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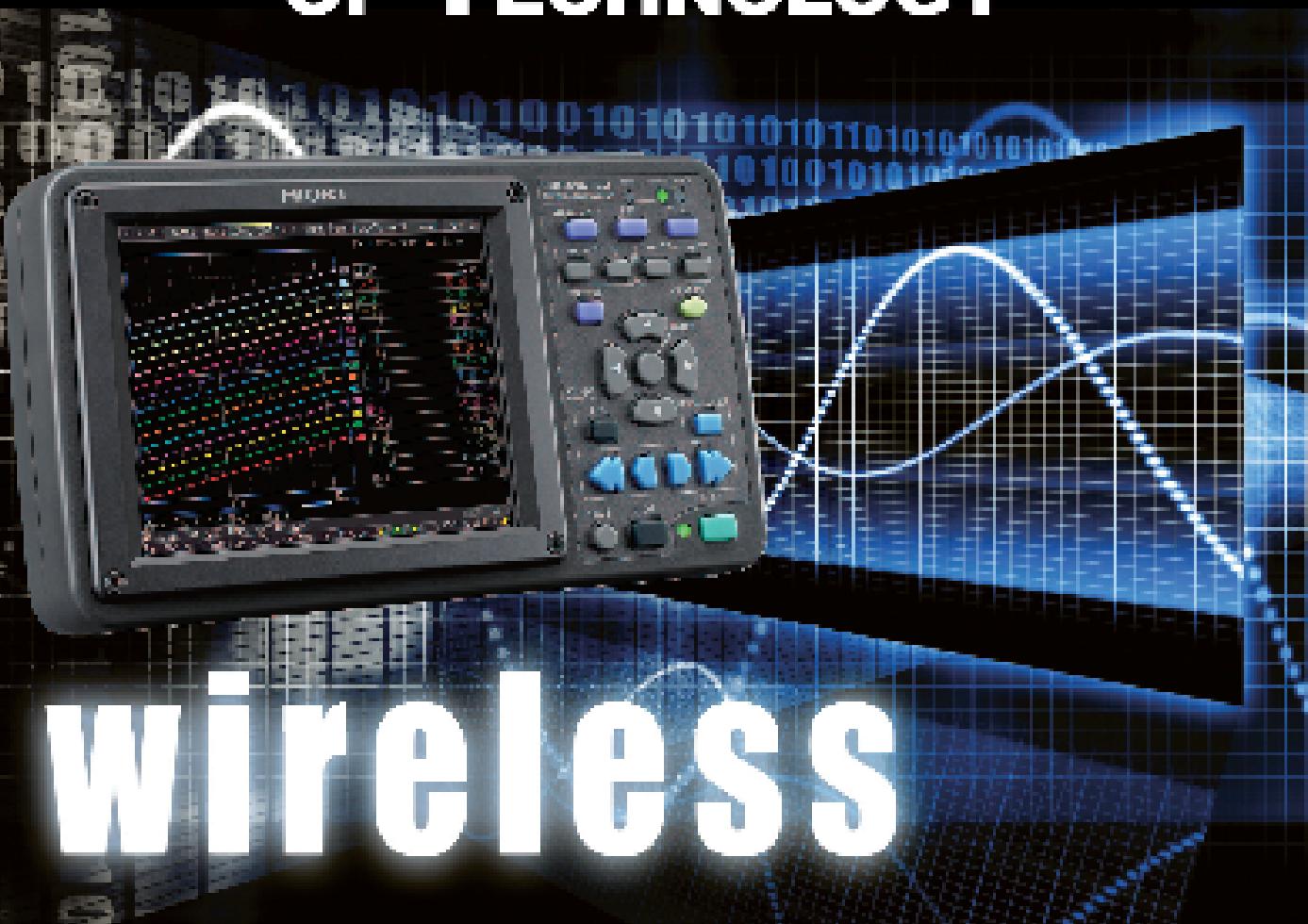
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NFPA70E, Arc Flash & Safe & Efficient Thermography Practices

By Josh L. White

What is an Arc Flash?

An arc flash is like a bolt of lightning that occurs around energized electrical equipment. It can occur spontaneously and is often triggered simply by the movement of air when an electrical enclosure is opened. The NFPA has recognized the significant hazard of arc flash and is attempting to protect workers via the latest implementation of NFPA 70E-The Standard for Employee Safety in the Workplace.

About 10-15 serious arc flash incidents occur in the US each day. Most causes of arc flash are operator induced.

Most technicians who routinely work around energized electrical equipment are familiar with arc flash-having seen it firsthand. It is thought of like a major automobile accident:

no one really expects it to happen to them, so people have a tendency to drive with significantly less caution than they should. So it is with arc flash, only worse. Similar to driving you can make a mistake, or you can be doing everything right when someone slams into you.

Specifically, what is an arc flash?

An arc flash is electric current flowing through an arc outside its normal path where air becomes the conductor of high thermal energy (5000°C %2B) and generates highly-conductive plasma. An arc flash will conduct all available energy and generate an explosive volumetric increase of gases which blows electrical system doors off and potentially generates shrapnel.

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An arc flash occurs when the gap between conductors or conductors and ground is momentarily bridged. There is always a trigger event which almost always involves human intervention. Typical causes and contributing factors include:

- ◆ Accidental contact with energized parts
- ◆ Inadequate short circuit ratings
- ◆ Tracking across insulation surfaces
- ◆ Tools dropped on energized parts
- ◆ Wiring errors
- ◆ Contamination, such as dust on insulating surfaces
- ◆ Corrosion of equipment parts and contacts
- ◆ Improper work procedures

An arc flash is electric current flowing in an arc outside its normal path where air becomes the conductor.

The vast majority of arc flash faults occur when the door is open or being opened. The National Fire Protection Agency (NFPA) is the author of NFPA 70, also known as the National Electric Code (NEC). This paper is not intended to provide a comprehensive review of the information available in the code, but merely to highlight some of the information that may be related to thermography.

NFPA 70E is the standard for safe electrical work practices.

