

Fall 2020

Electrical Safety

www.electricalsafetypub.com

IN THE WORKPLACE

Best Practices for an Electrical Safety Program

pages 12-15

Plus:

Testing Arc Flash Hazards 10

NFPA 70E® 2021 Edition 32

Training During COVID-19 18

Presorted Std
US Postage
PAID
Permit 93
Birmingham, AL

GETTING YOUR ATTENTION is our job.



LOUD & BRIGHT attention-getting devices.

Floyd Bell offers an Extensive and Diverse Line of Products

Announcer

Programmable Speakers in both panel-mount and stand-alone styles. **Up to 115dB!**

NEW! ↓

CAN Alarm

A large, super-loud intelligent alarm that can be controlled on any **CAN J1939** network.

Audiolarm

The most widely-used industrial piezo alarm in the world.

M-80

The original high-output piezo alarm in a **small footprint**.

Turbo

Small, front-mount panel alarm that is half-the-size and twice-as-loud as industry counterparts.

Turbo Light

High intensity panel LED indicator available in **5 different colors**.

Ultra

A rear-mount piezo alarm that is **12 dB louder** and **1000 Hz lower** than industry counterparts.

Twin Turbo

A panel mount lighted piezo alarm that combines **bright light** with **loud sound**.



AN-450 Announcer

For our complete line of products,
visit **www.FloydBell.com** or call
1-888-FLOYD-BELL



Floyd Bell Inc

Electrical Safety

IN THE WORKPLACE



Start or Renew your FREE SUBSCRIPTION

Complete this form and email it
to randy@rdgmedia.net

My Information:

Name _____
Address 1 _____
Address 2 _____
City _____
State _____ Zip _____
Email _____

Do you want a print or digital version?

☐ Print ☐ Digital

Did you want to receive our eNewsletter?

☐ Yes ☐ No

Company Information:

Company Name _____
Company Website _____

Should anyone else in your company receive this
publication? _____

Which of the following most closely describes your job function?

- | | |
|---|--|
| <input type="checkbox"/> Plant Manager | <input type="checkbox"/> Maintenance Manager |
| <input type="checkbox"/> Operations | <input type="checkbox"/> Safety Manager/Director |
| <input type="checkbox"/> Facilities Manager | <input type="checkbox"/> Owner/President/VP |
| <input type="checkbox"/> Other (Specify): | |

Which of the following best describes your usual involvement in your company's purchases?

- | | |
|--|---|
| <input type="checkbox"/> Approve/Authorize purchases | <input type="checkbox"/> Involved in other ways |
| <input type="checkbox"/> Select/Specify purchases | <input type="checkbox"/> Not involved in purchasing |
| <input type="checkbox"/> Recommend purchases | |

Which of the following products do you plan to buy in the next 6-12 months?

- | | |
|--|---|
| <input type="checkbox"/> FR/Hi-Viz Clothing | <input type="checkbox"/> Signaling Devices |
| <input type="checkbox"/> Hoods, hard hats, face shields | <input type="checkbox"/> Alarms, Anti-Theft, Security Systems |
| <input type="checkbox"/> Line hose, hoods and accessories | <input type="checkbox"/> Power Supplies |
| <input type="checkbox"/> Grounding & Jumpers | <input type="checkbox"/> Infrared Equipment/Thermal Imaging |
| <input type="checkbox"/> Flashlights | <input type="checkbox"/> Data Equipment |
| <input type="checkbox"/> Batteries | <input type="checkbox"/> Rubber Insulating gloves, sleeves, blankets |
| <input type="checkbox"/> Fire/Life Safety | <input type="checkbox"/> Confined Space Equipment |
| <input type="checkbox"/> Ladders Lifts & Platforms | <input type="checkbox"/> Gas Detection & Instrumentation |
| <input type="checkbox"/> Lockout/Tagout | <input type="checkbox"/> NFPA Hydraulic Cylinders (i.e. manifold valves, hydraulic valve manifolds, air cylinders) |
| <input type="checkbox"/> Lighting & Controls | <input type="checkbox"/> Safety Cans & Cabinets |
| <input type="checkbox"/> Low/Medium Voltage | <input type="checkbox"/> Fire Suppression, Smoke Detectors |
| <input type="checkbox"/> Arc Flash and Electrical Protective Clothing & Kits | <input type="checkbox"/> Dust Mitigation |
| <input type="checkbox"/> Training | <input type="checkbox"/> Traffic control/tapes |
| <input type="checkbox"/> National Electrical Code | <input type="checkbox"/> Audits, risk assessments, installations, repairs, improving overall facility and operational performance |
| <input type="checkbox"/> Conduit, Raceway, & Wireway | |
| <input type="checkbox"/> Power Quality & Distribution | |
| <input type="checkbox"/> Detectors, Testers and meters | |
| <input type="checkbox"/> Insulated Tools | |
| <input type="checkbox"/> Wire & Cable | |
| <input type="checkbox"/> Signs/Labels | |
| <input type="checkbox"/> HazCom Placards and signs/HazCom Labels | |

Fill this form out and email it back to randy@rdgmedia.net or go to www.electricalsafetypub.com/subscribe to fill this out online. For questions about your subscription email randy@rdgmedia.net. **Information in red is required*

Table of Contents

Fall 2020 | Volume 1, Issue 1

COVER STORY: BEST PRACTICES

- 12 Best Practices for an Electrical Safety Program**
Why following a comprehensive electrical safety program is one of the critical first steps for improving the electrical safety of a workplace.
- 14 Best Practices for Electrical Safety Programs**
A look at NFPA 70E®, and the wide variety of detailed recommendations and processes for safe electrical work.



ARC FLASH

- 10 Don't Test Your Luck When Exposed to Arc Flash and Electrical Safety Hazards: Test Your Rubber Goods for Continued Safety, Compliance, and Cost Savings**
Learn of the safe practices, including the use of personal protective equipment (PPE), to protect workers against arc flash and electrical incidents.

EMERGENCY LIGHTING

- 16 How to Specify Emergency Lighting for Your Facility**
If it's time for an emergency lighting retrofit in your building, this article will help bring you up to speed on the basics of today's emergency lighting requirements.

NFPA 70E

- 32 Changes to NFPA 70E® 2021 Edition: What You Need to Know to Stay Current**
What you need to know about The National Fire Protection Association's 2021 (NFPA) 70E® Standard for Electrical Safety in the Workplace.
- 34 NFPA CORNER**
NFPA releases first two videos of a new campaign series dedicated to the importance of electrical safety in the workplace and at home

PPE

- 20 PPE: The Last Line of Defense, But the First Step in Protecting Workers**
A look at the importance of proper electrical PPE in closing the gap in electrical safety.

TRAINING

- 18 Electrical Safety Training in 2021**
In the face of a global pandemic, can a virtual training platform still get the entire training, including hands-on demonstrations, done properly?
- 19 A Long-Standing Commitment to Safety Training**
An in-depth look at the proper training for employers that aims to minimize the frequency of electrocutions, arc blasts, and other electrical risks.

LEADERS IN ELECTRICAL SAFETY

- 22 Supplier Profiles**
Read more about these participating suppliers' solutions and how they can help you with your electrical needs.



From cover photo courtesy of Electrical Safety Foundation International

IN EVERY ISSUE

6 Editor's Column

7 Product Announcements

38 Industry News

5 Ad Index



CoreTex Products Inc. 9
www.coretexproducts.com



Electric Barn Inc. 11
www.electricbarn.com



Enespro PPE. 28-29
www.enesproppe.com



Floyd Bell Inc. 2, 39
www.floydbell.com



L P International/Powermate. . . . 15
www.powermate.info



Lakeland Industries Inc. 30
www.lakeland.com



National Technology Transfer 26-27
www.nttinc.com



Pfannenberg Sales America LLC . . 5
www.pfannenbergusa.com



Saf-T-Gard International Inc. . . 22-23
www.saftgard.com



Schneider Electric 31
schneider-electric.us



SEAM Group 24-25
www.seamgroup.com



Wiha Quality Tools. 35
www.wihatools.com



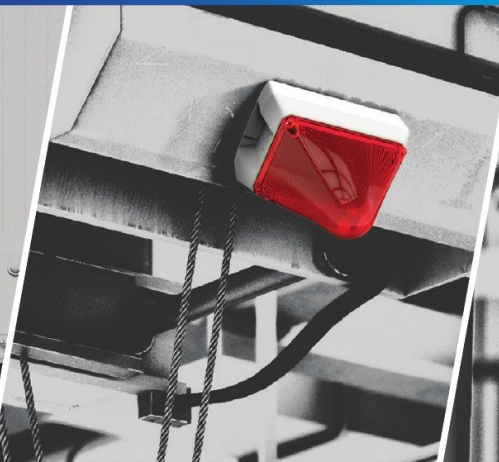
Youngstown Glove Co. 40
www.ytgloves.com

SAFETY BEGINS WITH UNDERSTANDING THE SITUATION



www.pfannenbergusa.com/
signaling-technologies/

AUDIBLE ALARMS • VISUAL ALARMS • COMBINED SIGNALING • SIGNAL TOWERS / STACK LIGHTS



ALARM



Used when immediate evacuation is needed for emergency situations. **These are high priority situations.**

WARNING



Used to alert personnel of nearby danger or a process or condition is in need of attention. **These are medium priority situations.**

INDICATE



Used to inform machinery operators of certain functioning processes/conditions, or nearby personnel of the status of a situation which is generally low priority.

Publisher's Note



Welcome to the inaugural issue of *Electrical Safety in the Workplace*.

Welcome to the first-ever issue of *Electrical Safety in the Workplace*. This PRINTED (replicated digitally, as well) publication will come to subscribers quarterly in 2021, covering all aspects of electrical safety in the manufacturing, construction, and utilities world. Each issue promises to bring laser-focused topics dedicated to keeping workers safe while working with electrical equipment.

This publication is part of our "Workplace" theme of publications. We publish six magazines in total, including two others under the "Workplace" theme – *Workplace Material Handling & Safety* and *Industrial Hygiene in the Workplace*. Each has its own focus, segments, and topics, and this publication will take the same form as those but focus on the world of electrical safety.

This year has been historic in many ways, with challenges for so many of us. So, we thought, "why not take the risk and launch a new magazine? See how the market responds?" I would say if this first issue is a sign, we might be in good shape covering electrical safety for the long term. We launched a magazine last fall, so we have a proven model, and we did extensive market research in the electrical safety space this past summer. The results pointed that there is a market for this publication, albeit as niche as it is.

We actually have two cover stories on **Best Practices for an Electrical Safety Program** which will talk about increasing awareness of electrical safety hazards and understanding the importance of following a comprehensive electrical safety program as the critical first steps for improving the electrical safety of a workplace.

Additional articles featured in this premier issue talk about these topics:

- **Changes to NFPA 70E® 2021 Edition: What You Need to Know to Stay Current** - The National Fire Protection Association's 2021 (NFPA) 70E® Standard for Electrical Safety in the Workplace® has been updated and is now in effect.
- **Testing Your Rubber Goods for Continued Safety, Compliance, and Cost Savings** - While the best way to prevent arc or electrical incidents from happening is to de-energize equipment

before beginning work, there are instances where turning off the power could create an even greater hazard. As such, employers and facility owners must establish safe practices, including the use of personal protective equipment (PPE), to protect their workers against arc flash and electrical incidents.

- **A Long-Standing Commitment to Safety Training** - Proper training for employers aims to minimize the frequency of electrocutions, arc blasts, and other electrical risks. These all-too-common incidents are preventable with a strong commitment to awareness and instruction by employers and employees.
- **Electrical Safety Training in 2021** - How virtual training has become the norm and some of the benefits and pitfalls you need to consider for doing electrical safety training virtually.
- **Exit Signs and Emergency Lighting** - How to plan code-compliant emergency lighting strategy for your facility, how to purchase the right exit signs and emergency lights for your facility, and how to simplify exit lighting maintenance while staying OSHA compliant year-round.

I hope you enjoy this inaugural issue and find the information instructional, educational, relevant to your business, and perhaps coming from a thought leadership perspective.

I want to thank our advertisers who supported this launch issue. Without them, this would not have been possible. Please feel free to pass this print or digital issue to colleagues and sign up for your complimentary subscription at www.electricalsafetypub.com/subscribe.

Please feel free to email or call me with any comments, suggestions, or if you would like to contribute an article next year.

Best wishes and stay healthy,

Randy Green

Group Publisher/President
RDG Media, Inc.
randy@rdgmedia.net
Direct Line: 586-227-9344

SALES

Randy Green, President/Publisher
randy@rdgmedia.net

Caitlin Bieda, National Sales Manager
caitlin@rdgmedia.net

EDITORIAL

Elisabeth Cuneo, Managing Editor

ADMINISTRATIVE

Tara Scanlan, Accounting Manager
Angi Hiesterman, Systems Admin/List Rental
Jody Kirchoff, Customer Service
Lacey Scanlan, Publication Coordinator
Josh Scanlan, Web Design

rdgmedia
PUBLICATION

A RDG Media, Inc. Publication
P.O. Box 893 • Fort Dodge, IA 50501
www.rdgmedia.net

ELECTRICAL SAFETY IN THE WORKPLACE will not be responsible for any errors in placement or content after first run of ad. Publishers shall not be liable for any costs or damages if for any reason it fails to publish advertisement. *Electrical Safety in the Workplace* recommends that you take appropriate caution before buying items sight unseen. *Electrical Safety in the Workplace* is not responsible for misrepresentation of advertisers. We suggest you contact your own attorney, the Better Business Bureau, or appropriate government agencies if you experience a problem.

