

electroindustry

www.nema.org | May 2018 | Vol. 23 No. 5

- 3** | National Electrical Safety Month 2018
- 7** | New Taxes on International Trade?
- 8** | NEC® Adoption Insures Against High Costs
- 20** | Evaluating Earthquake-Damaged Electrical Equipment

Bridging innovation and safety



NEMA



We protect and
beautify the world™

Putting You in Charge

General Electrical Finishes for Transformers, Switchgear, Enclosures and Lighting

From durable products that protect transformers, switchgear and enclosures to the bright whites and colorful coatings that illuminate the latest trends in lighting fixture design, PPG has been a trusted and reliable coatings supplier to the electrical equipment industry for decades.

Yet, there's more to our heritage than longevity. As one of the world's largest coatings companies, PPG produces an exceptional range of corrosion-, chemical- and UV-resistant products, including one of the most comprehensive selections of UL-1332 DTOV2-listed coatings in the industry.

We're also one of the few global coatings companies with expertise in every major coatings technology, from liquid and powder to electrocoat and pretreatment products. That means we can deliver fully integrated, single-source solutions for every stage of your coatings process, along with products tailored to your specific substrate, end-use application, production line and customer requirements.

To learn more, visit ppgindustrialcoatings.com or call 1.888.774.2001.



CONTENTS



Lifesaving connections



Lighting up Congress



Spotlight on Mike Madsen

electroindustry

Publisher | Tracy Cullen
Editor in Chief | Pat Walsh
Contributing Editors | Ann Brandstadter,
 Mariela Echeverria, Andrea Goodwin,
 William E. Green III
Art Director | Jennifer Tillmann
National Sales Manager | Chris Riordan
 The Townsend Group
 202.367.2462
criordan@townsend-group.com

electroindustry (ei) magazine (ISSN 1066-2464) is published monthly by the National Electrical Manufacturers Association (NEMA), 1300 N. 17th Street, Suite 900, Rosslyn, VA 22209; 703.841.3200. Periodicals postage paid at Rosslyn, Virginia, and additional mailing offices. POSTMASTER: Send address changes to NEMA, 1300 N. 17th Street, Suite 900, Rosslyn, VA 22209. The opinions or views expressed in *ei* do not necessarily reflect the positions of NEMA or any of its subdivisions. The editorial staff reserves the right to edit all submissions but will not alter the author's viewpoint. Every attempt is made to ensure that information is current and accurate.

Subscribe to *ei* at www.nema.org/subscribe2ei.
 Contact us at ei@nema.org.

Follow NEMA: [f](#) [t](#) [e](#) [in](#)

We thank our advertisers:

LUTRON
www.lutron.com

PPG We protect and beautify the world™
ppgindustrialcoatings.com

8	NEC® Analysis: Adoption Insures Against High Costs Patrick Hughes, Senior Director, Government Relations and Strategic Initiatives, NEMA
12	Lifesaving Connections that Matter Most Jim Bugel, Vice President, AT&T—FirstNet Program
13	DICOM Matters! Lisa Spellman, AStd, DICOM General Secretary, MITA
14	Best Practices for Selecting the Right Cabling Solution Peter Lafreniere, Product Manager—Cable, AFC Cable Systems, Inc.
16	Surviving the Elements with Corrosion Resistance Maria Lamorey, Business Development Manager, Electrical Transmission & Distribution Equipment, PPG Industrial Coatings
18	Bridging the Landscape of Automation Standards Jim Gilsinn, Principal Engineer, Kenexis
3	Comments from the President
4	Electric News
19	Advocacy
19	Business Analytics
20	Codes & Standards
20	Spotlight
21	International

Speaking of the Electroindustry



Kirk Anderson

Kirk Anderson, NEMA industry director of industrial systems, presented a case study on the IEC System of Conformity Assessment Schemes for Electrotechnical Equipment and Components (IECEE) at the Asia-Pacific Economic Cooperation Expert Group on Energy Efficiency and Conservation, April 10, in Washington, D.C. His topic was “IECEE Global Motor Energy Efficiency Programme: A Conformity Passport for International Trade.” He also will speak at the Motor Summit in Zurich, Switzerland, November 15, on the United States’ industry point of view on energy-efficiency standards.

Steve Griffith

NEMA Industry Director **Steve Griffith** will be a panelist discussing how to Minimize Cybersecurity Risks in the Development of IoT Solutions at IoT World 2018, May 14–17, Santa Clara, California. He will also speak on Insights on the Microgrid Market Opportunity at the Third Annual Grid Modernization Forum, May 24, Chicago.



Jonathan Stewart

Jonathan Stewart, NEMA industry director of the Utility Products and Systems Division, will moderate “Workforce Development and the Standards and Conformity Assessment Professional,” a program sponsored by SES, the Society for Standards Professionals, on August 9. He will address the mismatch that exists between the skills possessed by much of the U.S. workforce and the skills required by U.S. employers.

Do you need an electroindustry subject matter expert to speak at your next event?

Contact book-a-speaker@nema.org or visit www.nema.org/book-a-speaker.



officers

Chairman

David G. Nord

Chairman, President & CEO
Hubbell Incorporated

Vice Chairman

Mark Gliebe

Chairman & CEO
Regal Beloit Corporation

Treasurer

Theodore D. Crandall

Senior Vice President
Control Products and Solutions
Rockwell Automation

Immediate Past Chairman

Michael Pessina

Co-CEO & President
Lutron Electronics Co., Inc.

President & CEO

Kevin J. Cosgriff

Secretary

Clark R. Silcox

The world runs on the safe, reliable, and efficient products manufactured by the electroindustry. Since quickly developed and updated Standards play a critical role in maintaining that sense of security, this is a good time to reflect on the central role NEMA companies play in bringing products to market in a future increasingly driven by digitization and connectivity.

As an entirely new suite of offerings under development and testing heralds extraordinary opportunities, one important area remains largely unchanged: Standards development. While many leading companies have embraced a digital design process, the Standards process has remained virtually the same for decades.

Reimagining the Standards development process in the digital age has three key benefits:

- **Faster development:** With cloud computing and online workspaces, multiple experts can propose, modify, and agree on improvements nearly simultaneously.
- **Faster publication times:** Standards are now digitally formatted and issued electronically so market drivers can employ them immediately.
- **Faster and more frequent updates:** Because things change quickly as experts find and implement best practices, Standards must keep pace with real-world needs to remain relevant.

A process embracing these attributes will help manufacturers and users alike. And we know it is doable. Wired and wireless communication protocols evolve quickly with high levels of success. We can develop and implement our version of these protocols for the electroindustry so that our Standards are integrated with a market that depends on safety, reliability, and efficiency in all electrical products and systems.

A significant byproduct of reimagining the Standards development process is in the area of regulation. When industry Standards are delayed, regulators often develop their own—and corresponding test procedures—that do not take into account the latest advancements in research and engineering. Experience has taught us that this can result in industry mandates that add cost but little benefit. A dynamic Standards process also enables regulators to maintain a level playing field and more effectively police counterfeit and noncompliant products in the open market.

