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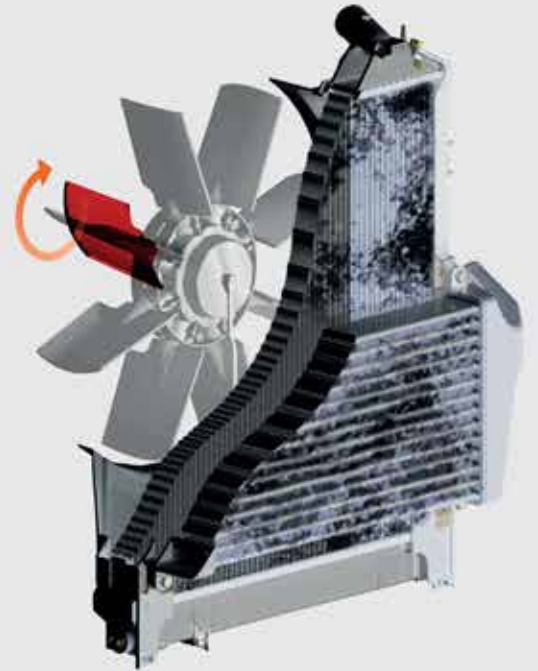
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# THE UTILITYSOURCE

Products and Services for Today's Electric, Telecom, and CATV Utilities

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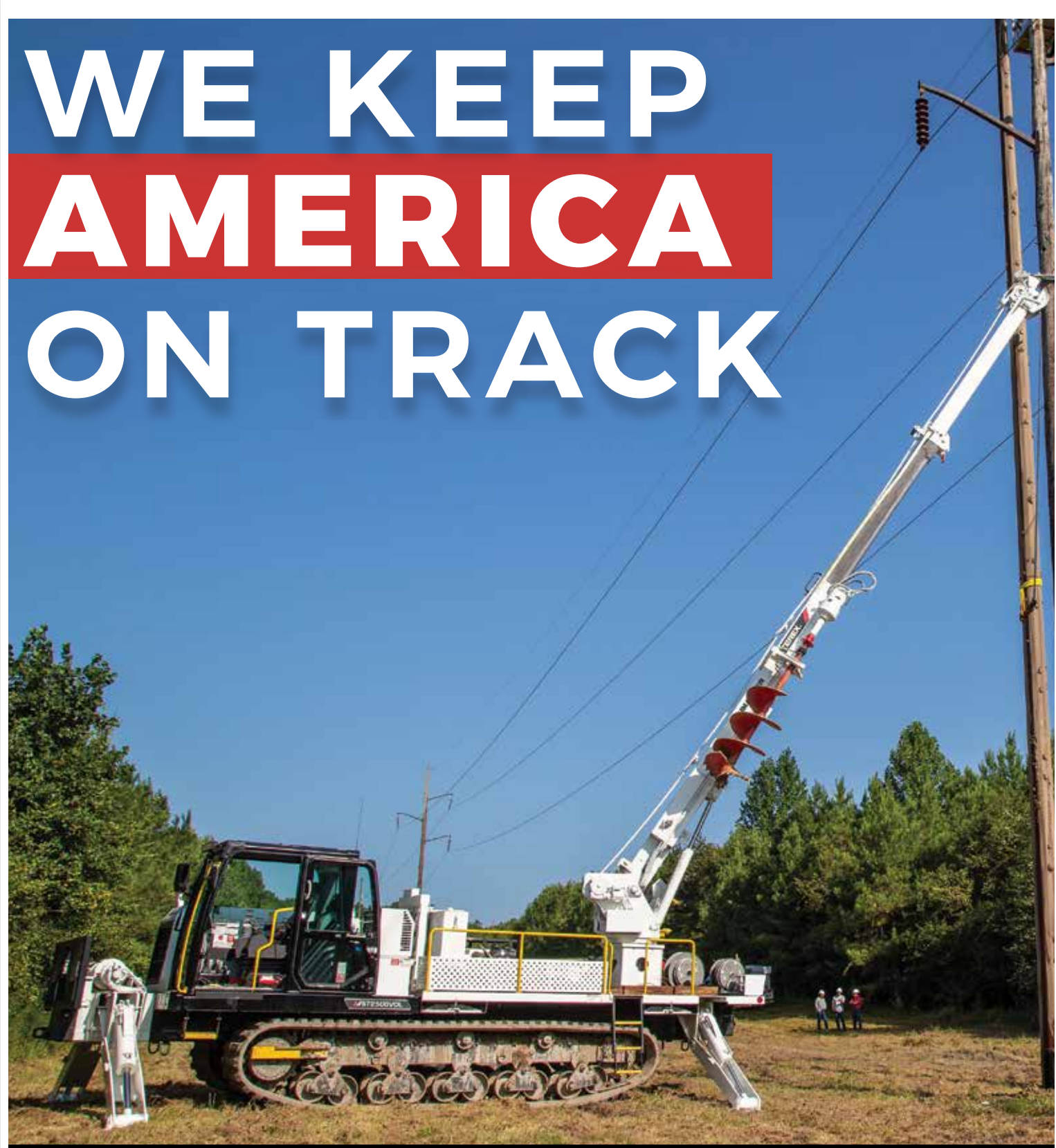