Randy Green, President & Group Publisher

Advertising rates, deadlines, and mechanical requirements furnished upon request. Copyright 2020 *Electrical Safety in the Workplace* All Rights Reserved. Reproduction in part or in whole without written consent is strictly prohibited.

Product Announcements

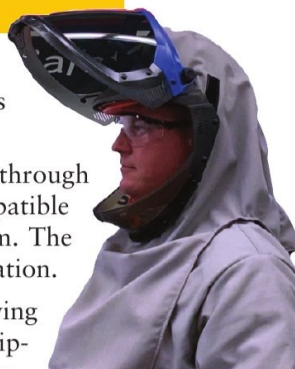
Cementex Announces New Lift-Front Hoods for Ultralight Series Arc Flash PPE

Cementex, the safety tool specialists, announced the release of a new lift-front hood in its Ultralight Series of Arc Flash PPE.

The lift-front hoods provide a larger viewing area through the updated clear gray color shield and remain compatible with Cementex's innovative hood ventilation system. The ventilation system helps to reduce the risk of dehydration.

The new lift-front face shield provides a larger viewing area through which users can see the energized equipment and helps to minimize accidental contact with energized, hazardous conductors.

For more information, visit <https://www.cementexusa.com>.



Youngstown Glove Company



Youngstown's 14" Primary Protector is ergonomically designed to fit perfectly over Class 1 thru 4 rubber insulating gloves per ASTM F496. It is made with the highest quality cow leather sewn into a 3D, pre-curved pattern to create a leather protector with incredible fit, dexterity and durability. Arc Rated to 32 cal/cm² and rated Puncture Level 5. Part # 16-5100-14.

info@ytgloves.com | www.ytgloves.com
| 800.680.7177

Neese FR 7 oz Ultra-Soft High-Visibility Class 3 Shirt



This premium FR work shirt is truly comfortable to wear and offers flame resistance for the life of the garment to help protect workers from short-term thermal incidents. Meticulously crafted and engineered with features that enhance comfort, durability, and performance, work crews exposed to AR/FR risks will want one. CAT 2, NFPA 2112, and UL Listed.

Learn more at www.radians.com.

ArcLite Air

Designed to be the lightest weight multi-hazard rainwear available, ArcLite Air is Hi Vis, Arc and Flash Fire resistant. ArcLite Air uses a composite film with CCT Technology™ to make it 40% lighter than the lightest arc rated product on the market.

Contact NASCO for more information (www.nascoinc.com) 800-767-4288.



RASCO FR Field Jacket

The 5.3 oz RASCO FR Field Jacket, made of GlenGuard fabric, provides reliable protection and durability at an ultralight weight. The field jacket features left and right chest mic tabs, Velcro front chest pockets, two front pouch pockets, Velcro arm cuffs, and long cut back.

Visit rasco.com/product/glen-guard-field-jacket/ for more information.



NOVAX® Rubber Insulating Gloves

PIP's NOVAX® electrical safety products are an industry-leading brand that is trusted by some of the world's largest utility and electrical contractors. Continued technological innovations result in unrivaled, exceptional products that customers proudly stand by.

PIP's versatile line of NOVAX® rubber insulating gloves feature more than 30 styles that come in a variety of lengths and cuff styles with select electrical class distinctions that range from Class 00 – Class 4.

For more information, visit <https://us.pipglobal.com> or call 518-861-0133.



Women's Versa V-neck Long Sleeve Shirt

Proudly Made in the USA, Tyndale's new Women's Versa V-neck Long Sleeve Shirt delivers flexibility while wicking moisture away. A high V-neck, curved hem, and flatlock seams yield a comfortable fit – all while providing CAT 2 arc flash and NFPA 2112-certified flash fire protection. The shirt features external labeling that keeps protective levels visible on the jobsite.

Visit www.TyndaleUSA.com/Versa for more information.



Milwaukee Tool

Milwaukee Tool's Hard Hats feature a BOLT™ Hard Hat Headlamp Mount that enables users to easily secure their headlamp to the front or back of their hard hat. The hard hats also feature six total accessory slots—four BOLT™ accessory slots and two universal accessory slots, allowing users to customize their hard hat for the application.

For more information, visit www.milwaukeetool.com or call 1-800-SAWDUST.



Job Sight FR™ Apparel

Tingley's Job Sight FR™ apparel keeps workers comfortable and safe. Sweatshirt, t-shirt, and vests utilize a modacrylic/cotton material blend to provide breathable stretch, durability and protection. Clothing meets ANSI 107 Class 2 & 3 Type R and ASTM F1506 for flame/electric arc resistance and conforms to NFPA 70E. For more info visit www.tingleyrubber.com.

JOB SIGHT FR CLASS 2 VESTS

CAT 1 ARC FLASH PROTECTION



STANDARD

Item #V61622

Arc Rating – 6.8 cal/cm²



BREAKAWAY

Item #V61522

Arc Rating – 6.8 cal/cm²



SURVEYOR

Item #V61632

Arc Rating – 6.8 cal/cm²



MESH

Item #V60622

Arc Rating – 5.1 cal/cm²

JOB SIGHT FR CLASS 3 APPAREL

CAT 2 ARC FLASH PROTECTION



T-SHIRT

Item #S85622

Arc Rating – 9.1 cal/cm²



ZIP-UP HOODIE

Item #S88122

Arc Rating – 15.0 cal/cm²

Triplett Simplifies Electrical Outlet & Equipment Troubleshooting with Re-Imagined GFCI Receptacle Testers

Triplett Test Equipment, a leading maker of test equipment tools, announced the launch of two GFCI receptacle testers designed to expand the versatility of this essential electrical troubleshooting tool. The ET200's integrated line-splitter makes it easier to test both circuit wiring and connected electrical devices and appliances. The compact ET100 introduces an ergonomic "easy-pull" design to remove the tester from high-retention outlets.

The new tools are designed to make receptacle and electrical testing easier for commercial and residential electrical contractors, home inspectors, kitchen and bath installers, apartment/condo property managers, DIY'ers and handymen.

ET100 Easy-Pull GFCI Receptacle Tester

The compact ET100 tester re-imagines the GFCI receptacle tester by adding an ergonomic finger loop to ease removal from receptacles, especially those with high retention force. (Found in hospitals, schools, hotels, office buildings as well as residential kitchens and baths, these receptacles are designed to hold a plug's blades and grounding pin securely to ensure safety and effective grounding.)

As a full-function GFCI receptacle tester, the ET100 can pinpoint wiring faults in NEMA 5-15 receptacles used in residential and commercial sites throughout North America. A simple push-button test helps validate GFCI receptacles are operating properly. The color-coded

3-light display helps users pinpoint any one of five potential wiring issues: Open Ground, Open Neutral, Reversed Hot and Ground, Open Hot as well as Reversed Hot and Neutral. Codes are indicated on both side of the tester to ensure easy viewing regardless of the receptacle's orientation.

ET200 2-in-1 GFCI Receptacle Tester and AC Line Splitter

Along with the must-have GFCI receptacle testing capabilities of the ET100, the ET200 also includes an integrated line-splitter that makes it easier to perform voltage measurements and test current loads of connected appliances or electrical equipment. The ET200's line splitter can be used with a clamp meter to measure current loads up to 15A without splicing wires or other modifications that permanently alter a device's power cord.

The two-mode line splitter enables a clamp meter to capture direct current readings for typical current loads while an "X10" position can be used with smaller current readings, which are then multiplied by 10. Voltage test jacks can be used with a clamp meter or multimeter's test leads for in-line testing without disrupting the circuit.

Both the ET100 and ET200 are available now. To find a Triplett distributor near you, visit: <https://triplett.com/store-locator/>. Or to order online, visit: <https://triplett.com/online/>.



2020 Products & Solutions Catalog Introduces Latest Offerings from NFPA

This year's NFPA® Products & Solutions Catalog presents the latest offerings from NFPA in electrical, fire protection, building and life safety, industrial hazards, and emergency response. The publication features a broad range of codes and standards, as well as handbooks, pocket guides, and other materials that assist in understanding and applying critical safety requirements. Some of the most anticipated 2021 editions include:

- **NFPA 70E®**, Standard for Electrical Safety in the Workplace®
- **NFPA 101®**, Life Safety Code®
- **NFPA 99**, Health Care Facilities Code
- **NFPA 54**, National Fuel Gas Code
- **NFPA 1**, Fire Code
- **NFPA 921**, Guide for Fire and Explosion Investigations

NFPA is also committed to providing training and certification programs to meet continuing education requirements

and elevate your professional standing. Learn more about the new **live virtual training** that delivers an interactive classroom experience from the convenience of your computer or internet-enabled device.



Download now and start exploring the 2020 Products & Solutions Catalog today. Just click on the publications, training courses, or certifications you are interested in to be taken to the on-line listing for additional details.

Learn more at www.nfpa.org **ESW**

Electrical Safety
IN THE WORKPLACE

Want to contribute to Electrical Safety in the Workplace? Let us know if you have an interest in writing an article for an upcoming issue. Contact Randy Green at randy@rdgmedia.net

WORK OUTDOORS? CoreTex Has You Covered!

SUNBURN • INSECT BITES • POISONOUS PLANTS

CoreTex
Products Inc.

SunX50
sunscreen lotion

SunX30
sunscreen

SunX
Multi-Purpose Foil Pack

BugX30
insect repellent

BugX
insect repellent

IvyX
POISONOUS PLANT SOLUTION

IvyX
POISONOUS PLANT SOLUTION

SEE OUR FULL LINE OF PRODUCTS AT WWW.CORETEXPRODUCTS.COM
OR CALL US TOLL FREE AT 1-877-684-5774

Photo Courtesy of Saf-T-Gard International



Don't Test Your Luck When Exposed to Arc Flash & Electrical Safety Hazards

Test Your Rubber Goods for Continued Safety, Compliance, and Cost Savings

Did you know that OSHA reports that 80% of electrical-related accidents and fatalities involving “qualified workers” are caused by arc flash/arc blast? Most often, when there is an arc flash hazard there is also an electrical shock hazard, as arc flash hazards involve or are in close proximity to energized equipment.

The danger of exposure to arc flash and electrical hazards continues to increase as workers’ responsibilities expand to include interaction with electrical equipment. In reality, almost every single facility has a need for electrical safety – whether the company is a larger facility with building engineers overseeing distribution, or a smaller facility with maintenance staff working around floor or wall sockets. Janitorial staff, facilities staff and equipment operators all risk exposure to electrical shock.

OSHA, NFPA, and ASTM standards mandate the use and testing of in-service rubber insulating equipment when even the smallest probability of contact (with 50 volts AC or higher) exists. Regardless of the heavy

fines, serious injuries and deaths that occur from arc flash and electrical incidents, compliance continues to remain an issue because the shocking truth is that many workers are not using rubber insulating equipment (or having them dielectrically tested for that matter) because they don’t know they need to. Therefore, education and awareness are paramount – not only about the requirements for use, but also about the requirements for in-service inspection and testing of rubber insulating equipment for continued safety, compliance, and cost savings.

Establishing Safe Practices

While the best way to prevent arc or electrical incidents from happening is to de-energize equipment before beginning work, there are instances where turning off the power could create an even greater hazard. As such, employers and facility owners must establish safe practices, including the use of personal protective equipment (PPE), to protect their workers against arc flash and electrical incidents.

Rubber insulating gloves (electrical gloves) are the only protective gear designed for constant contact with, and protection from, energized conductors and equipment. All of the other items are designed for protection from accidental, incidental, or brush contact. Arc-rated work gloves alone provide no protection from voltage. Voltage-rated rubber insulating gloves are an essential element in protecting workers that are exposed to high-voltage currents. Shock protection is the primary benefit. However, electrical gloves worn together with the appropriate leather protector gloves also provide significant burn protection in the event of an arc flash.

According to the OSHA 29 CFR 1910.137 standard, electrical gloves must be rated for the voltage to which a worker will be exposed (phase to ground or phase to phase) and marked to indicate their rating. For in-service use, the maximum use voltage must be above the actual exposure, but it is important to take note of the proof test voltage as well. All electrical gloves are tested

Rubber insulating gloves (electrical gloves) are the only protective gear designed for constant contact with, and protection from, energized conductors and equipment.

by the manufacturer at the specified proof test voltage. Manufacturers also perform a dielectric breakdown test at an even higher voltage to validate the dielectric strength of the rubber material. The result is a significant margin of safety between the test voltages and the maximum use voltage. Each specific hazard assessment will help in determining which class of gloves is appropriate for the application.

