

JUNE 2019

# SAFETYZONE MAGAZINE

IMPROVED UTILITY  
STORM DAMAGE  
ASSESSMENT  
AND WORKER  
SAFETY WITH  
DRONES



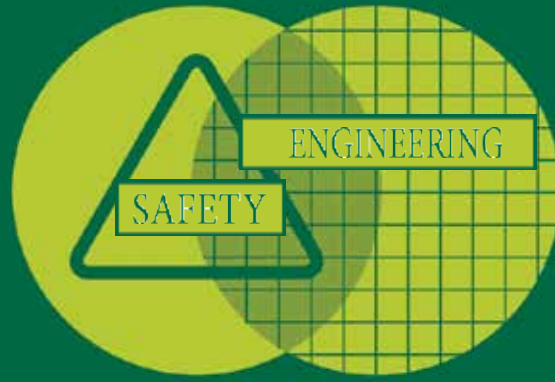
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# SAFETYZONE MAGAZINE

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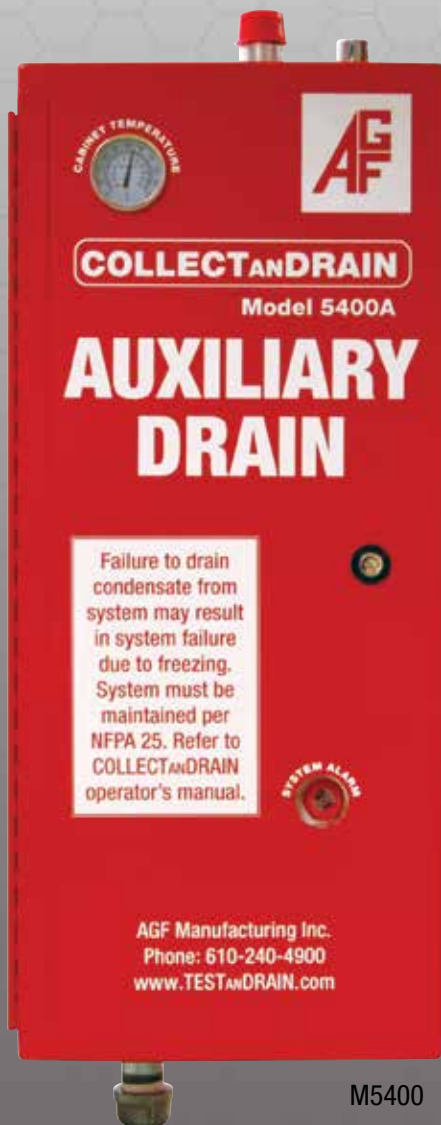
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# RedVector / Convergence Training to Demo Virtual Reality Ladder Safety Training Experience to Help Businesses Fight Falls

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*Because 20% of worker fall injuries involve ladders, RedVector / Convergence Training will seek to help employees and businesses stay safe with powerful virtual reality training. Company reps will demonstrate the new "OSHA Portable Ladder Safety Experience" at "Safety 2019" in New Orleans.*

RedVector / Convergence Training, a Vector Solutions brand and the leading provider of online continuing education, training, and performance management solutions for the architecture, engineering, construction (AEC), industrial and facility management industries, will launch a new virtual reality (VR) ladder safety training experience to help businesses and employees fight falls. The VR experience will be demonstrated at the ASSP Safety 2019 Conference and Expo on June 10.

Falls are one of the leading causes of occupational injuries and fatalities across a wide variety of industries. The Center for Disease Control and Prevention reports that 20% of fall injuries among workers involve ladders. From 2011 to 2016, ladders caused 836 work related fatal injuries, according to the Bureau of Labor Statistics. Occupational ladder injuries are especially prevalent in the construction industry, as 81% of fall injuries among construction workers treated in 2011 were caused by ladders, according to the CDC.