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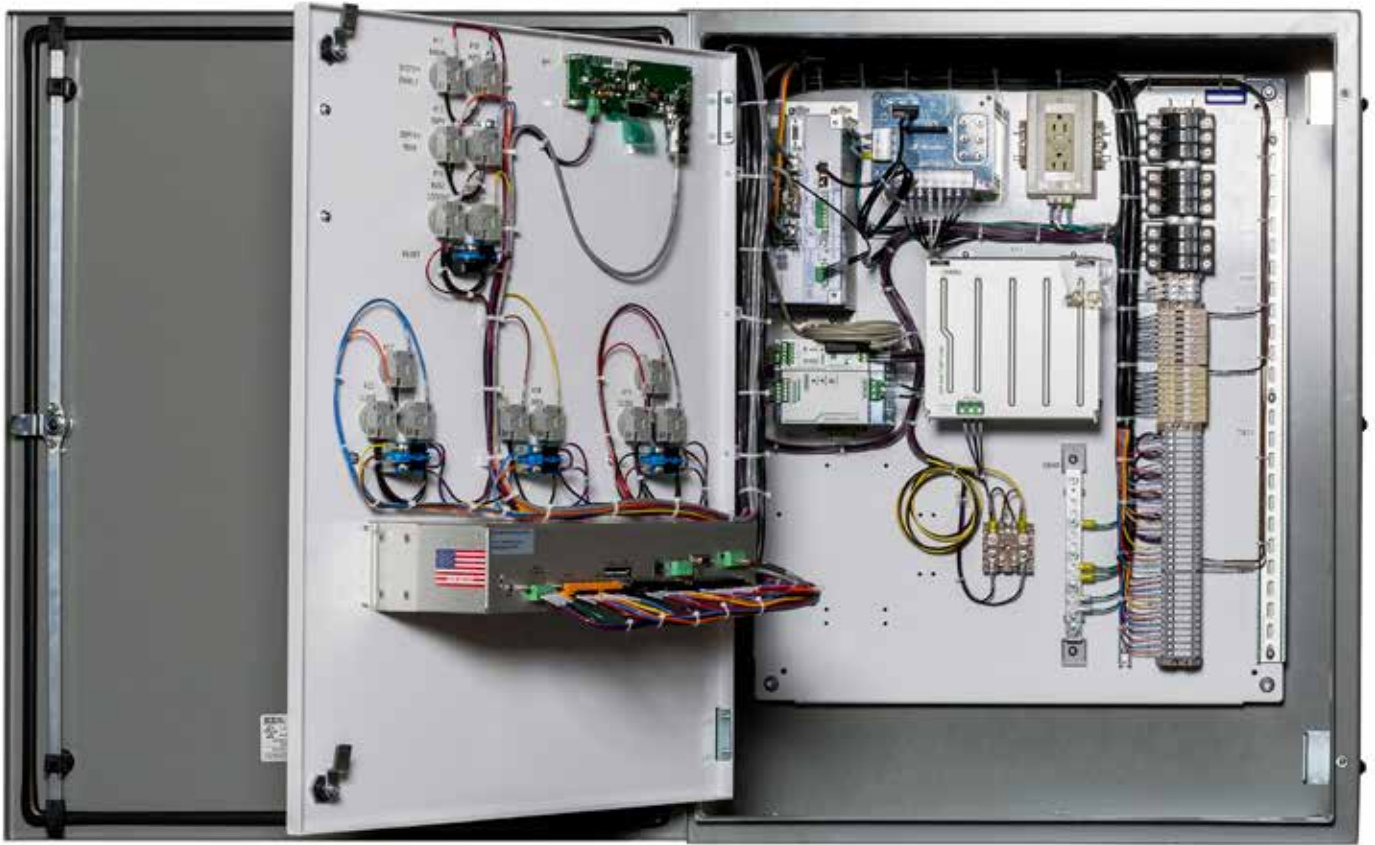
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# SIMPLIFYING DISTRIBUTION AUTOMATION IN SUBSTATIONS AND POLE-TOPS