Voltage protection is broken down into the following classes, and each class of gloves is clearly marked with the maximum use voltage on the color-coded label:

Class Label Color	Proof Test Voltage AC / DC	Maximum Use Voltage AC / DC
00 Beige	2,500 / 10,000	500 / 750
0 Red	5,000 / 20,000	1,000 / 1,500
1 White	10,000 / 40,000	7,500 / 11,250
2 Yellow	20,000 / 50,000	17,000 / 25,500
3 Green	30,000 / 60,000	26,500 / 39,750
4 Orange	40,000 / 70,000	36,000 / 54,000

The ASTM standards also include DC test and maximum use voltages.

The Power of Testing

Testing is also a critical, required, and often overlooked component to maintaining arc flash and electrical safety. ASTM standards mandate the testing of the rubber insulating products by the manufacturer or supplier prior to the first delivery to the end user. Users also have the option of performing or requiring an acceptance test upon receipt of the goods and prior to placing rubber insulating products into service. The interval between the date of issue and electrical testing should be based on work practices and test experience. For gloves, the interval shall not exceed six months, except for industries such as telecommunications that utilize insulating gloves as precautionary protection, in which case the maximum interval may be increased to nine months. However, do not place rubber insulating products into service unless they have been tested electrically within the previous 12 months. These in-service re-test intervals are the maximum permitted and

in addition to the daily field care and inspection. It is quite common for users, including power utilities and contractors, to specify shorter intervals.

Periodic re-testing of electrical gloves should be performed at the proof test voltage to ensure that they are still safe using specialized equipment designed to gradually increase the voltage to the desired test level. The dielectric test is two-fold: pass/fail on the ability to withstand the rated test voltage and, for gloves, quantitative on the ability to prevent electric current from passing through the rubber goods above the maximum contained in the specifications. Products passing the inspection and test procedures can then be returned to service for continued use and cost savings over purchasing a new pair of gloves that could have been re-tested and re-certified by a qualified test lab for a fraction of the cost. If you do not have the equipment required to perform these electrical tests, there are independent testing facilities that can perform the acceptance and in-service testing on behalf of end users. At a minimum, ASTM standards require that the inspection and testing process include the following steps:

Continued on page 36

WE SELL & WE BUY

the ELECTRIC BARN INC.

ELECTRICAL DISTRIBUTION EQUIPMENT
NEW-USED-RECONDITIONED
VINTAGE & OBSOLETE

121 Lafayette Road, North Hampton, NH 03862
Toll Free #: (866) 315 - 0137
Email: sales@electricbarn.com
www.electricbarn.com

AVO EABA PEARL Certified Technicians

Best Practices for an Electrical Safety Program

While electrical hazards are not the leading cause of on-the-job injuries and accidents, they are disproportionately fatal and costly. Workplace electrical accidents not only disrupt the lives of workers and their families but also impact their employers and workplaces because of downtime and days away from work. Most on-the-job electrocutions and electrical injuries can be prevented by following the steps established in a workplace electrical safety program. Increasing awareness of electrical safety hazards and understanding the importance of following a comprehensive electrical safety program are the critical first steps for improving the electrical safety of a workplace.

The Electrical Safety Foundation International (ESFI) is the leading authority on workplace electrical safety. ESFI's workplace safety materials provide valuable information to help employees make safe choices every day. The resources and tips outlined in those materials help to create a safer work environment, whether the work takes place in an office, on a job site, or in an industrial or manufacturing setting.

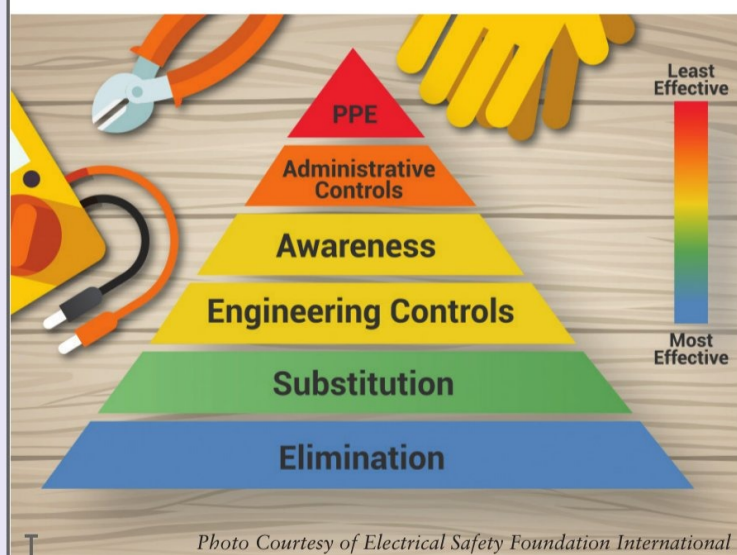


Photo Courtesy of Electrical Safety Foundation International

The hierarchy of risk controls seek to remove hazards and make work safer for all employees. The hierarchy begins with the most effective control at the bottom, elimination, which aims to eliminate hazards from the workplace.

ESFI's **Know When to Say When - Know When to Stop Work** infographic and **Know When to Say When** video strive to educate the workforce to exercise caution and prevent accidents before they can occur. The goal for all employers should be for all workers to go home safely at the end of a shift. To obtain this achievement, the electrical safety training program in place should teach workers to ask the following questions before engaging in a task:

1. Have I been properly trained to safely complete this job task?
2. Have I worked on this task before, and do I have the right training and experience?
3. Do I have the proper tools for this job?
4. Is the hierarchy of risk controls being followed to ensure that preventative and protective risk controls are being implemented?
5. Has a proper risk assessment been performed?
6. Are all conductors and circuit parts in an electrically safe working condition?
7. Are these parts properly guarded to reduce the likelihood of electrical contact or arcing faults?
8. Are all applicable procedures and job planning procedures completed?
9. Am I confident about completing this job without risk or putting others at risk?

Certain jobs require specific knowledge and expertise, so it is imperative to stop and reassess a task if there's ever a question about completing it safely. If an issue arises on the job, additional briefings and planning should occur. It is better to be safe and ask a more qualified individual to complete a task than to suffer a workplace injury or fatality. Before beginning work, a proper risk assessment should be conducted to address what risks can occur, how likely the risks are to occur, and the consequences if the risk occurs. The goal of the assessment is to evaluate any potential workplace hazards and stop them from happening in the first place.

The questions above and the hierarchy of risk controls seek to remove hazards and make work safer for all employees. The hierarchy begins with the most effective control at the bottom, elimination, which aims to eliminate hazards from the workplace. Next, substitution attempts to replace any potential hazards. Engineering controls separate workers from the hazard. Administrative controls change the way people work. The least effective method is protecting workers with their last line of defense, or PPE. By removing or replacing the hazards or workers from dangerous situations, a workplace accident can be prevented. All workers must know the limits of their qualifications.

Be Sure To Follow All Guidelines

Further workplace safety resources were created to provide innovative electrical training solutions for both managers and employees in electrical and non-electrical fields. Through compiling yearly workplace injury and fatality statistics, ESFI discovered that 40% of all electrical accidents on the job site are caused by overhead power lines. *Continued on page 36*

Photo Courtesy of Electrical Safety Foundation International

WORKPLACE SAFETY

KNOW WHEN TO SAY WHEN – KNOW WHEN TO STOP WORK

While qualified electrical line workers and electricians are often willing to go above and beyond the call, some jobs require specific knowledge and experience. That's why it's important to stop and reassess a situation if there is ever doubt about a job's task or a procedure's requirement. As qualified electrical workers, it is our jobs to ensure all trades are aware of danger related to unqualified electrical work.

ALWAYS ASK YOURSELF:

1

Have I been properly trained to safely complete this job task?



2

Have I worked on this task before, and do I have the right training and experience?



3

Do I have the proper tools for this job?



4

Is the hierarchy of risk controls being followed to ensure that preventive and protective risk controls are being implemented?



5

Has a proper risk assessment been performed?



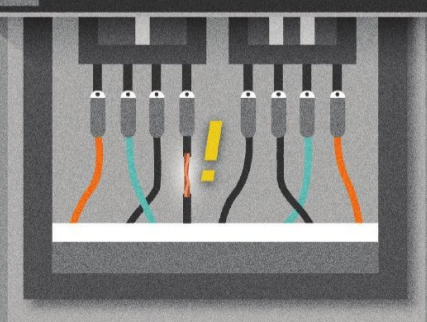
6

Are all conductors and circuit parts in an electrically safe working condition?



7

Are these parts properly guarded to reduce the likelihood of electrical contact or arcing faults?



8

Are all applicable procedures and job planning procedures completed?



9

Am I confident about completing this job without risk or putting others at risk?



KNOW WHEN TO SAY WHEN – IT CAN SAVE YOUR LIFE, AND THE LIVES OF THOSE WORKING WITH YOU.

Please share this free resource to save lives



www.facebook.com/ESFI.org



www.twitter.com/ESFI.org



www.youtube.com/ESFI.org

Best Practices for Electrical Safety Programs

OSHA's regulations are meant to keep workers safe. However, it takes a long time and a lot of effort to update regulations at the federal level, so those rules only describe a legal minimum—not best practices for safety. For more detailed and current guidelines, many organizations turn to respected industry standards, like NFPA 70E.

work will be tracked or measured. The force behind a program comes from its driving “policies,” which are meaningful written commitments to general goals. Most programs will include a collection of “procedures,” which give detailed instructions for specific tasks. Policies, programs, and procedures all tie together to help an organization achieve its goals.

An effective ESP needs to explicitly call out its driving policies. To meet NFPA requirements, it must specifically include the organization's Electrically Safe Work Condition Policy.

Worker Training

The greatest plan in the world won't mean a thing if nobody follows it. A good ESP needs to include a way to ensure appropriate training for workers, so they have the awareness and self-discipline needed to perform their work safely. Overall requirements for electrical training are given in Article 110.6 of the NFPA 70E standard.

Many workers will already have the general knowledge and expertise needed for their jobs, but specific information may still need to be provided by the employer, and the employer has the ultimate responsibility for providing safety training. Document any training that has been completed, along with what was covered and when it was done.

Risk Assessments

One of the most important parts of an ESP is the specific process that will be used to identify hazards, assess the risks involved with those hazards, and implement controls (using the Hierarchy of Hazard Controls) to mitigate those risks. This process should be written down and included in the ESP as the Risk Assessment Procedure. Controls can include a variety of methods for protecting workers, such as remote shutoff equipment to separate a worker from a hazard, or arc flash warning labels to provide detailed information at the point of need.

Two specific kinds of Risk Assessments get special attention in NFPA 70E: Shock Risk Assessments (described in Article 130.4) and Arc Flash Risk Assessments (described in Article 130.5). These detailed



Photo Courtesy of Graphic Products

One of the most important parts of an ESP is the specific process that will be used to identify hazards, assess the risks involved with those hazards, and implement controls (using the Hierarchy of Hazard Controls) to mitigate those risks.

NFPA 70E includes a wide variety of detailed recommendations and processes for safe electrical work. When implemented effectively, those elements are all tied together into one complete system: an organization's Electrical Safety Program, or ESP. NFPA 70E describes its requirements for Electrical Safety Programs in Article 110.5.

Programs, Policies, and Procedures

An ESP is a “program,” meaning that it's a written plan for ongoing operations, identifying what needs to be done, who will do it, and how that

Often, one program will refer to another. For example, Lockout/Tagout (LO/TO) is one of the most important ways to protect workers from electrical hazards; the NFPA standard calls for an ESP to either include a complete LO/TO Program, or refer to a separate LO/TO Program, whichever is more appropriate for the organization.

Some organizations use an overall Occupational Safety and Health (OSH) Program to organize all their safety-related programs under a single umbrella. In these cases, the ESP will fit into that overall OSH Program.

approaches are important, but focus only on specific hazards. Electrical work can also expose workers to other hazards, such as cuts or crushing from moving parts; the overall risk assessment process needs to consider these possibilities.

Procedures for Safe Work

When procedures are established for specific work tasks, those Standard Operating Procedures (SOPs) should be included in the ESP. Each SOP should identify the task and its hazards, the qualifications needed to carry out the work, the tools and protective equipment to be used, and the steps to be followed.

The ESP must also include the process to be used for creating new SOPs—that is, the process of Job Safety Planning. This process will include risk assessments and decisions on appropriate procedures and protections, and it must be done by a qualified person. The end results will include a written document that includes a description of the job, the results of its risk assessments, and the work procedures and controls that will be used: the foundation of a new SOP.

The ESP must call for a Job Safety Briefing before work begins. These briefings ensure that each affected worker has the information from the Job Safety Planning process. Workers need to understand the plan and have a chance to raise any concerns.

Equipment Details

When equipment is installed or modified, an inspection is often called for to ensure code compliance or correct implementation before the equipment is used. The ESP needs to include a way to verify those inspections. Records of inspections do not need to be included in the ESP itself, but the program should identify where the records are kept.

After installation, the ESP will need to consider the condition of maintenance for each piece of equipment. Because ongoing maintenance is so important and so often overlooked, it may be a good idea to collect the specific maintenance requirements for each piece of equipment, as well as records of maintenance done, in a single location. If your organization does this, identify where this information is kept as part of the ESP.

Investigations and Audits

As time passes, the ESP needs to be able to respond to events and changes in the work. For example, a good ESP must include a system for investigating any incident that resulted in an injury (or could have resulted in one). Due to the nature of electrical work, any “near-miss” is effectively a near-fatality, so it’s critical to pay attention to these events. Investigations may uncover weak spots or omissions in the ESP. Some organizations already have near-miss reporting programs in place, and the ESP may refer to those programs.

