The cost of ignoring electrical safety

By the Numbers, Annually:

- 47,700 electrical home fires
- 2,400 children injured by tampering with electrical receptacles
- 2,000 injured in personal property electrical fires
- 480 deaths in personal property electrical fires
- 420 deaths from carbon monoxide poisoning
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Did you know...

FEMA (the Federal Emergency Management Agency) supports the 34th Annual Building Safety Month to promote the importance of high building standards that protect the environment and save energy. Building Safety Month is a public awareness campaign founded by the International Code Council.

Learn more at media.iccsafe.org/news/eNews/2014v11n6/bsm.html#fema

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- SFI standards conserve biodiversity and protect soil and water quality, as well as wildlife habitats.
- SFI forests are audited by independent experts to ensure proper adherence to the SFI Standard.
- SFI participants also plant more than 650 million trees each year to keep these forests thriving.
What are voluntary recalls?

Listen to a podcast discussion of a proposed rule from the Consumer Product Safety Commission on voluntary remedial actions, commonly referred to as voluntary recalls.

podcast.nema.org/voluntary-recall
I often paraphrase NEMA’s mission by saying that our purpose is to make electricity and medical imaging safer, cleaner, and more efficient. Because May is National Electrical Safety Month, I want to focus on that aspect of our purpose.

As with other NEMA endeavors, we strive to improve safety by applying our skills in three core business areas: writing technical standards, promoting sound policy, and monitoring industry statistics to ensure we’re hitting the mark. Experience has proven that the energies associated with electricity and medical imaging can turn fatal in an instant. This makes our work all the more important.

Our tireless devotion to this cause, largely through the work of our member companies in the standards-writing process, has made NEMA a preeminent source for safety information among state and federal agencies, as well as other trade associations and non-profit institutions.

For example, NEMA’s medical division, the Medical Imaging & Technology Alliance (MITA), in recent years has published four standards to address dose optimization and dose management. One (XR 28) safeguards the operation of medical imaging equipment while another (XR 29) focuses on reducing radiation doses. Also known as the MITA Smart Dose™ standard, XR 29 was featured in the March 2014 edition of *ei*. As you’ll read later in this issue, legislation was recently passed to incentivize medical imaging technologies based on the Smart Dose standard specifically because of the fact that is is safer for patients.

Another major accomplishment had its origins 20 years ago when NEMA, UL, and the Consumer Product Safety Commission teamed up to address the dearth of public education about electrical hazards at home and on the job. That noble vision resulted in the formation of the Electrical Safety Foundation International (ESFI), which has flourished to become the foremost authority on electrical safety. ESFI touches millions of Americans on an annual basis with resources that meet hazards head-on as they arise.

Over the years, ESFI has provided a full spectrum of electrical safety education tools that benefit everyone—especially young children, older adults, electricians, and utility company workers. It is the leader in confronting the global issue of electrical product counterfeiting, and continues to be an advocate for consumers and customs officials in identifying counterfeit electrical products.

Sustaining this level of activity comes at a cost. If I could ask one thing of you, *ei* readers, it would be that your organization lends financial support to ESFI. While a certain percentage of its budget is satisfied through government grant programs, corporate sponsors are needed to help fund new programs.

This is the month when we are charged to make the electrical world a safer place. I can think of no better venue to meet that charge than through a contribution to ESFI. Please visit www.esfi.org for more information.

Evan R. Gaddis
President and CEO
If a killer were lurking in your home, you would do everything to stop it. Unfortunately, there is an invisible killer that far too many homeowners are not prepared to stop. That killer is carbon monoxide (CO), a poisonous gas that you cannot see or smell, but can kill you and your family in only minutes.

CO takes the lives of about 400 people every year in the United States. CO can come from cars, portable generators, furnaces, and water heaters.

Portable generators and permanently-affixed generators are regulated under our jurisdiction at the U.S. Consumer Product Safety Commission (CPSC). Deaths from CO poisoning associated with portable generators have taken a toll on communities around the country. Numerous CO poisoning deaths were reported from portable generator use after Hurricane Sandy struck the East Coast in 2012. Thirty-one deaths were reported from portable generators used after Hurricane Katrina and other hurricanes that hit in 2005. CPSC’s latest data show that from 1999 through 2012, there were 800 CO deaths involving portable generators. These deaths are made all the more tragic knowing that the deaths are preventable.

The reality is that when bad weather knocks out power, more and more homeowners rush out to buy a portable gas generator without any experience of using one. After surviving a storm, they put their families in danger by using generators either inside or too close to their homes. An open garage door or open window does not provide enough ventilation. A portable generator must be placed at least 20 feet away from windows, doors, and vents to avoid the seepage of the toxic gas into the home.

The CO that comes from a single portable generator running inside a home, garage, or shed is equal to the amount of CO from hundreds of cars running inside a home. It is that lethal.

This past December, CPSC joined with NEMA to warn the residents of Chicago and the nation about the dangers posed by CO and using portable generators indoors. It was an outstanding event that increased awareness of CO and encouraged the use of CO alarms on each floor of the home. This effort showed the positive impact we can have when CPSC and industry work together.

Our joint message in Chicago and today is that simple changes may save lives. We cannot avoid hurricanes and other storms that knock out power, but consumers can change how they react. Consumers need to keep all portable generators out of homes, garages, sheds, crawl spaces, and basements. Neighbors should work together to designate a “safer” generator zone, at least 20 feet away from homes. Generator salespeople should educate consumers and encourage safety when someone purchases a portable generator.

Tell all your friends and neighbors: Do not use a portable generator near vents or windows. Keep it off the porch. CO can seep in and literally kill you in minutes. Victims may never know that they are being exposed to CO until it is too late.

NEMA members take carbon monoxide seriously and we at CPSC have made CO safety a top priority as well. It is core to our mission of saving lives and preventing injuries associated with consumer products.

In 2007, the commission voted to require manufacturers to place a prominent “danger” label on newly-manufactured or imported portable generators with the warning: “Using a generator indoors can KILL YOU IN MINUTES.”

**FINDING SAFETY IN TECHNOLOGY**

Currently, CPSC is working to address the carbon monoxide poisoning hazard by limiting CO emissions from portable generators.

A 2012 study by CPSC, the University of Alabama, and the National Institute of Standards and Technology found that a portable generator’s CO emission rate could be cut dramatically by using closed-loop fuel injection and a small catalyst—the same technology used on motor scooters and small motorcycles. This technology increases a consumer’s escape time when running a portable generator in a garage from the current eight minutes to 96 minutes. CPSC staff has shared the results of this study with Underwriters Laboratories for consideration in improving the voluntary standard for portable generators.

Together, CPSC, manufacturers, distributors, installers, and service/repair companies can stop this invisible killer from stealing more lives. Let us be sure that proper ventilation is provided for portable generators. Let us encourage everyone to install working CO alarms in homes. And let us remind customers to get a professional inspection every year of all fuel-burning appliances—furnaces, chimneys, and water heaters—to guard against CO leaks.

We can stop this invisible killer from threatening the safety of our friends, family, and community.

National Electrical Safety Month (NESM) has become a time-honored tradition across the electrical industry. Each May, NESM is declared by a number of state governors and honored by electrical companies, manufacturers, distributors, contractors, testing laboratories, associations, and trade publications alike.

This widespread participation is not just a testament to the importance of electrical safety, but also to the tireless pursuits of the Electrical Safety Foundation International (ESFI). ESFI has sponsored NESM since 1998, and the unwavering support of the industry has propelled the campaign to bring many important electrical safety issues into the public spotlight.

Because of my job, I not only recognize the importance of electrical safety in the workplace, but in all facets of our everyday lives. I have proudly served on ESFI’s Board of Directors since 2001 before I was appointed chairman in 2006. During my tenure, ESFI has spearheaded several successful programs which have allowed the foundation to further its noble mission of reducing electrically-related fatalities, injuries, and property loss.

The adoption of NESM across the industry has provided ESFI with a national stage to disseminate critical safety messages and campaigns. Over the years, NESM has shed a spotlight on important issues such as electrical product counterfeiting, identifying and correcting home electrical hazards, workplace electrical safety, and the dangers of do-it-yourself electrical projects. Further, every campaign educates consumers about the importance of arc fault circuit interrupters, ground fault circuit interrupters, and tamper resistant receptacles, and their roles in mitigating electrical hazards in the home.

In addition to NESM, ESFI is commemorating its twentieth anniversary of leading the way in promoting electrical safety across North America. Since its humble beginnings in 1994, ESFI has constantly evolved to meet the demands of the industry and has achieved rapid growth in reach and impact. The success of NESM has poised ESFI to address important electrical safety issues and spurred a second platform campaign to address seasonal electrical safety hazards. Much like NESM, ESFI’s acclaimed Make Safety a Tradition campaign has garnered industry support and achieved exponential growth.

The public’s susceptibility to electrical hazards is directly proportional to our nation’s dependence on electricity. Additionally, with the average home now having more televisions than people, ESFI’s role in raising awareness of electrical hazards is paramount.

We must come together as an industry to reduce electrically-related deaths, injuries, and property losses—one home and one workplace at a time.

Thank you to those who support ESFI and who do their part to honor NESM.

For information on how you can get involved, visit www.esfi.org.

President, Governors Pledge Support for National Electrical Safety Month

In the first-ever presidential recognition of National Electrical Safety Month, President Obama emphasized the importance of educating the public about the importance of electrical safety, citing the precautions families and communities can take to reduce the risks to life and property.

At least 23 states also have issued proclamations for National Electrical Safety Month in 2014, and the number continues to grow.

Visit www.esfi.org for the list of supporting states and to read the presidential message.
NEMA was one of three organizations invited to sit on a March panel for Senate staffers on carbon monoxide (CO) and associated dangers. The panel was organized by Senator Amy Klobuchar (D-MN) in support of one of her bills (S 1793), which would establish a grants program within the Consumer Product Safety Commission ($2M per year for four years) to support state-level compliance, installation, and public awareness initiatives. The bill currently has three sponsors and various senate offices were represented at the briefing.

NEMA Government Relations Manager Jonathan Stewart spoke on state legislatives trends requiring the use of carbon monoxide detection in different settings. With more than 40 states currently requiring CO detection in residential units, states are now looking to protect citizens outside the home in schools, hotels, and restaurants. Mr. Stewart noted the difficulty that legislatures face in passing these bills because school buildings and hotels, for example, require installation of alarm systems that can be quite costly when compared to residential CO detectors found in consumer homes. These costs do not directly translate into a financial return on investment nor are they necessarily offset by cost-savings.