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Technological advances in “all-in-one” communication and automation processors allow distribution of information in many protocols while performing sophisticated logic functions and alarm annunciation

Utility substation automation schemes are typically complex, involving a variety of intelligent electronic devices (IEDs), microprocessor-based relays, meters and monitoring devices. The information collected is then sent to communication processors or RTUs, before being passed on to proprietary HMI interfaces, SCADA Master Stations, Energy Management Systems (EMS) and/or enterprise networks.

Within this scheme, the component parts are often cobbled together by utility automation groups from a multitude of competitor options with varying protocols (some proprietary), configuration options, wireless transmission bands and interconnections.

Given that utilities may have hundreds of substations and even more pole-tops to monitor and control remotely, the complexity of distribution automation has traditionally been staggering. Fortunately,

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over the past two decades, substation automation has evolved and changed.

“In the past, the design of the substation was a patchwork of many different devices,” says Russ Fanning, a P.E. with over a decade experience in the automation group of a large Wisconsin utility. “Once you finally got the patchwork figured out, you could replicate that pattern but when you went to the next substation and you wanted to bring in something new, you were starting from scratch again and trying to patch that new piece in.”

Today, Fanning says the focus is on stripping out as much of the complexity associated with substation automation as possible.

Technological advances over the past several years have reduced the need for the same amount of hardware in favor of “all-in-one” communication and automation processor units that can interpret and distribute information in many protocols while performing sophisticated logic functions and alarm annunciation without the need for PLCs and racks of RTUs. These all-in-one devices even eliminate the need for security-risk PCs and proprietary HMI interfaces.

The communication and automation processor can connect to nearly any substation device in its native protocol, perform advanced math and logic, and securely present the source or calculated data to any number of clients in their preferred protocol.

For utilities installing equipment in new greenfield substations, upgrading aging legacy technology, or concerned over support, this is a welcome development.

#### *Interpreting Communications and Protocols*

Fanning, who was previously employed at a Wisconsin-based utility for 38 years, started his career as protection technician. After getting his engineering degree in 1990, he worked in substation engineering as a protection engineer, then R&D engineer and in 2007 became a principal engineer in the substation automation group.

“In my last 5-6 years at the utility, I was responsible for distribution automation and substation integration, using the Orion Substation Automation Platform to interface with all the IEDs that were inside the substation and at the pole-tops. I integrated pole-top device IEDs into the distribution automation systems when they were enabled with communication capabilities,” says Fanning.



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Fanning was first introduced to NovaTech – the company he now works for – in 2002. NovaTech has more than 30 years as a supplier of automation and engineering solutions for electric utilities and process manufacturing industries. The company's flagship product is the Orion Substation Automation Platform, which performs an expanding array of automation and security applications in electric utility substations with minimal setup and maintenance. Over the years the utility has installed more than 500 Orion units to improve the operations of both old and new substations to date.

According to Fanning, the distribution automation system he installed at the time specifically involved 30 Orion units using NovaTech's unique Distribution Automation algorithm designed to automate the switching of substation breakers and pole-top devices to restore power and/or to avoid power outages and equipment damage.

The challenge at the time was having to work around ways to retrieve the data from the IEDs and other devices, says Fanning. Multiple protocols are often used for distribution automation, including proprietary protocols with custom communication links.

"In a typical substation set-up at the time, there was often different software in each device and I would have to manipulate the data just to be able to share it," says Fanning. "For one system I worked on, I needed a proprietary protocol and software just to communicate to the device."

