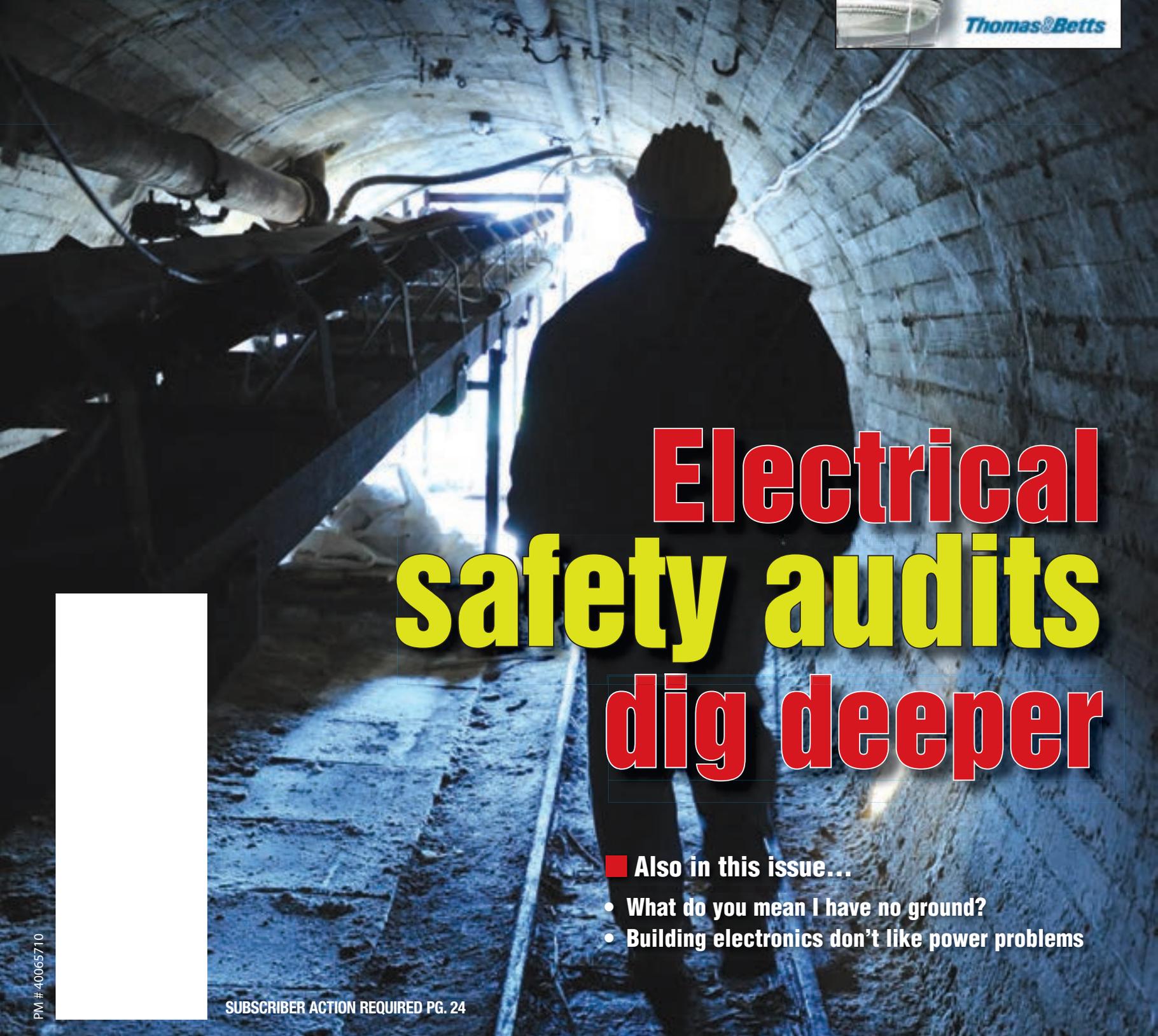
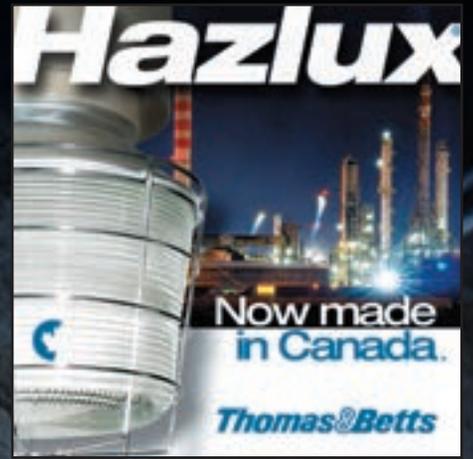


50 years Electrical Business



Electrical safety audits dig deeper

■ Also in this issue...

