. Your digging chain adjustment is part of it too. If it's too tight, then it's going to be putting more load on the bearings, which will put more drag on the engine. If it's too loose, you'll be causing the engine to work harder to keep the chain working how it's supposed to." ▼



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BY CRAIG MANDLI

Depending on the situation, locating underground utilities to safely dig around them can be accomplished with advanced acoustic electronic devices. The items below, including electronic utility locators, will help find hidden utilities and save valuable time.

Erosion Control Products

AlturnaMATS ground cover mats

AlturnaMATS ground cover mats provide a convenient portable roadway system to protect landscaped or environmentally sensitive areas from damage and prevent equipment from getting stuck in muddy or sandy situations. Made of 100 percent recycled high-density polyethylene, these 1/2-inch-thick mats will bend to conform to the ground but will not break, crack or splinter.

They have been tested in extreme hot and cold weather conditions, have a bold cleat



pattern for traction, can hold up to 120 tons in weight and are available in either black or white.

888/544-6287; www.alturnamats.com

SVE Portable Roadway Systems TRAKMAT

TRAKMAT versatile ground protection cover mats from SVE Portable Roadway Systems are designed to move vehicles over lawns, sidewalks and driveways without causing damage. Made from high-quality polymers, they help keep construction sites clean and safe. They provide maximum tire contact with a power cylinder traction design. The traction surface helps keep the



mats in place and prevents vehicle slippage. The lightweight mats with hand cutouts are easy to lift, load and unload. Mats can be used to cover access areas of the construction site, creating a clean and professional look and eliminating ineffective rock entrances. They help reduce the risk of pollutants leaving the site, eliminate curbside site erosion and reduce street sweeping. They aren't affected by chemicals, temperature or water.

800/762-8267; www.trakmat.com

Survey Equipment

Spectra Precision Trimble LL300N

The LL300N fully automatic, self-leveling laser level from Spectra Precision/Trimble is designed to handle a wide range of general construction, concrete and site preparation applications, including elevation control, leveling forms and footers, concrete pours, excavations and basic slopes. It has a glass lighthouse and offers an IP66 environmental protection rating, which allows operation in adverse environmental conditions, even heavy rain. With a metal sunshade and composite material housing, the laser is constructed to withstand drops of up to 3 feet onto concrete and tripod tip-overs up to 5 feet. It has one-button operation for basic leveling. The optional RC601 remote control enables single-axis slope mode and manual slope matching capabilities. A choice of receivers and kits including tripods and various scale grade rods in a system case are available.



800/527-3771; www.spectralasers.com

Utility Locators

Ditch Witch UtiliGuard

The UtiliGuard utility locating system from Ditch Witch uses ambient interference measurement to automatically scan the surrounding area for noise, recommending the best frequency among its 70 options. To help users make more accurate locates of obstructed utilities, it measures distances (depth) both horizontally and vertically to the utility. It has a six-button, multi-language operator interface and a high-contrast LCD display to ensure visibility in all conditions, including direct sunlight. Dual outputs allow users to connect the transmitter to two utilities at once. It is Bluetooth-enabled to simplify data transfers. Its rugged housing with IP65 rating protects against dusty, dirty and wet conditions, and its transmitter and receiver battery life is 100 and 30 hours respectively.



800/654-6481; www.ditchwitch.com

E-Z Drill Model 20 UTL

The Model 20 UTL vertical drill from E-Z Drill allows companies to pinpoint the site of a gas leak without tearing out a significant stretch of roadway. Utility companies can drill through the road surface in periodic intervals to check for gas. This enables workers to narrow the potential leak area to a stretch between holes that would need to



be removed for repair work, rather than destroying a much longer length of road. The standard 18-inch drill depth can be significantly modified based on needs, with depths customized to several feet. Bit diameters range from 5/8 to 2 1/2 inches. A minimum of 100 cfm compressed air is required for operating the drill. It comes with quick-coupler air fittings and a quick-release bit guide. It weighs 207 pounds and is supported by a 29-inch wheelbase. Since the frame absorbs vibrations, it reduces hand, arm and back injuries typically associated with hand-held rock drills.

800/272-0121; www.ezdrill.com

Forbest Products FB-R2012



The 512-hertz FB-R2012 wireless digital locator from Forbest Products can detect buried water pipes, sewer lines and other pipeline. It can be used in normal or noise-control modes for different application environments. Noise control is chosen when there is interference. A shift button enables sensitivity grade conversion between near and far for locating and pinpointing the location and depth of the transmitter. On-screen status indicates the signal strength of 15 levels and battery volume. The lightweight hand-held locator is powered with 6 AA batteries and comes with retractable poles that make it easy to carry.