In most modern substations, microprocessor-based relays involve a proprietary protocol, so the communications processors must be able to retrieve real-time fault event data and records by

speaking to the relays in their native protocol.

Another standard protocol is DNP (Distributed Network Protocol), which is often used by SCADA Master Stations, RTUs, IEDs and also for relays. To promote interoperability of IEDs from different vendors, the IEC 61850 is an international standard defining communication protocols for IEDs. Older IEDs may still use Modbus or other legacy protocols.

"The Orion product is an essential hub for all this data collection, both in collecting and, perhaps, interpreting or actually taking action. The system could send that off to the control center to change setting, trip a breaker or switch a feeder," says Fanning.

"There is a wealth of information that is being created inside newer IEDs, microprocessor-based relays and meters that, until recently, has been left behind because it was too challenging to collect and distribute it," adds Fanning. "Today you can drill down into those IEDs from a remote location using a secure connection."

Reducing the driving time to remote sites was one of the biggest drivers in automating the substations, as well. The utility headquarters, and his home, were a 2 to 3-hour drive to some substations.

"With the Orion, I could access the IEDs in the substation and get a clear picture of what was happening," says Fanning. "Knowing what the situation was, I could drive there knowing what I had to do or I could delegate that work to someone in the area – depending on what it was."

Today, open-source web-based SCADA and HMI solutions eliminate the need for a substation PC

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and its inherent software and cybersecurity concerns, at a fraction of the cost.

In this approach, engineers can build interactive screens accessible from standard web browsers. For example, a browser can be used to view data from connected IEDs and RTUs. The software comes with pre-configured pages for data archiving, sequence of events recording, alarm annunciation, alarms, trending and communications diagnostics. Customized screens could easily be built for one-line diagrams, IED faceplates, and control screens.

As for HMIs, web-based systems provide a direct-to-touchscreen connection out of the box without a PC as an intermediary. Information can also be accessed by Smartphone, which will bring up a substation and graphically show the faceplate of each device with push buttons as if the technicians was physically there.

“The HMI is served up through webpages that are easily constructed with graphic software. It’s all integrated in one package, so building an HMI is so much simpler than it used to be,” says Fanning.

If there is a physical manifestation of the reduction in complexity, Fanning points to the substation. In many substations he worked in there would be racks or cabinets of devices with hundreds of wires and blinking lights.

“Today, substation layout is much cleaner. You can probably eliminate entire writing racks and cabinets – or at least make it much smaller – depending on how you are handling your I/Os to the IEDs,” says Fanning.

*For more information on NovaTech, visit their website at [www.novatechweb.com](http://www.novatechweb.com) or call 1-844-668-2832.*