- What do you mean I have no ground?
- Building electronics don't like power problems

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EBMag is featuring a different guest editor on this page every issue during our 50th anniversary year.

Jodi Moskal is a construction electrician, co-owner of Moskal Electric Ltd. and the current chair of the Winnipeg Chamber of Commerce.

A great time for construction trades in Winnipeg

I am honoured by this opportunity to showcase a few remarkable projects in our city as we celebrate the 50th anniversary of Electrical Business Magazine. I'm also grateful to Anthony for having the courage to turn over his pen to a *live wire* from Winnipeg.

It's a great time to be an electrician or any other construction tradesperson in Winnipeg, the centre and heart of our country. With the recent ribbon-cutting of CentrePort by the prime minister, the city has become Canada's first inland port, offering 20,000 acres of high-quality, affordable industrial land with access to tri-modal transportation (including three Class 1 railways—Canadian National, Canadian Pacific and Burlington Northern Santa Fe—yet to be developed, which means lots of work on the way).

Recently and soon-to-be completed projects include a new airport (named one of the world's 10 most iconic terminals), a stunning CFL football stadium, and the first national museum outside of Ottawa—the Canadian Museum for Human Rights.

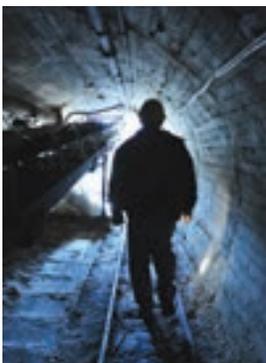
Downtown revitalization continues to reflect the bold ideas of our citizens, with several substantial construction projects evident in the city centre. One of

these projects will be right across from the MTS Centre, home of the Winnipeg Jets: a \$130-million project comprising a 15-storey hotel atop a five-storey office tower, a parkade and 21-storey condo tower.

The RBC Convention Centre is undergoing a \$180+ million expansion, making it the largest tier-two, publicly owned convention centre in Canada. Soon to be developed are 12 acres at The Forks, a historic meeting place and junction of the Red and Assiniboine Rivers. Discussions for the location of our newly acquired World Trade Centre are also underway, along with a \$200-million redevelopment plan for Assiniboine Park & Zoo.

Winnipeg continues to grow its building permit values each year, with 2013 showing an increase of over 13% from 2012.

While it may not be the best place to be a contractor given the restrictive apprenticeship ratios as well as the (perceived or real) questionable tendering practices at both the municipal and provincial government levels, the place to be is Manitoba for skilled tradespeople. Low cost of living, limitless entertainment, high wages and an abundance of exciting projects are making our city the No. 1 choice to live, work and play. **EB**



On the cover and page 10

Electrical safety audit in the mines... a case study

While performing a detailed external electrical safety audit in the mining sector using the validation and verification techniques of interviews, documentation review and inspections/observations, I measured the success of the implementation of available controls.

STOCK PHOTO.

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It does not take a genius to recognize that almost every major subsystem in today's commercial buildings has some type of solid-state electronics package installed, and pretty much all of these electronic systems can have problems due to power.

14 LEDs cut energy consumption and cost by half

Running leaner and greener is a top priority for companies globally as facility managers look for solutions to help mitigate the rising cost of electricity, and LED technology has emerged as one of the most attractive retrofit solutions for delivering immediate performance improvements and cost savings.

17 The Apple-ization of smart submeters

Pervasive consumer technology can benefit you. Like the smartphone, the most profound change in metering technology over the past 30 years is that the real value derived from metering hardware is that it houses incredibly sophisticated software.

18 A glimpse into Taiwan's LED lighting players

Last November, EBMag's Alyssa Dalton was invited on an exclusive press tour in Taiwan to visit select LED lighting manufacturers in advance of the Taiwan International Lighting Show (TILS) 2014. Through this rare opportunity, she was able to see how these companies have evolved within this dynamic industry.



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Wesco acquires utility wholesale distributor LaPrairie Inc.

Wesco (www.wesco.ca) has entered a definitive agreement to acquire LaPrairie Inc. (www.laprairieinc.com), a wholesale distributor of electrical products serving the transmission, distribution and substation needs for utilities and utility contractors for the last 25 years across Ontario, Quebec and Atlantic Canada.