650/757-4786; www.forbestusa.net

General Pipe Cleaners Gen-Eye Hot Spot

The Gen-Eye Hot Spot pipe locator from General Pipe Cleaners uses a total field antenna array and on-screen icons to lead the operator to the target without a long learning curve. It can be used to quickly and accurately locate inspection cameras, sondes, active power lines and utility lines. The easy-to-see auto backlit LCD display includes arrows that point in the right direction. Rated at IP65, it is dust and dirt proof, water resistant, and passed the 1-meter drop test, while the screen passed the 18-inch steel ball drop test. The Hot Spot transmitter, in tandem with the locator, has a powerful 5-watt transmitter to boost location power. Choose from 1, 8, 33 or 65 kHz frequencies.



800/245-6200; www.drainbrain.com

MALA GeoScience USA Easy Locator HDR

The Easy Locator HDR from MALA GeoScience USA has a single-frequency transducer that allows the detection and imaging of targets. Users can zoom in for visualization of small near-surface targets or out for maxi-



imum range to view the deepest targets. The detection limits span a broad range of various-size utility targets, particularly nonmetallic, nonconductive utilities such as plastic, asphalt composite, concrete and terracotta. It has a built-in DGPS receiver and upgradeable GPS mapper software for mapping utilities marked digitally. The screen-capture function allows users to turn screenshots into JPGs to record and archive a location on the screen. A rough terrain cart is available, as well as a portable foldable version outfitted for urban streetscapes.

843/852-5021; www.malags.com

McLaughlin Group Verifier G2

The Verifier G2 from McLaughlin Group uses smart transmitter technology along with noise reduction to achieve accuracy in utility line location and depth calculation. It has peak and null locating modes, four active frequencies, depth estimate readout and current measurement index, passive radio search, increased depth capacity to 30 feet and a weather-proof receiver.

800/435-9340;

www.mclaughlinunderground.com



Prototek LineFinder LF2200

The LineFinder LF2200 from Prototek locates any frequency sonde or transmitter box between 16 Hz and 100 kHz using its frequency-sniffing feature. It has a preset support of 16 Hz (steel or ductile iron as well as cast iron and nonmetallic), 512 Hz (cast iron or nonmetallic) and 8 kHz (nonmetallic only) sondes. It traces underground metallic lines at four industry-standard frequencies using an external transmitter box; other frequencies can be sniffed as well. It passively locates underground power at 50 or 60 Hz. Power frequency and scaling in U.S. or metric units is selectable. The operator is guided through a series of LCD screens to locate both sondes and lines with accurate position, as well as precise depth. Locating is enhanced by handle vibration and LED feedback at key locating points, in addition to on-screen imagery.

800/541-9123; www.prototek.net



Pure Technologies US Sahara

The Sahara tethered leak detection tool from Pure Technologies US locates leaks and gas pockets in pressurized pipelines. It gives the operator close control and sensitivity during inspections, with no disruption to regular pipeline service. The sensitive acoustic sensor is able to locate



pinhole-sized leaks. The platform also includes in-line video to observe live pipe conditions. Surveys are completed while the pipeline remains in service by inserting the sensor through a tap. A small parachute uses the flow of water to draw the sensor through the pipeline while it remains tethered to the surface, allowing for real-time results and tight control. It can be moved back and forth using a winch system to confirm suspected leaks.

403/266-6794; www.puretechltd.com

Radiodetection Corporation precision locators

RD7000+ and RD8000 precision locators from Radiodetection Corporation have the ability to detect RF utility markers, also known as EMS or Omnimarkers. Their automatic marker depth measurement system eliminates the need for a two-step manual process, and a combined utility and marker locating mode allows fast and accurate surveys. Interfacing to maps and GIS systems is a simple task with internal GPS options and Bluetooth and USB connectivity. Optional automatic data logging provides operators with usage monitoring, enabling proof of work and improvement of best practice. Every second, key locator parameters are saved into the unit's nonremovable internal memory for later retrieval and analysis using the USB connection and RD Manager software. GPS models offer positional data, enhancing the value of survey data.

877/247-3797; www.radiodetection.com



RIDGID SeekTech SR-24

The SeekTech SR-24 line locator from RIDGID streamlines the creation of accurate maps of underground utilities in order to protect critical assets. Using integrated Bluetooth communications, it transmits locating data to a third-party survey grade GPS or a mobile device. Data logging capabilities allow recording GPS and locating data to an onboard microSD card. In addition to OmniSeek passive locating capabilities, it can be programmed to detect any active frequency from 10 Hz to 35 kHz.