The NEC is an electrical design, installation and inspection standard. It does not specifically address topics like electrical maintenance and safe work practices. A national consensus was needed for safety while working around live electrical equipment. NFPA 70E is the standard for safe electrical work practices. NFPA 70E addresses four specific topics: safety related work practices, safety related maintenance requirements, safety requirements for special equipment and installation safety requirements. NFPA 70 suggests that a Hazard/Risk analysis must be conducted prior to working on electrical equipment. The core of the analysis is based on shock and arc flash boundaries which must be done by a qualified electrical engineer.

Shock Hazards, Flash Hazards and Personal Protective Equipment (PPE) Selection

Prior to beginning work around live electrical components, an Energized Electrical Work Permit must be obtained and should include but not be limited to the following:

- ◆ A description of the circuit, the equipment to be worked on and the location
- ◆ Justification for why the work must be performed in an energized condition
- ◆ Description of the safe work practices to be performed
- ◆ Results of the Shock Hazard Analysis

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- ◆ Determination of the Shock Protection Boundaries
- ◆ Results of the Flash Hazard Analysis
- ◆ The Flash Protection Boundary
- ◆ Identify the necessary Personal Protective Equipment (PPE) required to safely perform the assigned task
- ◆ Means employed to restrict unqualified personnel from entering the work area
- ◆ Evidence of completion of a job briefing
- ◆ Energized work approval from responsible management, safety officer and owner

Prior to working with live components, the correct Personal Protective Equipment and safe working practice must be determined.

NFPA 70E allows for an exemption to the safe work permit for qualified personnel who are performing tasks such as testing, troubleshooting, voltage measuring, etc. so long as they utilize safe work practices and the proper PPE. Prior to working with live components, the correct personal protective equipment and safe working practice must be determined by carrying out a Shock Hazard and a Flash Hazard Analysis. A Shock Hazard Analysis will determine the voltage to which personnel are exposed, boundary requirements and the proper PPE necessary to minimize the possibility of shock to personnel. The shock protection boundaries are identified as limited, restricted, and prohibited for the distances associated with various voltages.

Unqualified personnel should be notified and warned of hazards by qualified personnel when working at or near the limited approach boundary. When an unqualified person must work inside the restricted boundary, it is important that they be further notified of the risks and hazards and continuously escorted by a qualified person. Under no circumstances should they be allowed inside the prohibited boundary. It is important that a Flash Hazard Analysis be conducted in order to protect personnel from being injured by an arc flash. The analysis will determine the Flash protection boundary and determine the proper PPE. In so doing, the Flash protection boundary is calculated at the distance from energized parts where a burn will be "recoverable" (2nd Degree) and "incurable" (3rd Degree). The guidelines dictate that the Flash protection boundary for systems that are 600 volts or less be 4' for clearing times of 6 cycles (0.1 second) and available bolted fault current of 50kA or any combination not exceeding 300kA

cycles. For all other clearing times and bolted fault currents, the flash protection boundary is normally determined based on the calculated incident energy of an arc fault taking into account system voltage, available current, and clearing time (where incident energy is the measure of thermal energy at a specific distance from the fault). Where it is not possible to perform these analyses (or they have not been performed), NFPA 70 provides guidelines (NFPA 70 Table 130.7-C9a) that can be used to determine the required PPE based on the task conducted. In lieu of a Flash Hazard study, selection of PPE by task is normally allowed. However, for tasks not listed in the table and for clearing times different than those listed there, a complete Flash Hazard Analysis is required. Using Flash Hazard Analysis or Task Risk Assessment, the following table can be used to identify the correct PPE:

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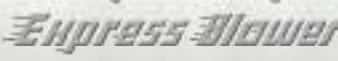
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Thermography Inspection Practices Infrared cameras have been used to identify problems in electrical systems for many years. Problems in electrical systems manifest themselves by connections and conductors becoming overheated as the result of increased resistance, the result of loose or corroded connections, or load imbalances. An infrared camera can readily identify these problems in a thermal image and is an excellent method for identifying failing or problem components prior to a failure. A failure can disable an electrical system and cause significant lost production, equipment damage and bodily injury. Insurance companies use infrared electrical inspection to help determine risk profiles and rates for industrial customers. More recently, thermographers have found that they can use IR to prevent and predict failures to help further reduce down time equipment failure and increase overall safety.

Often, during thermography inspections, panel covers are removed and subsequently replaced, a method that conflicts with the requirements of NFPA70E.

Like visible cameras, infrared cameras require a direct-line-of-site view of an object. In most cases surveys are hampered by cabinet designs that obscure the target components being inspected and thermographers are put at risk by having to open cabinets or doors in an attempt to gain access to the internal components. IR surveys of electrical systems are best conducted when the system is under heavy if not peak electrical load, which requires the thermographer to perform the inspection in and around live electrical components. Typically, electrical system covers are removed during thermography inspections and subsequently replaced. This working method conflicts with the requirements of NFPA 70E.

Recommendations of NFPA70E as they relate to Thermography Inspection

NFPA 70E recommends that only "qualified" personnel be allowed to perform work inside the flash protection boundary. Thermographers must be accompanied by "qualified" individuals if they intend to have panel covers removed. Both the thermographer and the additional person should be in full PPE. One way NFPA 70E determines Hazard and Risk and the required PPE is based on the activity that you are conducting around the equipment. Risk potentials are determined on a scale from 0-4, where 4 indicates the highest risk potential. For example, removal of a bolted cover on 600V equipment carries a hazard/risk classification of 3 and that goes up to a rating of 4 on voltages greater than 600V. As this work occurs within the Flash Protection boundary, the appropriate PPE must be worn. The required minimum PPE for Hazard/Risk Classification 3 work is to withstand 104.6 J/cm², and the required minimum PPE for Hazard/Risk Classification 4 work is to withstand 167.36 J/cm². As much of the work performed for an IR inspection requires removal of bolted covers, this would be the PPE that is required.