With nearly 700 published Standards and hundreds more that we help develop with other organizations each year, NEMA understands the importance of rethinking this process. We know there will be challenges along the way—there always are. But meeting the future by embracing change outweighs the short-term discomfort of learning new ways of doing things. ☺

National Electrical Safety Month 2018

In celebration of Electrical Safety Month 2018, ESFI launched the fifth installment of *Electrical Safety Illustrated*. This year's theme, "Understanding the Code that Keeps Us Safe," focuses on the importance of the *National Electrical Code*® and its three-year cycle. Learn more at www.esfi.org.

Congress Funds DOE Research, Removes Burgess Rider, and Keeps ENERGY STAR® at EPA

Before leaving for its April recess, Congress passed HR 1625, the Consolidated Appropriations Act of 2018. Most of NEMA's appropriations work over the past year has focused on ensuring proper funding for research programs at the Department of Energy (DOE).

NEMA Members have a long history of utilizing many of the DOE programs, including the Solid-State Lighting Program, the Advanced Research Projects Agency–Energy (ARPA-E), the Advanced Manufacturing Office, and ENERGY STAR Building Portfolio Manager®.

FY2018 Department of Energy Appropriations

Updated: 3/22/18	FY17 Continuing Resolution (CR) Adj.	Admin FY18	House Bill	Senate Bill	Final FY18
Advanced Research Projects Agency—Energy (ARPA-E)	\$ 290,446,000	\$ 20,000,000	\$ 0	\$ 330,000,000	\$353,314,000
Office of Electricity Delivery and Energy Reliability (OE)	\$ 205,608,000	\$ 120,000,000	\$ 218,000,000	\$ 213,141,000	\$248,329,000
Research and Development	\$ 161,192,000	\$ 78,000,000	\$ 175,000,000	\$ 168,141,000	\$200,829,000
Transmission Reliability	\$ 38,926,000	\$ 13,000,000	\$ 36,000,000	\$ 36,000,000	\$39,000,000
Resilient Distribution	\$ 34,933,000	\$ 10,000,000	\$ 37,000,000	\$ 35,000,000	\$38,000,000
Energy Storage R&D	\$ 20,461,000	\$ 8,000,000	\$ 31,000,000	\$ 37,141,000	\$41,000,000
Transformer Resilience and Advanced Components R&D	\$ 4,990,000	\$ 5,000,000	\$ 6,000,000	\$ 7,000,000	\$7,000,000
Cybersecurity R&D	\$ 61,882,000	\$ 42,000,000	\$ 65,000,000	\$ 53,000,000	\$75,829,000
Office of Energy Efficiency & Renewable Energy (EERE)	\$ 2,069,059,000	\$ 636,149,000	\$ 1,103,908,000	\$ 1,936,988,000	\$2,231,778,000
Building Technologies Program	\$ 200,119,000	\$ 67,500,000	\$ 91,406,000	\$ 195,000,000	\$220,727,000
Solid-State Lighting R&D	\$ 25,000,000	\$ 8,190,000	\$ 25,000,000	\$ 25,000,000	\$25,000,000
Federal Energy Management Program	\$ 27,000,000	\$ 10,000,000	\$ 10,000,000	\$ 25,000,000	\$27,000,000
Advanced Manufacturing Office	\$ 228,066,000	\$ 82,000,000	\$ 102,000,000	\$ 252,000,000	\$305,000,000
Vehicle Technologies Program	\$ 310,000,000	\$ 82,000,000	\$ 125,000,000	\$ 277,988,000	\$337,500,000
State Energy Program	\$ 49,905,000	\$ 0	\$ 50,000,000	\$ 50,000,000	\$55,000,000
Weatherization Assistance Program	\$ 215,000,000	\$ 0	\$ 225,000,000	\$ 215,000,000	\$248,000,000

Updated: 3/22/18	FY17 CR Adj.	Admin FY18	House Bill	Senate Bill	Final FY18
Office of Science	\$ 5,336,835,000	\$ 4,472,516,000	\$ 5,392,000,000	\$ 5,500,000,000	\$ 6,259,903,000
Batteries and Energy Storage Hub	\$ 24,000,000	\$ 0	\$ 10,000,000*	\$ 24,088,000	\$ 24,088,000
Critical Materials Institute	\$ 24,000,000	\$ 0	\$ 15,000,000*	\$ 25,000,000	\$ 25,000,000
Energy Information Administration (EIA)	\$ 121,468,000	\$ 118,000,000	\$ 118,000,000	\$ 122,000,000	\$ 125,000,000

* Program would offer grants but no longer support the Hubs

The President's original budget request in February 2017 contained significant reductions in funding for renewable energy, energy efficiency, coal, and nuclear research. By the end of July 2017, both House and Senate lawmakers released their proposed appropriations for America's energy programs. Since that time, congressional leadership and the White House have been debating a long-term funding solution. It was not until February 2018 when Congress agreed on the overall funding numbers at levels similar to those during the Obama Administration.

NEMA also worked to remove the Burgess rider affecting the ability of DOE to enforce and implement energy-efficiency standards for general service incandescent lamps and to maintain the ENERGY STAR program at EPA. The final result is aligned with our request: The Burgess rider is not included in the FY18 bill, and ENERGY STAR stays at EPA.

NEMA continues to advocate in support of DOE programs that provide value to our industry in the FY19 appropriations process, which is already underway. As soon as Congress returns from its two-week recess, we expect both chambers to hold hearings with agency officials to discuss the FY19 budget request from the Administration. NEMA will post appropriation updates to the NEMA Portal.

The above chart illustrates how our key energy programs fared compared to FY17 funding levels, the President's request, the initial bills from Congress, and the final numbers for FY18. For more information about the federal budget or NEMA advocacy initiatives, contact Joseph Eaves (joseph.eaves@nema.org) or Patrick Hughes (patrick.hughes@nema.org). ☎

NEMA Creates Transportation Systems Division

At its March 2018 meeting, the NEMA Board of Governors approved the creation of a new division dedicated to transportation systems. With the growing and increasingly connected transportation systems that are powered by the U.S. electroindustry, the time is now for NEMA and its Member companies to become more active in this emerging ecosystem.

The overall mission of the Transportation Systems Division is to promote the tools and infrastructure associated with the movement of people and goods in safe, cyber secure, and efficient ways.

Existing member companies manufacture transportation management systems such as traffic management controllers and assemblies, dynamic and portable message

signs, electric vehicle supply equipment systems, outdoor and roadway lighting, and energy storage systems. Future growth opportunities in the entire spectrum of transportation include areas such as parking, ports, rail terminals and crossings, and airports.

With the coming wave of connected, autonomous, and electrified vehicles, communication back and forth with infrastructure becomes increasingly important. NEMA Members represent the "I" in the V2I (vehicle-to-infrastructure) framework.

Formal activities for the new division will soon be announced. For more information on the Transportation Systems Division, contact Industry Director Steve Griffith (steve.griffith@nema.org). ☎

Webinar to Present Upside of Frontside Flip

George Bailey, managing director of the Digital Supply Chain Institute (DSCI), will discuss the global transformation of supply chains during our May 14 webinar, "Smart Manufacturing: Factories of the Future."



George Bailey

He will explain "Frontside Flip" and show how it will enable revenue growth in the emerging digital supply chain model. He will also cover the transformation of specific global companies, essential performance metrics, blockchain, artificial intelligence (AI) and machine learning (ML), and big data for managing demand.