800/769-7743; www.ridgid.com



RYCOM Instruments 8873

The 8873 cable, pipe, camera and sonde locator from RYCOM Instruments offers two versions of the dual active frequency packages — 512 Hz and 82 kHz or 512 Hz and 33 kHz — ensuring the ability to track any manufacturer's camera or sonde system operating on 512 Hz. It can be used to locate pinches and blocks in nonpressurized conduits and pipes, as sonde frequencies are matched to the frequency of the receiver. Sondes at all frequencies

will trace through conduit up to 20 feet in the air or 10 feet in cast iron. The receiver pinpoints inspection cameras and sondes in nonmetallic conduits in a peak mode. A backlit digital display provides both relative and actual signal strength. A variable tone pitch gives an audio indication to the signal. The triple antennae configuration provides push-button depth accuracy up to 15 feet and works in peak, pinpoint peak and null modes when used with a transmitter.

800/851-7347; www.rycominstruments.com



Schonstedt Instrument Company XTpc+

The XTpc+ multi-frequency pipe and cable locator from Schonstedt Instrument Company has a lightweight, compact receiver and 5-watt transmitter. The receiver operates at 512 Hz, 33 kHz and 82 kHz, with passive detection at 50/60 Hz and sonde detection at 512 Hz. It is powered up to 12 hours by a single 9-volt alkaline battery. It operates at a maximum depth of 19 feet in temperatures of -4 to 140 degrees F. The transmitter is powered by a rechargeable 12-volt NiMH battery pack that operates up to eight hours. It has a backlit white LED array and ambient light sensing.

800/999-8280; www.schonstedt.com



Spartan Tool AccuView Locator

The AccuView Locator from Spartan Tool can locate in virtually any pipe material, as well as trace existing lines from other services. It directs the operator to the beacon location with on-screen location arrows at depths up to 25 feet. The receiver uses six frequencies (512B Hz [beacon], 33B kHz [beacon], 65 kHz, 60 Hz, 150 Hz, 120 Hz), with single peak, twin peak, null and left/right (cable only) antenna configuration. It includes a hard-sided carrying case that is lightweight and balanced for easy handling. It has easy-to-operate controls, reliable digital signal processing, auto shut-off, fully automatic calibration and an optional cable beacon. It uses D-size alkaline batteries, with a battery life of approximately 60 hours.

800/435-3866; www.spartantool.com



SubSurface Instruments all-material locators

AML PRO and AML+ all-material locators from SubSurface Instruments use ultra-high radio frequencies to find differences in subsurface densities to locate PVC and PE pipes and nearly any other subsurface object that has an edge. They can locate subsurface materials indiscriminately, includ-

ing plastic, metal, wood, cable or pipe. They work in clay, wet soil, snow or standing water. They have lightweight and durable ABS housing construction, advanced microprocessor intelligence technology, USB and headphone connectivity, and a high range of sensitivity levels to eliminate any unwanted and inaccurate readings.
855/422-6346; www.ssilocators.com



SubSurface Locators LD-18

The LD-18 digital water leak detector from SubSurface Locators reduces ambient, intermittent noises from dogs barking, cars passing by, footsteps and people talking. Its digital electronics sample the sounds every few thousandths of a second, and if it detects an intermittent sound, it suppresses it instantly. Water leak sounds are almost always continuous noises, and the unit can identify the continuous leak sounds even in difficult conditions, like busy streets.
775/298-2701; www.subsurfaceleak.com



Tinker & Razor Model 505 GO-FER




The Model 505 GO-FER split-box locator from Tinker & Razor locates buried metal structures with smooth accuracy and ease. Its quartz crystal controlled



transmitter fine tunes the signal for precise location. It can reach depths as great as 20 feet and tracing distances of 1,000 feet are not uncommon. Its radio frequency receiver allows it to screen out distracting noise while it simultaneously detects cables and pipes with assured precision. It has a separate volume control for reducing signal loudness without sacrificing sensitivity, enabling quieter operation in enclosed areas where lower volume is desired.

909/890-0700; www.detectron.com ▼

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THE LATEST: News

HammerHead names UK distributor

HammerHead named Mammoth Equipment of Cambridgeshire, England, distributor for trenchless equipment in the U.K. and Ireland.

Legacy Equipment names general manager

Legacy Equipment Co. hired John Webster as general manager. Legacy rents hydroexcavators, industrial vacuum trucks, sewer cleaning trucks and other specialized equipment.

Hi-Vac launches industrial division website

Hi-Vac Corp. launched new websites for its Hi-Vac and UltraVac brands. Product sections are divided between stationary and portable units and include specifications, literatures, photos and videos. An aftermarket services portal provides quotes for repairs and/or rebuilds.

Mathey Dearman names factory representative

Mathey Dearman named Rizzo & Associates, managed by Marc Rizzo, factory representative for Arizona, California, Hawaii and Nevada.

Subaru Industrial Power redesigns website

Subaru Industrial Power redesigned the layout and functionality of its website, www.subarupower.com. Product pages include 360-degree views, quick search provides parts accessibility and illustrated guides help ensure proper selection.