Infrared Windows: Eliminate the Controllable Risk

The first rule in any risk assessment is to eliminate the risk if possible. Infrared Windows eliminate many of the risks associated with live inspections since they enable an infrared camera direct view of live electrical components without the need to open electrical enclosures. They provide an excellent means of accessing electrical equipment efficiently and safely. In addition, a second qualified technician is not required to open and unbolt enclosures. An IR viewing window is basically an infrared transparent material with a holder/mounting body. Thermographers may even decide to not use a window when inspecting energized components at some distance from the cover and use a protective grill in place of a window. The grill must be IP2X certified (the grill size must offer protection against foreign objects with diameters larger than 12mm). This method can significantly reduce the window cost and also has the additional benefit of allowing ultra sound inspections of the electrical switchgear. However when using grills, operators will be exposed to live electrical components and they must wear the appropriate level of PPE identified from the Arc Flash Hazard Analysis of the switchgear. Infrared Windows eliminate many of the risks associated with live infrared inspections since they enable an infrared camera direct view of live electrical components without the need to open electrical enclosures. The optics holder design depends upon a number of parameters: the field of view, equipment lens and window size are all functions of the design and must meet all the parameters that the thermographer requires before a holder is manufactured. Also, a protective cover should be included in the design as crystals are very expensive and in some cases, extremely fragile. Infrared Windows are available in multiple sizes and can be custom made to retrofit dead fronts on distribution



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Considerations in Installing Infrared Windows

To correctly install infrared windows, the targets that require inspection must be identified. Typically, traditional surveys only look at the bolted connections within the switchgear. These are generally considered to be the "weakest points" or "points most likely to fail." These may include:

- ◆ Cable connections
- ◆ Bus Bar Connections
- ◆ Isolator or Circuit breaker connections

The formula for calculating the field visible through an Infrared Window is: $\text{FoV} = 2 \times \tan(\text{angle}/2) \times D$, where FoV is the width of the object area that will be viewed, the "angle" is the angular field-of-view of the camera, and "D" is the distance from the camera (ostensibly the window) to the objects being viewed. Once a decision has been made about what objects are to be inspected through the infrared window, the number of windows and appropriate size must be determined as well as where they need to be installed to ensure best coverage (and therefore maximum efficiency). The size of the infrared window will depend on several factors, including the infrared camera's clear aperture, its ability to focus on close objects, its ability to be placed as

close as possible to the window, the camera's angular field-of-view and the amount of manipulation is possible with the camera when viewing through the window. An important consideration is how the infrared camera can be manipulated when looking through an infrared window. A high degree of manipulation can have the effect of increasing the size of the inspection area by up to a factor of 3. This means that if the object under observation is 12 inches across, depending on several factors, it is possible that a window diameter of 4 inches (for IR window size calculation purposes) can still be used if the operator manipulates the camera from left to right or up and down.

The required size of the window will depend on the following:

- ◆ the size of the objects to be viewed and their distance from the panel cover;
- ◆ the infrared camera's angular field-of-view and clear aperture;
- ◆ the camera's ability to focus on close objects and to be placed close to the window.

Typically, infrared cameras have a horizontal field of view of 25°. Those infrared cameras that offer a wide-angle lens option (for example 50°) permit the user to have a substantially wider field of view, resulting in an increase in viewing area through the same infrared window size. This can be a

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great advantage in certain situations, reducing the size and possibly the number of windows. Other useful infrared camera features are close focus capability, small lens diameter resulting in a small clear aperture, motorized focus (eliminating the need to get fingers on the lens focus ring and moving the camera away from the window) and a chassis design that facilitates movement at the window such as an articulating camera head that allows the user to look into windows above eye level or at near floor level.

The View through an Infrared Window

An infrared window allows a camera operator to inspect the inside of an electrical cabinet to check the physical condition of the components that you have chosen to inspect. As with traditional thermographic inspections we can see temperature differences very clearly. You need to have the confidence in the infrared windows that you are using. They are designed to allow infrared energy to transmit through them at a known transmission rate; therefore, if there is even a slight temperature difference you will be able to see that with your IR camera, and be able to record images for the IR inspection program.

Considerations for Installing Infrared Windows

Installing an infrared window requires cutting holes into very expensive switchgear. Therefore, it is very important to be very sure that they are installed in the correct location and that the switchgear ratings are not degraded in any way. Before installation, the following factors need to be considered:

- ◆ NEMA or IP rating of the switchgear and IR windows: Remember to never install an IR window of a lower rating than the rating of the switchgear.
- ◆ Test Certifications: Ensure that the IR windows have been tested and approved by the certification bodies as the switchgear for which they are intended (i.e. UL, IEEE, Lloyds).
- ◆ Internal obstacles: Before removing internal Perspex/ Plexiglas covers or cables, ensure that the local safety manager's approval is sought first. In some cases you may not be able to totally remove the covers and may only be able to modify them by drilling or punching holes to retain the IP2X requirement for some switchgear.
- ◆ Explosion Ratings (if applicable): Some panels are positioned in intrinsically safe areas and as such can never be modified in the field.
- ◆ Dielectric Clearances: Where IR windows use grills or inspection orifices, they must comply with IP2X (13mm 0.5»), and clients must be made aware of the safe dielectric clearances for the type of switchgear that they intend to install the window into. The table shown at the left (from IEEE C37.20.2 table A.3) specifies minimum distances from live components, and it is recommended that these be considered as a standard for grills/inspection orifices.

When using Infrared Windows, it is important to correct for the transmission specification of the window and the emissivity of the component that is to be inspected through the IR window. One way of correcting for the effects of the window is by adjusting the camera's emissivity value for an object of known temperature until the camera's reading is correct. For objects at the same ambient temperature and emissivity, the new emissivity value can be used.

When using Infrared Windows, it is important to correct for the transmission loss of the window and the emissivity of the component that is to be inspected through the IR window.

Another way of using IR windows is to prepare all components that are to be inspected so that they have the same emissivity (for example, with electrical tape, emissivity paint, IR-ID Labels). In this case, all components being inspected will have the same transmission rate and emissivity readings; consequently, the results gathered will be far easier to compare.

Can IR Windows Carry a Generic Arc Rating?