This is a must-make webinar for anyone who cares about digital transformation and the new powerful role of the digital supply chain. ☎



REGISTER NOW FOR

Smart Manufacturing:
Factories of the Future

May 14, 2018

1 -2 pm, EDT

www.IoTNOWwebinars.org

NEMA Seeks Webinar Speakers

Are you an expert on the Internet of Things? Are you interested in sharing your knowledge?

NEMA is seeking subject matter experts to lead the following webinars:

- IoT Architecture
- Managing Supply Chains with Smart Sensors
- Battery-Powered Technology in the IoT
- Transportation Transformation: What's Driving the Future?
- 5G Communications: Better, Stronger, Faster

To learn more, contact Muhammad Ali
(muhammad.ali@nema.org, 703.841.3288). ☎

Wire and Cable Forum June 26

NEMA wire and cable members and invited guests will meet on June 26 to learn the latest in wire and cable technology from expert speakers at a forum sponsored by the Copper Development Association. Joint section meetings will follow to review strategy. To register, or for more information, contact Suzanne Alfano, NEMA industry director for the Building Systems Division (suzanne.alfano@nema.org). ☎

Save the Date



November 14-15, 2018

NEMA Annual Meeting
La Cantera Resort and Spa
San Antonio, Texas

News Analysis— NEMA Members Face New Taxes on International Trade

As winter closed, the Trump Administration reopened its trade enforcement toolbox to take on longstanding complaints of unfair trade practices for steel, aluminum, and some high-technology items. The tool that President Trump chose is a tariff.

Next steps—as well as ultimate outcomes—are still to be determined, but the near-term impacts on electroindustry manufacturers and medical imaging in the United States are becoming clearer.

In trade terms, a tariff (also known as a customs duty) is a simple tax on imports, most commonly applied *ad valorem*, or as a percentage of the declared customs value of the product at issue. The tariff's purpose is to protect domestic producers from off-shore competition by forcing up the real price of the imported product. The revenue from the tariff is collected by U.S. Customs and Border Protection and goes into the federal government general fund.

On March 23, the U.S. imposed 25 percent tariffs on imported steel and 10 percent tariffs on imported aluminum based on findings that excessive reliance on imports, which are supported by global overcapacity and overproduction of both, threatens U.S. national security. Days later, the President issued a proclamation granting temporary exemptions from the tariffs until at least May 1 for shipments from Argentina, Australia, Brazil, Canada, the European Union, Mexico, and South Korea.

The Commerce Department also published guidance for U.S. companies on how to request product-specific exemptions from the tariffs.¹ Commerce Secretary Wilbur Ross testified to the Ways and Means Committee of the House of Representatives on March 22 that he is prepared to use other trade laws to prevent circumvention of the tariffs.

Many NEMA Members use steel and aluminum from domestic and overseas sources in their manufacturing processes and are pressing for fairly traded and necessary imports to be carved out of any restrictions.

“To impose import taxes on fairly traded steel and aluminum will not help our manufacturers’ costs or aid them in being more competitive in the global economy,” said NEMA President and CEO Kevin J. Cosgriff. “We believe the opposite to be the case.”

On April 3, in a separate proceeding, the Office of the U.S. Trade Representative (USTR) announced a proposal to place 25 percent tariffs on more than 1,300 types of products imported from China, which together account for shipments valued at approximately \$50 billion. According to the USTR announcement, this action is intended to form part of the “U.S. response to China’s unfair trade practices related to the forced transfer of U.S. technology and intellectual property.”

NEMA analysis of the proposed product list found that approximately 100 of the 1,300 entries fall within the scope of 22 product Sections, including those in MITA. Based on U.S. government data, imports representing these 100 product types were valued at as much as \$7 billion. Following weeks of consultations with affected product Sections, NEMA has been preparing written comments for submittal by May 11 and testimony at a May 15 public hearing.

Acknowledging longstanding and increasing concerns about China’s intellectual property and industrial policies, NEMA supports a comprehensive approach to international trade that results in fair and open global markets.

“Discussions between China and the United States and others need to ensure a more level playing field through the application of clear, binding, and enforceable trade rules and compliance with international norms of intellectual property protection,” added Mr. Cosgriff. “The imprecision of broad-based tariffs usually is accompanied by collateral damage up and down global supply chains that is better avoided. If tariffs are perceived to be a necessary, attention-getting tool in bringing about a fair agreement, we would hope their use would be short-lived.” ☎

Craig Updyke, Director,
Trade and Commercial Affairs, NEMA

This issue of *ei* went to press the fourth week of April. Members can get updates from the *NEMA Daily Digest* or by contacting Craig Updyke at craig.updyke@nema.org.

¹ <https://www.commerce.gov/news/press-releases/2018/03/us-department-commerce-announces-steel-and-aluminum-tariff-exclusion>

NEC® Analysis: Adoption Insures Against High Costs

NEMA advocates for adopting the most current building codes, but to what extent does code adoption benefit homeowners?

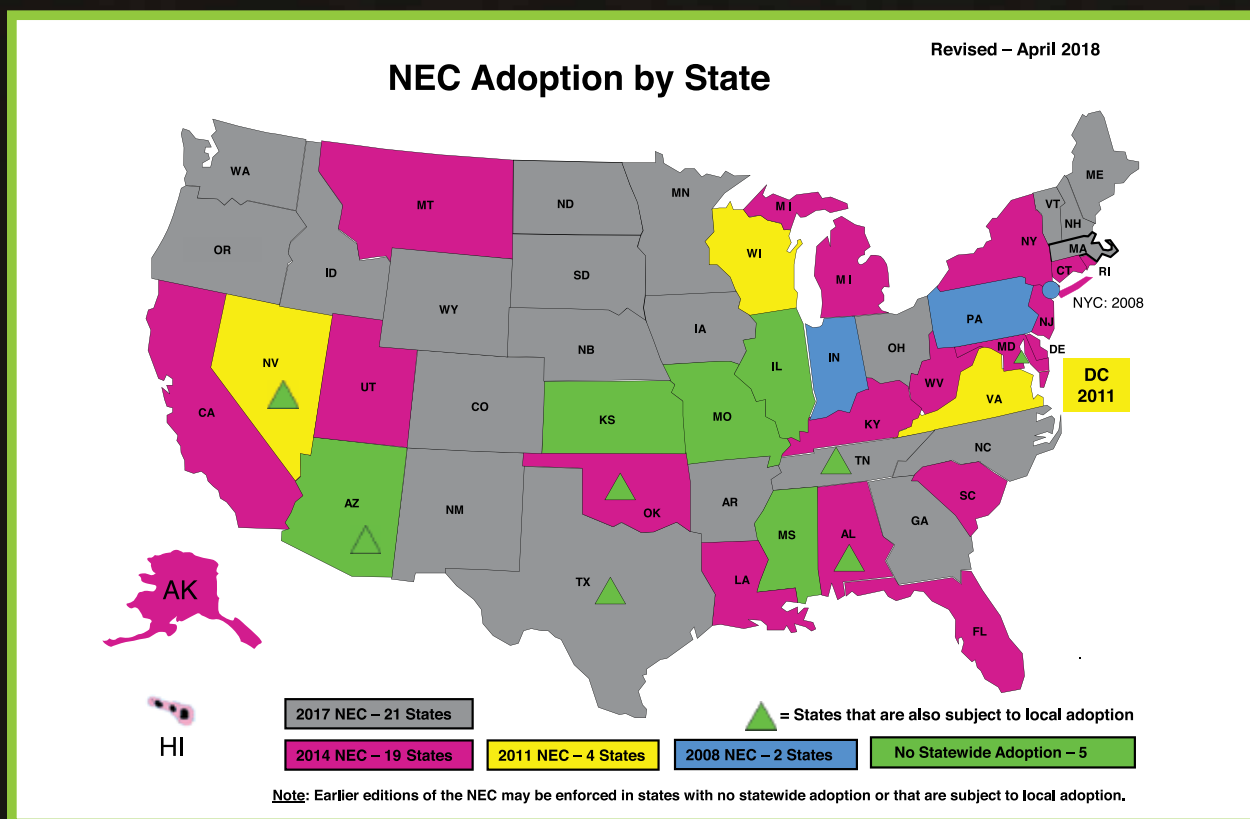
As part of a 2017 Strategic Initiative, NEMA worked with the Governing Institute to conduct a research analysis of the costs of electrocution and electrical fires and the corresponding benefits of adopting the latest version of the *National Electrical Code*® (NEC).