GapVax names Gulf Coast representative

GapVax named Alexander Teich sales representative for the Gulf Coast. Based in Deer Park, Texas, his territory includes New Mexico, Texas, Louisiana, Oklahoma and Arkansas.



Alexander Teich

Deep Foundations Institute elects president

Deep Foundations Institute (DFI) elected John R. Wolosick president. DFI is an international association of contractors, engineers, suppliers, academics and owners. It has 3,300 members worldwide. Wolosick is director of engineering for Hayward Baker Inc.'s Atlanta office.

General Pipe Cleaners celebrates 85 years

General Pipe Cleaners, a third-generation, family-owned business founded in 1930, celebrates its 85th anniversary. The company's line of

products includes drain cleaners, water and trailer jetters, video inspection systems, water leak detectors, pipe freeze kits, pipe thawing kits, and copper and plastic tubing cutters.



Pictured from left are Mike Silverman, Jeff Silverman, Steve Glick, Steve Silverman, Art Silverman, Marty Silverman, Bob Silverman, Lee Silverman and David Silverman.

View and learn about alternative excavation technology and equipment at:



Water & Wastewater Equipment, Treatment & Transport Show

www.wwettshow.com

Education Day: Feb. 17, 2016 ■ Exhibits: Feb. 18-20, 2016
Indiana Convention Center, Indianapolis, Ind.

Predicting Safe Outcomes

A NEW APPROACH TO ACCIDENT PREVENTION GOES BEYOND THE TRADITIONAL PRINCIPLES

BY DOUG DAY

Anyone involved in safety is familiar with Heinrich's Law: For every 330 incidents, there will be 300 with no injuries, 29 minor injuries and one major injury. While the accuracy of his theory is questioned, the principle seems sound enough — minor incidents lead to more serious ones.

Heinrich did his work in the 1930s using data from the '20s. That's nearly a century ago, long before we had the power to crunch "big data" to reveal unseen patterns and trends. "In the last 20 years, the number of injuries in the U.S. has steadily declined," says Griffin Schultz, general manager of Predictive Solutions in Pittsburgh. "Fatalities and significant injuries have flatlined."

He adds that companies are finding the theory that smaller injuries predict larger ones isn't necessarily true. "They're also finding that precursors to significant injuries and fatalities are different than precursors to less severe injuries."

Predictive Solutions, a global safety and predictive analytics company, uses safety observations rather than actual incidents to predict the future. "Injuries are on the far right of the spectrum, that's what happens at the end; a wrench falls off scaffolding and hits someone in the head. A near miss is one step to the left; a wrench falls and doesn't hit anyone."

That is the typical scope of safety analysis based on Heinrich's Law and leads to answers about what, where and how incidents happen. "Those are lagging indicators — looking backward," he says.

"Further to the left are safety observations," he says. "You see a wrench on scaffolding and there's no toe rail to prevent it from falling. That's the data we use to predict injuries."

LOOKING AHEAD

Predictive analytics, used for years in sales and marketing, finance, maintenance and other business functions, looks ahead to answer questions such as why things are happening and what's going to happen next, moving from lagging indicators to leading indicators.

The company analyzes data from the entire base of customers using its SafetyNet software, including some leading gas and oil companies. Its 170 million safety observations are growing by 3 million per month.

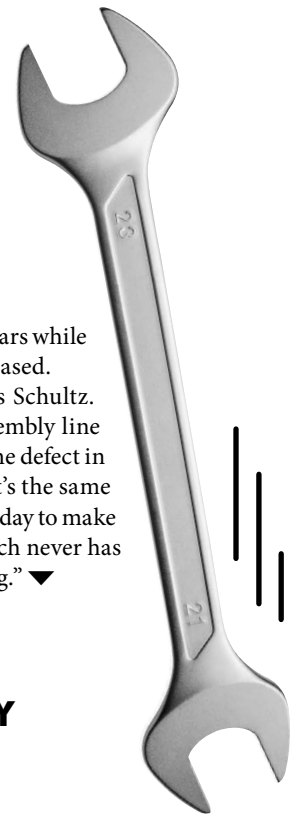
Using computer analytics, the observations predict workplace injuries at an accuracy rate of between 80 and 97 percent, determined by comparing actual incidents to the number predicted. The company cites these examples of how analytics have helped companies:

- A *Fortune* 150 manufacturer reduced its lost workday rate by 97 percent within one year.
- A *Fortune* 150 energy company reduced its incident rate by 67 percent within 18 months.
- A top 20 construction company achieved significant safety improvements, including 90 percent of work sites experiencing no lost-time incidents.
- A top 10 specialty contractor reduced its workers' compensation fees by

57 percent and 66 percent in two years while the number of hours worked increased. "It's no different than quality," adds Schultz. "Testing a product at the end of the assembly line is one measurement. You want to catch the defect in the steps of the process, not at the end. It's the same thing in safety. You want to observe every day to make sure the toe rail is installed so that wrench never has the opportunity to fall off the scaffolding." ▼

"IN THE LAST 20 YEARS, THE NUMBER OF INJURIES IN THE U.S. HAS STEADILY DECLINED. FATALITIES AND SIGNIFICANT INJURIES HAVE FLATLINED."