The ESP also needs to be periodically reviewed, even when everything seems to be working as intended. Audits should be performed on:

- the ESP itself, at least once every three years;
- work done according to procedures, at least once each year; and
- the LO/TO Program and each of its elements, at least once each year.

These audits are not meant to catch and punish violations, but to verify that the ESP is doing its job. To help make these audits meaningful, the ESP should identify specific and quantifiable metrics that will be used to check its overall performance. Some possible metrics are year-to-year increases in near-miss reporting, or decreases in actual injuries. The goal of an ESP is to improve worker safety, and a well-planned and executed ESP can make a huge difference. **ESW**



Brian McFadden is a Compliance Specialist and Technical Writer for Graphic Products, the makers of the DuraLabel line of industrial label and sign printers (www.GraphicProducts.com).



Lifting Profits
with a PowerMate

LIFTGATE

PowerMate will save you money, save back injuries, and save valuable time.

The smart, cost effective way to move your products safely.



Lifts up to **500** lbs.

For more information call: **1-800-697-6283**

www.PowerMate.info

M3323101

How to:

Specify Emergency Lighting For Your Facility

Emergency lighting is one of the most important parts of your building's life safety system. Yet, it is often the most overlooked.

If it's time for an emergency lighting retrofit in your building, this article will help bring you up to speed on the basics of today's emergency lighting requirements. You will also learn the different types of egress lighting solutions available, as well as important considerations for lowering maintenance liabilities and costs.



Photo Courtesy of Orbit Electric

In a power outage, exit signs “point the way” to safety for people escaping your building.

Code Analysis

The first step in your retrofit process should be a thorough code analysis. This will determine the specific codes and standards that apply to your jurisdiction and building type.

Your local authority having jurisdiction (AHJ) will likely use a mix of the following codes:

- UL-924: Standard for Emergency Lighting and Power Equipment
- International Building Code (IBC)
- NFPA 101: Life Safety Code
- NFPA 70: National Electrical Code
- NFPA 110: Standard for Emergency and Standby Power Systems
- NFPA 111: Standard on Stored Electrical Energy Emergency and Standby Power Systems.

Thankfully, you only need to know which codes your jurisdiction follows, and which revision (year) they've



Photo Courtesy of Orbit Electric

adopted. A call to your local fire marshal or buildings department is the best place to start.

Emergency Lighting Product Selection

The second step in your retrofit process should be to familiarize yourself with the different types of emergency egress lighting that are available, along with some of their basic requirements.

- **Exit Signs.** In a power outage, exit signs “point the way” to safety for people escaping your building. Exit signs are required by NFPA 101 Article 7.10 and must comply with UL 924 for luminance. Signs must be visible in all directions from the exit access and must not be spaced more than 100 ft. apart. You may need low-level exit signs, which are visible through dense smoke, in certain parts of the building (see NFPA 101 Chapters 11 through 43).

There are two standard types of exit signs:

1. Battery powered
2. Self-luminous

Battery-powered exit signs use Light Emitting Diodes (LED) to illuminate their ‘EXIT’ legend. These signs will revert to battery power when normal AC power fails. These signs typically use nickel-cadmium (NiCad) batteries which can last from 10-20 years.

Self-luminous exit signs do not need a battery, or hookup to an electrical circuit. They come in two forms: *self-powered* and *energy-storage type*.

Self-powered luminous exit signs contain tritium gas that stays illuminated for at least 10 years. Since tritium is radioactive, special procedures must be followed for their disposal.

Stored energy type, or photoluminescent exit signs, absorb energy from nearby ambient light (general lighting). When the ambient source is turned off, these signs will glow-in-the-dark at sufficient levels for 90 minutes. Photoluminescent exit signs are an excellent way to “go green” in your facility. They last more than 20 years without any maintenance and are safe for the environment.

- **Emergency Lighting Units.** Emergency lights must lay a minimum of 1.0 foot-candle (fc) of light along the entire path of egress. These “bug-eye” units activate when a power outage occurs; and remain on for at least 15 minutes after power returns. Emergency lights typically

use sealed lead acid (SLA) batteries, which must be replaced every 5-7-years.

- General Lighting with Emergency Backup. Concerned about clunky “bug-eyes” ruining your building aesthetics? If so, you can purchase backup battery packs for local general lighting fixtures. These “emergency ballasts” work with many types of fluorescent or LED luminaires.
- Uninterruptible Power Supply (UPS) and Generator System. One centralized emergency lighting option is to have an uninterruptible power supply (UPS). The second option is an on-site generator. Both are expensive; however, sometimes a single UPS or generator can be more cost-effective than many emergency battery units scattered throughout your facility.



Emergency lights activate when a power outage occurs; and remain on for at least 15 minutes after power returns.

it possible to efficiently test a large number of devices. You must also inspect each individual unit for damage or misalignment. The annual test must be performed after hours, which may incur overtime.

Finally, it very important that you keep written documentation of these tests. These logs will be required during inspections.

Options for More Efficient Maintenance

The third step in your retrofit process should be to think about maintenance. Most likely, your team is spending far more time than they need to on emergency lighting maintenance. Luckily, there are some options that can drastically reduce these maintenance costs.

- Self-Testing and Self-Diagnostic Options. Self-diagnostic options are available with many emergency lighting units on the market. When enabled, these units will run the monthly and yearly tests automatically, and alert staff the moment there is a problem. With self-testing battery units, your team will only need to walk through the facility every 30 days. All maintenance can all be done during normal business hours, with no overtime.
- Remote Lamp Heads. Some emergency lights and exit signs come with “remote capable” options. This means you can install separate lighting heads away from the parent unit and have them share the same battery.



Exit signs are required by NFPA 101 Article 7.10 and must comply with UL 924 for luminance.

- Combination Units. Another way to cut maintenance costs is to install combination exit sign and emergency lighting units. Sometimes called “exit lights”, these two-in-one units eliminate the need for a second run of electrical conduit or battery to test.

Specifying the emergency lighting solution that’s right for your facility requires analysis of local codes and knowing the available solutions that are within your budget. Most importantly, it requires taking a hard look at your current maintenance regimen. Because when testing, maintenance and documentation is made simpler, compliance (and ultimately safety) will improve overall. **ESW**

Aaron Downes writes for Orbit Industries, Inc. (www.orbitelectric.com).

Required Testing for Emergency Lighting

NFPA 101 Article 7.9.3 requires periodic tests in the following intervals:

- Monthly, for a minimum of 30 seconds. All emergency lights and exit signs feature an integral test switch. Personnel must press and hold this test button for 30 seconds to satisfy the monthly test requirement.
- Annually, for a minimum of 1.5 hours. For the extended, annual inspection, you’ll need to shut off power for 90 minutes. This makes

Stay On Top of What’s New with Industry-Specific Ebooks!

Our sister publication WMHS has published several informative ebooks chock-full of current, useful information on Construction Safety, Arc Flash Protection, OSHA Compliance and more.

Find them at www.workplacepub.com/ebooks.



Electrical Safety Training in 2021



Photo Courtesy of Leaf Electrical Safety

In the face of a global pandemic almost every organization has had to rethink the way it performs employee training, and this does not exclude electrical safety training.

Having an instructor in the classroom who can interact with the group and facilitate hands-on training has always been a necessity in the electrical safety world. Electrical safety standards even call out the importance of students to demonstrate their skills and abilities during the training.

With virtual training becoming the most practical way to get information in front of the students during the pandemic, it is becoming quite clear that hands-on and practical instruction is posing to be a challenge.

The question then becomes whether we can use a virtual training platform and still get the entire training, including hands-on demonstrations, done properly?

The Virtual Classroom

Through my own experience of being a virtual trainer and a virtual student I have been pleasantly surprised how well the on-line classrooms are working. Even after standing in front of a camera for an 8-hour session I felt the students were still engaged in the material and acting as if I was right in the room with them. I will not get into what platform works best or what gadgets you can install to make them run a little smoother, but I will say, in general, they work well and are easy to use. So, for theoretical and example-based training, the virtual classroom works perfectly.

What topics can easily be covered virtually?

Luckily, the underlying material for electrical safety training has not changed at all. There may be a few slight differences, but essentially you want to cover how to start and finish an electrical job safely. If an electrical worker can figure out what hazards he is up against, what is the potential severity of an incident, how to mitigate any risk in a safe way, and then the safest way to perform the work, then you've got it covered.

Every course should go over the following material, and this can all easily be done virtually:

- How to determine a shock hazard

- Effects of a shock on the human body
- Step and touch potential
- Voltage tables for distances and shock boundaries
- How to determine an arc flash hazard
- Effects of an arc flash on the human body
- Reading and interpreting arc flash hazard labels
- Examples of when you are exposed to shock and arc flash
- How to select appropriate PPE
- Other methods of hazard control
- Emergency preparedness and response

All of these topics are straightforward, and it is not the intent of this article to go over each one in detail. The main point I want to illustrate is that whether the instructor is in the room is not going to impact the knowledge transfer on these items.

How To Perform Hands-on & Practical

In previous years, this is the part of the course when the instructor would either bring in some example materials (tools and equipment) that the class can use, or the entire class would get up and go out in the facility to do demonstrations on some de-energized equipment. Here in lies the problem with a virtual session.

There are two key tasks that every electrical safety trainer should get the students to demonstrate:

1. Operating a disconnect (and applying locks)
2. Testing for absence of voltage (the most critical step in establishing an electrically safe work condition).

Other courses may require hands-on training for tasks which are related to working on high voltage equipment or other unique equipment types. We will exclude these for the sake of simplicity, but you should be able to apply the same methodologies to those topics for virtual training as well.

So far, we have been using two methods to get the students to experience the hands-on curriculum. Either bring the materials to the class or have the class perform the demonstrations in the field under supervision.

Continued on page 37



Photo Courtesy of Construction Safety Council

A Long-Standing Commitment to Safety Training

It was 50 years ago that a federal law was enacted creating the Occupational Safety and Health Administration (OSHA) and requiring all employers to provide safety training to employees. Today, this instruction is more important than ever and cannot be dismissed as inconvenient or unaffordable. Too many lives – and livelihoods – are at stake.

More than 120 years ago, the National Fire Protection Association (NFPA) was established to eliminate death, injury, and economic loss due to electrical hazards. The NFPA 70E Standard is still the industry model for promoting safety in the workplace. It details the training that employers should provide to minimize the frequency of electrocutions, arc blasts, and other electrical risks. These all-too-common incidents are preventable with a strong commitment to awareness and instruction by employers and employees.

Contractors must evaluate the levels of risk on jobsites and develop training programs that focus on the recognition and avoidance of unsafe conditions. Similarly, workers must actively participate in training and become proficient in identifying and avoiding workplace hazards. Together, they should work in concert to develop policies and procedures for tools, protective equipment, precautions, and decision-making that will promote job safety.

Creating an Electrical Safety Program

So, how does an employer get started? The first step in establishing an electrical safety training program is to become familiar with OSHA requirement 29 CFR 1926.21 – Safety Training and Education: (1) The employer should avail himself of the safety and health training programs the Secretary (OSHA) provides; and (2) The employer shall instruct each employee in the recognition and avoidance of unsafe conditions and the regulations applicable

to his work environment to control or eliminate any hazards or other exposure to illness or injury.

Compliance with the first part of this regulation can be accomplished by attending the training courses offered by the national network of OSHA Training Institute (OTI) Education Centers. Specifically, OSHA #3095 – Electrical Standards is a four-day course that covers topics such as single- and three-phase systems, cord- and plug-connected equipment, grounding, ground fault circuit interrupters, and safety-related work practices. This course is a prerequisite for obtaining the Public Sector Safety & Health Fundamentals Certificate, which is a credential recognized by the U.S. Department of Labor and available to private sector employees, as well. For more information, contact the nearest OTI Education Center at www.osha.gov/otiec.

NFPA also offers training and certification programs to recognize employer and employee commitment to professional development. Visit www.NFPA.org to obtain these credentials:

- Certified Electrical Safety Worker (CESW)
- Certified Electrical Safety Technician (CEST)
- Certified Electrical Safety Compliance Professional (CESCP)

The second step toward following OSHA regulation 29 CFR 1926.21 is to train employees on the recognition and avoidance of specific workplace conditions and the regulations that apply to their work environment. This type of training is most effective when it occurs at the workplace using real-life examples and actual equipment presenting unique hazards.

The golden rule of operating safely around electricity is for all equipment to be placed in an “electrical-safe work condition.”

Continued on page 37

PPE: The Last Line of Defense, But the First Step in Protecting Workers

In the 20 years since the NFPA 70E standard (2000 edition) was revised to put much more of a focus on the arc flash hazard, many people and organizations have dedicated a significant amount of time to educate companies on how to comply with the new requirements and establish an effective electrical safety program to help keep their employees safe. In the 2018 edition of NFPA 70E edition, an electrical safety program is defined as “a documented system consisting of electrical safety principles, policies, procedures, and processes that directs activities appropriate for the risk associated with electrical hazards.”

