

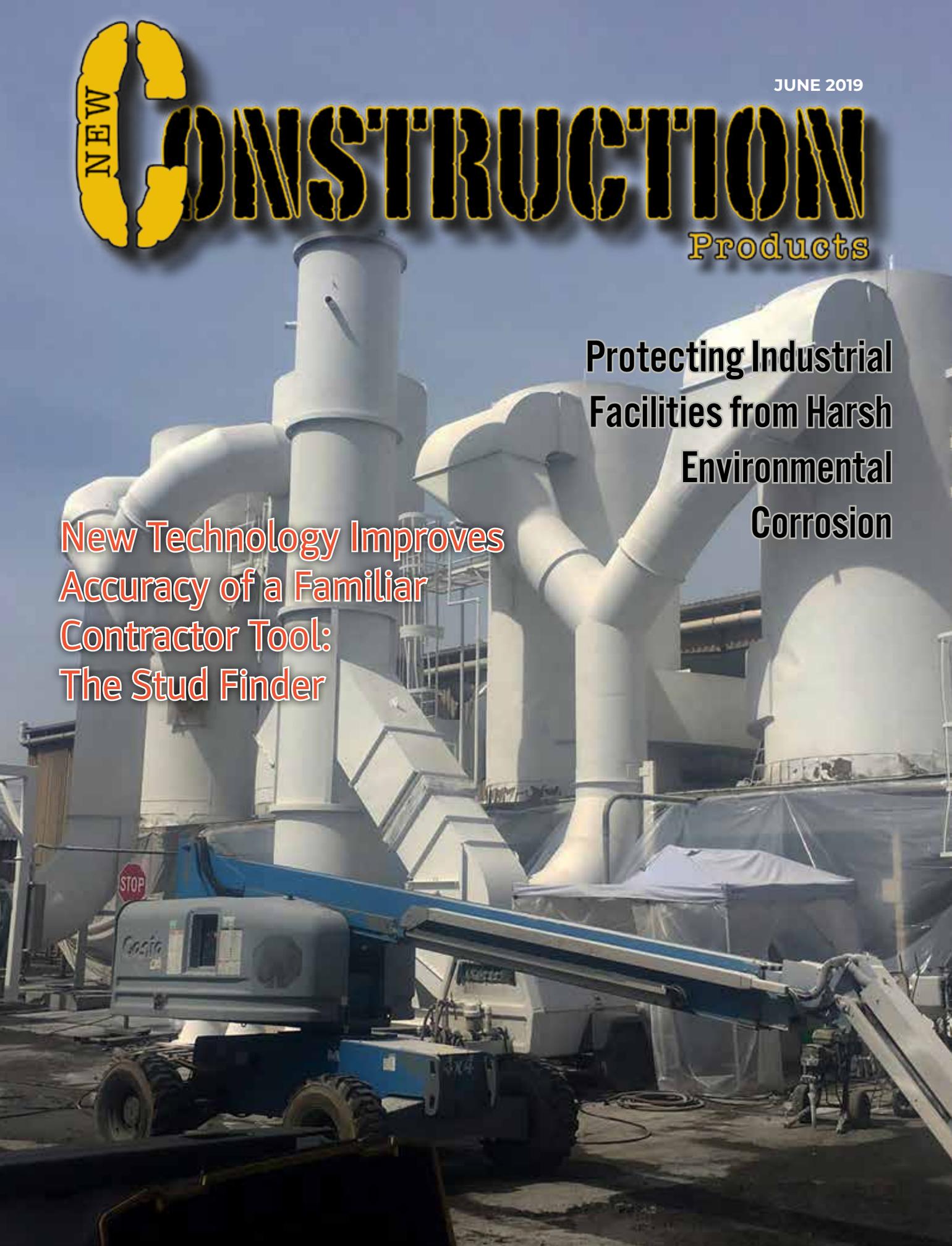
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PUBLISHER