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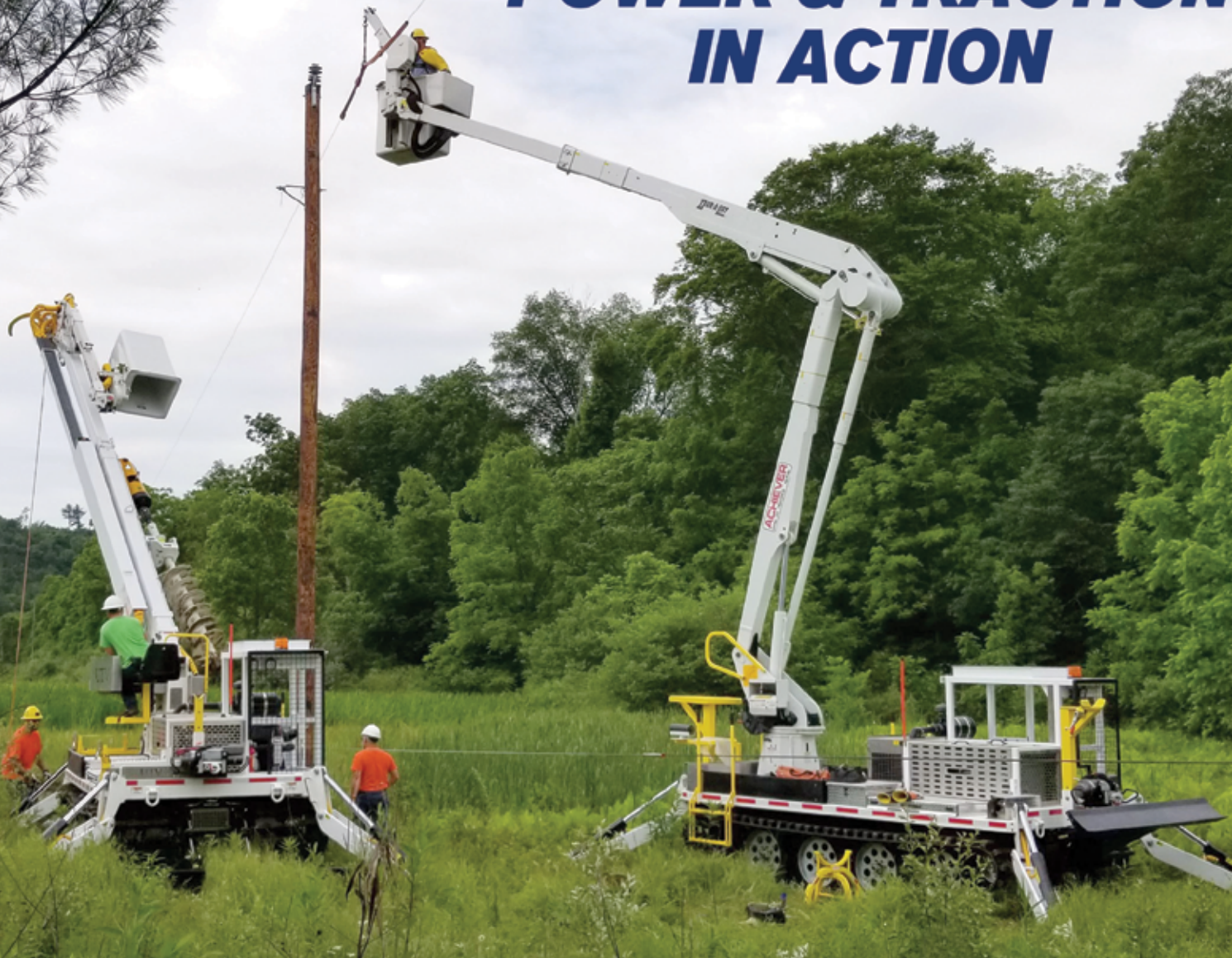


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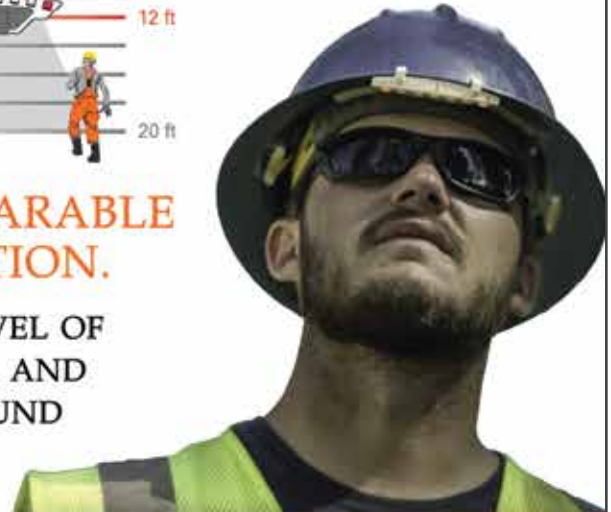
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# Creating a Safer, More Productive Lit Environment for In-Service/Field Workers



*Working with a lighting expert can help to optimize vehicle hazard, ground, scene, and surface lighting*

For fleet managers of upfit vehicles or those working in dangerous roadside or off-road conditions – such as field mechanics, rescue workers, telecom linemen, farmers, landscapers, plumbers, electricians, and other contractors – using the right quality of lighting can be the difference between life and death.

In these cases, safety is determined not just by using bright lights on the vehicle, but by producing optimal light quality to fully illuminate the environment and attract the attention of those nearby. Of course, it is crucial for hazard/strobe lights to warn nearby drivers of danger to prevent them from driving into the workspace.

Proper lighting is also required to effectively light up the ground and surroundings, so the upfit vehicle will not be driven or backed into a ditch, off a cliff or into any unsafe condition, in what otherwise can





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sometimes be complete darkness.