The NEC is an electrical safety code developed by the National Fire Protection Association (NFPA). First published in 1897, it is updated every three years and must be adopted by states or local governments to take effect. The most recent NEC (2017 edition) was published in August 2016.

NEMA and the Governing Institute tracked all changes to the NEC for the 2011, 2014, and 2017 editions. The analysis found that the costs related to the increased specification of NEMA-scope technologies in the code were minimal, and the potential decrease in electrocutions and residential

Patrick Hughes,
Senior Director,
Government
Relations
and Strategic
Initiatives, NEMA

Before joining
NEMA, Mr.
Hughes advocated
for energy-
efficiency and
high-voltage
transmission
policies at the
United Nations
Foundation.



fires could easily outweigh those technology costs if the code is adopted and enforced by states.

HIGH COST OF ELECTROCUTION

Deaths from electrocution have steadily decreased to an annual average of 238 between 2011 and 2015, due at least in part to increased adoption of NEMA Members' technologies like ground-fault circuit interrupters (GFCIs).¹ However, the annual cost of electrocution deaths is approximately \$1.8 billion.² With increased requirements for GFCI use in recent versions of the NEC, the number of electrocutions and the associated cost should continue their downward trend if the code is adopted and enforced.

HIGH COST OF ELECTRICAL FIRES

Electrical malfunctions remain one of the least common causes of residential building fires (cooking accounts for 51 percent of residential fires, followed by heating at 11 percent, with electrical malfunction at just six percent).³ Even so, there were 45,210 residential electrical fires each year between 2010 and 2014, on average, which resulted in an annual 420 deaths, 1,370 injuries, and \$1.4 billion in property damage and \$1.4 billion in property damage per year (approximately \$31,000 per fire).⁴ With increased requirements for technologies like arc-fault circuit interrupters (AFCIs) that can prevent certain types of fires, adopting the most recent version of the NEC on a regular basis can put downward pressure on the number and cost of electrical fires.

LOW COST OF PROTECTION

For NEMA-scope products covered by the NEC (e.g., AFCIs, GFCIs, tamper-resistant receptacles, and weatherproof covers), the cost increase from new requirements in the NEC between 2011 and 2017 was under \$200 for an average home.⁵

With the annual property damage from fires at \$1.4 billion, and the annual cost of electrocutions at \$1.8 billion, states should invest in low-cost insurance options like adopting the most recent NEC every three years without amendments. Ⓜ

GFCIs Save Lives



Ground-fault circuit interrupters (GFCIs) were first released to the public market in the late 1960s. They were originally required by the *National Electrical Code*® only for exterior spaces such as swimming pools. Toward the end of the 1970s and into the 1980s, GFCIs were mandated for kitchens, bathrooms, unfinished basements, and several other spaces. Today, GFCIs are required near most wet areas within a residential dwelling.

As the use and requirements of GFCIs increased, the yearly number of electrocution deaths began to decline. Studies published by the Consumer Product Safety Commission show that in the mid-1970s, there were 500 to 600 electrocution deaths per year. By the 1980s, as the requirements for GFCIs increased to guard against electrocutions in more household spaces, the numbers decreased to the 200 to 300 range. From the year 2000 and beyond, the number of deaths decreased even further to less than 200 per year as the number of GFCIs in the market has reached almost 100 million. GFCIs have a direct lifesaving effect.

GFCIs work by monitoring the amount of electrical current flowing through an outlet. If there is an imbalance in the current from the hot side (small hole on the right) to the neutral side (large hole on the left), the GFCI will interrupt the circuit as fast as one-thirtieth of a second and protect the end user from electric shock.

GFCIs typically come in several types, including receptacles, circuit breakers, and even portable cord-connected versions. Receptacles protect the end user at the point of use, where electronics and appliances are plugged into a wall. GFCI receptacles can also provide downstream GFCI protection through multiple-location wiring, which protects the first GFCI receptacle and every receptacle downstream of it (including standard receptacles) in the same circuit. Circuit breaker types are used within an electrical circuit breaker panel, and when installed, the GFCI protects all the receptacles downstream from that breaker.

GFCIs are now ubiquitous for interior and exterior applications, and for good reason. They have proven to be an extremely effective deterrent to electric shock, with wide availability and easy installation. As the number of electrically operated devices and appliances continues to rise, GFCIs will continue to protect the public. Ⓜ

**Danny Abbate, Industry Director,
Building Infrastructure Division, NEMA**

¹ <https://www.esfi.org/resource/ground-fault-circuit-interrupters-preventing-electrocution-since-1973-614>

² Based on the U.S. Environmental Protection Agency's current "Value of a Statistical Life" of \$7.4 million

³ <https://www.usfa.fema.gov/data/statistics/#causesR>

⁴ <https://www.nfpa.org/-/media/files/news-and-research/fire-statistics/major-causes/oshomelectricalfires.pdf>

⁵ NEMA Members can download the full report at <https://bit.ly/2pO4xJv>

Overvoltage Protection Safeguards Communities

Bryan P. Holland,
South Field
Representative,
NEMA

The purpose of the *National Electrical Code*® (NEC) is to safeguard persons and property from hazards arising from abnormal conditions on an electrical system, such as overcurrents, ground faults, and arc faults. These conditions are mitigated by the installation and use of innovative electrical products either required or permitted by the code.

The occurrence of overvoltage and transient surges on a premises wiring system from outside sources has dramatically increased. Overvoltage and other transient surges may result from lightning strikes, faults on the utility distribution system, or internal sources on a premises wiring system. The installation and use of lightning protection systems and surge protective devices are proven methods to mitigate overvoltage and transient surges.

In addition to NFPA 780 *Standard for the Installation of Lightning Protection Systems* and UL 96A *Installation Requirements for Lightning Protection Systems*, the NEC also addresses overvoltage. Under the 2017 edition of the code, surge protective devices (SPDs) are required for elevators, critical operations data systems, industrial machinery, wind electric systems, fire pump controllers, and emergency systems.