Glen Hobson
205-441-5591
glen@tipsmag.net

ACCOUNT EXECUTIVE

Hank Underwood
205-624-2182
hank@handfmedia.net

ACCOUNT EXECUTIVE

Brian Lockheart
205-593-1508
205-624-2183
brian@cjspublishing.com

ADMINISTRATIVE DIRECTOR

Steven Hobson
steven@tipsmag.net

EDITOR

Brandon Greenhill
brandon@handfmedia.net

CREATIVE/ WEB DIRECTOR

Jacklyn Greenhill
jacklyn@handfmedia.net

P.O. Box 1568 • Pelham, AL 35124
Phone: 205-441-5591 • Fax: 205-624-2181
www.newconstructionproducts.com
info@newconstructionproducts.com



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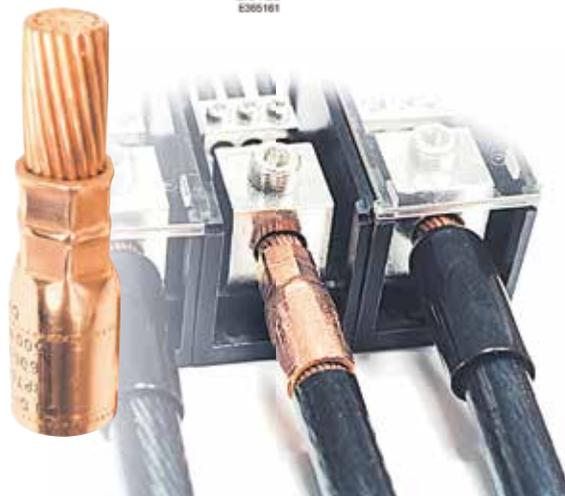
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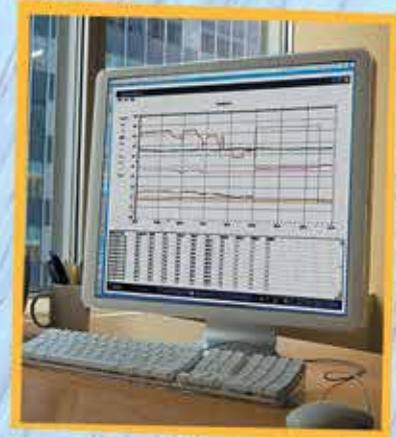
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New Technology Improves Accuracy of a Familiar Contractor Tool: The Stud Finder



Advanced stud finders with more sensors and a wider, horizontal display identifies the full width of the stud

For residential and home remodeling contractors frustrated by conventional stud finders of questionable accuracy and reliability, more advanced versions with six times the sensors are finally providing a solution. Combined with a wider, horizontal display of up to 7 inches, these more advanced stud finders reliably identify the full width of the stud.

The multiple sensors enable far greater accuracy when securely fastening objects to the center of studs, and as a result minimize wall damage. For some trades, it can also be critical to avoid studs when cutting into drywall for plumbing or electrical work.

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Some contractors are rediscovering a familiar tool that, with the increased accuracy, is speeding jobs and ensuring optimum fastening to studs.

The right tool for the job

Contractors understand the value of having the right tool for the job. However, many are dissatisfied with traditional stud finders that require multiple steps, “error-out” frequently and provide inconsistent readings.

Although there is no shortage of stud finders in the market, traditional units with one or two sensors may not delineate the location of studs clearly enough. Even higher priced options with LCD screens typically utilize the same one or two sensors as lower-end models and thus offer similar sensing technology.

Another problem with conventional electric stud finders is the multiple steps required for calibration and then locating the stud. A user is usually required to slide the unit from left to right until a stud is identified by a single LED light and an audible beeping sound.

“The older style [stud finder] typically has a single indicator light that is supposed to show you when you hit the left and then the right side of the stud. But with only one indicator light, you are sort of left guessing,” says Fred Stevens, president of Up Front Construction. Stevens started as a contractor in 1988 replacing windows and doors before starting a remodeling and new home building business in 1995.

Nicolino Argentina, a builder of multi-unit rental apartments in Ottawa, Ontario, Canada, has a similar view of traditional stud finders. A civil engineer by education, Argentina sub-contracts aspects of his projects to licensed contractors, but personally installs some millwork, shelves, closet systems and cabinetry.