As a result, some state legislatures are reactionary when it comes to life safety legislation, often focusing on bills in response to a CO incident in the state. Mr. Stewart concluded by pointing out that legislation such as S 1793 could help reframe the CO issue to state policy-makers as a public health issue that they should be proactive on.

Appearing as panelists with NEMA were the National Association of State Fire Marshals and Safe Kids. Both organizations agreed that S 1793 would help to meet an important need with the states to promote education and awareness.

Jonathan Stewart,
Government Relations Manager | jonathan.stewart@nema.org

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 Legislation Incentivizes MITA SmartDose™ Technology

MITA’s campaign to improve access to lifesaving member technologies and expand markets through strategic standards achieved a major success on April 1, when President Obama signed into law a new policy to incentivize the adoption of computed tomography (CT) radiation dose optimization technology. As a result of this victory, starting in 2016, Medicare will pay relatively more to healthcare providers who use CT equipment compliant to the MITA SmartDose™ standard (NEMA XR 29-2013). This achievement follows two years of work by MITA and its members to identify basic dose optimization technologies that:

• significantly benefit patients
• construct a new standard to highlight those equipment features
• educate lawmakers on the value of promoting these patient safety protections through Medicare
• build the momentum necessary to pass a new Medicare policy through a historically unproductive Congress

In the last decade, manufacturers have developed groundbreaking CT dose optimization technologies that have assisted doctors and technologists in dramatically reducing the radiation dose required for a CT scan. Unfortunately, payment cuts for advanced imaging services as well as other economic pressures have slowed the adoption of this technology across the U.S., limiting patient access to these safety features.

To encourage wider adoption of these features in the past, MITA developed industry standards incorporating key dose optimization advancements. In 2013, MITA took this effort a step further in releasing MITA SmartDose—a standard incorporating several basic dose optimization technologies to which every patient should have access. MITA and individual CT manufacturers began promoting SmartDose in March 2013 to educate patients and health care providers on the value of these technologies.

Following the successes of countries such as Japan, Australia, and France that have used payment incentives to promote the adoption of better medical imaging equipment, MITA developed a federal Medicare policy proposal that would pay a doctor or hospital differentially based on their equipment’s compliance with SmartDose protections.

To support this advocacy campaign, MITA engaged federal agencies including the Food and Drug Administration and the Centers for Medicare and Medicaid Services, as well as imaging community stakeholders such as the American College of Radiology, Image Gently, Image Wisely, and individual clinicians who understood the value of the SmartDose equipment features.

Also, for the first time, MITA activated its “Right Scan Right Time” patient network via email and social media, which led patient advocates across the country to send almost one thousand letters to Congress in support of this policy.

With Medicare promoting the adoption of these technologies, MITA expects some providers to decide to upgrade their existing CT equipment to comply with this standard or even purchase a new system that includes even more advanced radiation dose reduction capabilities. In addition to working with the Centers for Medicare & Medicaid Services and our imaging community partners on the implementation of this new policy, MITA is already working to leverage this success to develop and promote additional equipment standards that protect patient health and safety.

Brian Connell, Director of Government Relations, MITA | bconnell@medicalimaging.org
Government Relations Update

Tax Incentives for Energy Efficiency Advance in Senate

On April 3, the Senate Finance Committee approved legislation that would restore and extend a number of expired tax provisions, including the energy-efficient commercial buildings tax deduction commonly known as Section 179D.

Section 179D expired on December 31, 2013. The committee’s action reinstates the deduction for 2014 and extends it through 2015. The deduction was enacted into law as part of the Energy Policy Act of 2005, and represented the first performance-based federal tax incentive aimed at energy efficiency improvement in commercial buildings.

On April 11, the U.S. Department of Energy (DOE), along with the Office of Science and Technology Policy in the White House (OSTP), hosted a public meeting on enhancing infrastructure resiliency. Held at the Capitol Visitor’s Center, this was the first of several public meetings focusing on a Quadrennial Energy Review (QER) as directed in a presidential memorandum issued in January.

The initial focus for the QER will be the nation’s infrastructure for transporting, transmitting, storing, and delivering energy. The current infrastructure is increasingly challenged by:

- transformations in energy supply, markets, and patterns of end use;
- issues of aging and capacity;
- impacts of climate change; and
- cyber and physical threats.

Any vulnerability in this infrastructure may be exacerbated by increasing interdependencies of energy systems with water, telecommunications, transportation, and emergency response systems. The first QER report will serve as a roadmap to help address these challenges.

DOE, as QER Task Force Secretariat, will hold a series of public meetings to discuss and receive comments on issues related to the review. The most significant meeting to NEMA members will be one that focuses on electricity transmission, storage, and distribution. The meeting will take place in Portland, Oregon, but the date has not been determined.

Earlier this year NEMA formed a working group to help formulate its input to the QER. The group is subdivided into teams focused on functional recommendations for grid reliability, security, resilience, and efficiency. Additional teams are defining challenges for the current infrastructure and making recommendations for changes to the utility business model.

NEMA’s QER working group will continue to meet on a regular basis until the recommendations are completed, which is expected to be in mid-June. This will allow enough time to go through revision cycles with the NEMA Codes and Standards Committee and the Board of Governors prior to submission.

Interested participants should contact NEMA Vice President for Strategy and Policy Chuck Konigsberg at 703-841-3292.

Paul A. Molitor, NEMA Assistant Vice President | paul.molitor@nema.org
What is the Code?
The National Electrical Code® (NEC) codifies the minimum requirements for safe electrical installations in a single, standardized source. While the NEC is not itself a U.S. law, the NEC is commonly mandated by state or local law. Local jurisdictions and code enforcement boards inspect for compliance with the minimum standards, as set forth in the code.

What is the revision process?
The NEC is revised by the National Fire Protection Association’s Committee on the National Electrical Code, which consists of 19 code-making panels and a technical correlating committee. Revision occurs every three years to ensure that the code takes into account the latest in technology and safety. Following the release of a new edition, the development process continues;

In light of new data and trends about electrical safety, new and improved technology will emerge to address deficiencies.

- **New**: Mitigates hazards within scopes/application not previously addressed
- **Improved**: R&D enhances existing technology to increase protections

Codes incorporate new technology, data, and feedback on existing Code to establish new electrical safety minimums.

- Mandate the use of recent technological advancements
- New proposals considered
- Comments on existing and proposed Codes reviewed

Data and Statistics provide the fuel to drive innovation and policy.

- Demonstrates need for new technology and education on codes and policies
- Evaluates the effectiveness of existing codes and safety technologies
- Provides cost analysis of implementing new technologies and economic impact in local communities

Once codes are adopted, compliance and enforcement ensures that the minimum standard in electrical safety is being applied.

- Permits
- Inspections
- Training of trade industry
- Penalties for noncompliance
- Potential civil and criminal liability

Is it necessary to update the Code every three years?
As the unbiased authority on electrical safety, the Electrical Safety Foundation International (ESFI) is a staunch supporter of the National Electrical Code and its current three-year revision cycle. The process is accountable to the public, both in soliciting public participation in the development process and the resulting protections provided by the code. ESFI strongly encourages states and jurisdictions to adopt the most recent NEC edition to protect its residents with the latest advancements in electrical safety. The NEC saves lives and its importance should not be minimized; it is the agreed upon minimum standard for safety, as determined by experts, and should be promptly adopted in full.
Adopting Current Building Codes Makes $ense

Building codes are adopted in every state, Canadian province, and Mexico. Why? Safety. We do it to make sure our community and families have a safe environment at home, school, and in the workplace.

Building, fire and life safety, and electrical codes have a rich history born out of tragic events. Unfortunately, we still have electrocutions, fires, carbon monoxide poisoning, and many other fundamental safety hazards. The great news is that our society has an effective means to address mitigating these hazards through a periodic code revision process.

The National Fire Protection Association and International Code Council are code-development organizations with active revision processes that unfold like clockwork every three years. They bring thousands of stakeholders together to address identified hazards and establish parameters for safe installations of new or improved technology. Safety always serves as the foundational thread through the code development process. It is also a core element in recognizing technological advancements that support economic development opportunities.

Role of Technological Advancement

The pace at which technology transforms the construction industry and our ability to drive efficiency for commercial and industrial processes is faster now than at any other time in modern history. To keep up with these developments, NEMA supports a three-year code adoption cycle. There is growing movement in many communities, however, toward a six-year code cycle. Because old codes do not acknowledge new technology, building codes published more than three years ago simply do not incorporate the newest safety developments, like those listed below.

CO Detection—How Much is a Life Worth?

Vince Baclawski, Senior Technical Director, Codes and Standards

After a couple and two teenage sons in Idaho failed to show up for a family dinner party, they were found dead in their home. The county coroner identified the cause of death as carbon monoxide (CO) poisoning caused by a faulty water heater. The home was not equipped with a CO detector.

When the family’s home was built in the 1980s, the residential code in force did not require CO detection. Recently, though, Idaho adopted the 2012 International Residential Code. Section R315.3 requires the installation of CO alarms in existing dwellings where work requiring a permit occurs. Idaho amended the requirement in R315.3 to add the following exceptions:

- Work involving the exterior surfaces of dwellings, such as, but not limited to, replacement of roofing or siding, or the addition or replacement of windows or doors, or the addition of a porch or deck or electrical permits, are exempt from the requirements of this section; and
- Installation, alteration, or repairs of noncombustion plumbing or mechanical systems are exempt from the requirements of this section.

The reason for the exemptions was to minimize costs for contractors and home owners. The provisions that Idaho amended out of the code would have resulted in the retrofit installation of CO alarms in many existing homes, just like the one in which the tragic death of a family of four occurred.

If anything good has come out of this tragedy, it is the heightened level of awareness in the state legislature. Senator Fred Martin said, “For $50, we can help prevent other families from being taken too soon by supporting the Senate resolution for carbon monoxide detectors in every home.”

He asked Idahoans if their lives and those of their loved ones were worth the average cost of a CO detector. He fell short, however, of asking the state to adopt the latest editions of the residential code and other safety codes without exceptions. ©
The most recent International Fire Code® and International Building Code® introduce enhancements for public safety by requiring an emergency voice/alarm communication (EVAC) system in schools for evacuation and other signaling purposes (e.g., general paging, daily class changes, severe weather alerts, and acts of violence). An EVAC system reduces construction costs by eliminating the need for separate systems.