The 2020 edition may expand SPD requirements to all services in dwelling units under a new Section 230.67. A new Article 242 for Overvoltage Protection may also be included in the 2020 NEC. It will provide general, installation, and connection requirements for overvoltage protection and overvoltage protective devices. Part II will cover SPDs permanently installed on premises wiring systems of not more than 1,000 volts, nominal, while Part III will cover surge arresters permanently installed on premises wiring systems over 1,000 volts, nominal.

Florida is currently the only state that mandates lightning protection systems and surge protective devices for hospitals, nursing homes, and public schools. Surge protection is also required at mental health facilities and for building smoke-control systems. The Florida Building Code requires the installation of these systems in compliance with NFPA 780 and the NEC. UL has submitted a proposal to the International Code Council to mandate compliance with NFPA 780 and UL 96A for the installation of lightning protection systems under Chapter 27 of the International Building Code.

NEMA's engagement in the codes and standards that address overvoltage, lightning, and surge protection includes its Low Voltage Surge Protective Devices, Surge Arresters, and Electrical Connector Sections.

The NEMA Field Representative Program supports these sections by providing training and education to electrical professionals in the field, by providing testimony at code adoption hearings, and by assisting electrical professionals on code compliance issues in the field. Ⓜ

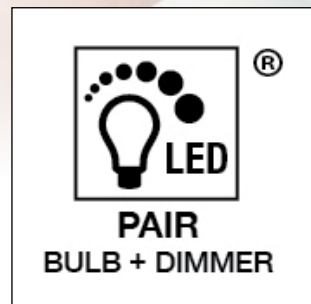


Join the Effort

**Help consumers find LED bulbs
and dimmers that work together.**

Join the NEMA LED Dimming Compatibility Program. Manufacturers of LED lamps or dimmers that meet industry standards can use this logo on qualified product packaging.

Visit www.nema.org/led-dimming to join the program.



Lifesaving Connections that Matter Most

Jim Bugel, Vice President, AT&T–FirstNet Program

Mr. Bugel oversees AT&T's strategy, policy, and product development for state, local, and federal public safety initiatives.

We live in a highly connected world. A world where if you dream it, you can connect it. Think traffic lights, pallets, and soda fountains. Yet as industries move forward technologically, first responders have been stuck years in the past. But that's all changing with FirstNet.

FirstNet is the country's first nationwide communications platform dedicated to public safety to help first responders connect to the critical information they need every day and in every emergency. Built with AT&T, in a public–private partnership with the First Responder Network Authority, FirstNet is bringing public safety a long overdue and much-needed technology upgrade.

A tremendous amount of progress has been made in the past year to begin making FirstNet a reality for public safety. All 50 states, the District of Columbia, and five territories recognized the value of FirstNet, joining in its mission to strengthen and modernize public safety's communications capabilities.

A Force for Good

We believe FirstNet will be a force for good, forever changing the way first responders think about and use communications.

It will make first responders' communications simpler, faster, more collaborative, and more secure in achieving their lifesaving missions. And it will drive public safety–focused innovation, making advanced communications tools—like smartphones, apps, and connected devices—more useful, valuable, and available to first responders.

Within the Internet of Things (IoT), we have a unique opportunity to bridge public safety's capabilities with the connected world. As we create smarter cities, we can also help first responders create smarter emergency responses.

Think about connected vehicles that can enable better access to the closest emergency resources. Or connected infrastructure, like smart lighting solutions that monitor traffic, so first responders can find the fastest route to an incident. Sensors placed on lights around the city can also provide additional situational awareness, helping to detect gunshots when and where they happen.

Connected gear can feed critical data to incident commanders to keep first responders safer. For example, monitoring firefighters' health data can detect early warning signs of cardiac arrest, which is the leading cause of death on the job.¹

FirstNet opens first responders up to transformative possibilities. We will continue to build on FirstNet's capabilities with IoT to bring public safety the most valuable communications system possible. ☪

Why FirstNet?

The recommendation for a dedicated, purpose-built solution for first responders was born from the communication challenges public safety experienced during the September 11, 2001, terrorist attacks. Those challenges made it clear that the needs of public safety demand more than what commercial offerings provide.

That recommendation turned into a vision championed by the public safety community, a vision that was advanced by Congress in 2012 when it formed the First Responder Network Authority. This is an independent government agency charged with carrying out public safety's vision of FirstNet, bringing first responders their own separate dedicated communications ecosystem.

The First Responder Network Authority issued an RFP in January 2016 to create a public–private partnership to bring FirstNet to life. After a rigorous RFP process, AT&T was selected in March 2017 to build and manage FirstNet based on the high standards and objectives of first responders.



¹ Based on a 2015 report from the National Fire Protection Association

DICOM Matters!

As I begin a new chapter as the general secretary for DICOM, I'm busy writing pages for what I expect to be an interesting chapter in an already full book.

DICOM is the familiar acronym for Digital Imaging and Communications in Medicine. It ensures the interoperability of systems used to produce, store, display, process, send, retrieve, and query medical images and related information. NEMA holds the copyright.

Even though I was quite familiar with DICOM and health IT standards before I arrived at NEMA, there is much to learn. I love meeting new stakeholders and listening to their questions, interests, needs, and concerns. Here are a few.

DOES DICOM STILL MATTER? ISN'T IT DONE?

This one is easy: DICOM still matters and it is not done. It matters for more reasons than I have space here.

DICOM adoption tells a story. It is one of the most widely deployed healthcare messaging standards in the world. It is ubiquitous in radiology and cardiology imaging. It is so widely deployed that it has set the standard to demonstrate how a well-developed and thoughtfully deployed standard can live up to the promise of standards.

Generally viewed as an expansion opportunity, DICOM has extended into such clinical domains as dentistry, ophthalmology, pathology, and encounter-based imaging. With the evolution of electronic health records, the use of DICOM objects and services will continue to grow.

So clearly, DICOM isn't done. That's because healthcare and technology are not done; medical imaging is the fastest growing and most profitable segment of healthcare. DICOM has endured because it was developed to be extensible, flexible, and built to meet the future—not bang up against it.

DOES DICOM ADDRESS SECURITY?

Security considerations were built into DICOM from the start. Of course, no one can ever know exactly how technology will advance, and hackers do immense

damage. We cannot cover the large topic in this article, so I invite you to visit this link to learn more: www.dicomstandard.org/using/security.

WHAT'S HOT?

One exciting area is 3D printing, which is also known as additive manufacturing. It is seeing rapid adoption, with multiple applications directly related to patient care. There is a strong natural tie between 3D printing and medical imaging, as cross-sectional imaging is often used to design a replacement organ or to validate an object's design relative to patient anatomy.

DICOM WG-17 has creative experts from around the world collaborating to extend and promote its use for the creation, storage, and management of 3D printing models in settings where the model is either derived from medical images or expected to be compared or composited with medical images.

Another tidbit is patient-centered care mandates. DICOM supports access to data from multiple institutions—anywhere—and consistent access to all types of data, including images.

WHAT ARE MY GOALS?

At various times in my career, I've worked with new standards or the development of standards that had yet to exist. I'm intrigued to work with a mature standard that has so much opportunity and exciting work underway.