“Sometimes the stud finder starts beeping and flashing and you have to start all over again,” explains Argentina. “It seems to get easily confused and you have to just keep starting over and it keeps beeping and flashing.”

The problem is so prevalent that some contractors re-

sort to alternative techniques like tapping into drywall with a small drill bit or finishing nail or rapping on the walls to physically locate each of the studs.

Improving Accuracy and Ease of Use

Today, more advanced units with a greater number of sensors can more accurately delineate the location of the stud. Because these units are available in a horizontal configuration, the sensing and display area is much wider and can locate the edge and center of studs simultaneously.

Argentina learned about such a stud sensor from Franklin Sensors, through a recommendation from a friend, who owned a local hardware store called Preston Hardware. The unit utilizes up to 13 sensors. The 7-inch, horizontally oriented device includes LEDs spaced across the entire width of the product that illuminate to show the full width of the stud – usually 3 lights for each standard 2” x 4”. Studs are shown, as well as any gap between them.

“With the more advanced Franklin Sensor, you can place it anywhere on the wall, press the button and it just lights up and tells you what is happening and you rarely have to start over again. It doesn’t beep at all. It is a lot simpler and easier to read,” says Argentina.

Argentina uses the advanced stud sensor to ensure shelf or cabinet supports are firmly fastened to studs, to prevent future call-backs from tenants.

“Because I build multi-unit rental apartments, I don’t want a tenant to call me about cabinets that are not secured to the wall or something falling off and creating damage. The investment in a good stud finder helps mitigate any future problems of that sort,” says Argentina.

He also uses the stud finder to ensure trim molding is nailed securely.

“Some people just nail the trim without first looking for the studs and the nail can miss and the trim is just nailed through drywall. Now the trim is not secured as well to the wall,” explains Argentina. “Now I run the

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Franklin Sensor on the top of the baseboard and, as it lights up, I know exactly where the studs are and I nail my baseboard at those locations.”

“The Franklin Sensors unit is very consistent and gives a very accurate picture of exactly where the stud is located,” agrees residential contractor Stevens, adding that he has used it on a variety of wall textures with similar results.

“With a more precise definition of exactly where the stud is behind the wall, it allows you to be much more precise when nailing base trim, installing fasteners or hanging cabinets,” adds Stevens. “That ultimately saves time and can also save you having to go back and repair walls where you thought you had a stud, but didn’t.”

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Beyond marine environments exposed to salt spray or compounds that cause corrosion, common gaseous industrial air pollutants, such as sulfur dioxide, ozone, and nitrogen dioxide, can be corrosion inducing. So can exposure to industrial chemicals such as chlorides, acetic acid, and formaldehyde.

“There is a huge need for an anti-corrosion coating that can go on in areas where conventional coatings tend to fail,” says Joey Taylor, President of IPI Inc., an Elkview W. Va.-based paint/coating contractor for commercial and industrial construction. “On certain projects, chlorides need to be removed in order to meet peak performance. But in most cases, this can be cost prohibitive.”

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Fortunately, for industrial facilities with assets prone to environmental corrosion, a new category of tough, Chemically Bonded Phosphate Ceramic (CBPC) coatings is helping to stop corrosion, ease application, and reduce production downtime.

Long-Term Environmental Corrosion Protection

When aluminum is recycled, it is melted to separate the pure metal from the impurities. The process creates a

waste product called salt cake, which contains compounds that can promote corrosion.

As a result, typical barrier-type anti-corrosion coatings, such as polymer paints, can fail prematurely. This is particularly true when the paint is scratched, chipped, or breached and corrosion promoters enter the gap between the substrate and coating. Then the coating can act like a greenhouse – trapping the corrosion promoters – that allows the corrosion to spread under the coating.

So, when an aluminum recycling plant in West Virginia required corrosion protection for its operation, it sought a long-term term solution that would not require frequent recoating, according to Taylor, who was involved with the project.

“The recycling plant was not having much luck with conventional anti-corrosion coatings, which only lasted about three or four years,” says Taylor. “Really, anyone trying to protect their assets from corrosion wants their coating to last much longer than that.”