The National Electrical Code® recognizes that modular data centers provide opportunities for small businesses to invest in a cost-effective and scalable system that supports business growth and operational demands. Installation requirements permit infrastructure advancement as well as drive appropriate safety elements for installation.

The economic feasibility for expanding the use of renewable energy, such as photovoltaic systems, is being driven through the recognition of higher voltage systems that increase efficiency. The most recent code language tightens conditions for disconnecting a photovoltaic system to safely allow firefighters and first responders to enter a building during an emergency.

Investments in infrastructure components can leverage energy-efficiency gains. This may involve LED lighting, building envelope enhancements, and HVAC. Additional cost is generally weighed against the payback period. Infrastructure investment is reduced: fewer electrical circuits for smaller lighting loads; less heating and cooling tonnage; and reduced maintenance and operational expenses, even beyond utility bills, over the life of the building.

Not implementing these technologies puts communities at risk.

Communities that adopt the most recently published building codes can also entice businesses that employ and deploy modern technology. This gives them a competitive advantage over locations that do not recognize the competitive business aspects that current code adoption offers.

Become an Advocate of Current Codes

Safety, technological advancement, and an economic model that recognizes that savings can be reinvested into the local economy are often overlooked because of special interests that do not support adoption of the most current building codes. It takes involvement at state building commissions and legislative hearings to support adoption. You can make an impact through letters and in-person testimony.

NEMA, through the Coalition for Current Safety Codes and the Electrical Code Coalition, is actively involved with industry partners to advocate for the adoption of the most current building, life safety, energy, and electrical codes. Our Board of Governors has recognized this as a continuing priority. Preserving the three-year code adoption cycle, along with encouraging current code adoption, remains a NEMA Strategic Initiative.

We encourage you to join us at the national or local level to communicate the benefits of adopting the most current set of building codes on their publication schedule for your community. It will maximize the safety and economic benefit that these codes can deliver.

Mr. Manche chairs the NEMA Task Force on State Code Adoptions.

Pursuing Safety with Three-Year Cycle

The search for the perfect home typically includes granite countertops, stainless steel appliances, or hardwood floors. If it includes all three, consider it sold.

While our eyes gravitate to the new and shiny, the technologies that better protect life and property are hidden. Whether a home is new or refurbished two years ago, it should have been constructed according to the most current building codes.

While NEMA supports a three-year code adoption cycle, there is growing movement toward a six-year cycle.

This, according to Ellen Vaughn and Jim Turner in The Value and Impact of Building Codes, a report by the Environmental and Energy Study Institute, “is, in effect, a full economic generation in the building industry.”

They conclude that, “Failure to update codes condemns purchasers of buildings constructed during the ‘out-of-date’ code period to the consequences of that failure during their buildings’ lifetimes.”

Up-to-date building codes are valuable to society and crucial to public safety.

For more information on NEMA’s code adoption initiative, visit www.nema.org/Code-Adoption-Initiative.

Phallan K. Davis, Public Relations Specialist | phallan.davis@nema.org

1 www.esi.org/The-value-and-impact-of-building-codes

NEMA electroindustry • May 2014 11
Great strides have been made in electrical safety over the last 40 years. Affordable and reliable electrical safety products such as ground-fault circuit-interrupters (GFCIs), smoke alarms, carbon monoxide (CO) alarms, arc-fault circuit-interrupters (AFCIs), and tamper-resistant receptacles (TRRs) save literally thousands of lives and make our homes safer.

Consider this:

The date: April 18, 1906. The time: 5:13 a.m. The place: San Francisco, California. The event: the Great San Francisco Earthquake and Fire. Widely regarded as one of the worst natural disasters in U.S. history, an estimated 3,000 people died from the quake and ensuing fires that raged for three days. The U.S. Geological Survey show a total of 3,721 deaths in the U.S. since 1906 attributed to earthquakes and resultant tsunamis and fires—about 35 deaths per year.\(^1\)

Why, you may ask, are we discussing earthquakes in an article for Electrical Safety Month? According to a 2002 report\(^2\) by the Consumer Product Safety Commission (CPSC), during the baseline period of 1975–1977 there were 620 electrocution deaths associated with consumer products per year. There were as many consumer product-related electrocution deaths in only a six-year period as there were earthquake deaths in more than 100 years.\(^3\)

Because of safety efforts on many fronts, there is good news. The same CPSC report shows electrocution deaths declined from 620 per year to approximately 200 in 1998. The number of lives saved from electrocution from 1978 to 1998 is estimated by CPSC to be 6,250. To put it in perspective, the lives saved from electrocution death during a 20-year period is almost twice as many as the number of earthquake deaths recorded for a 100-year period.

Although these statistics are 20 years old, they clearly illustrate the success of electrical safety products in reducing electrocution deaths. In 2008 the commission stated, “GFCIs have contributed significantly to the reduction of electrocution and severe electric shock incidents since their introduction in the early 1970s.”\(^3\)

Building a house in an earthquake area (i.e., all of California and most western states) requires seismic design to provide a reasonable level of safety. Typically, the design and actual construction costs are well above $10,000 for the most basic structure. In contrast, installing GFCI protection in one of those same houses costs between $100 and $200—probably less than one percent of the cost of required seismic construction. Even though code-compliant smoke and CO alarms, AFCIs, and TRRs typically add several hundred dollars more, it is still a small fraction of the cost of seismic design.

The number of lives saved for the dollar amount invested is not even comparable.

Of course we need to be ready when the Big One hits. No reasonable person would suggest lessening the requirements to build earthquake-resistant structures. The point is not to minimize the importance of seismic safety, but rather to emphasize the importance of electrical safety, and that it can be achieved at minimal effort and cost.

If we have the means to reliably provide electrical safety and save lives for pennies of what it costs to build seismically safe structures, shouldn’t we do so? Obviously, the answer is yes. Some in the construction industry, however, continue to oppose any expansion of code requirements that provide for practical, reliable, and cost-effective electrical safety. They claim that raising the cost of construction by a few dollars is not worth it if only a few lives are saved. The facts show that they are clearly wrong.

Spread the word—electrical safety is an earth-quaking deal. \(^\circ\)

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1. earthquake.usgs.gov/earthquakes/states/us_deaths.php

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\(\text{NEMA Field Representative Program}
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NEMA’s field representatives serve NEMA members by promoting the use and adoption of the National Electrical Code® and by monitoring regional developments of importance to the electroindustry. Field reps are located in regional offices around the country. They are:

- **Don Iverson** (don.iverson@nema.org)
  Midwest
- **Jack Lyons** (jack.lyons@nema.org)
  Northeast
- **Mike Stone** (mike.stone@nema.org)
  West Coast
Imagine that you are a prospective home buyer. As you walk through a model home, you wonder what it would be like to live there. You assume that wiring, lights, and receptacles are constructed and installed in a manner that is free from electrical hazards. This is not always the case.

Electrical safety just doesn’t happen—it involves standards, manufacturing, installation, and inspection. Manufacturers build their products to stay within or even exceed guidelines of product safety standards. Electrical professionals install the infrastructure. Electrical inspectors survey the installation to ensure that wiring and products were installed to the current electrical code and are free from potential hazards.

The invisible hand guiding these activities is code adoption. Most states successfully adopt building codes without amendments. However, some jurisdictions eliminate safety because of misinformation by special interest groups. The industry must educate government on the benefits of adopting current building codes for both safety and economic reasons.

Up-to-date building and electrical codes foster healthy and safe communities. While worker and public safety is a major driver in code adoptions, so is expense. Installations done during construction are more cost effective.

Current electrical codes significantly lower the risk of electrical hazards. One example is ground-fault technology. Ground-fault circuit interrupters (GFCIs) made their debut in the 1968 National Electrical Code® for use in pool lighting. By 2002, the Consumer Product Safety Commission noted a large reduction in the number of electrocutions because of GFCI technology.

The expansion of GFCI technology has proven its value. This wasn’t accomplished by just mandating GFCIs in NEC. It takes a concentrated effort by many stakeholders to educate the public on the safety benefits of current electrical codes.

Education and public awareness must remain a top priority of the electrical industry going forward. Society expects that interaction with electrical products—even when it’s invisible—will be free from hazards.

When states and local municipalities deliberate new building codes, common concerns are technology, economy, health, and safety. Is technology available to build better and more efficiently? Will there be economic impact? Will citizens be safer?

As regulators and lawmakers debate, key players defend their positions and calculate how adoption will affect them. Builders, contractors, government, business owners, homeowners, and manufacturers are just a few of the parties in code adoption. Electrical manufacturers have a vested interest in the construction market. They provide products that offer efficiency, value, and most importantly, safety.

Controversy has evolved over the use of arc-fault circuit interrupters (AFCIs), ground-fault circuit interrupters (GFCIs), and even sprinkler systems in households. The argument is that these systems cost too much.

The average cost of implementing the codes covering these devices obviously falls into a wide range of numbers depending on who is having the conversation. Builders’ organizations have one set of numbers and safety organizations have another—often on opposite ends of the scale. The question, however, remains. What is the correct cost acceptable to save lives?

Data that supports the adoption of expanded use of products, such as AFCIs, is provided by safety advocates to prevent fires and saves lives. There seems to be less argument over their effectiveness and more concern over cost.

The expansion of GFCIs into areas that were not previously covered has been met with trepidation by adoption agencies. This is also true of AFCIs, which prevent electrocution. The Home Builders Association opposes the expansion of sprinklers in one-and two-family homes because of cost, yet these systems save lives and minimize damage.

The value of safety is a social and philosophical conundrum. It seems we must assign a value to life. Will we continue to gamble on the lives of the consumers? Are insurance actuary tables an Ouija board to the future?

Electrical manufacturers have fought hard to produce the most efficient, most innovative, and most effective products for safety. Manufacturers need to continue this fight to assure that the idea we all share is presented to all parties involved in code adoption—lives are priceless.
Electricity has become such a standard part of our daily lives that it is often taken for granted.

Technological advancements coupled with regulations and compliance may increase consumer safety, but electrical failures continue to be a leading cause of home fires. Every year, home electrical fires take the lives of 480 people, injure more than two thousand, and destroy more than $868 million in property.

With that in mind, there are dozens of precautionary measures that consumers can and should take. Some are obvious, for example, like not running electrical cords underneath carpets or pinching them through windows and doors. Others, like installing an arc-fault circuit interrupter (AFCI), are not. An AFCI is one of the best ways to protect against electrical fires.