Over the years, NFPA, IEEE, NSC, ASSP, and many other organizations have conducted thousands of educational training sessions on how to create a safer working environment for electricians. The statistics show that all of this excellent work has dramatically improved electrical safety and, as such, I’m sure their efforts have saved countless lives. Unfortunately, we still have a long way to go to ensure all electrical workers are properly protected. Clearly the best

solution to keep workers safe is to eliminate electrical hazards entirely. However, in many industry applications, de-energizing the electrical system may not be practical, and in some cases, may result in an even greater safety hazard. In addition, even the task of verifying the absence of power requires use of PPE, as does frequent trouble-shooting requirements.

Protecting electrical personnel from electrical hazards is an evolutionary process and, unfortunately, there is no individual solution that will eliminate the arc flash hazard when working on energized equipment. There are, however, certain protections that are more effective than others. Added to the main text in the latest edition of NFPA 70E (2018), the hierarchy of controls begins at the source, starting with the protections considered to be immune to human error and moving to the controls that are often the most feasible at any facility. The six steps are as follows:

1. **Elimination:** Removing the hazard entirely

2. **Substitution:** Replacing a severe hazard with a less severe one
3. **Engineering Controls:** Replacing equipment or changing the work environment to separate workers from a hazard
4. **Awareness:** Educating workers on the hazards and providing information on making safe decisions
5. **Administrative Controls:** Developing formal procedures and processes for working safely under anticipated conditions
6. **Personal Protective Equipment (PPE):** Equipping workers with clothing and equipment designed to reduce risk and limit the severity of injuries.

The Importance of PPE

In addition to being the final step in the hierarchy of controls, electrical PPE is commonly referred to as the “last line of defense.” This is appropriate and it make sense, however, when it comes to protecting workers, the timeline on issuing PPE should be pulled in. While specific exposure details may have to wait for engineering



Photo Courtesy of Enespro

Providing electrical PPE that workers will wear when required, and wear properly, is a huge step toward closing the large gap in electrical safety.



Photo Courtesy of Enespro

studies to be completed, it isn't difficult to issue PPE using the "Simplified Two-Category, Arc-Rated Clothing System" highlighted in informative Annex H in 70E. The main concern with using this method is that it could lead to "over-protection," which could adversely impact the comfort and functionality of the PPE. Thankfully there are many options on the market that have largely taken this concern off the table. In fact, many companies have adopted their own "simplified one-category, arc-rated clothing system," in which electricians are only issued one 40 cal kit to use when conducting tasks in all PPE categories from 1 to 4. This may seem irrational on the surface, but as you dig deeper it makes a lot of sense. After all, there are PPE CAT 4 arc flash suits (40 cal) on the market today that are similar in weight to legacy CAT 2 suits, and they're arguably more comfortable and user friendly, not less.

I'm not suggesting that companies should implement a simplified PPE program to avoid or delay the other important items listed on the hierarchy of controls. Those are extremely important steps, and they need to be followed. However, if you ask electrical safety consultants that provide 70E compliance training throughout North America what percentage of electrical workers wear electrical PPE every time it's required, you'll be surprised by their answers. I've heard estimates ranging from 40-50% all the way down to 15-20%.

The point I'm trying to make is that companies should take action today to make sure each qualified worker has an electrical PPE kit. Yes, the upfront cost of electrical PPE can be higher than other types of PPE but electrical accidents, although infrequent, result in one of the most expensive injuries a worker could sustain. There have been many case studies conducted over the years highlighting all the costs involved with an electrical injury and it's easy to see that just one serious injury or fatality would more than enough to pay for an electrical PPE program for decades. In addition, electrical PPE routinely lasts 5-10 years in the field so the cost per wear will be relatively inexpensive over time.

Do Your Research

One other very important point I would like to make is that if workers view wearing electrical PPE as a painful experience, they may not wear it, or wear it properly (especially when no one is looking). This could negatively impact compliance and, more importantly, worker safety. As mentioned above, this PPE will be in your system for a very long time so placing an order sight unseen or hitting the "easy button" and buying what you've always bought is NOT the best solution.

You also need to be careful searching options on the internet simply using the arc rating you need because you will see a wide variety of price points with performance and quality that is equally as varied. Therefore, companies should fully investigate the options that are on the market, talk with PPE company representatives to understand what meaningful benefits their PPE offers the actual



In addition to being the final step in the hierarchy of controls, electrical PPE is commonly referred to as the "last line of defense." Photo Courtesy of Enespro

wearer, seek testimonials from other companies in your field that have experience using their products and, last but definitely not least, conduct a comprehensive wear trial evaluation. It's often recommended that the trial participant(s) be a person on your team that isn't shy about sharing their feedback about the gear (both positive and negative). The feedback should be captured on wear trial evaluation forms so they can be summarized for all to see. While this sounds like a daunting task, suppliers typically take on most of the heavy lifting.

Obviously, all safety professionals want their workers to go home to their families in the same condition they were in when they came to work, and nobody plans to have an accident. While it's important for companies to create, implement, and enforce an electrical safety program so workers know their roles & responsibilities, understand processes & procedures, and follow policies; providing electrical PPE that they will wear when required, and wear properly, is a huge step toward closing the large gap in electrical safety that still exists today.



Mike Enright is the President & CEO of Enespro. He has 27 years of experience in the electrical safety PPE industry and is committed to executing Enespro's mission of improving the electrical PPE user experience through collaboration and continuous innovation to increase compliance and help make workers safer. www.enesproppe.com.

Leaders in Electrical Safety 2020

The Voltgard® Test Lab a division of Saf-T-Gard International, Inc.

About Us

Located in Northbrook, Illinois, Saf-T-Gard International, Inc. is a privately-held family-owned and operated manufacturer, distributor, importer, exporter and global supplier of personal protective equipment, electrical safety, facility safety and first aid. Today, Saf-T-Gard carries on the tradition that was started more than 80 years ago: Bringing customers the products, training and service they need to keep employees safe in the workplace.

The Voltgard® Test Lab is a division of Saf-T-Gard International, Inc., a family-owned and operated manufacturer, distributor, importer, exporter and global supplier of personal protective equipment, electrical safety, facility safety and first aid. Based in suburban Chicago, Saf-T-Gard has been bringing workers home safely since 1936. The Voltgard® project was launched in 1983 as a small test lab with the mission to develop the electrical testing and utility industry business by providing the testing of rubber insulating products to complement the sales of new products. Today, it is the largest, independent, NAIL4PET-accredited test lab for rubber insulating products in the United States and provides full-service testing and recertification of rubber gloves, sleeves, blankets, line hose, covers, dielectric footwear, jumper cables, grounding sets, plastic guards, hot sticks, matting, hoods and insulating hand tools – all to applicable OSHA standards.



The Voltgard® Test Lab acts as an off-site lab for numerous utilities, telecom companies, contractors, municipalities and industrial facilities nationwide. The Voltgard® division of Saf-T-Gard is dedicated to serving industries where worker safety and protection from electrical current are critically important and has developed its own proprietary Voltgard® brand of award-winning electrical safety products, including the Voltgard® V-GRIPS® Leather Protector Gloves and the Voltgard® Telescopic Insulated Rescue Body Hook in addition to offering a full line of electrical safety products ranging from rubber insulating goods to arc flash safety

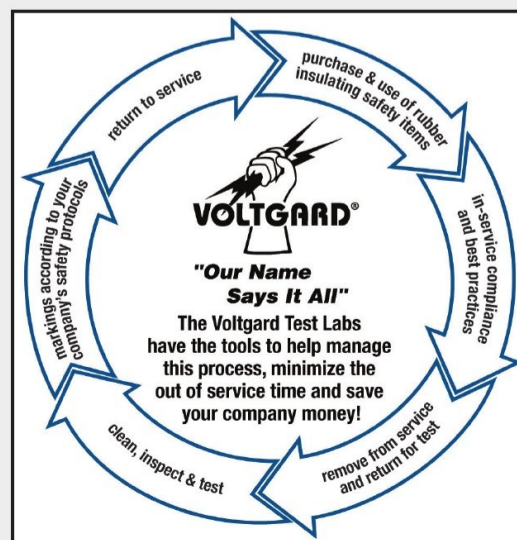
rubber goods' in-service use and testing intervals to minimize out-of-service time and ensure tested materials are received within compliance deadlines so that workers can remain safe and productive. Additionally, Saf-T-Gard has one of the largest new rubber goods inventories in the world and can immediately replace any goods not meeting applicable standards. Furthermore, the Saf-T-Gard and Voltgard® team has more than 100 combined years of safety experience that includes ASTM



Voting Members, OSHA 30-hour trained safety professionals, Qualified Safety Sales Professionals (QSSP) and NFPA 70E trained safety professionals. The expertise of our team can be an extension of your team when you partner with Saf-T-Gard on your company's safety program. Our comprehensive electrical safety program delivers proven time and cost savings for our customers in nearly every industry, and we can do the same for you! No one else offers the Voltgard® level of service!



Saf-T-Gard International, Inc. (Voltgard Test Lab)
205 Huehl Rd.
Northbrook, IL 60062
1-800-548-GARD (4273)
voltgard@saf-tgard.com
www.saf-tgard.com



DID YOU KNOW THAT 80% OF ELECTRICALLY-RELATED ACCIDENTS INVOLVING QUALIFIED WORKERS ARE CAUSED BY ARC FLASH HAZARDS?

DON'T TEST YOUR *LUCK* WHEN EXPOSED TO ARC FLASH & ELECTRICAL SAFETY HAZARDS. TEST YOUR *RUBBER GLOVES* FOR CONTINUED SAFETY, COMPLIANCE & COST SAVINGS WITH THE **VOLTGARD® TEST LAB!**



WARNING
ELECTRICAL GLOVES MUST
BE TESTED EVERY 6 MONTHS
ACCORDING TO ASTM-F496



ALSO TO PROTECT AGAINST:

- LOSS TIME
- COSTLY DAMAGE
- LEGAL LIABILITY
- INCREASED INSURANCE PREMIUMS
- HEFTY REGULATORY FINES

Saf-T-Gard is uniquely qualified to service all of your arc flash, electrical safety and dielectric testing needs with its **VOLTGARD® TEST LAB** – The largest, independent, NAIL4PET-accredited test lab in the United States for the complete testing and recertification of rubber insulating gloves and more than 10 other product categories.



Visit

www.saftgard.com/ESWfreeglovetool

to request a **FREE**

VOLTGARD® VT-12 GLOVE INFLATION TOOL

to quickly and easily inspect your rubber insulating gloves for escaping air before use.

205 HUEHL ROAD, NORTHBROOK, IL, 60062 | PHONE: 1-800-548-GARD (4273)
FAX: 1-888-548-GARD (4273) | EMAIL: SALES@SAFTGARD.COM | WWW.SAFTGARD.COM

Leaders in Electrical Safety 2020

Improving Safety and Asset Performance for a Healthier Bottom Line

About Us

SEAM Group offers an unparalleled approach to safety and strategic enterprise asset management, ensuring a safe environment while achieving improved utilization, enhanced performance and reliability, all while reducing costs. SEAM Group specializes in electrical safety, predictive maintenance programs, reliability consulting and repair services; each supported by patented software systems ensuring program metrics. Each group of services is supported by certified professionals and patented software, ensuring program metrics are achieved.

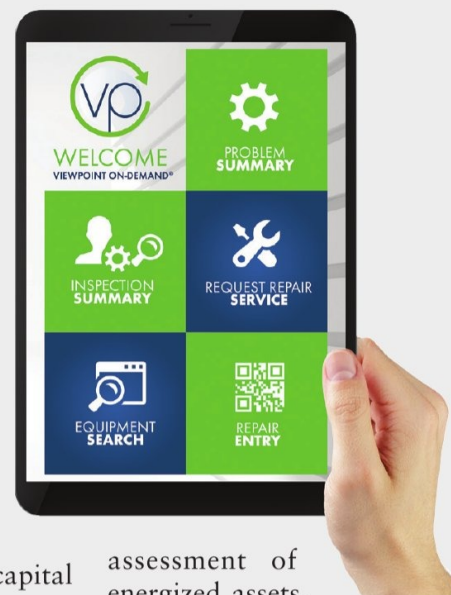
Did you know that an investment in safety performance is also an investment in operational performance? Research shows that best-in-class organizations rely on their safety systems to both prevent costly injuries and improve productivity. At SEAM Group, we have seen these results firsthand. Manufacturing facilities, distribution operations, retailers, hotels and hospitals, across the globe have leveraged our integrated approach to energized asset optimization to help save lives, prevent injury, and bolster the bottom line. From improvements in preventive failure finding and turnaround time – to up to a 40% reduction in asset downtime – our clients routinely demonstrate that safer organizations run better.

Organizations understandably face multiple challenges in energized asset management. Even the most rigorous safety programs may lack effective hazard identification or critical risk protocols. Missing procedures or weak data analytics may thwart otherwise comprehensive reliability efforts. Further, maintenance teams may receive hundreds

of well-intended corrective and preventive actions each week but minimal direction for prioritizing based on risk. Collectively, these challenges contribute to a disjointed and reactive approach to asset management that can increase the risk of worker injury, increase insurance costs, and prompt unplanned downtime and inefficient capital expenditure.