To provide long-term corrosion protection in a tough environment, the aluminum recycling plant and Taylor turned to EonCoat, a spray applied inorganic coating from the Raleigh, North Carolina based company of the same name. EonCoat represents a new category of rugged, Chemically Bonded Phosphate Ceramics (CBPCs) with unique properties.

In contrast to traditional polymer coatings that sit on top of the substrate, the corrosion resistant CBPC coating bonds through a chemical reaction with the substrate. The

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coating can even be applied over flash rusted, damp steel. An alloy layer is formed. This makes it impossible for corrosion promoters like oxygen and humidity to get behind the coating the way they do with ordinary paints.

Although traditional polymer coatings mechanically bond to substrates that have been extensively prepared, if gouged, moisture and oxygen will migrate under the coating's film from all sides of the gouge.

By contrast, the same damage to the ceramic-coated substrate will not spread corrosion in industrial infrastructure because the carbon steel's surface is turned into an alloy of stable oxides. Once the steel's surface is stable (the way noble metals like gold and silver are stable) it will no longer react with the environment and cannot corrode.

Visible in scanning electron microscope photography, EonCoat does not leave a gap between the steel and the coating because the bond is chemical rather than mechanical. Since there is no gap, even if moisture was to get through to the steel due to a gouge, there is nowhere for the moisture to travel, which effectively stops corrosion in industrial applications.

The corrosion barrier is also covered by a ceramic layer that resists corrosion, water, impact, abrasion, and chemicals as well as fire and temperatures up to 450 °C.

For such durable corrosion protection, IPI Inc. successfully sprayed EonCoat on two industrial dust collectors (one 60,000 CFM and one

40,000 CFM), including four tanks as large as 40 feet tall and associated ductwork, according to Taylor.

"The CBPC anti-corrosion coating is designed to last significantly longer than traditional coatings, so frequent recoating should not be an issue," says Taylor.

Industrial operation managers or corrosion engineers looking to reduce costs are also finding additional

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advantages with CBPC coatings like EonCoat beyond corrosion resistance.

Such coatings consist of two non-hazardous components that do not interact until applied with a standard industrial plural spray system like those commonly used to apply polyurethane foam or polyurea coatings. Since CBPC coatings are inorganic and non-toxic, there are no VOCs, no HAPs and no odor. This means the water soluble, non-flammable coatings can be applied safely even in confined spaces, or when adjacent parts of a plant continue to operate.

"With the CBPC coating, since there are no VOCs or odor, coating can be done around plant employees or other contractors without restrictions," says Taylor.

One of the greatest benefits, however, is quick return to service that minimizes facility downtime. The time saved on anti-corrosion coating projects comes both from simplified surface preparation and expedited curing time. With a typical industrial coating, near white metal blast cleaning (NACE 2 / SSPC-SP 10) is required to prepare the surface. But with the ceramic coating, only a NACE 3 / SSPC-SP 6 commercial blast cleaning is typically necessary.

With traditional coatings, extensive surface preparation is required and done a little at a time to avoid surface oxidation, commonly known as 'flash rust', which can require re-blasting.

However, with the CBPC coating, flash rust is no issue. There is no need to 'hold the blast'. The reason for this unique CBPC characteristic is due to the presence of iron in the rust, which helps to create the magnesium iron phosphate alloy layer. It is this alloy layer that allows CBPCs to so effectively protect carbon steel from corrosion.

"Conventional coatings require you to prime the substrate every day so you do not lose your blast," says Taylor. "You have to stop sandblasting in the early afternoon, and then prime [the substrate] the rest of the day. This requires time-consuming daily

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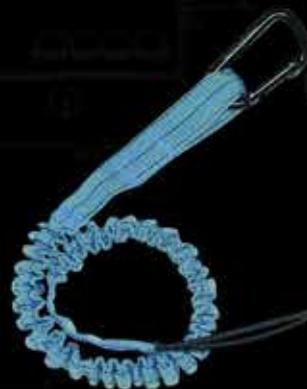
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teardown and set up of paint equipment.”