Electrical switchgear takes on many different shapes and sizes. The surface areas and volumetric elements of the cabinets are different with each model, type and rating. Each cabinet is subjected to the testing that is laid down by the certification bodies such as UL, IEEE, etc. This test is completed on the cabinet assemblies and not the components that make up the assembly. Electrical cabinet designs and dimensions are infinite, and we therefore CANNOT or MUST NOT use the data from one cabinet design for another design unless they are identical in every way. This is why components never carry a generic arc rating and must be subjected to industry standard tests to confirm that they conform to the minimum required level of mechanical strength and environmental properties for the electrical cabinets and assemblies which they are going to be fitted into.

Conclusion

Because of the frequent occurrence of arc flash in industry, it is extremely important to be aware of the risks associated with inspection of high voltage switchgear and related items. Concerns about operator safety due to an arc-flash event are causing inspectors to adopt new practices in accordance with NFPA 70E, the standard for safe electrical work practices. Shock and Flash Hazard analyses are required in many situations. Personal Protective Equipment recommendations are also available. One new common safety practice involves the use of infrared transparent windows which eliminate many of the risks associated with live infrared inspections since they enable an infrared camera to have a direct view of live electrical components without the need to open electrical enclosures.

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Benefits of Using Subsurface Utility Engineering SUE With Pipeline Construction

By Daniel Locke

Subsurface utility engineering (SUE) is a highly advanced method used to locate positions of installed pipelines. SUE methods provide precise information that help pipeline contractors minimize project delays and lessen workplace accidents.

In the 1990s, subsurface utility engineering SUE was mainly used by the U.S. Federal Highway Administration for designing highways. Today, it has become an invaluable tool for the U.S. military, FAA, Department of Transportation, and pipeline construction companies.

Common types of tools used include ground penetrating radar (GPR), locatable rodders and sondes, and pipe and cable locator systems. Since SUE methods are non-invasive these methods are quickly moving to the forefront as the chosen technology for projects related to environmental restoration.

Subsurface utility engineering contractors needs to work in harmony with utility companies. SUE contractors use subsurface geophysical equipment to determine if the depth and position of existing subsurface utilities. The collected data, along with planning sheets are shared between contractors and utility companies.

One method contractors use to analyze potential conflict of design plans and utility positioning is air/vacuum excavation. This method helps determine if utility relocation is required or if blueprints require modification. If utility relocation is deemed

necessary, SUE contractors draft relocation blueprints for approval from project owners and city planners.

Subsurface utility engineering encompasses many facets including: utility design and coordination; 3D underground imaging; GPS surveys; geographic information systems (GIS); and ground penetrating radar.

Combined methods supply a 3D map of existing utility pipelines from which blueprints can be developed. SUE contractors begin the process by collecting utility records and making a composite drawing from gathered information.

Another aspect of the design phase involves visiting the construction site to perform a topographic survey and locate surface features like catch basins and sewer manholes. When previously installed utilities affect the proposed design, SUE companies have to conduct further investigations using geophysical methods like ground penetrating radar and underground imaging.

Subsurface utility engineering is vital for identifying existing underground pipes and to classify utilities. SUE contractors can lessen risks of delays and workplace injuries by determining the position, depth, condition, and size of existing pipes.

SUE necessitates cooperation amongst project owners, utility companies, pipeline contractors, and engineers. Engaging in open exchange of information speeds up progress and provides a safer workplace.



Subsurface utility engineering SUE is advantageous to public utility companies, municipalities, and private enterprises. In addition to improving construction safety, these methods have proven to reduce project costs and are responsible for saving taxpayers millions of dollars in highway construction and road repairs.

Kana Pipeline utilizes subsurface utility engineering SUE when engaged in pipeline construction jobs. These methods are effective at reducing costs and improving safety conditions when installing water and sewer pipelines, fireline, and storm water drainage systems. Learn additional benefits of using SUE by visiting us at www.KanaPipeline.com.



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Towmaster's Hydraulic Tail trailer has quality features built to stringent Towmaster specs. It features a T1 steel frame outer frame design with the sides attached to a sub-frame and junior I-beam cross members. At its tall height, T1 is ideal for vehicles. Hydraulic side supports allow equipment to be loaded onto the trailer quickly. A hydraulic winch can be installed to pull equipment onto the deck.

The hydraulic operated four-center tail design features a clamshell plate metal approach with wood ramp, side protection. Steel pockets and tie-down points are standard equipment.

Driver's side controls make it easy to operate the functions. All lights on the trailer are high-quality LED's and the trailer is finished with two-coat powder-resistant polyurethane primer and top coat.

More information can be found at www.towmaster.com or call Towmaster at 800-462-4677.

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Altec Launches New Double Elevator with Increased Capabilities

Altec Inc. launches the AN67-E100 and AN67E-E100 aerial devices to offer customers increased safety and job site efficiency. These new units will be added to the Global Rental fleet this fall, and are now available to order.

"We worked directly with customers and took a hard look at all aspects of this machine; the aerial device, the elevator and the overall layout and chassis interface," says Dustin Yost, Altec market manager. "Every feature designed into this package directly aligns with what linemen and fleet managers thought most important: safety, productivity, reliability and operator convenience."

Advanced Platform

The industry leading AN67-E100 and AN67E-E100

incorporate the field-proven design and reliability of Altec's AA/AN Series Aerial Devices into a 100-foot total platform height elevator for transmission applications. A high-flow hydraulic system and new independent controller for the elevator provide speed and multi-function capability. Standard platform rotator, available extended side reach and material handling jib offer more options to position the platform and get tools and materials to height. By reducing time required for setup and positioning, a crew's productivity is greatly improved.

Enhanced Elevator

The new elevator design features high-tensile steel and a modern box-boom design for improved strength-to-weight ratio. "Depending on configuration, our new double elevator allows up to 3,900 pounds of total payload on a 58,000 pound GVWR all-wheel drive chassis. Optimizing payload allows crews to carry more materials, tools and accessories on the truck, which is key to the overall efficiency of the job," says Yost.

A service-driven design offers new features, including additional larger access holes and covers, accessible grease points and hydraulic hoses, redesigned pins and fasteners, hydraulic hose bulkheads, and hydraulic diagnostic ports. These features simplify preventative maintenance and allow more efficient troubleshooting and repairs, reducing both down-time and operating costs.