By building strategies to fully integrate asset safety, reliability, and maintenance efforts, organizations can begin to direct investments toward the most critical risks to human safety and operational performance and better position themselves for long-term growth. At SEAM Group our integrated approach to energized asset optimization has helped organizations in all 50 states and more than 80 countries globally connect the dots between safety, reliability, and maintenance.

Our comprehensive services include consulting and training, inspection and



assessment of energized assets, and asset installation and repair. All of our services are supported by certified professionals and powered by our ViewPoint platform for real-time visibility to asset status and program performance. With offices in North America, Europe, and Asia, we can help organizations across the globe identify gaps in asset management and implement solutions for long-term safety and performance outcomes.

To learn how SEAM Group can partner with you to optimize the safety and operational performance of your energized assets, contact us today.



SEAM Group
866.772.6770
seamgroup.com



CREATING A **SAFER,** MORE RELIABLE WORLD

Are these problems familiar to your organization?

- Failure to prioritize work based on risk
- Not enough time to do root cause on current asset failures
- Unacceptable level of unplanned downtime
- Ineffective Hazard Identification
- Unsafe working conditions or lack of safety awareness
- Ineffective or non-existent Lockout / Tagout (LOTO) procedures
- Reactive maintenance - always seemingly in fire fighting mode
- Lack of continuous improvement

Many organizations struggle to effectively manage, inspect, train, and repair across all of their commercial or industrial assets. These are just a few of the common problems we see our clients wrestle with.

At SEAM group we are uniquely equipped to help you improve the **SAFETY, RELIABILITY** and **MAINTENANCE** of your critical assets. And, we do this with a fully integrated approach that drives alignment across each discipline. Our Integrated turnkey services blend:



Consulting & Training



Inspection & Assessment



Repair & Installation

SEAM Group can partner with you to save lives, prevent injuries, increase uptime and control costs - seamlessly.

To learn more, contact us today.

seamgroup.com | contact@seamgroup.com

Leaders in Electrical Safety 2020

Skilled Workers. Stronger Companies. That's the NTT Difference.

About Us

NTT Training is about delivering very practical hands-on safety and trade skills to workers around the world, skills that you'll learn from us today and apply on the job tomorrow.

Based in Centennial, Colorado, NTT, Inc. was founded in 1984, delivering its first Hydraulic systems and troubleshooting course. Throughout the years as a client focus solution driven company, NTT became the leader in Electrical, Mechanical, Compliance and Professional services provider. Our mission is: "Deliver solutions to our clients (and their global workforce) designed for safety, productivity and profitability."

For nearly three decades, NTT has successfully built Safety Management Systems for clients and trained nearly 1,000,000 employees at thousands of American companies and government agencies in locations around the world.

NTT SME's, subject matter experts, instructors bring an average of over 30 years of real-world experience into the classroom. We continually expand our curriculum of one to five-day instructor led courses, conducted virtually, Live On-Line, at more than 75 cities in public locations and onsite at our client's facilities.

We offer over 60 seminars within our seven program disciplines:

Electrical Safety, National Electric Code, Electrical and Electronics, Compliance, HVAC, Fluid Power, and Mechanical Systems.

SKILLED WORKERS. STRONGER COMPANIES.



NTT Training is about delivering very practical hands-on safety and trade skills to workers around the world, skills that you will learn from us today and apply on the job tomorrow.

We deliver the most comprehensive, skills-based training programs and hands-on training because it is practical, reduces workplace accidents, and increases productivity.

NTT Training – Skilled Workers. Stronger Companies. That is the NTT Difference.

TRAINING DELIVERY METHODS

Live Online Training



Live Online Training (LOT) is NTT's interactive distance learning training method. LOT incorporates Live Instructor and Student interactions, Procedure and Equipment Demonstrations, and Digital Simulations to bring our Training Programs to you!

Hands-On



Roll up your sleeves and learn by doing — we bring tools to the classroom to make learning real, allowing you to touch and work with your hands as you learn.

Lecture

Quick lecture format. Classroom training is a perfect opportunity for industry professionals to brush up on new concepts or refresh their previous knowledge.



SkillCircuit

NTT Training developed an online electrical safety-training program to optimize the learning and retention curve for our hands-on instructor-led skills training. SkillCircuit online anchors what you learn in our instructor-led training. It is a self-paced tool intended to complement any past, present or future electrical safety training through NTT Training. It includes readings, slides with graphics and animations, and a progress check assessment.



A DIVISION OF ECPI UNIVERSITY

**National Technology
Transfer, Inc.**

6675 South Kenton St,
Suite 100,
Centennial CO 80111
800-922-2820
www.NTTINC.com



A DIVISION OF ECPI UNIVERSITY

Skilled Workers. Stronger Companies.

NFPA 70E® Has Changed. Is Your Team Trained?



SAFE, CONVENIENT, & INTERACTIVE

Our new Live & Online Training (LOT) is unlike online training you might have experienced in the past. Broadcast from one of our studio's, this training features live instructors, two way communications, and hands on activities. The **live classroom** experience only **online**.

Live Online Training, only through NTT Inc.



Pre-qualification required.
Call for more information.

EXPERIENCE MATTERS

A leader in Electrical Training for over 35 years. We've trained thousands of workers across the US and 30 other countries. Don't compromise on safety training, go with a proven leader, NTT Inc.

Contact us today to learn more about ELECTRICAL SAFETY TRAINING NFPA 70E® and how it could benefit you and your company.

1.800.922.2820



WWW.NTTINC.COM



CONTACT@NTTINC.COM

Leaders in Electrical Safety 2020

ENESPRO IS THE EMERGING LEADER IN ELECTRICAL PPE

About Us

Enespro PPE is an exciting, new brand of USA-made electrical personal protective equipment (PPE) featuring advancements in performance, comfort and functionality. Enespro PPE conducted extensive research with electricians and electrical safety professionals to gain critical insights required to achieve breakthrough improvements in electrical safety PPE. Coupled with extensive industry experience, Enespro now offers a complete line of arc flash kits, arc flash suits, rubber voltage gloves and glove kits, hood & face shields, and PPE storage bags.

We believe that true leadership is about being the first to see a problem and take the initiative to solve it. By this measure, Enespro is the emerging leader in electrical PPE. We have conducted extensive research with electricians and safety leaders to discover their pain points, challenges and priorities regarding electrical PPE. We've also invested in breakthrough innovation that solves those pain points and challenges.

TAKING THE LEAD BY TAKING ACTION

To us, leadership is not about sales numbers or company size. Launched just three years ago, Enespro may not be the biggest brand in electrical PPE, but we are also not novices. Our executive team has been involved in the electrical safety industry for decades, and we already have a full line of USA-made arc flash PPE that is preferred by hundreds of companies.

LISTENING FIRST TO MAKE A DIFFERENCE

Enespro PPE was founded to make a difference in electrician safety. That's why we actually ask people in the industry what's working for them and what's not. It's also why we listen to gain a deeper understanding of issues to help make electrical workers safer — and why our PPE challenges the status quo with design and details that focus on removing any barriers to use.

INVESTING IN INNOVATION

Enespro will continue to invest in ongoing research, so we can understand the perspectives of electricians and safety professionals on problems with current electrical PPE. It's just one more way we're committed to investing in meaningful innovation, so we can solve problems,

improve the PPE experience and make electrical workers safer.

Enespro is proud to produce American-made electrical PPE with innovative new features that offer meaningful benefits to electrical workers. Discover what we can do for you.

Visit enesproppe.com or call (866) 680-4950 to learn more.



Enespro PPE

122 West 22nd Street

Oak Brook, IL 60523

866-680-4950

<https://enesproppe.com>



ELECTRICAL PPE REINVENTED.



AT ENESPRO, OUR MISSION IS SIMPLE BUT POWERFUL: IMPROVE THE ELECTRICAL PPE EXPERIENCE TO MAKE WORKERS SAFER. We pursue our mission every day by collaborating with electricians and safety leaders to innovate and help solve problems associated with traditional electrical PPE.

DISCOVER WHAT ENESPRO CAN DO FOR YOU.

Learn more at **EnesproPPE.com**
or call **866.680.4950** today.

 **enespro®**
Electrical PPE Reinvented.

Leaders in Electrical Safety 2020

Lakeland Industries Protective Garments

About Us

At Lakeland Industries, our number one priority is creating protective garments that protect your people from fire, hazardous chemicals, and diseases, throughout the world.



Lakeland Industries
202 Pride Lane SW
Decatur, Alabama 35603
800-645-9291
www.lakeland.com



Lakeland Industries' mission is to create and manufacture a wide variety of technologically advanced protective clothing that saves lives and protects workers.

Producing protective garments for the electrical safety industry starts with a thorough understanding of the challenges and dangers workers face and creating garments designed to enhance performance and safety.

Lakeland's innovative technology and design features set the highest standards in the industry. With inherently moisture-wicking garments for all weather conditions, you can have confidence that your team will stay comfortable, safe, and protected when you choose Lakeland.

Lakeland's high-performance FR/AR layering system features permanent moisture-wicking fibers in every layer: base layers, mid layers, and outer layers. Lakeland's inherently FR fabric offers dual

hazard protection for flash fire and arc flash, which means workers are protected as worksite conditions change. Maximize performance, comfort, and safety with Lakeland's trusted high-performance FR/AR layering system.

When you choose Lakeland's FR/AR Layering System, extreme weather and dangerous conditions won't compromise your safety or performance. The base layer is designed to pull moisture away from the skin to keep workers feeling dry. Mid layer garments are soft of hand and provide added warmth, insulation, and protection while maintaining moisture-wicking capabilities. The outer layers offer rugged protection from the elements, but also offer moisture-wicking capabilities and breathability.

Whatever the weather, Lakeland's FR/AR Layering System offers



the performance, protection, and comfort you need.

At Lakeland Industries, our number one priority is creating protective garments that protect your people. Lakeland Industries' products have established and maintained a global reputation for overall quality, and are recognized as the field's gold standard.

Founded in Ronkonkoma, New York, in 1982, and now headquartered in Decatur, Alabama, you can trust in our experience, our expertise, and most importantly, our proven track record of superior garment performance on the job every day.

MANAGE MOISTURE WITH LIGHTWEIGHT HIGH-PERFORMANCE FR LAYERING SYSTEM

Maximize performance, comfort and safety with Lakeland's trusted high-performance FR/AR layering system, featuring:

- Permanent Moisture Wicking
- Dual Hazard Protection for Flash Fire and Arc Flash
- Inherently FR Fabric

Don't compromise your protection or performance, **#AskForLakeland's FR/AR Layering System.**



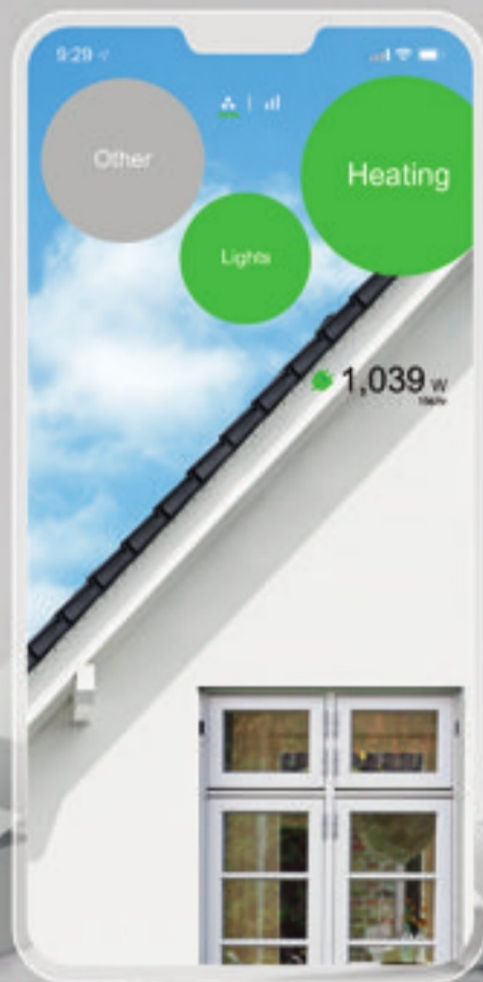
www.Lakeland.com/FR-layering-system



LEVEL UP

With a **WISER ENERGY™** system you've got a whole new way to impress customers.