“With EonCoat, however, once you have a clean substrate surface, free of mill scale and coating, it will not hurt it to let it flash rust,” adds Taylor. “So, you can continue coating [the next day] without having to re-blast the substrate, re-prime it, or set up and teardown paint equipment each day. You can continue to blast the entire 12-hour shift. That saved us about a 50-hour workweek on the project.”

For traditional ‘three-part system’ coatings utilizing polyurethanes or epoxies, the cure time may also be days or weeks before the next coat can be applied, depending on the product.

In contrast, a corrosion resistant coating for carbon steel, utilizing the ceramic coating in a single coat, requires almost no curing time.

“We were able to complete the project from start to finish in nine weeks, including substrate preparation, spraying, and adding a high-performance topcoat with minimal disruption to the plant’s operations,” says Taylor.

Industrial facility managers looking for more reliable, long-term corrosion protection in harsh environments will find that CBPC coatings add significantly to safety, production, and the bottom line.

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Three-dimensional, gyroscope-based mapping of telecom ductwork will verify whether it is ready for high-density fiber optic cable and allow assets to be properly charted

As the era of 5G arrives, the field of telecommunications is about to become even more dazzling, dramatically impacting every aspect of people's lives – autonomous cars, smart communities, far-reaching IoT. However, with the rollout currently underway, many contractors and telecom operators are discovering a significant challenge with the existing underground infrastructure, as well as potential obstacles for installing new fiber optic cable – the backbone of 5G and beyond.

As a result, gyroscope-based 3D mapping tools are beginning to play a critical role in telecom infrastructure, enabling operators to digitally track assets as well as ensure that installations are not inadvertently compromised.

Navigating underground maze

The challenge is twofold. First, due to a much greater fiber count, the physical makeup of fiber optic cabling for 5G is not only considerably heftier – having a much larger outside diameter than 4G – but in many cases, it is also less flexible. Second, the duct through which the fiber must run is often installed in highly congested underground areas competing for space in a tangled web of utility infrastructure. This is where telecom, electricity, gas, water, and cable TV grids all compete for space with drainage, mass transit, and other networks.

As a result of these and other natural obstructions, contractors are often forced to maneuver the ductwork to avoid existing barriers. Such maneuvers sometimes result in unexpected turns or bends that compromise min