"For a situation when someone's life would be in danger, a virtual reality training experience can enable someone to practice in the safety of their own environment," says Michael Schreiner, Vice President of Content for Vector Solutions, which is developing VR training to address common hazardous situations. "The VR technology stimulates vision and hearing and immerses the user in a simulated, but safe, reality."

The OSHA Portable Ladder Safety experience operates on Oculus Go and mobile devices (Android, Apple) and uses a story-based approach to emphasize the emotional elements of decision-making. Schreiner says people learn best when emotions are tied into learning.

The user is tasked with reaching a 20-foot elevated landing while using OSHA's height and pitch requirements for placing the portable ladder in a way that maximizes its strength and stability. The scenario then evaluates whether the learner made the right decision and gives them the opportunity to see the consequences of each choice.

This ladder safety training meets OSHA's 1926.1060 safety requirement for construction-stairways and ladders, which states that employers will provide a training program for employees who use ladders and stairways that will enable them to recognize and minimize related hazards.

To download the OSHA Portable Ladder Safety VR App, visit the app store.

## About RedVector / Convergence Training

RedVector/ Convergence Training is the leading provider of online continuing education, training, and performance management solutions for thousands of professionals in the architecture, engineering, construction (AEC), industrial and facility management industries. Its award-winning SaaS platform delivers professional development, accident tracking, incident reporting, credential management, asset management, mobile applications, knowledge assessments, professional evaluation tools, performance support tools and SDS management along with an extensive library of over 4,000 courses.

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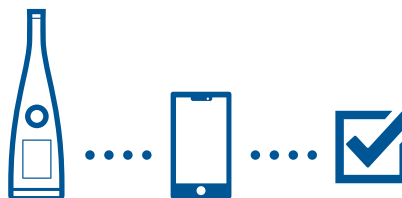
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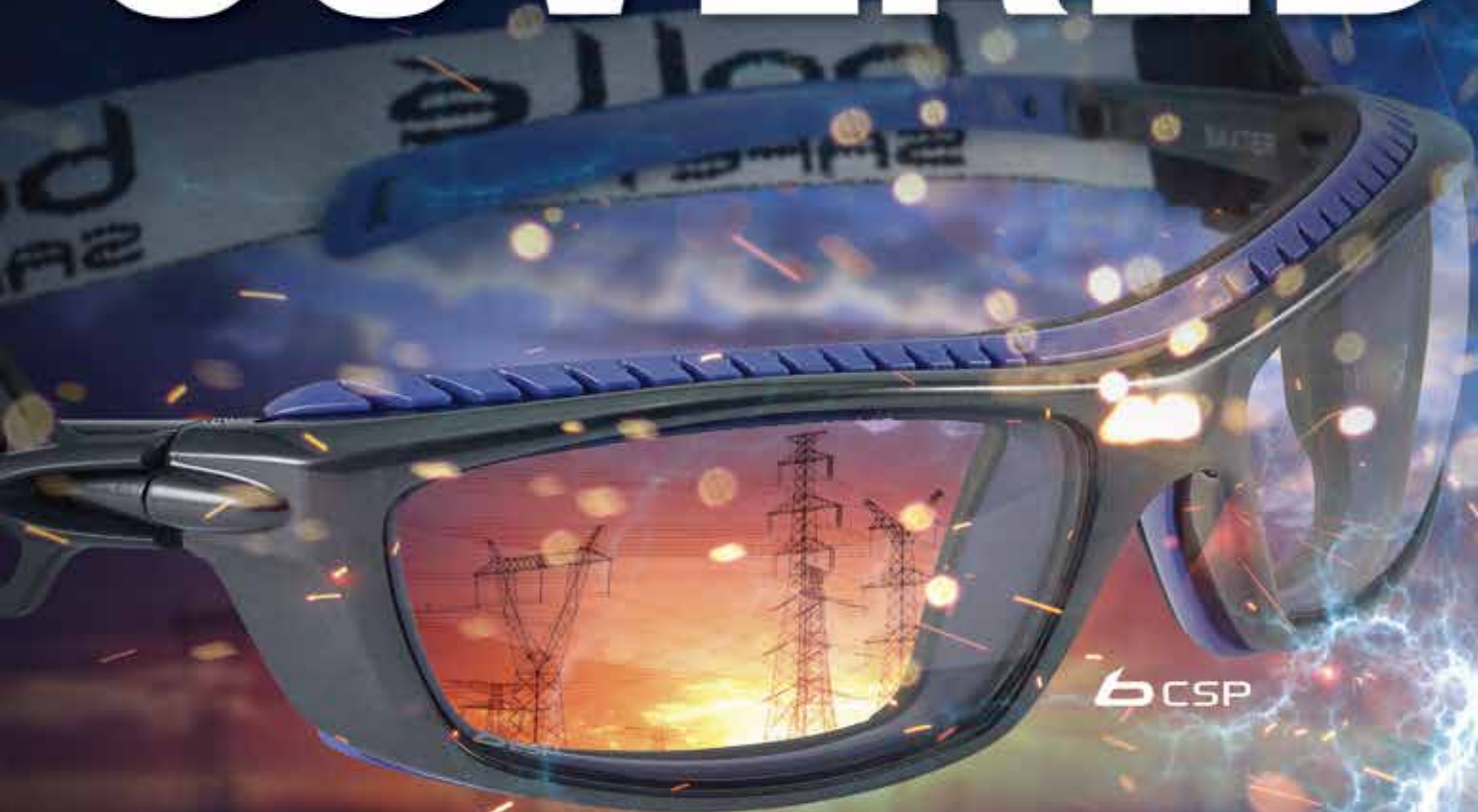
In industrial process facilities, corrosion is the biggest single cause of plant and equipment breakdown, including machinery, vessels, structures, supports, and pipelines. While atmospheric corrosion in the form of air (oxygen), and water (moisture, humidity, vapor, etc.) is the main culprit, environmental factors including high temperatures and pressures as well as harsh substances, chemicals and gasses can also accelerate the corrosion of carbon steel and other metals.