In addition, effective lighting is also needed at the jobsite, so workers can safely and efficiently complete any necessary tasks without endangering themselves or others. This includes effectively lighting up the scene and any work surfaces, so tools or equipment can be quickly accessed and safely used.

When making such lighting choices for upfit vehicles, working with an expert can help to optimize these lighting options for safety and productivity. The end result often reduces worker fatigue, stress, and error, while dramatically reducing maintenance, repair and replacement.

#### *Hazard/Warning Lights*

With so many distracted drivers today, it is critically important to get the attention of nearby drivers to protect any in-service field workers that could be in harm's way.

So, typically, SAE Class 2 warning lights are used for utility vehicles that work along roadsides, while Class 1 warning lights (with four times the intensity of Class 2 lights) are used for emergency vehicles like fire, police, and ambulance. A variety of colors are also used, such as red for emergency vehicles and amber for vehicles that obstruct or impede traffic.

"To alert other drivers, when service vehicles may unexpectedly stop, turn, or move out of regular traffic flow, it is easy to incorporate strobe lights in hideaway areas such as in headlamp, tail, turn, or back up lamps that do not require additional mounting. Beacons or bar strobes can also be added. There are many options," says Kevin Cornelius, Global Marketing Manager – Trailer and Body Builders at Grote Industries, a U.S.-based manufacturer and expert in vehicle lighting and safety systems.

#### *Ground Lighting*

When upfitted service vehicles have to drive or back up over uncertain terrain at night – sometimes in complete blackness – it is crucial to have good ground lighting, so the vehicle does not end up in a ditch, hole, or other hazard.

While some manufacturers still use incandescent or halogen lights for ground lighting, these tend to



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fail prematurely due to short bulb life and high heat, which can put in-service/field workers at risk. Instead, Cornelius recommends the use of advanced LED lights, which can last up to 10 times longer than incandescent or halogen bulbs, with much lower power consumption.

Just as important, such LEDs can provide significantly better light quality, which equates to better visibility and safety in dark environments, where there may be no other nearby light source

“Unlike traditional bulbs, the best LED lights today also can provide an even, high-quality white light color that is easier on the eyes and provides a contrast similar to natural sunlight for better visibility,” says Cornelius.

All ground lights should also be mounted below the vehicle shining downward, typically at a  $-40^\circ$  inclination, so the actual light source is not visible to the vehicle driver or others on the scene. “You don’t want to directly view the light source providing the ground lighting, or it can dilate your pupils, so your eyes are no longer adjusted for nighttime viewing,” explains Cornelius.

### *Scene Lighting*

Scene lighting is used when high-powered, long-range illumination is required from a service vehicle, and usually takes the form of work lamps. Again, advanced LEDs are used when safety is paramount,

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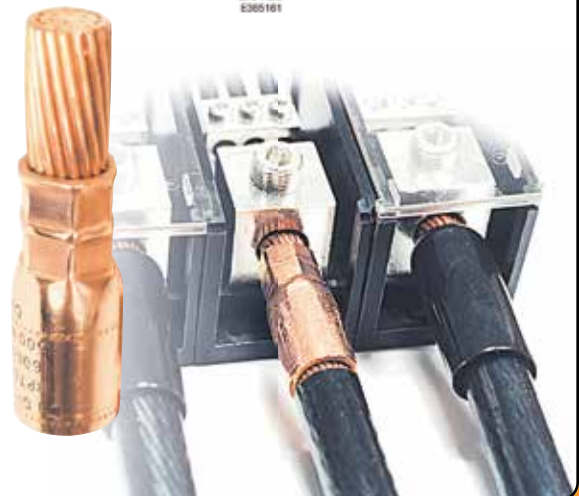
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and night must essentially be turned into day. This can help to eliminate stumbles, trips, falls, and work-related errors due to poor visibility.

However, there are different types of scene lighting, some of which are better suited for specific tasks.

“When work area lights are used on the rear of the vehicle, flood or wide flood LED lights cover the broadest area,” says Cornelius. “To light up an area at a distance, we recommend trapezoid or combination light patterns. For the longest distance viewing, a spot light or pencil beam type pattern is usually the best choice.”