At one time or another, we've each been a patient and we've each cared for a patient. I want to do my part to work with some of the best experts in the world to help move medicine forward and improve patient outcomes.

DICOM has many exciting initiatives underway. We regularly publish news and updates in the *MITA Minute* and on the DICOM website. Visit www.dicomstandard.org to learn more. Or just ask. I love answering questions. ☺

Lisa Spellman,
AStd, DICOM
General Secretary,
MITA

Ms. Spellman has extensive experience in technology, standards development, healthcare, health IT, health policy, and business.



Weathering the Storm: Best Practices for Selecting the Right Cabling Solution

Peter Lafreniere,
Product Manager—
Cable, AFC Cable
Systems, Inc.

Mr. Lafreniere
leads product
strategy for the
Cable Solutions
business unit's
product line and
is responsible
for its strategic
innovation
initiative.

As heat waves, cold spells, hurricanes, and floods attack all regions of the country, contractors and engineers need to consider resiliency as they build critical infrastructure to withstand these natural disasters.

To ensure electrical safety during extreme weather situations, industry workers and electricians must understand the environment they are building in to better utilize appropriate cables and conduits for safe and secure construction.

Let's take a look at the best practices for selecting cables for potentially dangerous jobsite conditions, including wet environments and extreme temperatures.



MC jacketed cable

Wet Environments

According to the *National Electrical Code*® (NEC), wet locations are installations underground or in concrete slabs or masonry in direct contact with the earth, in locations subject to saturation with water or other liquids, and in unprotected locations exposed to the weather's elements.



MC cable with a PVC jacket

Locations considered “damp” and protected from the weather are still subject to moderate degrees of moisture and require appropriate cables and conduits to protect electrical products and the overall structure of the build.

In most instances, the conductor insulation determines the appropriate application for dry, damp, or wet environments. Engineers must recognize that while some wires are transferable from damp to dry locations, there are properties of dry location wires that do not possess the appropriate insulation suitable in wet locations.

True or False? *Cables and conduits need to be replaced when exposed to floodwaters.*

TRUE. Always immediately replace armored and metal-clad cables when exposed to extensive moisture and water resulting from hurricanes or extreme rain. Floodwaters contain numerous contaminants and sewage that can be hazardous to electrical products, potentially causing the insulation to fail or become conductive.

Use corrosion-resistant jackets and wet location-rated conductors in areas that are predisposed to wet elements. A common cable type that is rated for wet locations and complies with the NEC is a metal-clad cable with a polyvinyl chloride (PVC) or polyethylene jacket, due to its durability, moisture (MC) and oil resistance, flame-retardant features, and superior resistance to weathering and soil environments.

The *NEMA Storm Reconstruction Toolkit* is a cohesive blueprint for actions related to loss of power, damaged equipment, and rebuilding according to accepted best practices. Learn more at www.nema.org/storm-Disaster-Recovery

Surviving the Elements with Corrosion Resistance

Maria Lamorey,
Business
Development
Manager, Electrical
Transmission
& Distribution
Equipment, PPG

With more than 20 years' experience in industrial OEM manufacturing, Ms. Lamorey has been recognized for her leadership in the electrical equipment industry by the University of Pittsburgh Institute for Entrepreneurial Excellence.

Performance-critical electrical equipment—typically fabricated from a variety of metals—must withstand years of challenging outdoor conditions to support the flow, supply, and management of electricity. The design emphasis for transformers, electrical enclosures, switchgear, and exterior lighting is typically focused on its sensitive instrumentation, controls, and operation. Few consider how critical it is to protect the metals that house these vital components and ensure their reliability.

According to the Electric Power Research Institute (EPRI), the cost of corrosion-related problems in the electrical industry exceeds \$17 billion.¹ This represents an estimated 7.9 percent of the total cost of electricity to consumers in the U.S. Incredibly, roughly 20 percent or more of these corrosion costs are avoidable. Electrical component manufacturers and their customers bear a significant portion of these costs, yet the best design and coating strategies for protecting these devices from corrosion often are an afterthought.

Finished electrical components are about 70 percent metal and 30 percent nonmetal substrates, yet nearly 100 percent of electrical equipment manufacturers view painting metal as outside their core competency.

¹ <https://www.epri.com/#/pages/product/1004662/>

That means an average-sized switchgear manufacturer running 10 to 15 million square feet of coated metal through its facility is staking a lot of its reputation on work considered outside its core competency.

Building a Great Specification

Most electrical equipment has a minimum life expectancy of 20 years, yet many components are expected to survive 50 years or more in extreme conditions and operating environments. Unfortunately, when it comes to painting and protecting new equipment, many manufacturers still combine old “cut-and-paste” specifications that date back 20 to 30 years with current industry-standard regulatory requirements written by IEEE, UL, CSA, and ASTM.

Equipment manufacturers may write paint specs solely on achieving a minimum industry standard or according to a specification written by a paint supplier. Paint manufacturers may contribute to the problem by designing coatings systems that merely meet old specifications or achieve industry standards dictated by customers instead of featuring the latest technologies to provide better field performance.

If the goal of an electrical equipment manufacturer is to build next-generation components that exceed performance mandates while protecting its brand reputation, paint specifications should be reviewed and updated regularly. In addition to product scope and substrate type, manufacturers should address the following criteria:

- **Paint type.** Avoid using a specific manufacturer's product code, which can be ambiguous or difficult to find. Instead, detail the technology the equipment demands (liquid, powder, or electrocoat) and the resin chemistry (e.g., TGIC polyester, epoxy, or urethane).
- **Substrate preparation and protection.** In addition to cleaning and removing oils, lubes, and coolants from the fabrication process, the specification should spell out chemical and mechanical cleaning methods.
- **Color.** Detail an acceptable range of color variation and have a proven method for determining that the color of painted parts falls within specification.
- **Gloss.** Like color, the gloss range may affect a product's finished appearance. Provide a specific gloss range, as variations may cause the same color to appear as different shades.



- **Texture.** In the electrical industry, some orange peel (minor paint dimpling) is considered preferable, as it tends to hide flaws and to wear well over time. Even so, firm rules for texture types and variation should be written into the paint spec.
- **Cure.** This section establishes paint curing parameters for oven- or air-drying paint.
- **Product handling and storage.** Manufacturers suggest specific rules for handling and storage in their product data sheets, including an acceptable range of temperature exposures and fixed expiration dates for proper rotation of inventory.
- **Performance.** Regulatory standards such as UL 1332 are written to include a range of acceptable results for products undergoing laboratory-based performance tests.

Performance Testing

While many coatings systems are robust enough to pass industry-accepted performance tests, they can sometimes fail in the field because real-world conditions are more difficult to survive. For that reason, it is critical to write into the paint specification the tests that most accurately reflect a product's ability to fulfill a warranty or an expected service life. For example, does a specific impact test predict paint chipping once installed in the field? Or does an accelerated weathering test depict the real-world color fade or breakdown of a coating?

Performance testing also must correspond to field troubleshooting. If a coating fails in the field, correlating the failure to a specific testing method will enable the equipment and paint manufacturers to identify the reason for the failure more quickly, which also can lead to quicker solutions for corrective action.