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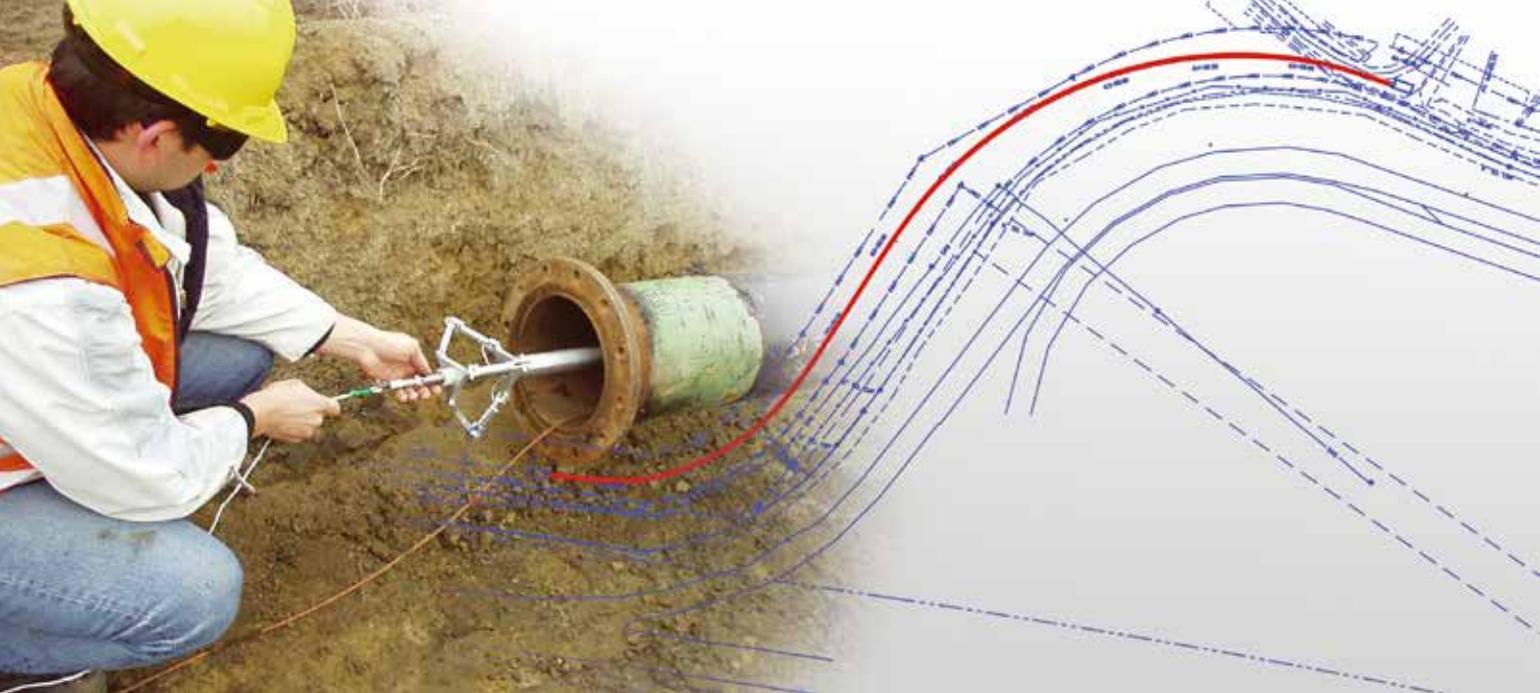
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imum “bend radius” specifications mandated by the cable manufacturer which can cause breakage and ultimate failure of large quantities of fiber during installation. Additionally, these manipulations with the path of cable ductwork can leave assets which are not properly mapped, more vulnerable to accidental damage.

It is not only new construction that is at issue. Many plans for installing 5G cable include utilizing what is known as empty or “dark” HDPE ducts that were previously installed with earlier cable installations to allow for future growth. Yet, not many telecom experts were able to foresee the potential shortcomings of these pre-installed ducts. With the smaller 4G and earlier cable generations, the fibers within were able to withstand the tighter bends. Installing 5G cable in many of these same areas has become an unknown risk.

“Looking back on the emergence of 4G, who could have envisioned five years ago that the increase of fiber count for 5G would double or triple – with a range of 1,700 to nearly 7000 fiber strands in a single cable resulting in a fill ratio in excess of eighty percent,” says Santosh Saride, Market Analyst, with Condux International (Mankato, MN).

Condux is a major supplier of equipment used to install fiber optic cables, and has found that utilizing advanced duct mapping technology is saving telecoms significant time and money during the ramp-up to 5G.

“Proper mapping of the duct in both new and previously installed ductwork promises to expedite the installation of fiber optic cable for 5G and beyond, as well as reduce future downtime due to improperly mapped ducts,” Saride adds.

Evaluating possible solutions

The fact is, many, if not most, telecom operators do not have precise maps of their underground assets. Even for those that have invested in geographic information systems (GIS) to store network-related data, the quality of their three-dimensional (XYZ) data provided from most standard GIS platforms is often inaccurate or inadequate. This is largely due to factors such as: unknown depth; references to aging or no longer existing above ground landmarks; analog data references; and the inability to map infrastructure installed by means of trenchless methods, such as river crossings, underneath buildings, etc.

Alternative techniques such as ground-penetrating radar and beacon-based systems are unreliable or impractical because these systems are difficult to use and don’t get the exact measurement of the pipe’s centerline. Moreover, beacon-based systems can measure to a limited depth and are highly susceptible to electromagnetic interference, rendering them virtually useless in densely piped areas or near railways and power lines.

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Gyroscopic-based 3D mapping systems, however, are solving the underground duct mapping problem, delivering reliable XYZ data as well as the centerline of the duct or pipe. The technology, which has been proven through years of mapping underground water infrastructure and pipelines, is now being applied to both existing and new ductwork within the telecom market.