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."

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.

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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 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 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.

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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 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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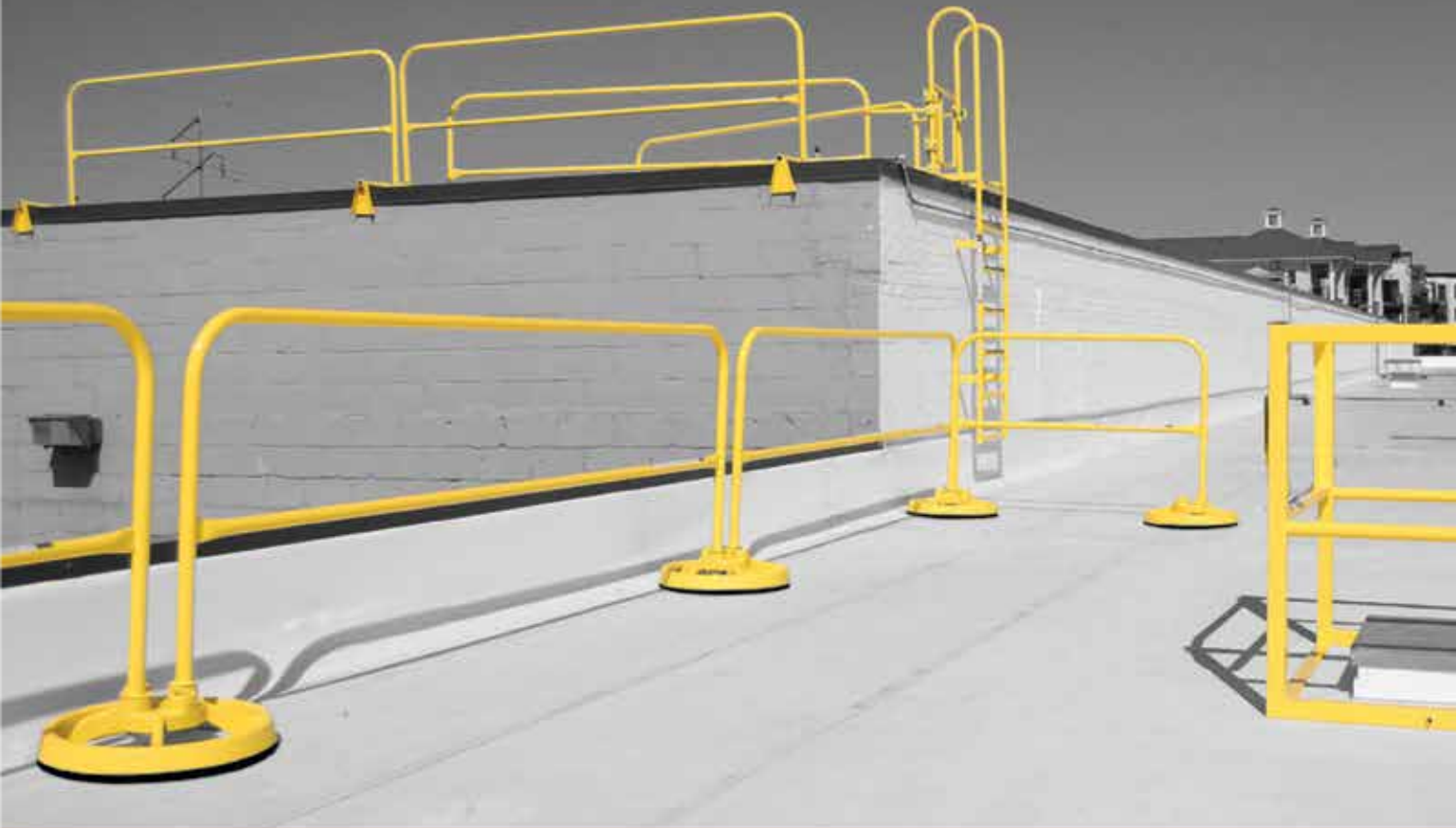
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# IMPROVED UTILITY STORM DAMAGE ASSESSMENT AND WORKER SAFETY WITH DRONES



As the frequency and intensity of North Atlantic hurricanes have increased over the past 30 years, coping with storms has become a way of life in the Southeast. A hurricane strikes, launching debris and causing extensive damage to trees, roads, buildings, power lines and more. Once the hurricane passes comes the gradual process of damage assessments, recovery and rebuilding. The National Oceanic and Atmospheric Administration reported that in 2017, natural disasters caused a record-breaking \$306 billion in total damage across the U.S., including to utilities. Utility companies will always be on the front lines of storm recovery as they work to assess and repair damage to power lines, transformers and other vital infrastructure as quickly as possible. Fortunately, advancing drone technology has allowed energy and utility companies to recover faster and with less risk to their workers than ever before.

According to a June 2018 survey conducted by Drone Industry Insights and the Energy Drone Coalition (EDC), the energy sector is strongly focused on unmanned aerial vehicles (UAVs) for maintenance and inspections, with 83% of 214 survey respondents reporting use of drones for these applications. A total of 55% report using drones in the power generation and power transmission and distribution sectors. Additional areas of use include surveying and mapping, monitoring and project management, aerial photography and filming, safety and security and transport and logistics.

A great example of an energy company embracing drone technology today is Southern Company, a leading producer of clean and affordable energy, and the second largest utility company in the U.S. Southern Company and its affiliates were among the first energy companies to use drones across its business to aid in remote inspection, wire transport and damage recovery assessments, among other tasks. Southern Company uses UAVs to improve workflow and reliability, while keeping the safety of employees and customers their number one value. In October 2018, the company announced plans to expand its drone program through a partnership with Skyward, a Verizon company advancing drone fleet management solutions, automated risk management and research and development.