Some of the most common performance tests written into an electrical equipment paint specification include:

- Salt spray, the most commonly specified test in the electrical industry. UL 1332 requires 600 hours of salt-spray exposure for electrical enclosures and switchgear. Many transformers require between 1,000 and 2,000 hours of exposure
- Ultraviolet accelerated weather testing, which is designed to predict how a coating will fade outdoors over time
- Simulated corrosive atmospheric breakdown (SCAB), which predicts how well a coating will maintain its integrity when subjected to a succession of regular and extreme performance environments

- Humidity testing
- Impact resistance
- Gravelometer, which predicts a coating's ability to withstand road gravel and chip resistance

Other tests that are occasionally used and built into specifications for electrical equipment include those that test for adhesion. There also are many types of chemical tests, including one for insulating fluids to determine a coating system's ability to resist exposure to certain types of chemicals.

Specifying Success

When creating a paint specification, it is critical to correlate a device's expected service environment and service life to the testing methodology that most rigorously replicates the performance challenges it will face. Not only will this help a product perform reliably throughout its lifetime, but it may also lessen maintenance requirements.

Equipment manufacturers should evaluate paint specifications on a regular schedule to confirm that they incorporate the most targeted and technologically advanced coating systems and testing methodologies for a specific application. They also should involve paint and pretreatment suppliers in the design process as early as possible, preferably with a proven coatings company that can offer both pretreatment and paint capabilities as an integrated package.

Integrated, full-service coatings suppliers typically have a deep understanding of the coatings process from start to finish, along with a wide range of products and resin chemistries that have been tested according to industry-standard criteria.

Suppliers can act as a partner in identifying potential vulnerabilities to corrosion and help customers select the right products to prevent it. Most integrated coatings suppliers have dedicated lab resources that enable them to recommend the best methodologies to measure a product's potential service life as well as complete testing services to verify lab results, identify potential reasons for a product failure, suggest potential solutions to correct a failure, and troubleshoot general coatings-related production problems. ☞

Visit the NEMA Standards Store for standards related to transformers, electrical enclosures, switchgear, and exterior lighting.



Across the Abyss—

Bridging the Landscape of Automation Standards

Jim Gilsinn,
Principal Engineer,
Kenexis

Mr. Gilsinn co-chairs the ISA99 committee, which is developing the ISA/IEC 62443 series of standards.

It's been more than a decade since the International Society of Automation (ISA) published its first standard on securing industrial automation and control systems (IACS), referred to as the ISA/IEC 62443 series. One of these standards, which was released earlier this year, addressed a secure development lifecycle. Another will be released shortly with functional requirements for IACS components. Manufacturers need to be aware of these standards to build more secure products.

The ISA99 committee has spent considerable effort writing—and rewriting—standards and technical reports to address various aspects of cybersecurity for IACS. In that time, ISA99, in cooperation with the International Electrotechnical Commission (IEC), published seven standards and technical reports. This may seem like a glacial pace, especially given how fast cybersecurity is moving.

Manufacturers need to be aware of these standards to build more secure products.

Since the initial publication, the IACS cybersecurity landscape has changed drastically. There have been major IACS-targeted malware incidents, including Stuxnet, Havex, BlackEnergy, and Triton, as well as numerous other incidents of IT-style malware spreading to the IACS environment. There are now tools for searching the internet for any device using IACS protocols and security tools for automating attacks against those systems.

With more than 700 members on the ISA99 mailing list and 50 or so active members, why does it take so long to produce anything usable? Creating international consensus standards can be an arduous process, especially with a committee as large as ISA99. People love well-written and usable standards; writing and

producing something that is useful to a broad audience, however, is often difficult and tedious. (International standards are one place where there are arguments over the Oxford comma.)

How can the process be sped up? How can standards committees be more responsive to changes in the industry and the security landscape? Is it possible to update them more frequently? These questions are not new and will continue to be asked about almost every consensus standards organization.

Identifying Challenges

One of the biggest challenges is people. ISA99 is a volunteer organization. ISA supports the committee with editorial and clerical help, but the technical work is taken on by people working for IACS organizations. Committee members often take time away from their day jobs to participate in meetings and provide content. Having more people means the workload can be distributed.

Another challenge involves the IEC voting periods, which can be as long as seven months for a single draft version of a standard. ISA has made a commitment to publish the 62443 standards with IEC. This means that ISA99 cannot produce standards as rapidly but also means that the standards are more broadly accepted internationally.

One tactic that ISA99 has taken in cases like Stuxnet, and the more recent Triton, is to gather industry experts to produce a report on ways to improve the standard based on the recent incident. The experts review the available material about the incident and suggest changes to the standard where appropriate.

ISA99 will continue to develop and revise standards for IACS for the foreseeable future. In the end, the hope is to have a high-quality set of functional standards that are broadly usable by many industries. ☞

Shining Light on DOE Program

Members of the Next Generation Lighting Industry Alliance (NGLIA) and the OLED Coalition met in March with new political staffs at the Department of Energy (DOE) and several offices in Congress. Their goal was to press upon elected officials the benefits of continuing the Solid-State Lighting (SSL) Program at DOE.

Over the last several years, the two groups have been responsible for spearheading the grassroots effort to maintain the current funding level of \$25 million for the program. Although the funding at this level for FY18 was agreed to earlier in March, the lighting groups focused on funding levels for FY19, which should be finalized during the summer of 2018.

The SSL program drives research and development of innovative LED and OLED technologies. It has resulted in reduced costs, rapid improvements in technology (260 patents), and increased U.S. market availability (220 products impacted). Even with its success, there is still potential energy savings to be gained by reducing energy consumption from lighting by 75 percent by 2035, lowering U.S. electricity bills by \$50 billion annually. Solving existing technical problems will continue bringing down costs for both consumers and manufacturers, all of which will increase further private sector investments in the U.S.

In 2016 alone, energy savings from LED lighting installations amounted to 469 trillion Btu, equivalent to an annual cost savings of about \$4.7 billion. While this already represents a remarkable return on a total DOE investment of about \$400 million (since 2007), far bigger savings are on the horizon with connected lighting.

NEMA supports the groups by providing government relations and operational management to meet their policy and technical goals for the program. NGLIA represents for-profit U.S. corporations and formed to accelerate SSL development and commercialization through government-industry partnership. Membership is open to any private, for-profit firm substantially active in SSL research, development, infrastructure, and manufacturing in the United States. Members include Acuity Brands;



Visiting Capitol Hill were (from the left) Joseph Eaves, NEMA; Mark Taylor, Corning; David Woodward, Philips; Tanya Hernandez, Acuity Brands; and Michele Ricks, EMD Group. Photo by an anonymous bystander

Corning, Inc.; Cree, Inc.; EYE Lighting; GE Lighting; Lumileds; OSRAM; Philips Lighting; and Universal Display Corp.

The OLED Coalition is a group of U.S. companies and advocates of OLED technology. It is the recognized voice for the OLED general lighting industry in the United States. Members include 3M; Acuity Brands; Corning, Inc.; EMD Performance Materials Corp.; Kaneka; Kateeva; Kurt Lesker; OLED Association; OLEDWorks; OSRAM; PPG; and UDC.