Functional Layout

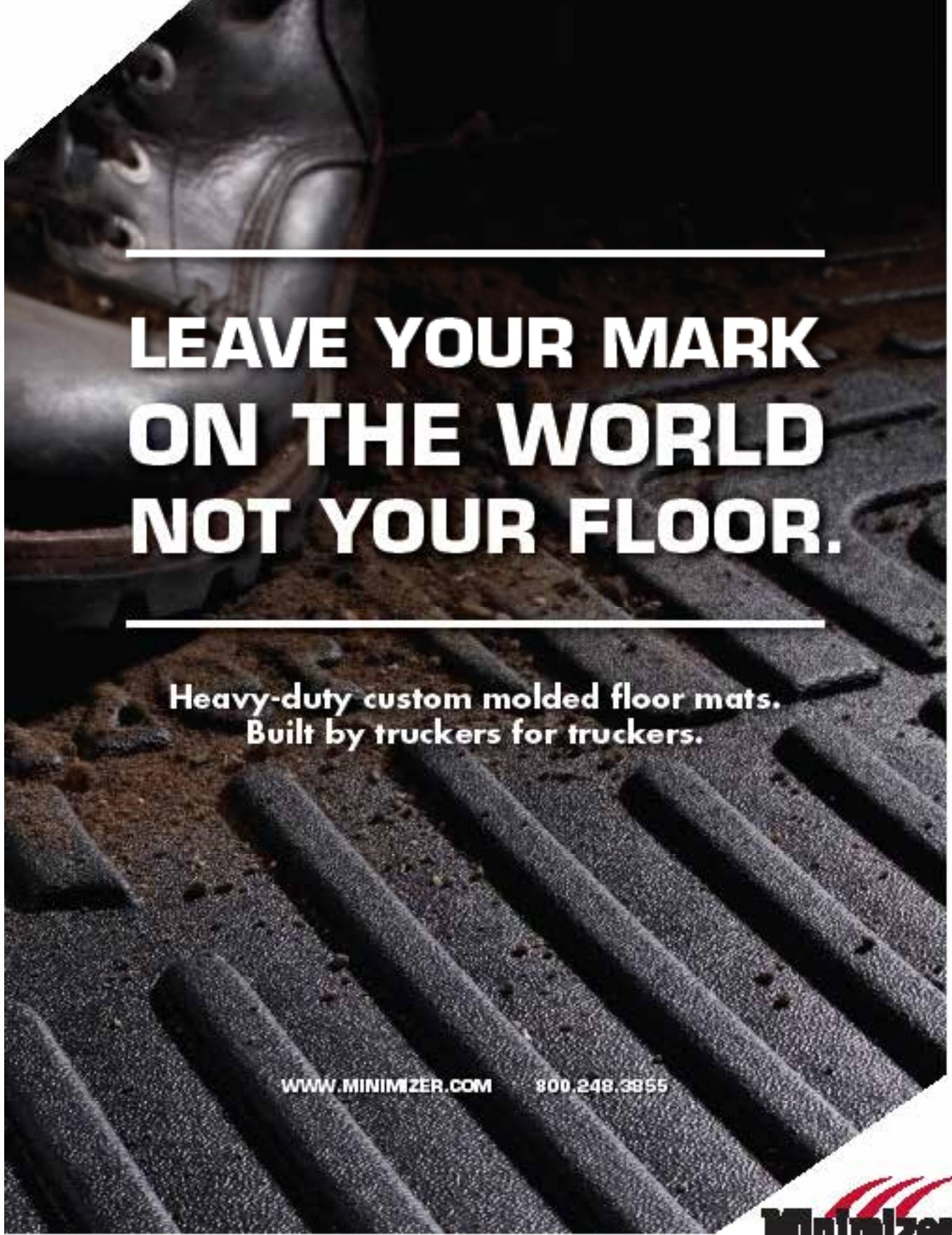
Every finishing detail of the unit, body and chassis layout is designed with safety and efficiency in mind. The extended reach lower boom (AN67E-E100 only) puts the platform directly on the ground, providing the safest method for linemen to enter. An automatic upper boom stow latch eliminates the need to climb up the truck to secure the boom for road travel. The ergonomic lower control station provides excellent line-of-sight to the platform and convenient access to the truck bed. Available upper boom access walkway allows safe inspection of the upper boom fiberglass for Category A bare hand applications. This attention to safe ingress/egress greatly reduces slip, trip and fall hazards, providing a more safe and productive job site.



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Terex® XT Pro Tree Trimmer Series Are a Cut Above

The completely redesigned Terex® XT Pro Series Tree Trimmer trucks are designed to meet the unique jobsite needs of tree care professionals. These new overcenter aerial devices have the same features that made the company's previous tree trimmers so popular — simple, reliable operation, low maintenance and lightweight design. The XT Pro Series tree trimmers also boast a host of new features, including a longitudinal hydraulic lift option to provide up to 75 ft (22.9 m) of working height, upper boom articulation of 250° and 125° of lower boom articulation, to further extend these aerial devices' capacities and capabilities.

Extensive user interviews were conducted throughout all aspects of the design process so all three models in the new XT Series Pro tree trimmers share common user friendly design elements, including round pedestals for easier access to bearing bolts, a platform capacity of up to 400 lb (181 kg) to accommodate one person plus tools and an elbow cylinder that is fully retracted when stored, decreasing exposure to the elements. The compact longitudinal lift on these models is lighter and shorter than its predecessors, and the new design accommodates an 11-ft (3.35 m) chipbox so there is no reduction in chip storage space.

A unique feature of the XT Pro tree trimmer is a control system that senses what hydraulic flow is needed to move the boom to a new position without having to disengage the tool circuit. This feature allows the operator to concentrate on the task at hand without having to manually manage hydraulic flow between the controls and tools. This new control system is

designed to save the operator both time and effort throughout the course of the working day.