Drone Industry Insights and the EDC survey also concluded that while the industry is just scratching the surface of what UAVs can do, it is expected that growing adoption will increase beyond visual line of sight (BVLOS) research and development. For Southern Company, BVLOS capability translates to the ability to pre-position an aircraft and launch it as soon as it's ready to fly and patrol a line, simply with the push of a button.

Located in the Southeast, Southern Company has extensive experience working with large-scale events, such as hurricanes. In fact, Southern Company deployed drones

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after each of the last five major hurricanes that impacted the Southeast. As a result, crews were better-equipped to quickly and accurately assess damaged areas, efficiently coordinate response efforts and even restore power ahead of schedule in some cases. In Puerto Rico for example, the company deployed drones to pull more than 72,000 feet of rope for an electrical conductor crossing dense jungle canopy and varying terrain elevations. Drone technology allowed crews to complete their job in a matter of weeks, whereas alternative methods would have spanned months.

Energy companies have a lot of infrastructure, and UAVs have proven to be valuable tools for inspecting that vital infrastructure. Plus, using an unmanned system keeps humans out of harm's way, mitigating risk and greatly enhancing safety and efficiency. So, when a natural disaster rolls in and crews assemble to assess and restore utility damage, consider the following ways drones can be used to improve worker safety:

**Inspecting power lines and poles:** Utility companies regularly inspect power lines, regardless of any damage or threats posed by a storm. In the U.S., there are 200,000 miles of high-voltage transmission lines and 5.5 million miles of distribution lines that need periodic inspection. The Occupational Safety and Health Administration reports that a worker must establish that a utility pole can withstand the stresses of repair assessment before climbing up. In the case of visible cracks or rot resulting from things like severe storm winds, heavy rains and flooding, crews can instead send drones up and down the pole to capture data and images. This not only expedites storm damage assessment, but more importantly, it prevents utility workers from scaling unstable structures.

**Surveying dangerous and hard to reach locations:** Drones can hover over surfaces and locations that are hard to reach or much too dangerous for a worker to get to. In November 2018, the North Carolina Department of Transportation's traffic operations center received national recognition from the National Operations Center of Excellence for its response to Hurricane Florence. The state used drones to identify which roads were safe in the wake of the storm and provided ongoing updates about road conditions, ul-

timately providing safer working conditions for crews and an easier evacuation for residents.

Similarly, in September 2017, Hurricane Irma left tens of thousands of Florida residents without power for days. When crews needed to access and examine the "Overseas Highway", a two-lane thread connecting the Florida Keys to the rest of the state, they turned to drones. Gresco Utility Supply used drones to examine infrastructure damage and coordinate the crew's responses in advance of physically assessing storm damage.

**Inspecting roofs:** In addition to reducing inspection time, drones can replace ladders and eliminate the need for utility workers to wear ropes or harnesses to manually inspect a roof. Hurricanes, earthquakes and hailstorms can leave damage to roofs, including leaks, holes, missing shingles and gutter problems. Further, debris propelled against the roof by high winds, such as trees, furniture, garbage or fallen powerlines can puncture shingles and in some cases the roof altogether.

**Advancing data collection:** Collecting assessment data digitally via drones creates the opportunity to store all data in one location and allows assessment crews to increase the accuracy of the information collected. Plus, the ability to pair data with live photographs can help aid assessors as they review the information required to evaluate the damage. Compared to paper-based assessment reports, drones not only expedite utility storm damage assessment, but also allow for immediate verification and feedback. Further, drone technology ultimately reduces the amount of time assessment crews are required to be on-site, thus subject to safety risks resulting from a natural disaster.