**What is an Arc Fault?**

An arc is an electrical current that occurs through a normally nonconductive platform such as air. Lightning, for example, is a naturally occurring electric arc. That “shock” you get when you walk on carpet in socks and then touch something is another. Copper wire, on the other hand, is a normally conductive platform.

An unintended arc can be created by electrical equipment with loose or corroded connections. Although it is often difficult to tell just by looking at a piece of electrical equipment whether there is an arc-fault risk and the extent to which it exists, the associated dangers are obvious when arc faults occur near flammable objects.

**How Does an AFCI Work?**

There are two kinds of AFCIs—panel-based and receptacle-based. AFCIs detect abnormal voltage conditions (i.e., arcs) unlike a circuit breaker, which detects abnormal current conditions.

There are a few devices used in the home that create arcs. Light switches and motors are the most common. Arcs are detected by AFCIs by analyzing the downstream voltage frequency spectrum. In buildings, however, there are more electrical devices that introduce noise into a circuit, which can look like arcs.

Microprocessors in the AFCI analyze the voltage spectrum signature of these devices and identify them as non-arcing. Examples are dimmers, UPS, and converters like those used to convert photovoltaic or stored energy. These examples are not arcing but could play havoc with the AFCI. NEMA has a task force in its Building Systems Division that identifies the signatures for these types of devices in an effort to make AFCIs immune to them.

Depending on when and where your home was built, it may include few, if any, AFCIs. Replacing your circuit breakers with panel-based AFCIs or installing receptacle AFCIs is not an extensive process and can be easily accomplished by an electrical professional.

Once the AFCIs are in place, test them regularly.

Learn more at www.afcisafety.org.

Mr. Moldoveanu (and_moldoveanu@nema.org) is responsible for technical activities in the Wiring Device Section and High Performance Buildings Council.

Mr. Stewart (jonathan.stewart@nema.org) works on issues related to the Consumer Product Safety Commission, Environmental Protection Agency, and Occupational Safety and Health Administration for the electroindustry.

Learn more at www.afcisafety.org
When students at the College of Mount St. Joseph in Cincinnati, Ohio, returned for the fall 2013 semester, they were welcomed to fresh updates at the Seton Residential Center. The largest building on campus, the six-story structure is home to office space, classrooms, campus police, a chapel, and more than 500 students.

Over the summer months, four levels holding nearly 160 dormitories underwent renovations not only for enhanced cosmetics, but also for updates to the electrical system.

Facing upcoming changes to the National Electrical Code® (NEC) and concern for student safety, electrical contractor Nicholas Volpenhein, PE, sought protection from arc faults, which may lead to electrical fires resulting from damage in branch circuit wiring as well as extensions to branches such as appliances and cord sets.

In 2014, the NEC requires that arc-fault circuit interrupters (AFCIs) be added when replacing receptacles in locations where protection is needed, such as living rooms and bedrooms. The current NEC expands requirements to include dormitories.

In selecting a product solution, Mr. Volpenhein considered the lifestyles of the students. “The occupants of college dorms, like any other residences, are constantly plugging in computers, tablets, and other devices, and using cord-connected equipment,” he explained. “It doesn’t take a lot of abuse to damage cords or cord ends to the point where some arcing may occur, which can then result in an electrical fire.”

As part of the electrical updates, Mr. Volpenhein sought a solution for replacing both the receptacles and breaker-style AFCIs with a single solution.

In the past, when students experienced a loss of power due to an AFCI breaker interruption, they relied on staff to reset trips of the electrical circuit in a central panel. Students and staff were inconvenienced when this occurred after business hours. With this in mind, Mr. Volpenhein selected outlet branch circuit (OBC) AFCI receptacles made by NEMA member Leviton, providing AFCI protection at the device level while allowing students to reset the AFCI directly from the receptacle.

“The more I looked into the NEC requirements and the alternative option of installing AFCI breakers, it was determined that the site conditions allowed for device-based protection per the NEC.”

OBC AFCI receptacles provide additional benefits beyond localized reset. They save time and money, eliminating the need to purchase and replace all the breakers in each of the 18 existing panel boards on the residence room circuits, in addition to all new receptacles. Designed to detect a wide range of arcing electrical faults, OBC AFCI receptacles also de-energize the circuit downstream of the device when an arc-fault is detected.

Following the installation of the AFCI receptacles, Mr. Volpenhein received positive feedback from the school. Leviton and of Volpenhein Brothers Electric will see that all expectations are met and continue to make recommendations that will enhance the safety, efficiency, and reliability of the electrical systems at the College of Mount St. Joseph.

Mr. Grande is responsible for residential safety and lighting controls products.
Electrical Safety on Campus Reconciles Competing Requirements

Electrotechnology developments in U.S. manufacturing and the energy industry are impressive. Equally impressive is the evolution of electrotechnology on campuses—the “cities-within-cities” that are a vital part of the identity and economy of their host communities.

Mike Anthony, PE, Senior Manager of National Infrastructure Standards Strategy for Plant Operations

Approximately $60 billion is spent every year on electrical energy, construction, operation, and maintenance of electrical systems in the $300 billion education facilities industry in the US. After home-building and road-building, the education industry overall—representing eight percent of the U.S. economy—spends the most on new, non-defense construction.

Some of this spending engages up to 100,000 electrical professionals who are trained to work on educational facility electrical systems safely; a great deal of the spending does not. Human contact with campus power systems runs the gamut of contractors maintaining the utility service switchgear, staff electricians replacing ballasts in a site-lighting fixture, security guards re-setting breakers supplying power to a dormitory room, or a professor and graduate student who improvise in their laboratory without an electrician. Campuses are cities-within-cities where intentional interaction with uncertainty is necessary to carry out the education, research, and clinical delivery mission.

Campuses are typically the largest asset owned by any state—fairly well managed in spite of grim budgets common in the public sector, but with heightened expectations for safety and economic efficiency common in the private sector. Like the private sector, there can be no enduring economic health if electrical hazards are unmanaged. It takes just one accident to kill off the payback period of a brilliant idea for saving money in the electrical budget. On the other hand, we destroy any hope of staying in business to begin with if we overdo safety to the point where no one can work on energized electrical systems anymore.

So how do campus electrical professionals reconcile the competing requirements of safety and economy?

Getting a grip on these cost-risk conundrums for its own balance sheet inspired the University of Michigan to lead a consortia of non-profit organizations in assertive advocacy in economic spaces where NEMA, NFPA, IEEE, and ASHRAE have been present for many years. The purpose was not to just respond to the proposals of others, but to introduce new concepts—backed by self-financed research, if necessary. Higher education is rich in expertise that can provide the data necessary for ANSI committees to discover leading practice.

In 1995, only a few schools, colleges, and universities were sending representatives to the National Electrical Code® (NEC) meetings as experts in areas such as healthcare and agriculture-related power systems. There were no strong voices for the user-owner interest at a scale that matched the commitment of incumbent interests who have been present on the regulatory landscape for decades. The organizing principle was—and remains—to leverage the economic footprint of the education facilities industry to add value to public-asset stakeholders on a daily basis with assertive engagement in technical standards development processes.

1 National Fire Protection Association publishes NFPA 70 National Electrical Code® (NEC).
2 Institute of Electrical and Electronics Engineers
3 American Society of Heating, Refrigerating and Air-Conditioning Engineers
The results produced by the consortia have been significant (see accompanying sidebars). One summarizes safety advocacy of the past; the second summarizes a current advocacy project, i.e., getting enough light for electricians to do their work in electrical rooms; and the third is a sample of two of the larger concepts that the consortia is driving through its pipeline over the next ten years. It hopes to expand and accelerate the trend it created and is eager to collaborate with all NEMA members in all dimensions.4

4 The full story is available at www.plantops.umich.edu/director/ANSI_Standards_Advocacy_Results_and_Strategy/home3.html

Mr. Anthony is the author of electrical power textbooks, including NEC Answers (McGraw-Hill, 1999), and several articles in professional journals.

The author thanks Nick Labuskey, Electrical Designer at the University of Michigan Architecture, Engineering, and Construction Department for his time and expertise in preparing illumination models.

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Safety Advocacy 2014

When “Addendum bh” to the 2013 revision of ASHRAE 90.1 proposed lowered electrical/mechanical room illumination levels from 0.97 watt/square-foot to 0.42 watt/square-foot, the consortia negotiated a change to “Addendum dj” that permitted lighting controls to restore lighting levels back to the 0.97 watt/square-foot level in high-risk areas with timed switching. This compromise was accepted but has since been followed by an original proposal to ASHRAE to accomplish the following:

Differentiate between electrical, mechanical, and elevator equipment rooms from the standpoint of illumination safety in Table 9.6.1. Existing Illumination Engineering Society guidance does not make this distinction.

Raise illumination levels to 1.5 watt/square-foot, which is sufficient power to supply about 40 footcandles (a unit of light intensity equal to one lumen per square foot) of illumination using fluorescent lamps with photometrics that illuminate vertical workpoints and are maintainable in an environment of fast-moving air. (See Figure 1 and Table 1.)

The average age of workers is increasing and along with it the frequency of corrective eyewear. When corrective eyewear is coupled with protective glasses, hazards are even less visible. Given the relatively small amount of building square footage in electrical, mechanical, and elevator rooms, and the tendency for these rooms to be used for storage, the consortia believes that this is no place to be cutting corners on illumination.

<table>
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<th>Luminaire</th>
<th>Qty</th>
<th>Lamp</th>
<th>Lumens</th>
<th>Light Loss Factor</th>
<th>Watts</th>
</tr>
</thead>
<tbody>
<tr>
<td>General purpose industrial</td>
<td>5</td>
<td>Two 32-watt T8 lamps per luminaire</td>
<td>2900 lumen per lamp</td>
<td>0.81</td>
<td>58</td>
</tr>
<tr>
<td>fluorescent</td>
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<tr>
<td>Footcandles Floor</td>
<td></td>
<td>46.6 avg</td>
<td>31.4 min</td>
<td>1.71 max/min</td>
<td>1.41 avg/min</td>
</tr>
<tr>
<td></td>
<td></td>
<td>54.2 max</td>
<td>1.71 max/min</td>
<td>1.41 avg/min</td>
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</tr>
<tr>
<td>Footcandles Wall</td>
<td></td>
<td>28.2 avg</td>
<td>4.4 min</td>
<td>10.41 max/min</td>
<td>6.41 avg/min</td>
</tr>
<tr>
<td></td>
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<td>45.9 max</td>
<td>10.41 max/min</td>
<td>6.41 avg/min</td>
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</tr>
<tr>
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<td>200.00 ft.2</td>
<td>1.5 watts ft.2</td>
<td></td>
</tr>
</tbody>
</table>

Table 1. The 1.5 watts/square-foot proposal assures about 40 footcandles of illumination, which the Illuminating Engineering Society recommends for “industrial” areas such as component manufacturing, inspection, rough machining, motor/equipment observation, etc. These areas have similar hazards as electrical rooms that require low to medium visual acuity.