Automated gyro-based mapping

Condux International, a U.S. based company that has spent decades providing tooling for blowing and pulling fiber through ductwork, has started providing gyroscopic-based 3D mapping technology that allows customers to ensure successful installations of pipelines and ducts – including those for fiber optic cable.

“The gyro-based tools can precisely map the duct or pipeline through miles of dense infrastructure, accurately locating irregularities in ductwork and providing data on bend radius and other deviations that can interfere with the transmission of fiber optic signals, often robbing a 5G cable of up to 40% or more of its transmission capabilities,” says Saride.

Precise mapping of underground cable ducting is now possible through the use of inertial guidance technology that incorporates the exacting 3D instrumentation – gyroscopes, accelerometers, and magnetometers. Incorporated into an innovative tool that travels through the cable ducts, it can precisely map the path from end to end, including bends, undulations and other deviations that may have been required to route the duct

through the congested maze of existing underground infrastructure.

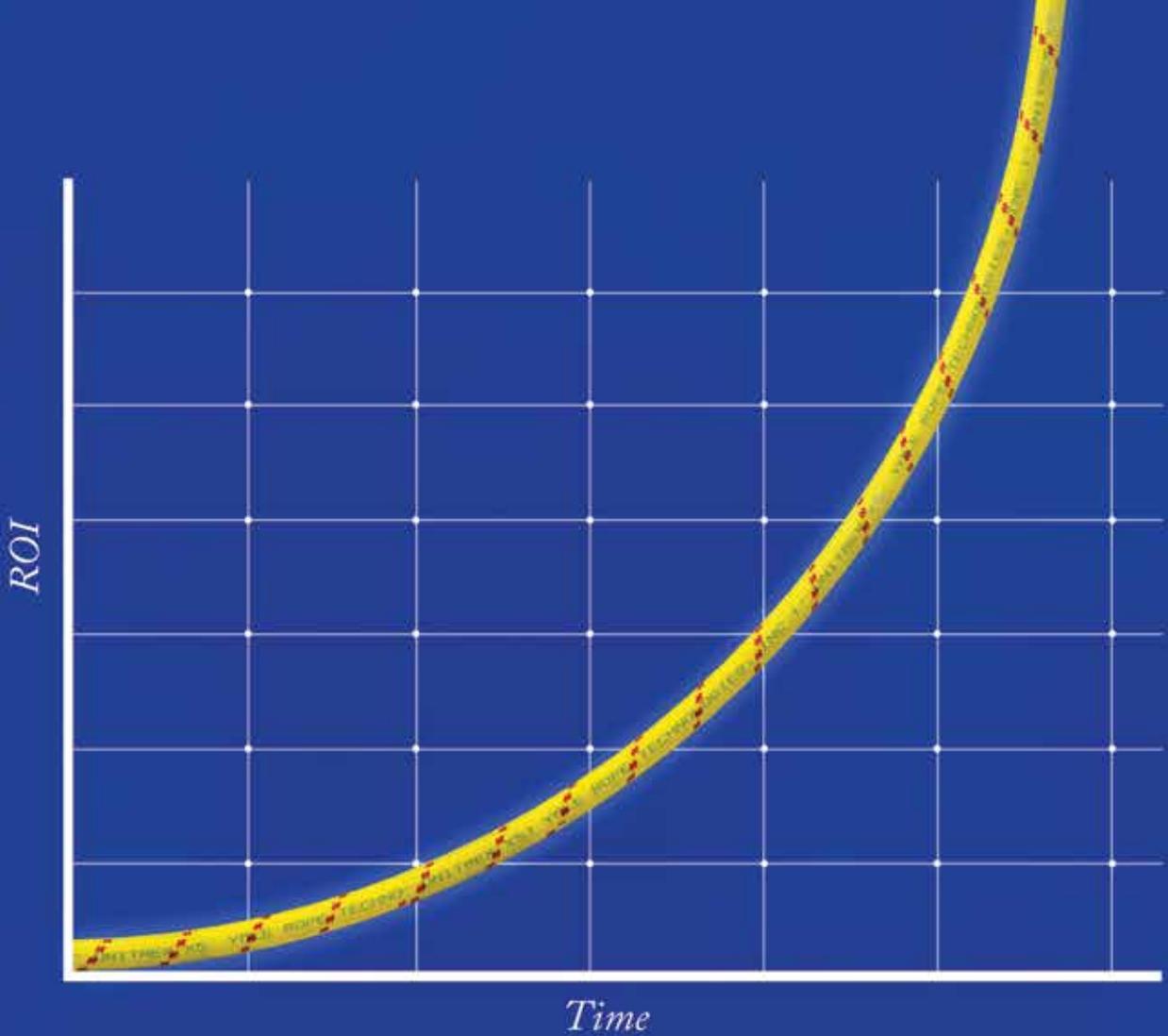
Knowing the extent of those deviations, particularly bends, can be critical to understanding the true capacity of the ducts to successfully accommodate the bulkier super-high-bandwidth fiber cable. This is because the radius of every bend in an underground duct can adversely affect the ability of the 5G-or-higher cable to perform according to cable manufacturers’ specifications.