Griffin Schultz



The four truths of safety

Looking at four years of safety data while building its analytical tool, Predictive Solutions found that those projects with the fewest safety incidents had several things in common. Two are what safety professionals have known for many years:

- Too many unsafe observations predict an unsafe work site: Commit time and resources to fixing observations before they cause incidents.
- More inspections predict a safer work site: Make sure your program rewards high levels of inspections.

Predictive Solutions also found two that are more counterintuitive:

- More inspectors, specifically more inspectors outside the safety function, predict a safer work site: Include as many people as you can in your safety inspection program and ideally, have more non-safety than safety people doing inspections.
- Too many "100 percent safe" inspections predict an unsafe work site: Train for and reward the reporting of unsafe observations.

From the white paper *Predictive Analytics in Workplace Safety: Four 'Safety Truths' That Reduce Workplace Injuries*; www.predictivesolutions.com

Using All the Technology

GROUND PENETRATING RADAR CAN BE A POWERFUL TOOL FOR LOCATING SERVICES COMPANIES

BY ROB HARRIS

One of the big misconceptions in the “locating” world is that 811 finds everything. However, any utility beyond the service meter is usually considered to be a private utility, which will require a second call to a firm that locates private utilities. This can range from parking lot lighting to secondary communication lines from building to building.

A couple other big items that are not typically located by 811 are water and sewage. Sometimes the mains are located by the city, but they may be going off maps or assuming it’s manhole to manhole.

One big advantage over 811 that private utility locating companies should always have is ground penetrating radar (GPR).

GPR is a geophysical method that uses radar pulses to image the subsurface. This nondestructive method uses electromagnetic radiation waves and

detects the reflected signals from subsurface structures.

GPR is limited on depth, depending on antenna frequency and electrical conductivity of the ground. In clay the conductivity is high, dissipating the waves and making it hard



Rob Harris

ONE BIG ADVANTAGE OVER 811 THAT PRIVATE UTILITY LOCATING COMPANIES SHOULD ALWAYS HAVE IS GROUND PENETRATING RADAR (GPR).

to penetrate decreasing depth, while dry or sandy soils are ideal for wave penetration. Although GPR is a very valuable tool, it should never be the only locating method a private utility locating company uses.

GPR should be considered another tool in the toolbox that assists in helping do a thorough locate. It is highly valuable to use after you have tried all conventional locating equipment in searching for both metallic and nonmetallic pipes, tanks, trenches and voids in the soil.

ABOUT ROB

For over 19 years, Rob Harris has led The Underground Detective in providing underground utility locating services to commercial and residential companies in several areas of the U.S.

The Underground Detective began as an effort to help plumbers precisely locate sewer blockages. As technology has grown, the service has adapted and evolved into utility locating, leak detection, vacuum excavation, ground penetrating radar, concrete scanning and utility mapping.

Since Harris took over management of The Underground Detective in 1997, the firm has expanded to a regional service with offices in Knoxville, Tennessee, Philadelphia, Atlanta, Chicago and Toledo, Ohio, along with its original headquarters based in Cincinnati.

Harris has experience in electromagnetic locators, sondes and GPR, including manufactures such as Radiodetection, Subsite, Vivax-Metrotech, Prototek, Goldak, RIDGID and MALA GeoScience.

Included in his multitude of industry specific certifications are OSHA 10 Hr., OSHA 40 Hr. Hazwoper, Smith Defensive Driving certification. Harris also has customer specific certifications, such as BP, Marathon and Shell. ▼

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Filtration tubes used to remove sediment from pond

PROBLEM: A community pond in Lenexa, Kansas, was in poor state due to decant water. The pond could no longer sustain aquatic life and was a community eyesore. It was determined that approximately 6,000 cubic yards of sediment would need to be removed to bring the pond back to a healthy status for aquatic life.

SOLUTION: In order to properly remove sediment and clean the pond with minimum erosion and haul-away, **Envirotubes** from **Industrial Fabrics** were used. The tubes were staged so that the 12 mil reinforced single-piece liner was placed on the lowest terrace that had a 24-inch earth berm built on three sides around it. The liner was draped over the berm and placed up and over the terrace to the next level. A sump well 24 inches deep was excavated in the corner closest to the project pond to collect decant water and return it back to the pond using a 4-inch, self-priming diesel pump. All terraces were graded completely flat for the tube with a 5-foot perimeter graded at a 1/8-inch-per-foot slope to drain the water to the next lower terrace, or in the case of the lowest terrace to the sump corner.