A new boom tip on the XT Series Pro models reduces the overall weight of the machines. It is also manufactured with durable covers over all-steel components to hold up over time against environmental elements. Because of the way these tree trimmers are engineered, these models have the capability to mount a 75-ft (22.9 m) unit on a 13,200 lb (5,987 kg) front axle chassis.

The XT Pro 56 model has a 56-ft (17 m) bottom of platform height. This unit offers a 61-ft (18.6 m) working height, a 45.6-ft (13.9 m) overcenter side reach and a 41.5-ft (12.6 m) non-overcenter side reach.

The XT Pro 60 aerial device has a 60-ft (18.3 m) bottom of platform height. This tree trimmer achieves 65-ft (19.8 m) of working height, 49.9-ft (15.2 m) of overcenter side reach and 45-ft (13.7 m) of non-overcenter side reach.

The XT Pro 60/70 tree trimmer has a 70-ft (21.3 m) bottom of platform height. It boasts 75-ft (22.9 m) of working height, 49.9-ft (15.2 m) of overcenter side reach and 45-ft (13.7 m) of non-overcenter side reach.

For more information about Terex Utilities products and services, visit www.terex.com/utilities.

quality operator safety training available. The Edge is a web-based course, allowing Terex customers to study the safe operation of aerial devices at each individual's own pace, when it is convenient for them.

"The Edge course for aerial devices is designed to provide utility fleet professionals with an innovative, cost-effective and efficient training solution for insulating aerial device equipment operators," said Jason Julius, technical support and training development, Terex Utilities.

"This course gives Terex the opportunity to supplement our customers' in-house training efforts, providing them with a crucial piece of the training puzzle. It is comparable to attending in-person training with the convenience for participants of completing it as their schedules allow and the cost-saving benefits of utilizing an online tool compared to hiring an instructor."

The Edge course, "Insulating Aerial Device Operator Safety Training," includes all aspects for the safe operation of an aerial device, including general usage guidelines, pre-operation, during operation, post-operation, hand signals and electrical hazards. New to this version of The Edge is a pre-test that all users take before beginning the training. According to Julius, this enables participants to compare their knowledge going into the test to what they gain during the course. This enhanced course also includes in-depth, up-to-date information on OSHA and ANSI standards, as well as video tutorials and demonstrations.

The new Insulating Aerial Device Operator Safety Training course costs \$150 per person and takes participants approximately eight hours to complete the entire course, including taking the pre-

Terex Utilities Expands The Edge Online Training Course for Insulating Aerial Devices

Terex Utilities has updated its popular The Edge online training course for insulating aerial devices to provide the most comprehensive,

test and final test. Once the final test is passed, participants will receive a certificate of completion and a wallet card to share with their employers and keep for their records.

For more information about Terex Utilities products and services, visit www.terex.com/utilities.

Terex® Texoma® Interchangeable Head Augers Increase Productivity and Versatility

To increase drilling performance and decrease operational costs, Terex® Texoma® Interchangeable Head (ICH) augers are now available for the popular Terex General and Commander series digger derricks. ICH augers increase productivity and versatility by enabling

utility contractors to accommodate a variety of drilling configurations and applications with a single auger body.

ICH augers eliminate the need for customers to have multiple augers in their equipment fleet. By simply switching out the head on the auger, customers can work in various ground conditions throughout their operations area, as well as change hole diameters, with minimal effort. With only one pin to switch out, ICH augers can be taken on and off auger bodies in two minutes or less. Measuring approximately 12 in length, several interchangeable heads can easily be stored in the truck bed. This allows customers to always have the right auger for the job, when and where it's needed most.

Three types of Terex ICH augers are

available: TX (TXD and TXC) Series for dirt or cobble applications, BTA Series (standard and spiral cut) for hard rock applications, and a core barrel option for extreme applications. ICH augers are designed with a 2-5/8" diameter hex shaft to provide a robust connection between the auger body and auger head, giving them the ability to withstand the full torque of the auger drive regardless of the auger drive output. The design of these augers also incorporates a new high-strength drawn-over-mandrel (DOM) stem.

ICH augers are available in three flight options: medium duty, heavy duty and extra heavy duty. Replacement teeth and pilot bits are also available.

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DEWALT® Introduces New Folding Pocket Knife

DEWALT® introduces its new heavy-duty Folding Pocket Knife – model DWHT10272 – featuring a stainless steel blade for durability and rust resistance, and other convenient jobsite features.

The DEWALT® Folding Pocket Knife is designed to be a versatile everyday carry knife with cross compatibility at a competitive price of only \$14.99. The knife is light-weight, thin, and comfortable to use. It is ideal for quick cutting on the jobsite such as removing strapping around lumber and other building materials.

The pocket knife offers a combination blade with both a serrated and straight edge for versatile cutting. A thumb stud makes the knife easy to open. A tanto tip design allows for piercing through tough materials. A liner lock secures the knife blade in the open position while in use.

The DEWALT® Folding Pocket Knife will be available in July 2014 at mass retailers, home centers, and in the independent channel.

DEWALT® Introduces New Folding Auto-Load Knife

DEWALT® introduces its new Folding Auto-Load Knife – model DWHT10261 – which automatically loads a new blade to save time on the jobsite and provides a better cutting experience.

The Folding Auto-Load Knife is a premium cutting utility knife for professional drywallers and general contractors. When a utility blade dulls, simply remove the used blade by depressing the blade release button and retracting the slider to load the new blade. With features such as the convenient automatic blade loading as well as on-board blade storage, you can spend more time making cuts and less time changing blades.

Changing blades with traditional utility knives requires removing work gloves, unscrewing the knife, and manually removing the dull blade and inserting

a new blade. Other auto-load utility knives are bulky, having an oversized auto-load mechanism inside the handle. The DEWALT Auto-Load Knife and auto-load mechanism is compact, providing a slender handle design that is easy to grip. The Auto-Load Knife stores up to 3 blades and accepts standard utility blades. No special blade packs required. The Auto-Load Knife also features a soft grip so the knife is comfortable in your hand.

The DEWALT Folding Auto-Load Knife is available now at mass retailers, home centers and in the independent channel and it will retail for approximately \$14.99.