To learn more about this effort, contact Joseph Eaves at joseph.eaves@nema.org or 703-841-3221. ☎

**EBCI Indicates Business Conditions
Remain Steady and Strong**

Visit www.nema.org/ebsci

Evaluating Earthquake-Damaged Electrical Equipment

Similar to the NEMA guides on evaluating water-, fire-, and heat-damaged electrical equipment, a new guide on evaluating earthquake-damaged electrical equipment is anticipated to be published later this year. *Evaluating Earthquake-Damaged Electrical Equipment* will help assessment personnel to recognize damage to electrical installations after a serious seismic event.

As is the case in the aftermath of natural disasters such as hurricanes, tornadoes, and wildfires, earthquake damage assessment personnel are sent out to determine the extent of damage as soon as safety allows. These safety evaluators typically have limited time to make their determinations. They are often more focused on obvious structural collapse, and sometimes the safety of other building systems can be overlooked. NEMA's document will help evaluators to see that safety has not been compromised.

Unlike weather-related disasters and wildfires, there is no earthquake season. Devastating earthquakes can and do strike at any time with



This surface-mounted electrical power panel was undamaged by the 2010 Mw 7.2 earthquake in Haiti, even though the wall and structural columns were severely damaged. Photo courtesy of Schneider Electric

no warning. NEMA's new document will be one more valuable tool that can be used to ensure a community's resilient and successful recovery from disaster. 📖

Spotlight

Mike Madsen, director of regulatory and reliability at Miller Electric Manufacturing Co., poses with an award from Rea Magnet Wire Company, Inc. Miller Electric received Rea's 2017 Best in Class Award, given to customers that significantly grew their businesses by demonstrating trust, transparency, and teamwork. 🏆



This Month in Standards

ANSI C78.5-2017 *American National Standard for Electric Lamps—Specifications for Performance of Self-Ballasted Compact Fluorescent Lamps* is available in hard copy and as an electronic download for \$56.

ANSI C78.43-2017 *American National Standard for Electric Lamps—Single-Ended Metal Halide Lamps* is available in hard copy and as an electronic download for \$500.

ANSI C136.53-2017 *American National Standard for Roadway and Area Lighting Equipment—Enclosed Pendant Mounted Luminaires* is available in hard copy and as an electronic download for \$40.

ANSI/NEMA WC 58/ICEA S-75-381-2017 *Portable and Power Feeder Cables for Use in Mines and Similar Applications* is available in hard copy and as an electronic download for \$214.

NEMA WT 1-2018 *Wireless Communications Technology for Fire and Life Safety Systems* is available as an electronic download at no cost. 📖

Ann Brandstadter

Manager, Standards Publications
and Marketing, NEMA

STOCKART

Cover, 18: ©istockphoto.com/ZargonDesign

1, 12: ©istockphoto.com/bubaone

8-10: ©istockphoto.com/MegaV0lt

9: ©istockphoto.com/leah613

13: ©istockphoto.com/ipopba

14-15: ©istockphoto.com/Maxiphoto

16: ©istockphoto.com/3alex

17: ©istockphoto.com/teptong

CANENA Assesses the Future of Regional Electrotechnical Standards

Julian Yarza, president of the Council for Harmonization of Electrotechnical Standards of the Nations in the Americas (CANENA), addressed conformity assessment and electrotechnical safety with the standards development community from Canada, Costa Rica, Mexico, and the United States at the 26th CANENA Annual Meeting in Chicago, Illinois, in February.

CANENA's objective is to advance regional harmonization of electrotechnical product safety standards for equipment intended for use in the North American-type distribution system by reducing technical barriers to trade caused by differing national conformity assessment and product installation criteria.

NEMA recognizes CANENA's importance to public safety, facilitating market access and serving as a model to other industry sectors in achieving unprecedented integration between Canada, Mexico and the U.S. economies. This recognition is further supported by NEMA's role in CANENA as its secretariat.

This year's program completes a three-year circuit focusing on Canada, Mexico, and the U.S.'s national processes for electrotechnical standardization and harmonization. This year's program included a panel discussion on the impact of the North American Free Trade Agreement (NAFTA) on standardization and conformity assessment.

DIFFERING GLOBAL MODELS

Electrical distribution systems throughout the world have evolved into two distinct designs—North American and European. CANENA is responsible for harmonizing North American electrotechnical standards while the European Committee for Electrotechnical Standardization (CENELEC) is responsible for the European design.

The North American electroindustry believes that standards must be developed by private sector-led systems with government and regulators as active and equal partners. CENELEC is committed to supporting the European Commission policies through standardization activities, relying heavily on the adoption of International Electrotechnical Commission (IEC) standards.



CANENA's Executive Committee met at the council's recent annual meeting. Photo by Joel Solis

The North American system provides a more flexible primary design to support various independent power generators and power distribution networks and has standardized on a 60 Hz, 120/240 V, split-phase secondary system for connecting to residential homes. The European system provides a more flexible secondary design to accommodate already established infrastructure and densely packed housing. Given the fundamental differences, disparate approaches to standardization are necessary in order to mitigate electric shock, burns, fire, and smoke-related risks.

China is increasingly challenging NAFTA and the EU on a number of fronts, including electrotechnical standards. It has significantly increased its participation in IEC working groups and is vying to secure IEC leadership positions. President Yarza sees China's ascension as having the potential to disrupt the existing dynamic. ☞

CANENA

CANENA is an industry-driven initiative to reduce the inherent complexity of designing products intended for multiple markets and opening the markets of the Americas to broader free trade of electrical distribution equipment and accessories.

As of December 2017, 98 harmonized electrotechnical standards have been published and more than 30 active projects continue in technical harmonization committees. Nearly half of those committees include relevant IEC standards in their scope.

Of the 98 CANENA harmonized standards:

- 83 are based on a regionally developed electrotechnical standard: 57 have been adopted as a national standard by Canada, Mexico, and the U.S.; 26 have been adopted by Canada and the U.S.
- 15 are based on IEC standards: 9 have been jointly adopted by Canada, Mexico, and the U.S.; 6 have been adopted by both the U.S. and Canada.
- 4 have been published as Pan American Standards Commission (COPANT) standards. COPANT is a forum to advance North American standardization activities to the rest of the Americas, including several Caribbean nations. ☞

Smart Building Solutions

Light, Shade, and Temperature Control
for your space, your budget, and your performance requirements



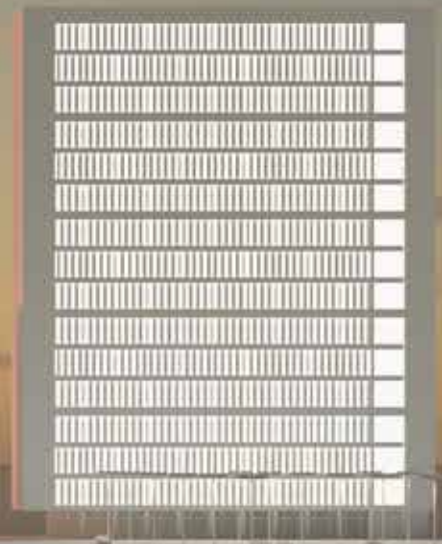
Single spaces

Simple, automated control



Whole floors

Centralized control for large
areas and tenant spaces



Entire buildings & campuses

IoT solutions enable 3rd-party
integration (BACnet & open APIs)



Create the Right Environment

[Lutron.com/RightEnvironment](https://lutron.com/RightEnvironment)