Today, drones can quickly and more safely go where humans can't. When storms roll in, drones present an incredible opportunity to survey and report conditions safely and efficiently to support restoration. As drones continue to transform the energy and utility sector, we'll see new use cases emerge. More importantly, these use cases will introduce new and improved processes for improving worker safety.



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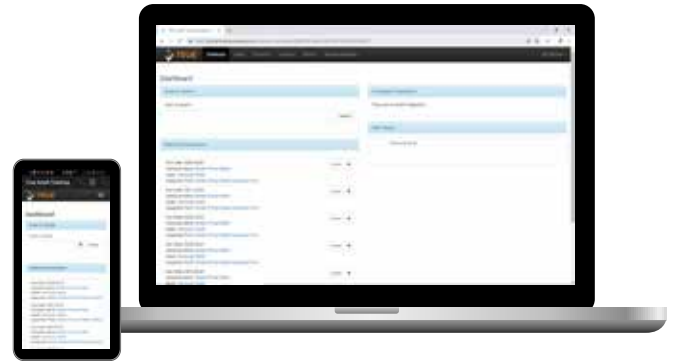
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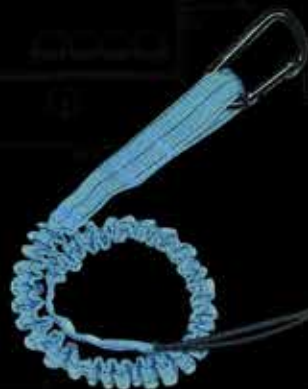
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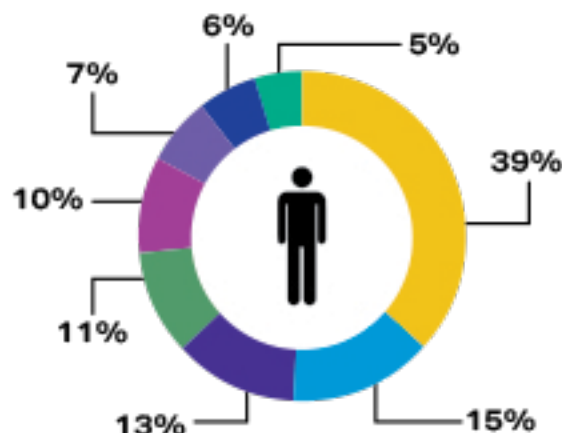