2014 and beyond

Continued Flash Hazard Reduction

The consortia leads the effort to find funding for research to revisit the branch circuit rules of Section 220 that may result in even smaller transformers. Smaller transformers usually mean lower incident energy.5

Resistance Grounding for Campus Distribution

Some progress was made by the consortia with the addition of language into the last revision of NFPA 70B regarding resistance grounding methods. A practical migration path from solid to resistance grounding is the subject of a forthcoming IEEE paper that raises the level of debate on resistance-grounded campus power systems such as at the University of California-Berkeley, where fault current is limited to 1000 amperes.6

Because of lost work time and distraction for occupants, many high-rises do not run complete fire drills where all occupants actually exit the building, so evacuation statistics are largely unknown. But if it takes 20 minutes to evacuate a 10-story building during a drill, it stands to reason that a 50-story high-rise will take substantially longer.

The chaos that ensues during an actual fire cannot be replicated in a drill. Many high-rise buildings around the country utilize an ECS that provides first responders with the exact location of a fire while providing alarms and instructions for occupants. Many of these systems are using conduit and wiring that has been determined to fail before full evacuation is complete, severing voice communication with emergency response personnel in a short period of time.

When fire breaks out in a high-rise, occupants and first responders rely on the building’s Emergency Communication System (ECS) and fire alarms for fast evacuation and instant firefighting information. The safety of the occupants is the top priority for first responders.

Few high-rises in the U.S., however, currently have fire alarm systems that operate for an extended time in flame or high-heat conditions because of substandard wiring, zinc-coated conduit, and changes in existing fire codes. Many of them can fail in as little as 20 minutes, placing occupants in serious danger.

This critical situation is causing some code-enforcement agencies to now demand that high-rises use systems that can withstand intense heat and remain operational until the fire is controlled.

Generally speaking, it takes a 10-story building 20 minutes to evacuate during a fire drill. The taller the building, the more time it takes.

Safeguarding Occupant Safety is Priority One

Patrick O’Hara, Marketing Communications Associate, Radix Wire

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Safer Buildings Pass Tougher Standards

In 2012, Underwriters Laboratories (UL) conducted extensive research on a collection of current products formerly certified under UL 2196 Tests for Fire Resistant Cables. UL discovered inconsistencies in the various products’ ability to pass the two-hour fire resistive test within the UL 2196 standard. The key concern with existing fire-rated cables was the interaction of zinc from rigid steel conduit with copper within the fire-rated cables. Circuit integrity, critical to fire alarm and emergency communication systems, was compromised by the reaction of the zinc with the copper conductor forming brass and lowering the melting temperature of the conductor, effectively disabling the circuit.

As a result of these findings, UL decertified all UL 2196 two-hour fire-rated wires and cables that required conduit for the raceway and prohibited the use of electrical conduits and conduit fittings with a zinc interior. UL then established an updated UL 2196-based interim test protocol, requiring newly submitted cables to contain five times the number of wires or cables to pass the fire test without failure.

When UL decertified the 2196 listing, a UL-approved two-hour fire-rated alarm cable was no longer available for system installers. In early 2013, UL drafted the new interim standards, but this left fire marshals and inspectors helpless to enforce code, because no conduit-based cable had yet been able to pass the new rigorous protocol. The result allowed many contractors to install non-rated fire alarm wire in new commercial buildings. Now that UL has established a new testing standard for 2196 and a fire alarm cable product has fully passed this new standard, ignoring the fire code and installing non-conforming cable should stop. This trend should make high-rise buildings in the future much safer.

Preventing Catastrophic Consequences

Many buildings currently have fire alarm systems that have zinc-coated rigid steel conduits. Zinc vapors that result from extreme heat can erode wire coating and destroy a connection to the local fire department or ECS in as little as 20 minutes. Studies have shown that a cable in non-zinc EMT (electrical metallic tubing) products that consistently demonstrated greater than three hours of survivability would lose circuit integrity in less than 30 minutes in rigid steel conduit simply because of the presence of zinc. Unfortunately, systems with zinc components are still allowed to operate legally in the U.S. by fire marshals who are unaware of this problem.

Occupants of buildings with low quality, uncertified cable or zinc-coated conduit or raceways in their fire alarm systems face catastrophic consequences in a fire. Many casualties in building fires are not caused by flames or burns, but by smoke or toxic gases. To reduce possible panic, ECS systems must stay fully operational long enough for voice evacuation notification until everyone is safe. Voice communication systems are especially important in high-rise buildings since they typically use occupant-relocation and partial-evacuation procedures.

Escaping a fire is often not as simple as finding the emergency exit and walking down the stairs. Occupants need to have continual guidance, which is why the two-hour fire-rating is so vital. If a system fails and occupants are left to fend for themselves, the results can be tragic.

Fire enforcement agencies are becoming less tolerant of failure-prone systems. NFPA 72 National Fire Alarm and Signaling Code, a new and more stringent list of rules, addresses the installation, performance, testing, and maintenance of fire alarm systems. NFPA 72 describes four levels of survivability. Levels two and three require “two-hour fire-rated circuit integrity cable” or “two-hour performance alternatives approved by the authority having jurisdiction (AHJ).” Commercial buildings and high-rises fall into categories two and three.

Many casualties in building fires are not caused by flames or burns, but by smoke or toxic gases.

Taking the AHJ route typically requires an army of architects, contractors, and fire protection specialists to determine if any corrective action is needed; this can be expensive and time consuming. Furthermore, getting the AHJ to verify the safety of a system is becoming less common. Having the AHJ verify the safe system was an alternative measure until UL delivered its standards.

With its new standards for UL 2196 in place, many localities are expected to mandate enforcement of these fire codes. Boston, Chicago, Denver, Los Angeles, and New York are just a handful of cities spearheading an effort to only allow UL two-hour rated certified systems to operate in commercial buildings. Other cities are expected to follow suit.

As NFPA 72 gains momentum, all buildings will be required to have a UL-certified system. Even more important than codes and restrictions, buildings having a first-rate ECS or fire alarm system can save lives. For safety-conscious building owners, the protection of the occupants inside the building is priority number one.

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NEMA electroindustry  ●  May 2014 19
In determining whether to schedule installations for after-hours or during the workday, the facility manager should consider such factors as labor costs, ease of monitoring and testing, and reduced disruption to business. Knowledgeable life-safety solution providers understand how to migrate systems effectively and can guarantee seamless operation during a transition. Forward thinking dramatically simplifies future upgrades. In selecting a system, products should come from a manufacturer with a proven history of providing upgrade paths for previous systems. Professional installers also take into account local codes and standards affecting system migration.

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Space permitting, the most common approach to migrating an occupied building is to place the new fire alarm control panel next to the existing head-end, where the required interface will be established. This allows the new system to communicate activity from the new field devices to the existing system so that all of the activity and control by event continues to work as it did on the old system. Conversely, information from the obsolete system can be integrated as necessary.

Once the control panels are incorporated, properly planning the zones or loops with the installer is critical. At that point, interfacing the new devices can begin on a loop-by-loop or zone-by-zone basis. Professional installers will know how to disarm the zone and schedule work according to the number of devices to be transferred to the new system. The more field devices that exist on the old system, the more critical it will be to plan ahead and segment out the correct devices for the phase-over.

Experienced installers will be able to make a building assessment and provide guidance on the best migration options. They can offer incremental testing and thorough documentation to monitor the transition as the new devices are phased in, rather than waiting to do so post-installation. This will help ensure that system phases are integrated as expected and that no surprises occur. Eventually, all field devices will be connected to the new system, and the old control panel can be removed.

At the end of the transition, facility managers will be able to rest easy knowing that they have done everything possible to maintain the safety of their occupants and the operational mission of their building. A properly installed system that is professionally maintained will provide many years of loyal service, while delivering great technological advancements that cover today’s codes and operational benefits.

Mr. Rivera, an electrical engineer, has 26 years of experience.
In 2009, President Obama launched the Educate to Innovate initiative. Its goal: prepare the country’s youth for careers in science, technology, engineering, and math (STEM).

Expanding STEM programs in schools is a good place to start, but what about exposing children to STEM in the home through games? Children learn through play.

The market for toys that introduce engineering and science concepts is growing—not just for boys, but for girls, too. I had the opportunity to review a few of these toys, and also found several others worth noting.

Toy Reviews

One popular line is GoldieBlox®. Geared toward girls, each kit tackles a different engineering concept. For example, the newest one, “GoldieBlox and the Dunk Tank,” introduces the hinge concept. By following the included storybook, players learn that main character, Goldie, needs help getting her dog, Nacho, clean. The solution is to trick Nacho into taking a bath—in a dunk tank. Players read and build along, eventually learning how a hinge works through constructing a dunk tank. The kit includes 52 pieces (not all fit together easily, though), a small Nacho figurine, and collectible bouncy ball. GoldieBlox is recommended for ages four through nine.

Another toy, little Bits™, approaches a different concept: circuitry. The base kit includes 10 connectible modules (e.g., power, dimmer, buzzer), 9V battery, eight projects, and easy-to-follow instructions. Each module is color coded and magnetized so users can’t make a mistake. Through a simple rhyme, users know which colored modules are always needed and which are optional: “You always need a blue and green, pink and orange are optional, in between.” All additional kits and modules are compatible with each other. Little Bits is recommended for ages eight and up.

If your child likes computers, MaKey MaKey™ might be a good creative outlet. Invented by two MIT students, users can turn everyday objects into specific computer keyboard functions. The kit includes a MaKey MaKey board, alligator clips, wires, and USB cable. The instructions are relatively simple: connect the MaKey MaKey board to your computer using the USB cable, connect an alligator clip to the board, hold the other end of the alligator clip, and test the board’s functions. Things get a little more challenging, but more fun when you start incorporating objects, such as fruit, to function as keyboard commands. Conceptually, however, this product seems slightly complicated for an eight-year old (the recommended age). Things to keep in mind: conductive materials work best; the circuit must always be grounded by the user; and keyboard functions are limited to arrow keys, spacebar, and click.