RESULT The sediment was removed, and after a 120-day dewatering and dehydration period, the material shrunk at a ratio of 3-to-1 so that only 2,000 of the 6,000 cubic yards removed had to be dealt with. Since the neighboring property was looking to add elevation to a sunken area, the remaining hardened sediment was used as fill.
800/848-4500; www.envirotubes.com.



Pipe scanning technology uncovers sewer defects

PROBLEM: The City of Surrey, British Columbia, Canada, sanitary sewer system serves approximately 130,000 customers with over 930 miles of sewer pipes ranging in diameter from 6 to 48 inches. Infiltration and inflow issues stem from aging infrastructure. The city sought quantitative data regarding its infiltration issues.

SOLUTION: **Electro Scan** partnered with Superior City Services to assess a total of 27 sewer mains ranging from 6 to 16 inches in diameter and a total of 65 sewer laterals ranging from 4 to 6 inches in diameter. This assessment included 102 municipal facilities, representing a total of 1.4 miles of sewer pipe completed in four days. Electro Scan locates pipe defects by sending a probe, which emits a condensed electrical current, through the pipe and measuring the amount of current able to escape the pipe.

RESULT The scan located 1,055 total defects with a total defect flow of 7.62 gallons per second. The majority of this defect flow stemmed from the sewer mains. Additionally, Electro Scan determined that the 10 worst sewer mains were responsible for 4.4 gallons per second, or 71 percent of the defect flow, from the 27 mains evaluated. The 15 worst sewer laterals were responsible for 1.27 gallons per second, or 91 percent of the defect flow, from the 65 laterals evaluated. The city is currently assembling a rehabilitation program to address the issues.
800/975-6149; www.electroscan.com. ▼

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THE LATEST: Products



1. Larson 50-foot pneumatic light mast

The trailer-mounted, fold-over, seven-stage light mast from Larson Electronics features hydraulic ram upright assist, air-powered pneumatic mast and LED light fixtures. The entire assembly is mounted on a 21-foot by 8-foot tandem axle trailer. The light plant extends to 50 feet and collapses to 13.5 feet. The 16 light heads are wet suitable and produce 52,000 lumens at 400 watts each.

800/369-6671; www.magnalight.com.



2. Sensoray multifunction pipeline inspection system

The Model 2253P A/V Codec with GPS receiver and incremental encoder interfaces from Sensoray can simultaneously encode, decode and preview A/V content. Independent video processors allow for two different video streams to be simultaneously produced from a single composite input. Image transformation such as resolution, rotation and mirroring are independently configurable for each stream, as are compression type and bit rate.

503/684-8005; www.sensoray.com.



3. Water Cannon Honda engine parts

Honda GX engine parts distributed by Water Cannon include replacement recoils (available in black and red), mufflers, carburetors and gasket kits.

800/333-9274; www.watercannon.com.



4. IMT TireHand tire handlers

TireHand tire handlers from Iowa Mold Tooling Co., an Oshkosh Corporation company, are designed to maximize productivity and improve operator safety. Features include hydraulically controlled fallback protection, optimized pad design, long arm length, minimal arm profile and dual pinion pad rotation.

800/247-5958; www.imt.com.



5. Muncie directional control valve

The V250 directional control valve from Muncie Power Products has high-grade iron castings and hard chrome- and nickel-plated spools to withstand extreme applications and resist wear.

800/367-7867; www.munciepower.com.



6. Komatsu hydraulic excavator

The PC360LC-11 hydraulic excavator from Komatsu America Corp. is powered by a Tier 4 Final Komatsu SAA6D114E-6 engine with 257 net hp. The excavator has an operating weight of between 78,645 and 80,547 pounds. Upgraded cab features include an enhanced power mode for greater productivity. Komtrax technology relays fuel levels, diesel exhaust fluid (DEF) levels, operating hours, location, cautions and maintenance alerts.

847/437-5800; www.komatsuamerica.com.



7. Ditch Witch mud recycler

The self-contained MR90 mud recycler from Ditch Witch can mix and recycle drilling fluid (mud) and handle spoils. The 25 hp unit has a hydraulic pump with optional remote control, 110-gallon clean tank and 340-gallon first-pass mud tank. Each tank has a 3-inch connection at the drain for vacuuming out mud and 300-gallon freshwater tank for extra drilling capacity. Options include a 14,000 GVWR trailer.

800/654-6481; www.ditchwitch.com.