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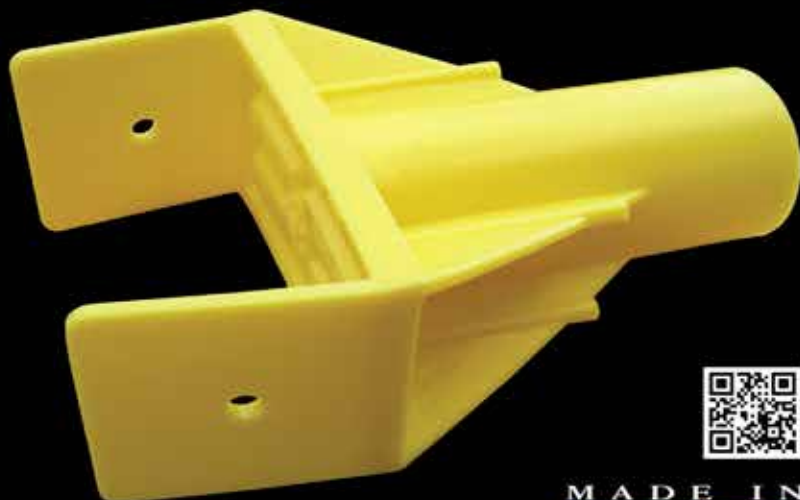
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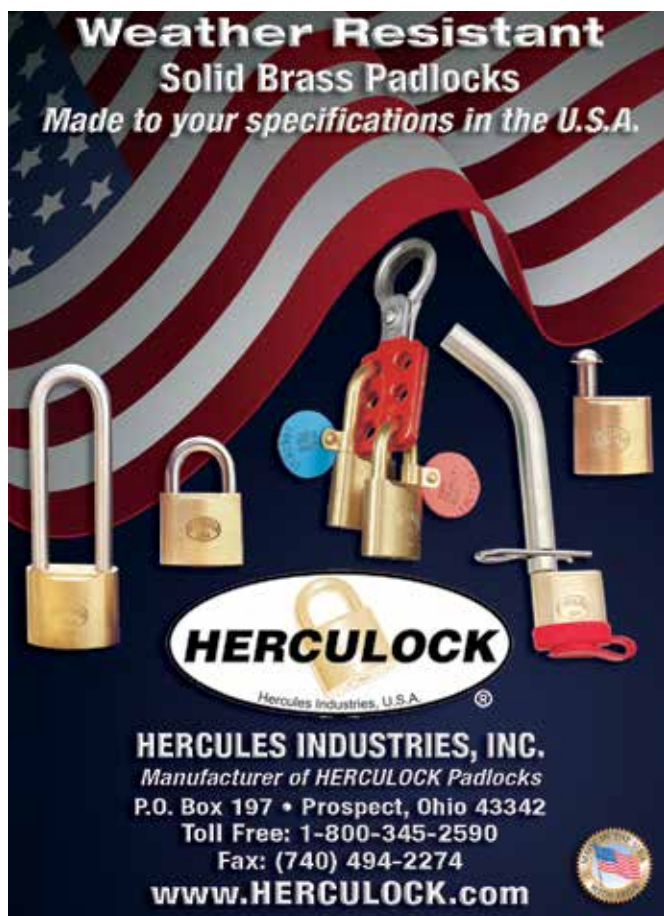


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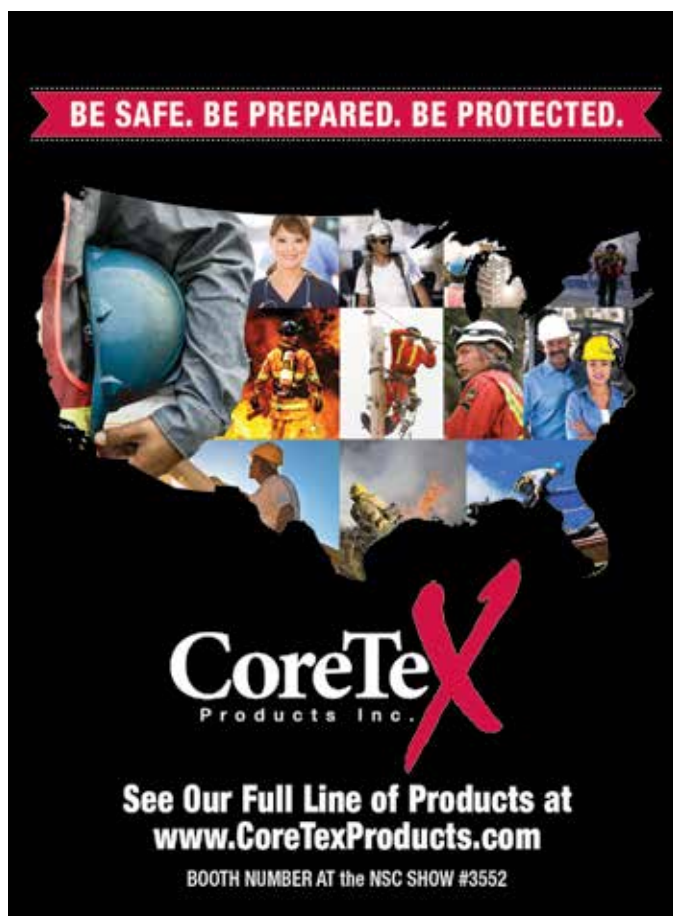
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