Untested Notables

Another toy geared toward girls is Roominate™, a kit where you build your own dollhouse and learn about simple circuitry. Roominate was developed by two female Stanford graduates who wanted to inspire young girls in STEM. Its open design encourages creativity and its website includes how-to videos, as well as a photo gallery of what you ng inventors have created. Roominate is recommended for ages six and up.

For kids excited about electronics, Snap Circuits® by Elenco explores more than 100 projects in just one kit. Create everything from flying saucers to doorbells. Also by Elenco is Snaptricity®, a kit that explores (you guessed it) electricity. Children will learn about magnetic fields, how switches control electricity flow, and how parallel circuits affect electricity. Both kits are recommended for ages 8 and up.

For young children interested in science, Thames & Kosmos offers a line of science kits called Little Labs©. Geared for ages five and up, Little Labs explore magnets, physics, engineering, weather, and plants. Thirteen different kits are available.

Ms. George (chrissy.skudera@nema.org) is a regular contributor to ei magazine and editor of eiXtra, NEMA’s electronic newsletter.

For more information on any of these products, visit the websites below. Prices range from $19.99–$99.99.

GoldieBlox: www.goldieblox.com
little Bits: littlebits.cc
MaKey MaKey: www.makeymakey.com
Roominate: www.roominatetoy.com
Snap Circuits and Snaptricity: www.snapcircuits.net
Thames & Kosmos: www.thamesandkosmos.com
Most people think of their national parks as wild and scenic places, such as Yellowstone or the Grand Canyon. NPS manages these natural places and provides for recreational activities, such as camping and picnicking, but there is so much more to its mission. NPS preserves places of honor from battles past, monuments honoring our nation’s founding, and items ranging from remembrances left by modern man at the Vietnam Memorial to artifacts left by the Ancestral Puebloans at Mesa Verde National Park. One could spend a lifetime visiting all of our sites and viewing all of our collections.

The Organic Act of 1916, the legislation that charged the National Park Service with “…conserving the scenery and...
natural and historic objects and the wild life therein in such a manner as to leave them unimpaired for the enjoyment of future generations,” helps to explain the complexities of fire prevention. Conserving historic buildings and artifacts from the effects of fire and smoke can be a fairly simple prospect, but when also charged with providing for the enjoyment of these buildings and artifacts, the job of structural fire protection becomes more difficult.

“It seemed a crime that this wonderful lodge had to be destroyed when there were fully a score of old lodges, hotels, government structures, etc., which we would have been rather pleased to have suffer a fate of this kind.”

—Former NPS Director Horace Albright on the loss of the Grand Canyon Lodge

In addition to protecting historic structures, monuments, and collections, the NPS structure fire program is responsible for the safety of 279 million visitors throughout the year. On any given night, there are 30,000 overnight guests and 22,000 employees staying in our national parks. The job of protecting our visitors and employees and preserving the historic buildings and objects from the effects of fire and smoke is immense. Employees whose jobs involve structural fire protection and prevention are mainly at the regional and national levels. At the park level, employees are tasked with structural fire prevention responsibilities among other duties. It is very unusual to find a park with an employee dedicated to focusing strictly on fire protection and prevention efforts.

Loss of important buildings is something the NPS has been dealing with from the beginning of its establishment as a federal bureau. Architect Gilbert Stanley Underwood is famous for designing many of the iconic NPS inns, such as Grand Canyon Lodge, Bryce Canyon Lodge, Zion Lodge, and Cedar Breaks Lodge. He set the standard for lodge-type architecture. Unfortunately, all of those lodges have been lost to fire, except for the Bryce Canyon Lodge, which was recently saved from a fire by a sprinkler system. In 1932, when the Grand Canyon Lodge succumbed, then NPS Director Horace Albright said, “It seemed a crime that this wonderful lodge had to be destroyed when there were fully a score of old lodges, hotels, government structures, etc., which we would have been rather pleased to have suffer a fate of this kind.”

While NPS is still experiencing fire loss, the Structural Fire Program is beginning to have success in building a proactive prevention approach by communicating with and educating employees through the periodic newsletter Prevention 52. P52, as it is known, reminds all employees that fire prevention is something they should think about 52 weeks a year, not just during Fire Prevention Week.

One of the most positive outcomes of this campaign is a partnership between the Facilities Management Division and the Branch of Structural Fire to solve long-term issues with the inventory and work order database maintained by NPS. By ensuring an accurate accounting of all of our fire protection systems, the service will be able to better manage the Inspection, Testing, and Maintenance (ITM) program. It’s a long list, with more than 30,000 buildings, but we are making considerable progress.

Two recent incidents demonstrate the effectiveness of a proactive fire prevention program that includes proper ITM of its fire protection systems. As mentioned above, the only original Underwood lodge left in the Grand Circle—the Bryce Canyon Lodge—caught fire in October 2009. Firefighting resources were delayed more than 20 minutes, but thankfully, the fire sprinkler system for this building had been properly designed and well-maintained. It contained the fire until firefighters could get to the building and finish extinguishing it.

In another example, The Wayside: Home of Authors, a residence to both Louisa May Alcott and Nathaniel Hawthorne in Concord, Massachusetts, caught fire in August 2012. Fire alarms quickly notified the city’s fire department and the fire sprinkler kept the fire in check until the firefighters arrived. A building that preserves our nation’s literary history stands today, mainly due to these fire prevention efforts, as well as park staff who fostered a good working relationship with local fire departments.

It’s something we either get right the first time or lose forever.

While there have been losses and challenges along the way, the importance of fire prevention is beginning to find its way into every employee’s thoughts and actions. Preserving our nation’s history from the effects of fire and providing the same for the enjoyment of this and future generations is an honor and a privilege for the employees of the NPS.

There are no do-overs when it comes to protecting our nation’s treasures; it’s something we either get right the first time or lose forever.

For more information on the NPS Structural Fire Program, visit www.nps.gov/fire/structural-fire.

Mr. Johnson identifies himself first as a firefighter and then as fire marshal for NPS. His nearly 30 years of firefighting experience also includes Orange County in Southern California and U.S. Marine Corps.
Taking a “Back to Basics” Approach to National Electrical Safety Month

Brett Brenner, President, ESFI

Twenty years ago the Electrical Safety Foundation International (ESFI) was founded as a cooperative effort by NEMA, Underwriters Laboratories (UL), and the U.S. Consumer Product Safety Commission to advance the public’s electrical safety awareness with unbiased information. We’ve accomplished a great deal since then, but statistics continue to prove the ever-present need for electrical safety education.

The National Fire Protection Association estimates 47,700 home structure fires reported to U.S. fire departments each year involve some type of electrical failure or malfunction as a factor contributing to ignition. These fires result in annual averages of 418 civilian deaths, 1,570 civilian injuries, and $1.4 billion in direct property damage.

Because of our growing dependence on electricity, we need ongoing and evolving public education addressing the hazards associated with our increasingly electrified lives. It is in this pursuit that ESFI develops our programs and initiatives, including its annual National Electrical Safety Month (NESM) campaign.

ESFI commemorates NESM each May with the release and promotion of new and updated electrical safety resources. As part of our campaign’s momentum, for example, governors across the nation have issued proclamations recognizing NESM to encourage their constituents to renew their commitment to safety.

For NESM 2014, we are excited to announce the launch of Electrical Safety Illustrated, a special edition publication that discusses timely electrical safety issues and provides tools to better protect your home, family, and communities.

While we touch on a variety of topics in our materials, we recognize that we must go back to the basics to ensure a fundamental understanding of electrical safety. Among the topics highlighted in the campaign resources is the National Electrical Code® (NEC) process and the importance of timely adoption.

Introducing our Latest Sponsor

ESFI thanks Encore Wire Corporation and its president and CEO Daniel Jones for the company’s generous $25,000 contribution for 2014. Encore Wire Corporation has rallied behind the importance of electrical safety and for doing its part to protect the industry, its workers, and its community.

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Impressive Accomplishments

As a non-profit organization, ESFI depends on contributions to provide funding for the development of new programs and resources throughout the year. Thanks to the continued support of our sponsors and contributors, ESFI has been able to further its mission of reducing electrically-related injuries, deaths, and fires while accomplishing a number of significant milestones including:

- surpassing one billion media impressions for the first time in 2012, and continuing the trend with more than 1,033,427,696 media impressions in 2013
- securing five consecutive Fire Prevention and Safety Grants from the Department of Homeland Security/Federal Emergency Management Agency, which has led to electrical safety awareness programs targeting elementary school students as well as adults over age 65
- reaching more than 10.5 million students and family members at a cost less than .04 cents a person
- implementing aggressive social media efforts yielded an increase in Facebook followers to 6,896 up from 409 at the end of 2012—a 1,586% increase
- providing expert commentary for national publications such as This Old House magazine, HGTV magazine, Parents magazine, Men’s Health, Popular Mechanics, and USA Today

While we have made great strides in the past 20 years, the need for electrical safety education continues to grow as our industry evolves and new technologies are introduced to the marketplace.
ESFI is grateful for the financial support provided by the following NEMA members in 2013 that help it champion its worthy cause:

- Coleman Cable Systems Inc.
- Eaton Corporation
- Hubbell Incorporated
- Hypertherm
- ILSCO Corporation
- Legrand/Pass & Seymour
- Leviton Manufacturing Co.
- Lincoln Motors
- Lutron Electronics Company, Inc.
- Rockwell Automation
- S&C Electric Company
- Schneider Electric
- Siemens Industry, Inc.
- Southwire Company

For more information on advancing electrical safety and becoming a contributor, visit www.esfi.org.

Testimonials

“ESFI impacts everyone—workers on the job, people at home, managers at the office, secretaries at their desks, and the people we commonly perceive to be most at risk for electrical hazards including electricians and linemen who interact with electricity routinely in their day’s work. ESFI’s unbiased voice sends a very powerful message to communicate hazards and safe practices to the general public and the workforce.”

— H. Landis Floyd II, Global Electrical Safety Competency Leader, DuPont

“Electrical safety is a core value for Siemens. We support ESFI because promoting electrical safety at home and in the workplace challenges the industry to be on the cutting edge of developing safety solutions that offer the highest level of protection possible.”

— Kevin Yates, President Low and Medium Voltage Division, Siemens Industry, Inc.

“Anyone who’s in the electrical business needs to be focused on safety. The impact of aging infrastructure in the workplace and in the home is a serious issue in terms of the risks that are involved, the fires that can be caused, and the deaths that can result. ESFI has done a particularly good job in addressing this issue and advancing the awareness of what’s involved to improve electrical safety.”