8. FCS portable leak detection amplifier

The portable S30 Surveyor leak detection amplifier from Fluid Conservation Systems can be used as a contact sensor at distribution access points and as a ground microphone. The 2-pound system includes adjustable analog meter, aviator-quality headphones, collapsible probe, sensor and Pelican case.

800/531-5465; www.fluidconservation.com.



9. Buckhorn pipeline pressure test pump

The TPS80D pipeline pressure test pump from Buckhorn Pumps is designed to produce a flow rate of 500 gpm and 350 of head down to 40 gpm at a discharge pressure of 0 to 3,000 psi (hydrostatic test). The pump package includes a Cat C4.4TA or Perkins 1104D-E44TA engine, MCM 250 4-by-5-by-14 centrifugal pump, FMC Technologies/Bean L114 triplex pressure pump, and FMC Technologies positive sealing check valve and auxiliary piping.

254/965-2555; www.buckhornpumps.com.

10. TT Technologies constant-tension winches

Grundwinch 3-, 5- and 10-ton hydrostatic constant-tension winches from TT Technologies are designed for the variable conditions in below-grade work, including pipe bursting, cable pulling, sliplining, pipe pulling and swage lining. Constant tension senses and automatically takes up cable slack. All models feature protective cable storage and are available with air-cooled diesel or gasoline engine and adjustable boom system.

800/533-2078; www.tttechnologies.com.

11. Snap-On heavy-duty diagnostic system

The Pro-Link heavy-duty diagnostic system from Snap-On Industrial Brands is designed for light diesels to Class 8 commercial trucks. Features include the ability to read and clear fault codes, access trip data to monitor vehicle and driver performance, create health reports and view live

data to verify performance. The diagnostic system has an 8.5-inch glass color touch screen that automatically adjusts brightness for indoor and outdoor use, 8-foot cable, solid state drive to store data and software updates, carrying case, battery pack and 120-volt AC power adapter.

800/446-7404; www.snaponindustrialbrands.com.

12. Hannay heavy-duty 6000 Series hose reels

Heavy-duty 6000 Series hose reels from Hannay Reels are designed for spray, waterblasting and sewer cleaning applications. Manual reels include crank rewind with pinion brake. Power reels feature gear-driven crank rewind or chain and sprocket drive. Bronze or aluminum swivel joint and stainless steel hub assembly and riser are available.

877/467-3357; www.hannay.com.

13. Kohler air-cooled, three-phase generator

The 14/20 kW air-cooled, three-phase generator from Kohler Power Systems is designed for commercial applications where 20,000 watts or less are needed during power outages. The generator runs on natural gas or LP and has a corrosion-resistant enclosure impact tested to -30 degrees F.

800/544-2444; www.kohlerpower.com.

(continued)

This Issue's Feature:

Personal active safety lighting system helps workers see and be seen

BY ED WODALSKI

The **Halo Light** 360-degree personal active safety system from **Illumagear** attaches to any hard hat, enabling the wearer to see and be seen in all directions.

Rooted in the construction industry, the concept for the light ring emerged about three years ago when Max Baker, CEO of Illumagear, sought a safer, more efficient way for him and his colleagues to work in low-light conditions.

"My co-founder, Max, came from construction," says Andrew Royal, president and chief product officer for Illumagear. "From his experience on job sites over eight years, he began looking for ways to improve worker safety."

Unlike reflective gear, the Halo Light, launched in 2014, actively illuminates the worker without the need for a secondary light source.

"Reflective vests are standard requirement for visibility on many job sites, but that's a passive system," Royal says. "Other than when an 18-wheeler comes bearing down at you with its headlights, you're often as dark as night."

The 9-ounce portable light system also frees up hands and eliminates shadows in personal work areas.

"As we first started to develop the product, we saw people essentially buying a camping light and tying or duct taping it to their hard hat. We thought we could do better," he says.

Visible from about a quarter-mile away, the diffused LED light ring,



Halo Light from Illumagear

made of PC ABS plastic, features a tension-spring mounting system, single-button functionality and four light modes: Halo, HI-Alert, Task and Dim. IP67 rated against dust, dirt and water, the Halo Light has a rechargeable lithium-ion battery that lasts 12 hours on full power (276 lumens) and breakaway, quick-release battery cord.

"We look at the product as having a dual value proposition, which is 'see' and 'be seen,'" Royal says. "'Be seen' is first and foremost for everything we do as a company. It's about making sure people get home to their families. We have crane operators tell us they can finally see the guys down below. It's critical that people see you because, unfortunately, every day two people are dying on job sites in the U.S."