In terms of light quality, LEDs are far superior to halogens. Because the color of LEDs is closer to that of daylight than the yellowish hue of halogens, it appears brighter and can illuminate details of objects in the distance better.

LEDs also help workers see more at the edge of the scene, where traditional lamps tend to fade out. This improves safety and reduces eyestrain since it helps the worker more quickly and easily spot potential dangers and other important details. For the same reason, it also can increase worker productivity, particularly when the task lasts for many hours.

### *Surface Lighting*

Typically, surface lighting is called for when safe footing up steps or quick access to tools and equipment in compartments or truck beds is required.

While this can be accomplished by mounting LED lamps on the side of steps, or at the ends of compartments, an increasingly popular alternative is to install LED light strips wherever needed. Advances in thin-film LED technology not only produce brighter illumination, but do so using paper-thin, ultra-light strips that can be easily installed into the existing lighting power system.

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The bottom line is that any fleet manager of upfitted vehicles can create a significantly safer, more productive lit environment for their staff working in the field.

Those who consult with a lighting specialist can not only optimize such choices, but also save dramatically on maintenance, repair and replacement over the service life of the vehicle fleet.

*For more information, contact Grote at 2600 Lanier Drive, Madison, Indiana 47250; phone: +1 (800) 628-0809; e-mail: [info@grote.com](mailto:info@grote.com); or online at [www.grote.com](http://www.grote.com)* •

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## Hino Trucks Introduces New Models and Cab Configurations

Hino Trucks has been asking you for a few weeks now the simple question: What size are you? Well, now it's time to answer that question. Hino has unified its entire lineup of trucks, including model names, to make it even easier for you to match the perfect Hino to you and your business' needs. Hino is excited to announce their new 'M Series' Class 4/5 COE's and new 'L Series' Class 6/7 Conventional trucks, which combined with Hino's recently launched 'XL Series' Class 7/8 vehicles, creates a cohesive family of commercial trucks.

The badges are not the only updates either. Each vehicle now contains larger cab configurations, and a full suite of features adding safety, fresh designs, durability, flexibility and connectivity options, making it clear why Hino is the fastest growing medium-duty truck brand. The new COE truck models carry Hino M4 and Hino M5 badging with the number in the naming scheme representing GVW class. For 2021MY, these trucks have been upgraded with an all-new grille design complete with optional LED headlights and HD 6-speed Aisin automatic transmission with gear hold feature. Available with the industry's first OE fully integrated Lane Departure Warning System in this vehicle segment and then we get to the interior upgrades with a new shifter layout, steering wheel controls, an all-new gauge cluster including a 4.2" LCD multi-information display and driver's seatbelt sensor.

The new Conventional line is represented by the Hino L6 and Hino L7 models boasting a bolder front fascia with optional LED headlights. The cab interior has been re-engineered with an automotive grade finish designed for commercial use and

improved functionality, steering wheel controls, a large 7" LCD multi-information display, more storage and leg room. Hino also takes your safety very seriously, which is why there are now an array of safety systems available on the Hino L Series including Electronic Stability Control (ESC), Collision Mitigation System (CMS), Lane Departure Warning (LDW), Active Cruise Control (ACC) and driver's seatbelt sensor. Adding even more functionality to your business are new wheelbase options and extended and crew cab configurations.

"Having extended and crew cab choices will help us better serve our customers' operational needs and open-up new markets for our trucks" explained Glenn Ellis, SVP Customer Experience. "It's impressive how accommodating and spacious both cabs are. Our engineering and design team really did an outstanding job with our new full line-up!" The 30" extended cab will have seating for 5 and the 44" crew cab will have full-size doors and seat 6 passengers and provide the comfort of rear zone A/C and heat. The Hino XL Series also gets new advantages for 2021 model year including the extended cab and crew cab configurations and a snow plow package complete with an 18,000 lb. GVW front axle and front frame extensions. The Hino XL7 and XL8 will now come standard with a driver's seatbelt sensor and available ACC building on the trucks' ESC, CMS and LDW active safety solutions. Hino Trucks dealers are now accepting orders for the new 2021 models. The extended and crew cab variants will be added in the Spring and the XL snow plow package in Summer timeframe.