— John Engel, ESFI Chairman, President & CEO, WESCO

While it is not necessary to understand the ins and outs of the NEC, it is important to be aware of the inherent risks when the most up-to-date version is not adopted.

Electrical safety affects everyone, which is why ESFI proudly leads the charge to raise awareness of not only the electrical hazards that threaten the public at large, but also the unique hazards that threaten a variety of at-risk groups. For example, adults over the age of 65 have the highest risk of death from fire, so ESFI developed materials that target this vulnerable demographic.

There are also essential safety measures that need to be top-of-mind for those working in the field. ESFI’s workplace safety resources address the electrical safety concerns of industry professionals.

Finally, seven children a day are sent to the emergency room as the result of tampering with wall outlets. ESFI doggedly promotes the installation of tamper resistant receptacles, which are the only devices proven to prevent instances of childhood electrical shock.

Be sure to visit ESFI.org for our NESM resources as well as our extensive library of safety materials for the home, school, and workplace. Awareness and education are the only ways we will reduce the incidence of electrical fires. We hope you consider doing your part to bring electrical safety to your home and workplace.
IDEA developed a partnership with most estimating software companies to deliver IDW product data to contractors. This will connect the entire supply chain and enable better buying decisions.

The IDW Analytics tool makes my job 100% easier.
- Barbara Spadaro, Bridgeport Fittings

40% to 400% Improvement in DATA QUALITY

160 CEOs personally contacted with data quality scorecards

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10X MORE MARKETING CONTENT

Based on percent completion of marketing content (SAID elements) in the IDW

Platinum: 100%
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Silver: 90-94%
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Without IDW, we’d need TRIPLE the staff.
- Jeff Skiles, Kirby Risk Electrical Supply

3 NEW WAYS to Match Brands with Generic Requests
The 98-series non-specific UPC numbers enable distributors and contractors to automate the bidding process.

3.5 million SKUs populated in IDW

1000+ brands represented by 300 manufacturers
2.4 million SKUs populated in IDW
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4000+ distributor locations using IDW content

Contact IDEA to schedule a ONE-ON-ONE
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Southwire’s Stuart Thorn Named Copper Man of the Year

The Copper Club named Stuart Thorn, president and CEO of NEMA member Southwire Company, as the 2014 Copper Man of the Year. The Copper Club was formed in 1944 to convene all participants in the copper industry. It encompasses copper producers, fabricators, refiners, dealers, traders, and merchants.

“NEMA extends its heartiest congratulations to Stu for this honor. We know the value that our members bring to the electrical industry and are proud that a representative on our Board of Governors is receiving this prestigious award,” said NEMA President and CEO Evan R. Gaddis.

The Copper Club’s Chairman, Arthur Miele, said, “The Board of Directors selection of Stu Thorn to receive the 2014 Ankh Award for Copper Man of the Year recognizes the exceptional leadership that Stu has demonstrated not only at Southwire, but within the industry as a whole. Under Stu’s leadership and vision, Southwire has grown and diversified both organically and through acquisition, to become one of the largest producers of electrical cable in the world.”

2014 ARPA-E Summit Cements Role of Microgrids in Energy Future

The fifth annual Department of Energy (DOE) Advanced Research Projects Agency (ARPA-E) Energy Innovation Summit took place in February, just outside Washington, D.C. To date, ARPA-E has awarded $900 million to 362 projects associated with research and development in the energy field. A non-comprehensive list of NEMA member awardees on hand included ABB, Cree, GE (Global Research & Power and Water), and Eaton Corporation. Short synopses of awardee projects can be found at www.arpa-e-summit.com/Showcase/About-the-Showcase.

Aside from the technology showcase and high profile speakers like best-selling author Thomas Friedman and DOE Secretary Ernest Moniz, a main attraction of this annual event is the panel discussions from thought leaders. The topics are bellwethers of energy policy and innovation and ideas serve as important outlines for how issues will evolve in the near term.

For the first time, microgrids were explicitly discussed in a panel titled, “Microgrids—Why Are They Tough and Will They Matter?” Panelists included:

- Robyn Beavers, Founder, Station A Group and Senior Vice President of Innovation, NRG Energy
- Sumit Bose, PhD, Senior Electrical Systems Engineer, GE Global Research
- Daniel C. Esty, Commissioner, Connecticut Department of Energy and Environmental Protection
- James Galvin, PhD, Program Manager, Energy and Water, Environmental Security Technology Certification Program, U.S. Department of Defense (DOD)
- Haresh Kamath, Program Manager, Energy Storage and Distributed Generation, Electric Power Research Institute (EPRI)

This mix of vendors, politicians, utility representatives, and DOD personnel confirmed that microgrids can be big, complicated projects. There was general agreement that hurdles to increased adoption of microgrids include adverse regulations and some technical shortcomings, like enhanced control technologies.

It was encouraging that DOD, NRG, and EPRI view microgrids as a huge opportunity especially enabled by the falling costs of energy storage devices, including batteries. The microgrid industry is still in its infancy, but customers will need to work with equipment suppliers to ensure that the design and operation of these electric power systems are safe, reliable, and effective at sustaining electricity service, and when warranted, providing a return on investment.

While microgrids are now often touted in trade and increasingly mainstream press, their inclusion at ARPA-E cements them as a fixture in the development of our future electricity grid.

Ryan Franks, NEMA Program Manager  
ryan.franks@nema.org

MW 1000 is the world’s premier standard for general requirements, product specifications, and test procedures for the manufacture and packaging of magnet wire. It presents in concise and convenient form all existing NEMA specifications for magnet wire, including round, rectangular, and square film insulated and/or fibrous covered copper and aluminum magnet wire for use in electrical apparatus.

One set of technical changes includes amendments to general provisions of the dielectric breakdown test procedure to:

- specify an operating current for the fault detection circuit that is sufficiently low to detect faults in the film insulation, and
- clarify that the purpose of the procedure is to detect destructive ruptures in the insulation caused by the applied voltage, as opposed to detecting leakage current typically measured in insulated cables through hi-pot testing.

Another change is a set of revised elongation requirements for film-insulated magnet wire in the 1–4/0 AWG and 48–50 AWG ranges. NEMA made these changes to keep MW 1000 updated with state-of-the-art manufacturing technologies and to harmonize with elongation requirements recently revised in IEC 60317-0-1 General Requirements—Enamelled Round Copper Wire.

NEMA also declared as obsolete, specification MW 29-C Polyurethane Overcoated with Polyamide and Self-Bonding Overcoat Film Insulated Round Copper Magnet Wire for Solderable Applications, Thermal Class 105. This is because there are NEMA specifications for Class 155 and 180 of the same wire construction. MW 29-C will appear in the standard for one more year with the statement “Obsolete Effective December 31, 2013—provided for reference only for one year” at the bottom.

Other specifications that were declared obsolete over the past two years, but retained in MW 1000 to advise that they were obsolete, have been permanently removed and are no longer available.

One final significant revision was the removal of all uses of mercury described in the standard, specifically in the low voltage continuity and dissipation factor test procedures. For these procedures, technically suitable replacements such as saline and graphite are now available. Modern equipment provides more accurate testing without mercury, yet meets the overall objective of the test.

These revisions demonstrate that NEMA is committed to keeping test procedures in its standards up to date with current technology, and removing those that are outdated or promote the use of harmful materials.

The website www.MW1000.com provides a wealth of information including:

- steps on how to best use the standard
- list of all amendments since the issuance of the previous base edition (2008)
- table of current and obsolete magnet wire specifications
- recorded podcasts on topics relevant to MW 1000
- links to NEMA member manufacturers of magnet wire
- NEMA staff working with the magnet wire industry

ANSI/NEMA MW 1000-2014 can be ordered in hard copy or electronically for $138 at www.nema.org/standards.

Mike Leibowitz, Program Manager
mike.leibowitz@nema.org

Recently published standards

- ANSI/NEMA C29.17-2013 American National Standard for Composite Insulators—Transmission Line Post Type. Download at no cost or purchase in hardcopy for $64 on NEMA website.
- ANSI/NEMA C29.18-2013 American National Standard for Composite Insulators—Distribution Line Post Type. Download at no cost or purchase in hardcopy for $65 on NEMA website.
- ANSI/NEMA KS 1-2013 Heavy Duty Enclosed and Dead-Front Switches (600 Volts Maximum). Download at no cost or purchased in hardcopy for $118 on NEMA website.
- NEMA KS 1-2013 Heavy Duty Enclosed and Dead-Front Switches (600 Volts Maximum). Download at no cost or purchased in hardcopy for $118 on NEMA website.
Why Aren’t Traffic Signals Coordinated?

The Role of NTCIP Signal System Masters

One common driver complaint is, “Why aren’t these signals coordinated?”

The U.S. Federal Highway Administration estimates that “outdated traffic signal timing accounts for more than ten percent of all traffic delays.” In contrast, well-coordinated traffic signals reduce travel times, emissions, and fuel consumption, and improve safety.

The benefits associated with well-coordinated traffic signals are clear, but coordination requires a sophisticated approach, especially where more than one jurisdiction (city, county, and state, for example) is involved.

One way to improve traffic signal coordination uses signal system masters (SSMs), which:

- communicate with a traffic management center, where traffic signals for an entire city or region are monitored and managed; and
- control and adjust the green, yellow, and red indications at a single intersection.

SSM can implement a change in traffic signal timing at one or more intersections. Such changes might accommodate morning or evening rush hours, weekends, or traffic patterns designed for a special event. NTCIP 1210 v01 standardizes SSM communication among different types of traffic equipment, and controls a broad range of deployed traffic signal equipment.

NTCIP (National Transportation Communications for ITS Protocol) is a family of standards that defines both the communication rules (protocols) and the vocabulary (objects) among traffic control devices. It is part of the ITS (intelligent transportation systems) initiative, which enables smarter, safer, and more coordinated use of transportation infrastructure.

A joint effort among NEMA, the American Society for Highway Transportation Officials, and Institute for Transportation Engineers, NTCIP enjoys continuing support from the U.S. Department of Transportation Research and Innovative Technology Administration. Since 1993, NEMA and member companies in the NEMA Transportation Management Devices Section have led the development and promotion of NTCIP. For further information, see www.ntcip.org and www.standards.its.dot.gov.