DEWALT® Introduces Three New Specialty Saws

DEWALT® introduces three new specialty woodworking hand saws for quick grab and go cutting in difficult to reach areas, including a Double Edge Pull Saw, Flush Cut Backsaw, and Single Edge Pull Saw.

The new specialty woodworking saws, with their flexible blades, slide into places power saws will not reach such as when cutting dowels, drywall, shims, trim, molding, and more.

The DEWALT® specialty woodworking saws offer 14 teeth per inch (TPI) for fine-finish smooth cuts and/or 7 teeth per inch (TPI) for quicker, coarse cuts. The saw blades are also heat-induction treated for long blade life. All three saws feature an ergonomic, over-molded handle for a comfortable grip.

The Flush Cut Reversing Backsaw – model DWHT20000 – features a reversing blade with push button for left or right handed cutting. With 14 TPI, the Reversing Backsaw offers smooth cutting. The offset handle assists with flush cuts and helps protect knuckles.

The Single Edge Pull Saw – model DWHT20215 – features a flexible blade for easy, flush cuts. With 14 TPI, the Single Edge Pull Saw provides precise cuts.

The Double Edge Pull Saw – model DWHT20216 – features a flexible blade

for easy flush cuts. The Double Edge provides two cutting options: 14 TPI on one side of the saw for fine-finish smooth cuts and 7 TPI for quick, coarse cuts.

Double Edge Pull Saw retails for \$22.99. The Flush Cut Backsaw retails for \$10.99. The Single Edge Pull Saw retails for \$13.99. Each saw is available now at home centers, mass retailers, and in the independent channel.

STANLEY® Anti-Vibe® Hammers Constructed with a Two-Piece Steel Core Designed to Reduce Vibrations*

Stanley® introduces two new FAT-MAX® Anti-Vibe® 2-Piece Hammers representing the newest generation of Anti-Vibe® technology.

Vice President of Innovation Christopher Woolley said, "This new iteration of Anti-Vibe® technology has built upon a decade of engineering. These new Hammers and Sledge Hammers are our best yet.

Each hammer is constructed of a two-piece steel core to isolate vibration* to the hammer head and reduce vibrations* transferred to the user.

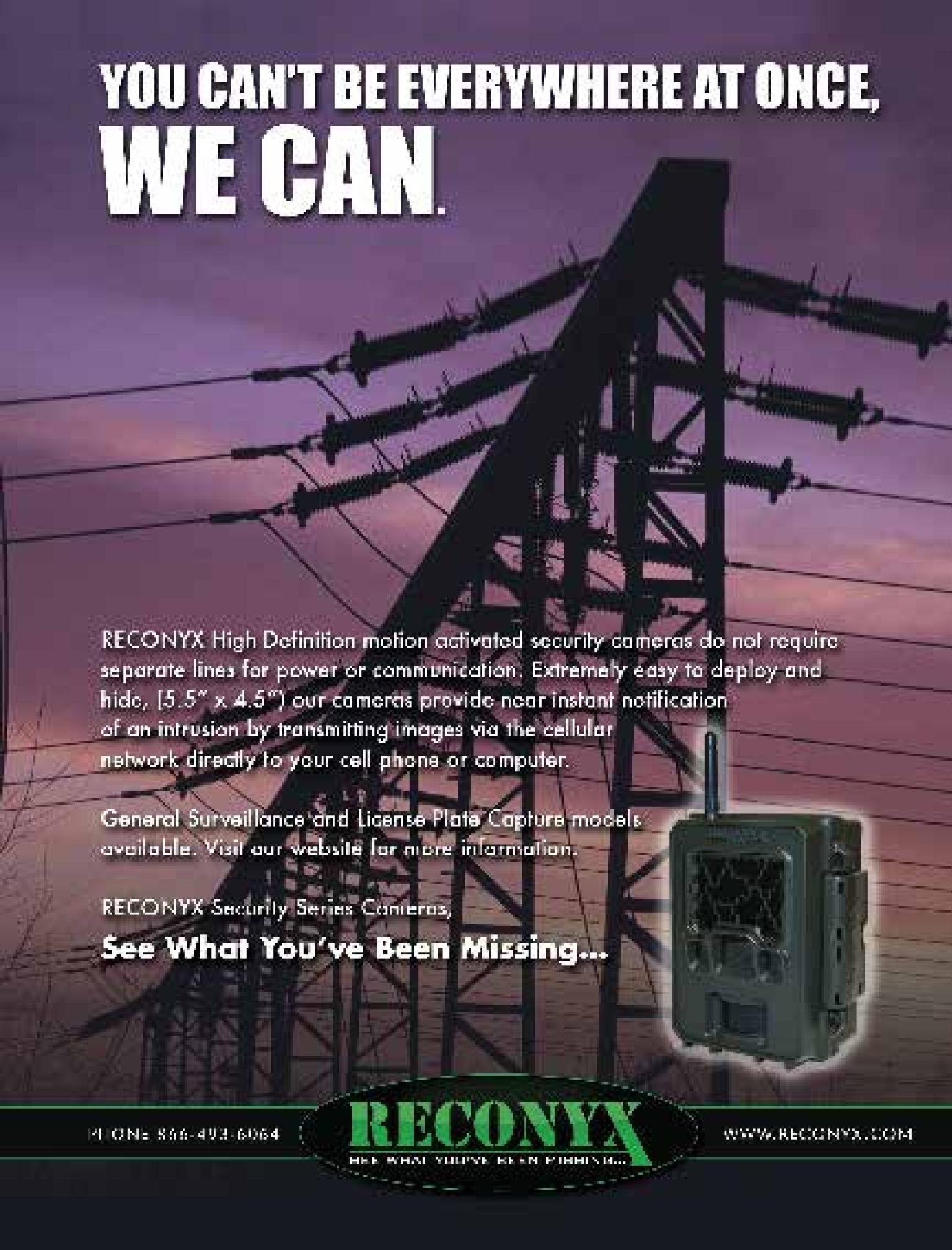
Additionally, the two-piece design isolates more shock waves to the hammer's head than a one-piece design. The steel core is wrapped in multiple layers of dampening materials, and a shock absorbing collar between the head and the handle further isolates vibrations to the head.