schneider-electric.us/wiser-energy



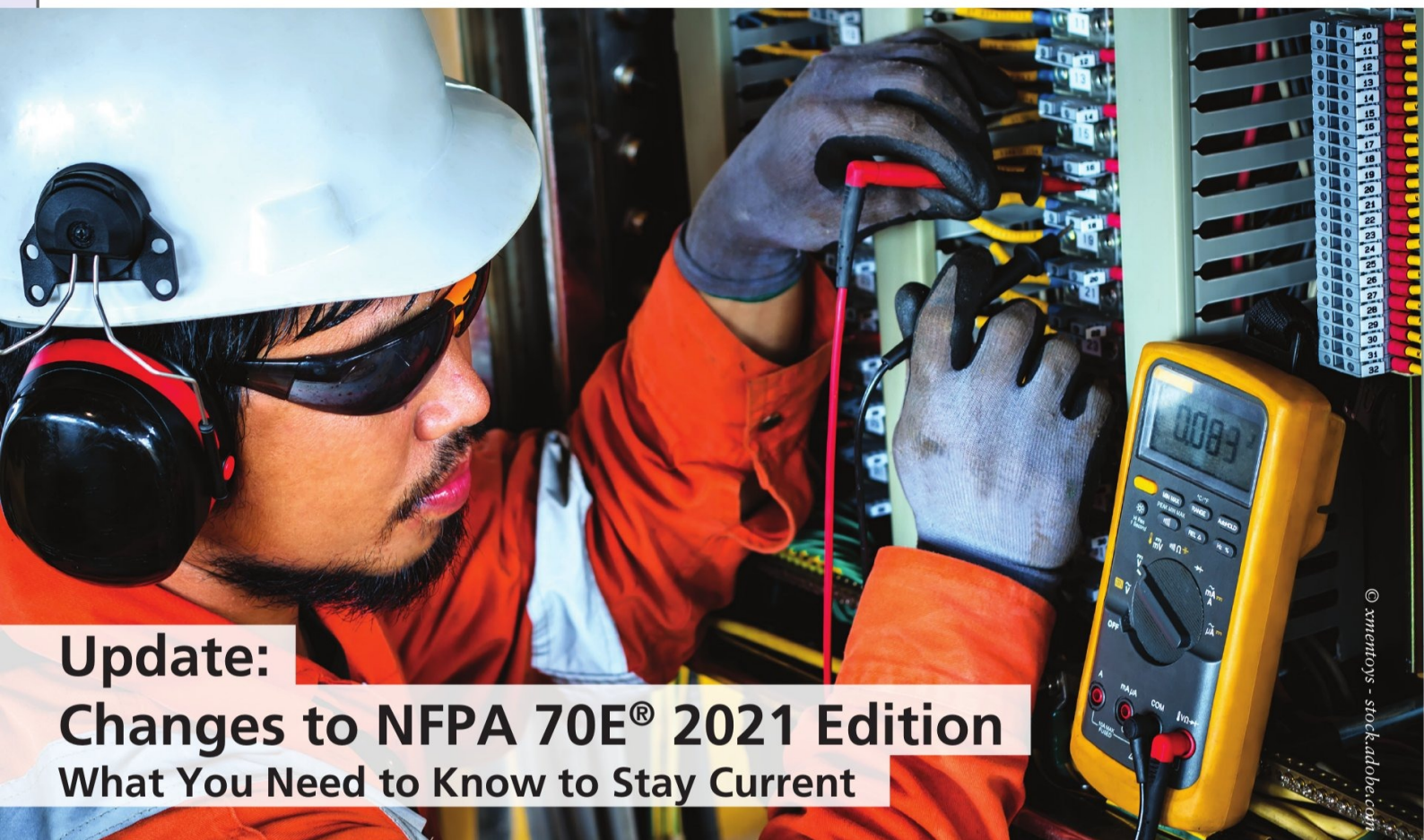
Give your customers' homes a voice

Wiser Energy system lets you expand your offer without expanding your workload. Installation is simple, quick, and straightforward. Adding Wiser Energy to every installation allows you to provide your customer insights into their home, so they can track exactly where their energy goes.



Life Is  On





Update: Changes to NFPA 70E® 2021 Edition What You Need to Know to Stay Current

The National Fire Protection Association's 2021 (NFPA) 70E® Standard for Electrical Safety in the Workplace® has been updated and is now in effect. NFPA 70E® is one of the most widely used consensus standards in U.S. workplaces. The standard has a comprehensive scope (the 2021 standard is 100+ pages), addressing electrical safety-related work practices, safety-related maintenance requirements, and administrative controls to protect employees from electrical shock and arc flash. The standard covers every part of electrical work from voltage measuring and troubleshooting on both ac and dc systems, de-energizing equipment, and verifying the absence of voltage before any work is done.

NFPA 70E standard is revised every three years. The 2021 edition of NFPA 70E® was issued on June 1, 2020 and became effective June 21, 2020. The changes are important for every electrical worker to understand so they can keep in compliance and stay safe on their jobs.

A Look at the Revisions:

- Some of the 2021 revisions have been reorganizing. For instance, Article 110 of the standard – General Requirements for Electrical Safety-Related Work Practices — has been revised to consolidate general requirements for electrical safety-related work programs, practices and procedures from other articles. The first priority in implementing these work practices is hazard elimination. Energized electrical conductors and circuit parts operating at voltages equal to or greater than 50 volts are to be put into an electrically safe condition before an employee performs work if the individual is within the limited approach boundary and/or the individual interacts with equipment where conductors or circuit parts are not exposed but an increased likelihood of injury from an exposure to an arc flash hazard exists.
- Electrical safety training for employees exposed to specific hazards associated with electrical energy is to be classroom-based, on-the-job,

or a combination of the two. New to the 2021 edition: classroom training can include interactive electronic or interactive web-based training components.

- The 2021 70E® edition places a new emphasis on keeping on file, documenting, and following the recommendations of electrical equipment and PPE manufacturers' instructions. Manufacturers' instructions sometimes have been skipped because the information might be hard to access, forcing workers to dig through equipment packaging, or small print instructions have made readability difficult. Manufacturers must now make instructions and recommendations more readable and more accessible.
- Personal protective equipment (PPE) constitutes part of NFPA 70E®. PPE includes nonconductive head protection, eye protection, hearing protection, and arc-rated clothing whenever there is possible exposure to an electric arc flash, insulating blankets, and non-melting footwear. The 2021 edition

addresses the common practice of wearing high-visibility vests over arc rated clothing. In the past qualified workers that were required to wear high-visibility vests had to remove the vests if the vest did not meet the level of arc flash protection required. Now qualified workers can wear a category 1 arc rated high-visibility vests (4 cal/cm²) during the workday and not have to remove it to perform electrical troubleshooting or voltage measurements

- Acceptable electrical safety footwear has been expanded in the 2021 edition to go beyond traditional leather footwear to include other types footwear other than leather or dielectric as long as it has been tested to demonstrate no ignition, melting, or dripping at the estimated incident energy exposure or the minimum arc rating for the respective arc flash PPE category.
- In addition, the definition of balaclava has been changed. The word “hood” and “sock” were removed. The new definition: an arc-rated head-protective fabric that protects the neck and head except for a small portion of the facial area.

Circuit Breaker Safety and Battery Safety

Circuit breaker safety and battery safety have new requirements in the 2021 edition. When circuit breakers are initially switched on after installation or after maintenance has been completed, operators are now required to wear appropriate arc-rated PPE. This change affects potentially every maintenance employee in a workplace.

Also, circuit breakers that interrupt faults approaching their interrupting ratings are to be inspected and tested according to the manufacturer's instructions.

The ever-increasing power of batteries (in particular lithium batteries) is addressed in the 2021 edition. Energy exposure levels are not to

exceed 50 volts AC and 5 milliamperes and 100 volts DC unless proper controls are implemented. Multiple hazards may be encountered when working on batteries, such as shock, arc flash, chemical, and thermal. PPE selection should consider all the hazards, depending on the task.

Typically, in the past, lithium batteries came in cells of 1.5 volts for uses such as powering cordless drills or cordless lawn mowers. More recently, lithium batteries come in packs of cells where voltage can exceed 100 volts. Some systems use lithium batteries with up to 1,000 volts. This is the type of power needed for electric automobiles, buses, and trucks. This level of energy can create serious electrical shock and arc flash hazards for employees. Heat released during cell failure can damage nearby cells, releasing more heat in a chain reaction known as a thermal runaway. The high-energy density in lithium batteries makes them more susceptible to these reactions.

The NFPA 70E® 2021 requires an arc flash risk assessment be conducted prior to any work on a battery system over 100 volts to identify chemical, electrical shock, arc flash hazards, and requires an assessment of the risks associated with the type of task being performed. Lower voltage can result in a bodily shock caused by a spark. Newer, higher industrial voltages can cause an arc flash explosion, necessitating the risk assessment.

A new article (Article 360) was added that covers safety related work requirements when working with capacitors. The article covers specific personal safety measures that must be completed by workers when working with or de-energizing capacitors.

The next edition of NFPA 70E® is set for the year 2024. The first draft public input deadline will be June 1, 2021, with the first draft being posted March 22, 2022. The second draft will be posted February 28, 2023.

ESW

Steve Edwards is the Executive Vice President of Electrical Safety & Condition Monitoring. As such, he has responsibility for Arc Flash, Lockout-Tag-out, Infrared, and Vibration/Ultrasound solutions to ensure a safe and reliable process for clients and their physical infrastructure with the multi-national field force. With over 18 years of global experience in various levels of business strategy, Edwards sets up teams and programs to supply a best in-class customer experience. He has held leadership positions with Exponent (engineering consulting business) and Stericycle (medical waste and product recall services). He has worked with partners both internally and externally to design customized solutions from small start-ups to large fortune 500 organizations. Edwards is a native of Indiana and received his bachelor's degree from of Purdue University with a degree in Organizational Leadership. sedwards@seamgroup.com

Jay Smith is the Director - Electrical Safety Services. As such, he is the (SME) for the Electrical Safety Services Division with a focus on assisting clients and internal safety teams for arc flash assessments and lockout/tagout services. For the past 19 years at SEAM Group, he worked with thousands of clients to improve workplace safety and performance by implementing industry standards for electrical safety. Smith is known nationally for his expertise with arc flash and NFPA 70E and is annually invited to speak at numerous national conferences and corporate safety summits. Smith is featured in several publications, webinars, and articles. jsmithjr@seamgroup.com

NFPA Releases First Two Videos In New Campaign Series

Series is dedicated to the importance of electrical safety in the workplace and at home.

The **National Fire Protection Association** (NFPA) and the **Phoenix Society for Burn Survivors** announced the rollout of the first two video interviews of a new campaign series entitled, *Faces of Fire/Electrical*, which will feature personal stories of people impacted by electrical incidents and demonstrate the need for continued education and awareness about electrical hazards in the workplace and at home.

The campaign introduces two electrical utility workers who were injured in the field. Dave Schury was working as an area operator for an Illinois power company when a rat short-circuited a 12,000-volt piece of equipment causing an explosion. He suffered second- and third-degree burns to 30% of his body and spent the next two weeks fighting for his life in the burn unit at Chicago's Cook County Hospital. In 2010, while working as a power lineman, Sam Matagi was involved in an electrical incident; nearly 15,000 volts of electricity surged through his body when a scrap of cut wire that he was holding came in contact with a live wire. His injuries resulted in the loss of both his hands.

Over the course of the campaign, a new video interview will be highlighted each month demonstrating the importance of workplace and home safety, in addition to related electrical safety resources and information.

Faces of Fire/Electrical features six personal stories of electrical burn survivors whose lives have been forever altered and how more understanding, training, and a change in work culture could have significantly impacted these outcomes. Woven into these

stories of resilience is an additional interview with a physician dedicated to the complete physical and emotional healing of patients suffering from a burn injury. Through these video interviews and written profiles, *Faces of Fire/Electrical* is a resource for electrical and non-electrical workers, and the general public to learn more about the importance of electrical safety.

"Exposure to electricity poses a real injury risk to workers and the public," said Lorraine Carli, NFPA's vice president of Outreach and Advocacy. "Many people are not aware of electrical dangers and yet each year people are injured or killed from these hazards. The *Faces of Fire/Electrical* campaign helps better educate people about the true dangers of electricity and ways to prevent related tragedies from happening."

Exposure to electricity continues to be an important source of workplace injury. According to the U.S. Bureau of Labor Statistics, on average there have been more than 2,000 non-fatal electrical injuries at work each year. In 2018, there were 160 electrical fatalities, an 18% increase over the previous year and the highest number of fatalities since 2011.

While many electrical injuries prove fatal, those that are not can be particularly debilitating, oftentimes involving complicated recoveries and lasting emotional and physical impact. The *Faces of Fire/Electrical* campaign ultimately works to help build a safer world by teaching others and supporting the burn survivor community in advancing lifelong healing, optimal recovery, and burn and injury prevention.

"Every survivor's story is unique, and their paths to recovery are, too. By uniting the voice of the burn community, we can bring awareness to the importance of fire safety and the lifelong impact of a burn injury," said Amy Acton, chief executive officer of the Phoenix Society for Burn Survivors. "We are proud to partner with NFPA on our shared goal to engage people across the world to help advance the message of fire prevention and protection."

Visit www.nfpa.org/facesoffire each month to watch the videos. Free resources are now available to download and share, and additional information about the *Faces of Fire/Electrical* campaign can be found on NFPA's website. **ESW**



FACES OF FIRE™
ELECTRICAL HAZARD AWARENESS

**RAISING AWARENESS ABOUT THE
IMPORTANCE OF ELECTRICAL SAFETY
IN THE WORKPLACE AND AT HOME**

A project in collaboration with the PHOENIX SOCIETY FOR BURN SURVIVORS

NFPA LiNK Digital Reference Tool Launches

The **National Fire Protection Association** (NFPA) launched **NFPA LiNK™**, a new digital platform, with the four most recent editions of **NFPA 70®**, **National Electrical Code® (NEC®)**. NFPA LiNK provides up-to-date code information and situational context that professionals and practitioners need to better understand problems and make decisions in real time while on the job. NFPA LiNK is designed for those responsible for building, electrical, and life safety, and can be accessed via mobile devices, tablets, laptops, or other preferred device.