Jean Johnson, Technical Program Manager | jean.johnson@nema.org

eMI3 and NEMA Join Efforts to Create Interoperability Standards for EV Industry

eMI3, the international electric mobility industry group aimed at accelerating interoperability throughout the electric vehicle (EV) market, recently held its second general assembly at ChargePoint’s headquarters in Silicon Valley, California.

eMI3’s goal is to enable global interoperability via a common interface language between all information and communication technology platforms that support EV users and the organizations that provide electric mobility services.

Officially established in November 2013 in Barcelona, Spain, eMI3 has attracted more than 35 private and public organizations representative of the global electric mobility market.

“Although eMI3 was initiated in Europe, we have had a global vision from the very beginning,” said Silvio Weeren, chairman of eMI3.

eMI3 works with relevant standards organizations to address electric mobility issues. NEMA’s Electric Vehicle Supply Equipment/Systems Section is working actively to drive interoperability in North America. During the recent meeting, eMI3 and NEMA agreed to further their ongoing liaison agreement to ensure the best alignment of the two groups’ industry standards work.

Andrei Moldoveanu, Technical Director | and_moldoveanu@nema.org

Listen to

Mike Leibowitz, Secretary of the NEMA Magnet Wire Section Technical Committee, and Jim Avery, Quality Assurance Supervisor at MWS Wire Industries and current Technical Committee Chairman, discuss five new product specifications in the ANSI/NEMA MW 1000 standard.

www.nema.org/MW1000-Podcast
Roger Daugherty Recognized by Motor and Generator Section

NEMA Motor and Generator Section expressed its appreciation to Technical Committee Chair Roger Daugherty, during a recent meeting. On hand to congratulate Mr. Daugherty are (from left) William Hoyt, NEMA Industry Director; John Malinowski, section chair; and Bill Buckson, Program Manager.

Photo by Pat Walsh

Working Space Clearances Keeping Current in its Place

While the ever-expanding use of electricity has created enormous technological growth, it has also increased human exposure to potential dangers. One important area of electrical safety is adequate working clearances. This is vital to allowing safe, unobstructed access to electrical equipment.

Section 110.26 “Spaces about Electrical Equipment” of the 2014 National Electrical Code® gives the individual working around electrical equipment important guidance on the various clearances needed. Section 110.26(A) is broken into subsections that cover working space, depth of working space, width of working space, and height of working space.

Any electrical equipment operating at 600 volts to ground or less—and is likely to require examination, adjustment, servicing, or maintenance while energized—shall conform to the various requirements expressed in the remaining subsections of 110.26(A).

Having the proper working space—depth, width, and height—is extremely important to the safety of the individual working within and around an enclosure. A 200A panelboard enclosure, typically found in a single-family residence, has specific requirements to ensure proper working clearances, according to Table 110.26(A)(1) Working Space. Assuming a 120/240V single phase system, you would experience 120V to ground, which demands no less than three feet of working clearance. In situations where voltage to ground is 151 volts or higher (or other conditions of exposure), the distance may increase to four feet.

Depth of the working space is no more or less important than the actual width of the space. According to 110.26(A)(2), width shall be the width of the electrical equipment or 30 inches, whichever is greater. This guarantees that an individual is not trapped within the work space. If the electrical equipment is six-feet wide, then the width of free working space will also be six feet.

There is also a height requirement. In 110.26(A)(3), with one noted exception for existing dwellings, working space shall be clear and extend from grade, floor, or platform to a height of 6’6” or the height of the equipment, whichever is greater.

Lastly, it is important to keep the working space clear—it is not for storage. Obstructing electrical equipment prohibits the entrance to and egress from the aforementioned working space as expressed in 110.26(B).

Electricity has no smell, makes no sound, and sadly has no conscience. Protecting safe working space clearances around electrical equipment helps keep the current where it needs to be—inside the equipment.

Paul Abernathy, Consultant

See related article, “Electrical Safety on College Campus Reconciles Competing Requirements of Safety and Economy,” page 16
ESFI Canada Advances Public Electrical Safety

ESFI Canada is committed to engaging safety and industry stakeholders as the core of a national mandate to reduce electrically-related deaths, injuries, and property loss across the country.

LOOKING BACK
In 2013, ESFI Canada focused on national campaigns that heightened awareness of potential electrical risks and hazards. Leveraging Electrical Safety Month activities, ESFI Canada launched Spring into Safety, encouraging homeowners to incorporate a basic electrical safety checklist as part of their spring cleaning plans. It also included tips to safeguard children from potential electrical hazards.

This public relations campaign included targeted releases and a dedicated section on the esfi.ca website, resulting in in 32 stories carried in daily, community, and online publications that reached 1.4 million Canadians.

In October, more than 70 stakeholders participated in two targeted safety sessions on combating unsafe counterfeit electrical products and reducing electrical workplace incidents. The outcome emphasized the need to build a common understanding and collaboration with key industry leaders as a means to advance common safety goals and objectives.

In November, following the release of the Royal Canadian Mounted Police 2012 Intellectual Property Crime Statistics,1 ESFI Canada launched Beware and Buy Safe, a campaign to enhance awareness and provide useful consumer tips to support safe electrical product purchasing decisions. This reinforced the need to warn consumers about harmful counterfeit electrical products. With research indicating that electrical products and electronics are preferred holiday gifts, this campaign included targeted releases, an online video, and a dedicated section of the esfi.ca website to shape consumer buying behavior during the holiday season. Campaign materials were included in 51 channels that reached 17 million Canadians.

ESFI Mexico Committee Restarts Activities

Citing the need for constant vigilance against low quality, dangerous, and often counterfeit products, the Electrical Manufacturers Association in Mexico (CANAME) and the Association of Standardization and Certification (ANCE) recently reiterated their commitment to restart the Electrical Safety Commission through ESFI Mexico.

Industry leaders met in January and elected Julian Yarza of Hubbell Mexico president of the ESFI Mexico Committee. Other actions taken at the meeting were the development of a strategic general plan and 2014 objectives:

• develop a marketing plan considering promotion activities

  • restart the Electrical Safety Commission web page
  • recruit new members (associations, manufacturers, government agencies, utility)

The committee adopted the following safety themes that promote:

  • information about grounding systems
  • use of proper electrical conductors for electrical installations
  • information about proper protection devices to reduce fires
  • correct use of live protection devices
  • use of electrical devices to protect property damages

CANAME and ANCE have been working with NEMA Mexico as ESFI Mexico technical secretary to promote electrical safety. During this new stage, it will be important to provide useful information to Mexican consumers about electrical products.

As part of this new cycle, Mr. Yarza met with Brett Brenner, ESFI President in February in Washington, D.C. He conveyed the general action lines that ESFI Mexico Committee will undertake and the topics that will be developed.

Ricardo Vazquez, NEMA Mexico | r_vquez@prodigy.net.mx

LOOKING AHEAD
Feedback from these campaigns propelled ESFI Canada to build and define a strategic direction to address key gaps in public electrical safety with 2014 campaigns. Members also created new participation models that facilitate shared resources.

The participation and dedication of our members, including the British Columbia Safety Authority, CSA, Eaton Canada, e-Branders, Electrical Safety Authority, Electro-federation Canada, Leviton Canada, Sonepar, Thomas & Betts, ULc, and WESCO, not only supported advancements to public safety awareness in 2013, but defined a plan for 2014.

This year, we encourage homeowners to think about what is Behind the Wall, with campaigns on making safe and responsible decisions about their electrical system when renovating or planning repair and maintenance projects.

Cathy Chernysh, Executive Director, ESFI Canada | cathy.chernysh@esfi.ca

Halogen A-line Lamp Shipments Continue to Rise during Fourth Quarter

Shipments of halogen A-line lamps increased for the sixth consecutive quarter in 4Q2013, posting an increase of 41.8 percent over the previous quarter. Similarly, the index for LED (light-emitting diode) A-line replacement lamps increased 42.3 percent during the quarter. CFL (compact fluorescent lamp) and A-line incandescent lamp shipments trended in the opposite direction by slipping 0.4 and 10.6 percent quarter-over-quarter, respectively. The index for CFLs declined by 2.4 percent for 2013 versus 2012. Meanwhile, the A-line incandescent index registered an annual decline of 13.5 percent.

Incandescent lamps ceded 4.3 percentage points of the combined A-line market during the quarter, with a share of 51.5 percent. Shipments of CFLs garnered a share of 33.8 percent, a decline of 0.3 percentage points. Shares of halogen and LED A-line lamps increased to 13.6 and 1.1 percent, respectively.

HID Lamp Indexes Continue to Slide

NEMA’s shipment indexes for high intensity discharge (HID) lamps continued to decline during 4Q2013. Shipments of sodium vapor lamps fell 5.7 percent on a seasonally adjusted basis compared to the previous quarter. Metal halide lamps contracted for the seventh consecutive quarter, declining 3.6 percent on a quarterly basis. Following suit, the index for mercury vapor lamps dipped 5.6 percent. Calendar year 2013 showed decreases of 6.1 percent and 7.0 percent for sodium vapor and metal halide lamps, respectively. Mercury vapor lamps shipments posted an annual decline of 8.9 percent during CY2013.

Market shares for sodium and mercury vapor lamps declined marginally to 32.3 percent and 4.0 percent, respectively. In contrast, metal halide lamps increased during the quarter reaching 63.7 percent.

Demand for T5 and T12 Lamps Increases

T5 and T12 lamp shipments improved by 9.9 percent and 9.4 percent, respectively, on a quarterly basis (q/q) during 4Q2013. Shipments of T8 lamps contracted 2.1 percent q/q. Nevertheless, calendar year (CY) 2013 showed the index advancing 9.4 percent on an annual basis. The index for T5 lamps also registered a gain during CY2013, besting CY 2012 by 9 percent. In contrast, T12 lamps posted an annual decline of 25.6 percent for CY2013.

Market shares for the three linear fluorescent lamp types showed mixed results during the quarter. T8 lamps yielded 2.3 percent posting a share of 70.6 percent. T5 and T12 lamps posted gains during the quarter, securing market shares of 11.7 and 17.7 percent, respectively.

Stacey Harrison, Director, Statistical Operations | harrisons@nema.org
Q. How do the ANSI Z535 standards contribute to worker safety in manufacturing plants?

The ANSI Z535 standards of signs, colors, and symbols are periodically updated to reflect the latest safety communication technology so that plant workers, even those with weak English-language skills, can easily notice and understand a safety message. They specify a system for communicating on signs and tags the hazards and best safety practices associated with the plant environment, processes, and equipment.

Got a question? Ask the experts at ei@nema.org

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