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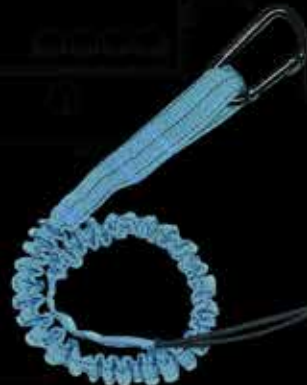
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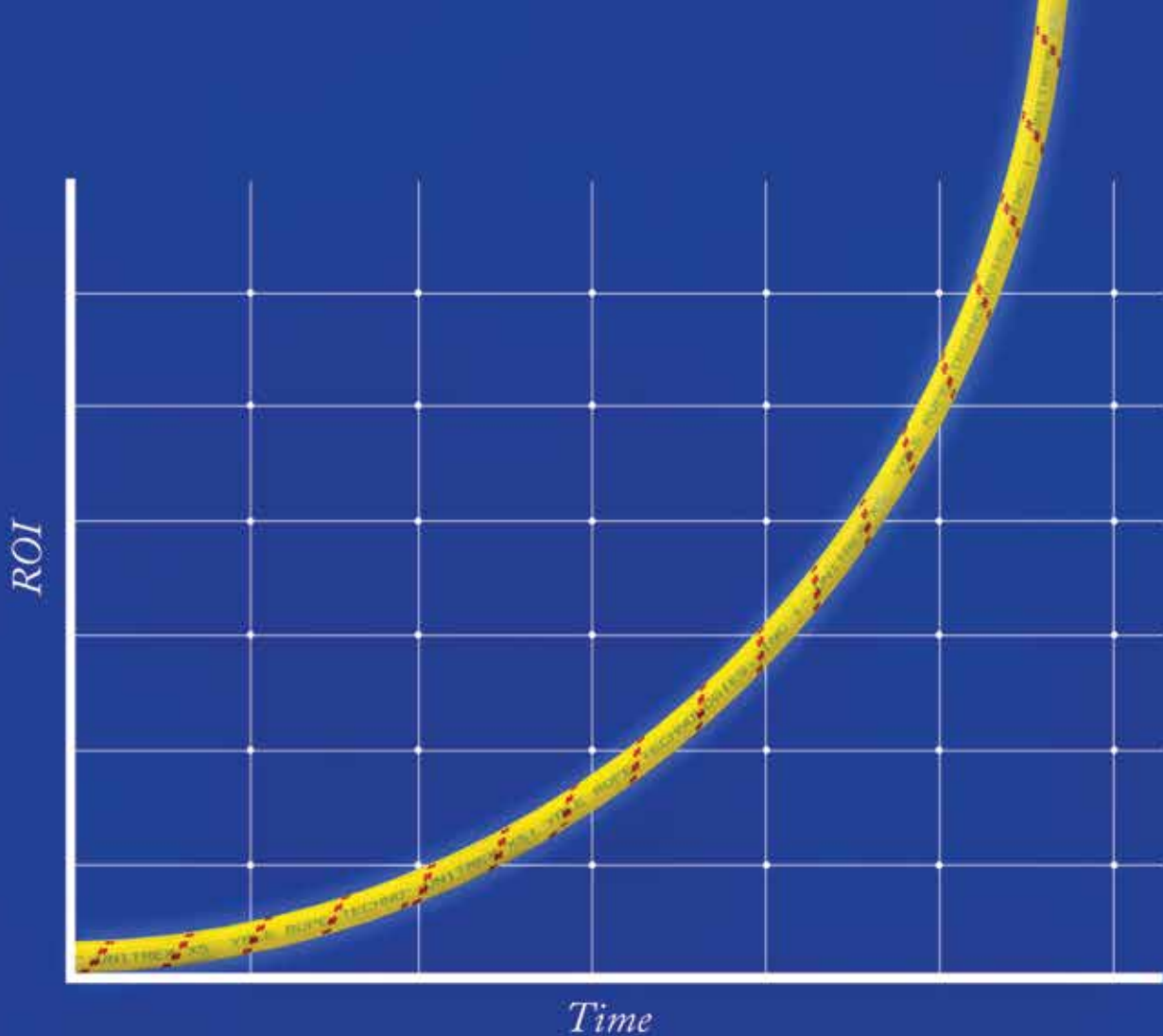
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