The NEC is the most widely used code in the United States and used around the globe.

Electrical professionals and practitioners have turned to NFPA codes and standards to perform their work more efficiently and effectively for more than a century. Over time, however, the ways they have approached their jobs have shifted; work now demands employees have the most current, relevant information and resources available at their fingertips to help solve problems quickly and at any given location. To help address these growing needs, NFPA LiNK will become a “living library” for users that offers:

- The ability to work alongside the NEC by adding personal notes, assigning colors, and saving to custom collections for quick and easy reference

- A broader understanding of code requirements through access to expert commentary, visual aids, and helpful resources
- Collaboration features to share code sections, work across teams, and ensure everyone knows what is required



“Electrical professionals tell us they not only want important code information, but they also need context and insights to help them better understand problems and develop solutions in real time,” said Jim Pauley, NFPA president and CEO. “NFPA LiNK is a revolutionary platform that will allow them to collaborate and stay connected easily while in the field. This means more lives are saved and more property protected from electrical hazards.”

NFPA LiNK subscribers will get access to continuous updates, features and functions, and new editions of NFPA codes and standards as they are released. NFPA will expand the collection of codes and standards within the application to include the more than 300 that NFPA offers.

More information about the platform, a timeline of additional codes and standards that will be coming to NFPA LiNK, and a product introduction video can be found at nfpa.org/LiNK.

Purchase or try NFPA LiNK by visiting the website. **ESW**

MEETS NEC 110.14 (D)

wiha 
Tools that work for you

**SAVE 25% OFF YOUR FULL PRICED
WIHA PURCHASE WITH CODE: ESW25
VISIT WIHATOOLS.COM/ESW**



**NO HASSLE
GUARANTEE**

Don't Test Your Luck When Exposed to Arc Flash & Electrical Safety Hazards

1. Check-in
2. Removing previous testing marking
3. Washing using cleaning agents that will not degrade the insulating properties
4. Visual inspection of all surfaces (inside and out)
5. Electrical test
6. Final inspection
7. Recordkeeping
8. Marking
9. Packing in appropriate containers (this means boxes, or similar sturdy packaging materials to prevent folding, creasing or similar loose storage that can cause stress on the rubber) for storage or shipment

When selecting a test lab for use, make sure that it is a NAIL-accredited test lab. NAIL stands for **National Association of Independent Laboratories for Protective Equipment Testing**. It incorporates the only Laboratory Accreditation for the electrical equipment test labs program in North America. NAIL4PET

helps develop uniformity in testing and works in close association with the American Society of Testing Materials (ASTM International).

All in all, nearly every industrial workplace has a need for arc flash and electrical safety, and regulatory standards require ongoing testing of in-service equipment in order to maintain compliance and ensure the products' integrity and safety when exposed to a wide range of voltages. Fortunately, there are practices that you can implement to prevent the lost time, damage to equipment and facilities, legal liability, increased insurance premiums, hefty fines, and unnecessary PPE spending that can result from arc flash and electrical

ASTM standards mandate the testing of the rubber insulating products by the manufacturer or supplier prior to the first delivery to the end user.

incidents. It starts with understanding the need for electrical protective equipment and periodically re-testing rubber insulating equipment for continued confirmation of effectiveness.

ESW

Richard A. Rivkin is President and Chief Executive Officer of Saf-T-Gard International, Inc., a global supplier of industrial safety products (www.saftgard.com).



Photo Courtesy of Saf-T-Gard International

COVER STORY BEST PRACTICES

Continued from page 12

Best Practices for an Electrical Safety Program

Most of these accidents are caused by non-electrical workers. These findings help to create new materials and prevent future incidents from occurring. The materials can be used to create an electrical safety program or to supplement an existing program with new resources created yearly. ESFI also recommends following the guidelines outlined in the "NFPA 70E: Standard for Electrical Safety in the Workplace." The NFPA 70E is the National Fire Protection Association's guidebook, which addresses electrical safety requirements for workplaces that are necessary for the practical safeguarding of employees to help prevent injuries and fatalities from electrocution, shock, arc flash, and arc blast. A revised and updated NFPA 70E edition is released every three years. The current version is the 2021 edition, which was recently released.

Educating the workforce of electrical hazards and how to avoid them requires a mutual effort between employees and employers. It is imperative all parties be involved in

an electrical safety training program to prevent any accidents from occurring. If a job requires workers to be near electricity, an electrical safety program should be in place to teach workers how to avoid accidental contact with electricity. Download ESFI's free-to-share electrical safety videos and infographics from esfi.org to amplify the electrical safety of your workplace. Distribute the content directly to your employees or your customers to help prevent future workplace injuries and fatalities and forward our mission of reducing electrically related deaths, injuries, and property losses at home and in the workplace.

ESW

Brianne Deerwester is the Communications Coordinator for the Electrical Safety Foundation International (www.esfi.org).

Electrical Safety Training in 2021

If you opt to bring materials to the class, while the trainer will not be in the same room, he will still be able to see what you are doing. By bringing an old disconnect switch or breaker to the classroom and positioning it in front of the camera you can still demonstrate your abilities. Every electrical worker should have access to a voltage detector they can bring to the training session as well as locks and tags. With a little organization and patience, each student can demonstrate their skills and knowledge on the screen.

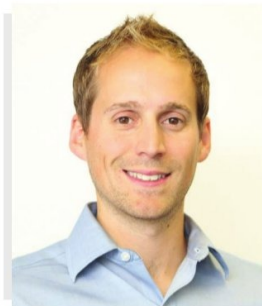
Identify a Responsible Person

If bringing equipment into the room is not an option, then you may have to designate a responsible person to act on behalf of the trainer. This would typically be a supervisor or a manager who has knowledge of the electrical safety procedures and protocols. Prior to the course, the responsible person would spend time with the trainer making sure they fully understand what is required of them. After the theoretical training session is complete, the responsible person would schedule time with each of

the participants to witness them demonstrating the necessary tasks for their jobs. The responsible person then reports back to the trainer and certificates are distributed.

While it may look and feel a little different in 2021, electrical safety training has not changed all that much. Add in some technology and creativity and you can still complete a comprehensive training session.

With a little thought and pre-planning, I believe any hands-on task can be completed as part of a virtual training session and therefore satisfy the requirements of the electrical safety standards. **ESW**



Jonathan Travis, P. Eng., PMP is the CEO of Leaf Electrical Safety, providing arc flash studies, electrical safety training, and electrical safety program development to industrial clients worldwide. He can be reached at 506.434.4602 (www.LeafElectricalSafety.com).

A Long-Standing Commitment to Safety Training

This requires a proactive lock-out/tag-out program that all employees must follow. With very few exceptions, all power must be shut-off so that the work environment is not energized and, therefore, safe for the performance of essential tasks. Documentation of this training is also required by the OSHA standard.

Employers must also adhere to aggressive preventative maintenance programs and enforce guidelines related to the selection, use, and care of personal protective equipment (PPE). This includes proper labeling of voltage, arc flash boundaries, and approach distances. All are necessary to providing a safe and healthful environment that accounts for the dangers that are inherent in electrical work.

Commit now to a New Year's resolution to work smart and build safe. A host of training resources are

available, but they demand attention and cooperation from employers and employees. Continuation of this decades-long commitment to safety will keep the electrical industry productive and profitable for many years to come. **ESW**

Paul A. Satti, M.S., is a Certified Safety Professional (CSP) and Certified Electrical Safety

Compliance Professional (CESCP). He is Technical Director for the Chicagoland Construction Safety Council (www.buildsafe.org) and Instructor for the National Safety Education Center (www.niu.edu/nsec) - one of 26 OSHA-authorized Education Centers nationwide.

**Pictures were taken pre-COVID-19*



*Photo Courtesy of Construction Safety Council**

Contractors must evaluate the levels of risk on jobsites and develop training programs that focus on the recognition and avoidance of unsafe conditions.

Industry News

Industry Leaders Launch The Partnership for Electrical Safety

The leading companies in the Arc-Rated (AR) & Flame-Resistant (FR) clothing and Personal Protective Equipment (PPE) industry announced the launch of **The Partnership for Electrical Safety**, an industry-led effort to ensure that the hundreds of thousands of Americans working on energized electrical equipment are properly equipped and protected from the hazards of electrical arc flash.

The partnership is committed to ensuring that every American working on or near energized electrical equipment is provided with the appropriate arc-rated clothing and PPE. Proper AR clothing and PPE allows those whose jobs place them in a potentially hazardous situation to comfortably perform their essential work and return home safely at the end of the work day. Hundreds of thousands of Americans working on or near energized electrical equipment are not currently provided proper protection from a deadly hazard, despite OSHA standards that have been in place for more than 20 years. The Partnership for Electrical Safety has been formed to directly address this longstanding issue and are dedicated to improving the health and safety of unprotected electrical workers across the United States.



Electric arc flash is an electrical explosion that results in a fireball that can reach temperatures hotter than the surface of the sun. This fireball can ignite flammable clothing and seriously burn exposed skin, causing catastrophic or fatal injury. As a result of being improperly outfitted, many American workers suffer serious burn injuries every year. ***This does not need to happen.*** Due to the nature of electrical work, arc-flash events will occur, but the fatal and catastrophic injuries are almost always caused by clothing ignition, not the arc-flash itself. The solution is simple - stop wearing fuel (uniforms that can burn) and start wearing AR clothing.

“The Partnership for Electrical Safety strongly believes that the PPE requirements of NFPA 70E: Standard for Electrical Safety in the Workplace provide the appropriate best practices to ensure worker safety and should be broadly adopted for substantially all live or potentially live electrical work in the United States,” said Scott Margolin, Co-Chairman of The Partnership for Electrical Safety. “The two primary goals of NFPA 70E and the Partnership for Electrical Safety are precisely aligned: 1) whenever possible, de-energize the equipment being worked on, and 2) when working energized, always wear arc-rated clothing and PPE that is appropriate to the hazard. As an association, we are looking forward to driving meaningful change to improve the safety of the American electrical worker.”

To learn more about the efforts of The Partnership for Electrical Safety or to share your arc-flash story, visit www.partnershipforelectricalsafety.org **ESW**

Visit our buyer's guide to find industry suppliers for all of your electrical needs.

Electrical Safety
IN THE WORKPLACE

Get Listed In Our Buyer's Guide both in Print and Online!

Suppliers: Reserve your company's listing today to be listed all year online and in the Fall 2021 print edition. The sooner you reply, the longer your listing will be seen in the *Electrical Safety in the Workplace* 2021 Buyers Guide. There is a range of listing options for the entire year online and in the Fall printed issue...this puts your company in front of more than 90,000 buyers.



All listings include a live link to your website.

Contact your sales rep to get a listing form.

- Randy Green - randy@rdgmedia.net
- Caitlin Bieda - caitlin@rdgmedia.net

www.electricalsafetypub.com/buyers-guide

GETTING YOUR ATTENTION is our job.



LOUD & BRIGHT attention-getting devices.

Floyd Bell offers an Extensive and Diverse Line of Products

Announcer

Programmable Speakers in both panel-mount and stand-alone styles. **Up to 115dB!**

NEW! ↓

CAN Alarm

A large, super-loud intelligent alarm that can be controlled on any **CAN J1939** network.

Audiolarm

The most widely-used industrial piezo alarm in the world.

M-80

The original high-output piezo alarm in a **small footprint**.

Turbo

Small, front-mount panel alarm that is half-the-size and twice-as-loud as industry counterparts.

Turbo Light

High intensity panel LED indicator available in **5 different colors**.

Ultra

A rear-mount piezo alarm that is **12 dB louder** and **1000 Hz lower** than industry counterparts.

Twin Turbo

A panel mount lighted piezo alarm that combines **bright light** with **loud sound**.



AN-450 Announcer

For our complete line of products,
visit **www.FloydBell.com** or call
1-888-FLOYD-BELL



Floyd Bell Inc



TAKE SAFETY INTO YOUR OWN HANDS

ARC RESISTANT GLOVES



**FR Leather Lined
with Kevlar® Wide-Cuff**
12-3275-60

ANSI/ISEA **A4** ANSI/ISEA **5** EN407
CUT LEVEL PUNCTURE 4343XX

Arc Flash
25 Cal



**FR Waterproof Ultimate
Lined with Kevlar®**
12-3290-60

ANSI/ISEA **A4** ANSI/ISEA **4** EN407
CUT LEVEL PUNCTURE 424344

Arc Flash
55 Cal



**FR Ground Glove
Lined with Kevlar®**
12-3365-60

ANSI/ISEA **A4** ANSI/ISEA **5** EN407
CUT LEVEL PUNCTURE 4343XX

Arc Flash
37 Cal



**14" Leather
Protector**
16-5100-14

ANSI/ISEA **5**
PUNCTURE

Arc Flash
32 Cal

DuPont® and Kevlar® are trademarks or registered trademarks of DuPont de Nemours, Inc. **Kevlar.**

info@ytgloves.com | 800.680.7177 | ytgloves.com

WARNING: Youngstown's Arc Rated gloves and Leather Protectors do NOT protect against shock or voltage.