206/973-4277; illumagear.com

THE LATEST: Products



14



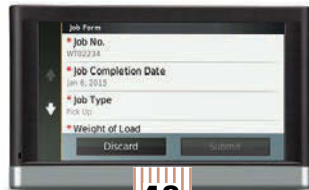
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14. McElroy hydraulically adjustable pipe stand

The hydraulically adjustable pipe stand from McElroy Manufacturing is designed to align 4- to 20-inch-diameter thermoplastic pipe on butt fusion job sites. The stand has a hand-pumped hydraulic lift that gives the operator the ability to adjust the height of the stand without having to remove the pipe.

918/836-8611; www.mcelroy.com/fusion.

15. Conjet hydrodemolition surface prep robots

The hydrodemolition surface preparation robots from Conjet AB/National Hydro use high-pressure water at 14,500 psi and repetitive motion to remove concrete, clean rebar and leave a roughed surface for the adhesion of new concrete without causing cracks or damaging the reinforcement. An alternative to jackhammers and hand-held waterjetting, standard models include the electric-powered 327 for areas where exhaust is a prob-

lem and the diesel-powered 557. Customized models 367 (electrical) and 437 (diesel) are available by special order.

517/223-0915; www.conjet.com.

16. Doosan Portable Power natural gas generators

NG160, NG225 and NG295 natural-gas-powered generators from Doosan Portable Power combine the ability to operate on wellhead natural gas and in harsh, rugged environments. Features include an automatic dual-fuel switch, enabling the generator to operate on natural gas as well as propane from an external tank. The Onboard Scrubber System improves machine performance by removing excess dirt and water from wellhead gas and includes a heated drain valve to prevent water removed from the gas from freezing in the hose.

800/633-5206; www.doosanportablepower.com.

17. Guzzler vacuum loader camera system

The High-Rail vacuum loader three-camera system option from Guzzler Manufacturing provides the operator with enhanced visibility while the unit is vacuuming on railroad tracks and in switchyards. The camera system includes a 7-inch, weatherproof LCD monitor and cameras mounted on the front and sides of the vacuum truck to provide a wide, real-time view, even in extreme weather conditions. The operator can simultaneously monitor the view from each camera on the screen.

800/627-3171; www.guzzler.com.

18. GPS Insight Garmin custom forms

Garmin custom forms from GPS Insight enable drivers to fill out forms and take the Garmin device from the cab to record data on the job or send submittals to the office in real time.

866/477-4321; www.gpsinsight.com.

19. Vermeer Tier 4 horizontal directional drill

The D100x140 Navigator horizontal directional drill from Vermeer features a 275 hp Tier 4 Final Cat diesel engine, 100,000 pounds of thrust/pullback, 14,000 ft-lbs of rotational torque and rotational speed of 203 rpm. The drill is available with the InSite asset management system, Digi-Trak Aura display and 15- or 20-foot rod options.

641/628-3141; www.vermeer.com.

20. Aclara Metrum LTE utility connectivity

The Metrum LTE network from Aclara Technologies provides cellular connectivity to utility devices, including SCADA, commercial and residential meters. Combined with Aclara's iiDEAS platform, applications include AMI, outage and restoration management, conservation voltage reduction, volt/Var optimization, fault detection and location.

800/297-2728; www.aclaratech.com.

21. FCI analyzer flow switch/monitor

The Model FS10A analyzer flow switch/monitor from Fluid Components International is approved for FM Division 1, Zone 1 on remote probe configurations. Designed to continuously verify flow within gas or liquid process analyzer sampling systems, the flow switch/monitor has no moving parts and requires little maintenance. Wetted parts are made from corrosion-resistant 316L stainless steel with Hastelloy-C22 sensor tips.

800/854-1993; www.fluidcomponents.com.

22. Reelcraft stainless steel reel

Series LC stainless steel hose reels from Reelcraft Industries are designed for light-duty, spring-driven reel applications in corrosive or sanitary environments. Made for stationary indoor and outdoor use, four base slots enable the reel to be easily mounted or adjusted. Models are available for up to 70 feet of 3/8-inch I.D. or 1/2-inch I.D. hose.

800/444-3134; www.reelcraft.com. ▼

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Happenings

CALENDAR

May 6-8

Ohio Stormwater Conference, Kalahari Resort and Convention Center, Sandusky, Ohio; www.ohiostormcon.com.

June 7-10

Rapid Excavation and Tunneling Conference (RETC), Sheraton New Orleans, New Orleans, Louisiana; www.retc.org.

Sept. 29-Oct. 1

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

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Portable Generator 6500 Watt



Honda-Powered Generator



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3"-24" Stainless Steel Spinners



Locking Safety Quick Connects



Pressure Washer Hoses



Stainless Steel Hose Reels



Industrial Trigger Gun Assemblies



Under Carriage Cleaner



Car Wash Booms & Parts



Truck Wash Components



Duct & Chute Cleaning Spinners



3 Story Telescopic Wands



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