Constructed with military grade hardware, the unit features centralizing rings that support a body containing mapping instruments. The 3D gyro-tool is articulated, enabling it to pivot through various bends, bumps and turns that typically occur in telecom ducts. It also features an easily accessible data port for uploading data to a GIS file via laptop or notebook computer.

Some gyro-mapping systems are now available in extremely compact sizes, ranging from the world’s smallest gyro-based mapping probe (duct range 40-75mm) to larger models with operational ranges for pipelines 3.5 in. and up.

For information contact: Condux International, 145 Kingswood Drive, Mankato, MN 56002-0247 USA; Phone: (800) 533-2077; FAX: (507) 387-1442; Email: conduxinfo@condux.com; Visit the website www.condux.com •





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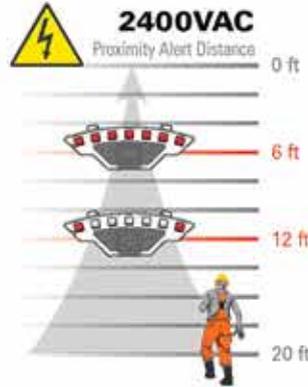
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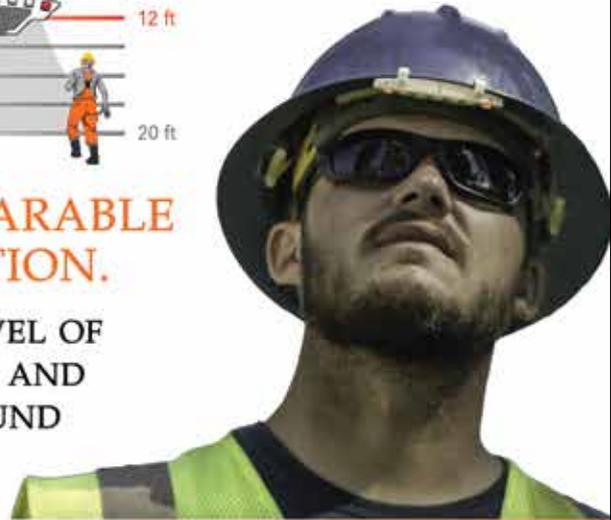
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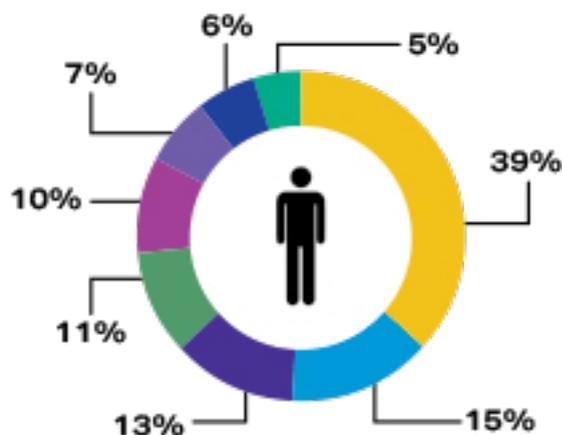
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