The hammers feature black exposed steel under the head, which provides over-strike protection, to help prevent damage to the hammer body if the handle accidentally strikes a surface.

The 17-ounce Framer Hammer – model FMHT51244 – features a checkered face design to reduce slipping off of nails when striking compared to a smooth face hammer. It also features a magnetic nail starter for one handed nail placement. The 14-ounce Nailer Hammer – model FMHT51249 – features a smooth face.

Both hammers are available at mass

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retailers, home centers, and in the independent channel. The 17oz Framing Hammer retails for approximately \$39.99 and the 14oz Nailing Hammer retails for approximately \$34.99.

STANLEY® Adds 16' and 30' Tape Rules to FatMax® Auto-Locking Tape Lineup with Customizable Hook System

Stanley® announced today the addition of a new 16' FatMax® auto-locking tape rule – model FMHT33316 – and 30 foot FatMax® auto-locking tape rule – model FMHT33348 – to its lineup of FatMax® auto-locking tape rules.

Stanley® introduced the new 25 foot FatMax® auto-locking tape rule – model FMHT33338 – in 2013.

At the very heart of every professional's tool collection is a tape rule. Vice President of Innovation Christopher Woolley explained why this tape is unique, "Our engineers are constantly looking for new ways to deliver innovation that matters to our users, and

this tape is no exception. We know pros are often on the jobsite measuring with one hand and marking with the other. The auto-locking design combined with professional features such as eleven feet of standout*, help to deliver a solution for the jobsite where we know time is limited and maximizing performance is a must."

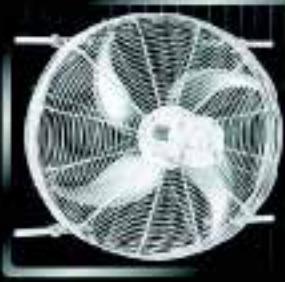
The new FatMax® tape has a blade that automatically locks at the length to which it is extended. When the release button is depressed, the blade retracts. The auto-locking feature allows users to control tape retraction which helps to provide long blade life. The tape also features a manual mode, a setting used to override the auto-locking mechanism, enabling it to become a traditional retractable tape, by depressing the button and pulling back away from the hook. Featuring a customizable hook system, users can configure their tape for the right application. Woolley added, "Pros will love our new detachable hook system. They can connect the over-sized hook attachment for framing applications or remove it for standard applications.

All of these features allow the FatMax® tape to be the most versatile tape we've made to date."

Historically, auto-locking tapes have been popular among DIY users, but this tape offers the features and benefits that professionals have come to expect from the FatMax® brand. The 1-1/4 inch blade touts eleven feet of standout*. The blade is coated in Mylar** and features BladeArmor® coating for durability and long life. The True-Zero™ end hook provides accurate measurements.

The lineup of FatMax® auto-locking tape rules will be available in June 2014 in home centers, mass retailers, and hardware stores. The 16 foot FatMax® auto-locking tape rule – model FMHT33316 – will retail for approximately \$19.99. The 25 foot FatMax® auto-locking tape rule – model FMHT33338 – will retail for approximately \$24.99. The 30 foot FatMax® auto-locking tape rule – model FMHT33348 – will retail for approximately \$29.99.

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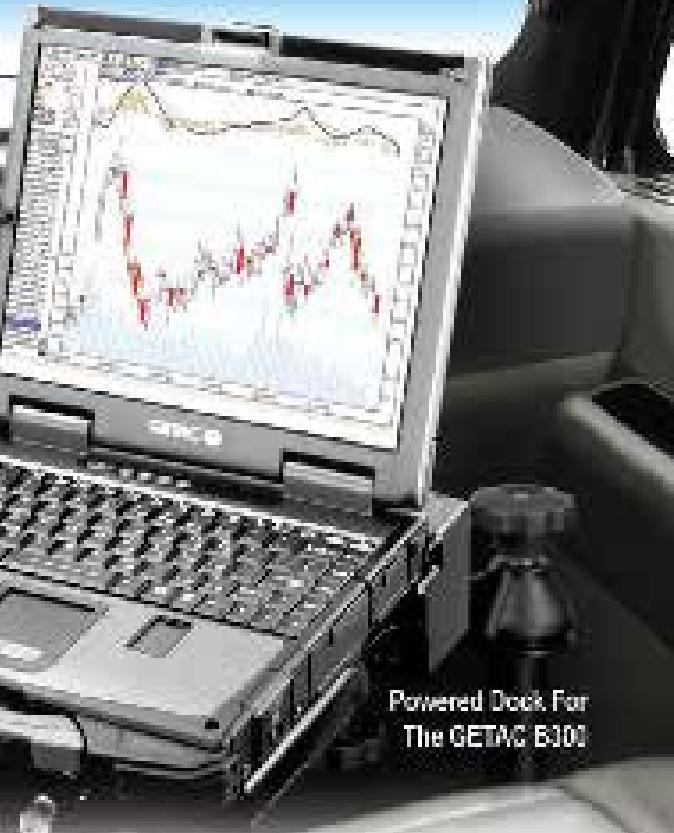
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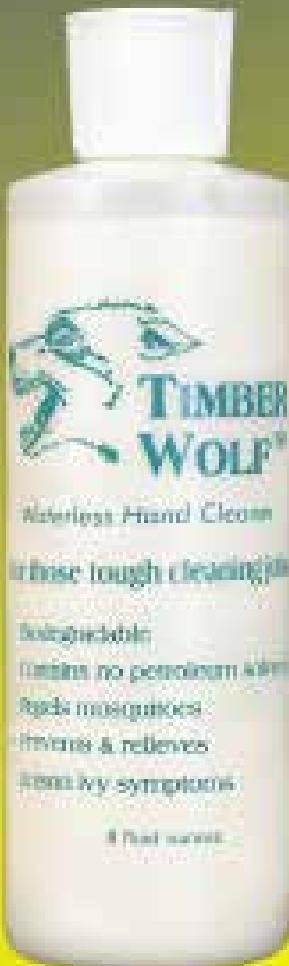
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