“LaPrairie is a well-regarded distributor of electrical products with a strong technical sales force that has developed long-standing relationships with utility customers,” said John J. Engel, Wesco’s chair, president and CEO.

Closing is expected to occur in January 2014. Wesco says LaPrairie generates about \$30 million in annual revenue from its location in Newmarket, Ont.

Sept-Iles the home of Franklin Empire’s 20th branch



Franklin Empire (www.feinc.com) is opening its 20th branch, which is located in Sept-Iles, Que. A native of the region, branch manager Jean Levasseur “comes with many years of experience in the domains of electrical and mechanical distribution in Northern Quebec”, says Franklin.

The new branch can be contacted at:
372, ave Noel
Sept-Iles QC G4R 1L7
(418) 960-1302 - Tel
(418) 960-1242 - Fax

Schneider lands 35kV power contract with North West Redwater Partnership



Daniel Peloquin

Schneider Electric (www.schneider-electric.com/ca) announced a long-term agreement with North West Redwater Partnership (NWR, www.nwrpartnership.com) to engineer and build the electrical infrastructure within the NWR Sturgeon Refinery near Edmonton, Alta.

“Schneider Electric has been supporting NWR on this project for several years and are pleased to have been selected as a key partner for this important facility in Alberta,” said Daniel Peloquin, president, Schneider Electric Canada (in photo).

The agreement assigns the engineering, procurement & construction (EPC) responsibility to Schneider as the main electrical contractor providing the electrical infrastructure within the Sturgeon Refinery Project.

The company’s scope of responsibility will be the 35kV power distribution & control system and all associated electrical equipment, prefabricated buildings and services for Phase 1 of the refinery. As the main electrical contractor—

together with an industrial electrical contractor—Schneider will execute associated site-based construction and equipment testing to ensure the solution “will meet NWR’s safety, quality and performance expectations”.

The first phase of the refinery will convert 50,000 barrels per day of bitumen, supplied by the Alberta Petroleum Marketing Commission (75%) and Canadian Natural Resources Ltd. (25%) to products such as ultra-low sulphur diesel fuel. This refinery will be the first built in Alberta in over 30 years, says Schneider.

PHOTO A. CAPKUN.

RECALL: Red Wing Shoes recalls steel-toe work boots

Health Canada informs us of a recall involving 2012 and 2013 Red Wing Shoe Company (www.redwingshoes.com) work boots in which the toe caps in certain sizes and styles of footwear may not comply with applicable voluntary standards for protective footwear, ASTM F2413 and CSA Z195, and may not withstand impact.

About 9025 pairs were distributed in Canada, and about 105,000 pairs in the United States. Health Canada has not received any reports of incidents or injuries to Canadians related to the use of these work boots.

The relevant steel toe caps all came from a single vendor and contain the size 14 cap, bearing the date code 122. Consumers should check the label on the inside of the tongue of their boots to identify the style number, size, width and manufacturing date. Date codes are visible and stamped, for example, 12/12, 01/13, 09/2013, etc.

The affected boots were sold in sizes 11-18 between October 2012 and November 2013. The toe caps are manufactured in Germany by Esjot Goldenberg, Esjot Group, while the boots are manufactured and assembled in the States.

Consumers should stop using the recalled boots immediately and visit their local Red Wing dealer or contact Red Wing Shoe Company to replace affected pairs.

Showcase your shop and trade with ECAA and Skills Canada-Alberta



The Electrical Contractors Association of Alberta (ECAA, www.ecaa.ab.ca) says it is partnering with Skills Canada-Alberta (SCA, skillsalberta.com) to “share our industry and organization with students, and we need buy-in from our Associate and Contractor members”.

According to ECAA, participation gives you the opportunity to talk about your industry and showcase your organization to future workers, apprentices and customers. The only cost of participation is time: just 1-3 hours as students tour your facility and you provide them with “an interactive, fun experience”. (Transportation expenses are typically \$150-\$300/class/visit and will be covered by Skills Canada-Alberta.)

Interested? ECAA says SCA will work with you to make a field trip to your facility “a truly memorable event for all involved”. Contact ECAA executive director Sheri McLean at smclean@ecaa.ab.ca for more information and to take the next steps.

ELECTRICAL BUSINESS is the magazine of the Canadian electrical community. It reports on the news and publishes articles in a manner that is informative and constructive.

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Industry often struggles with maintaining both safety requirements, as well as machine reliability. In comparison to the switches below, Eden offers tremendous advantages in both of these areas. Eden is a non-contact, non-magnetic, non-mechanical safety sensor designed using solid state technologies with no moving parts.

Magnetic switches

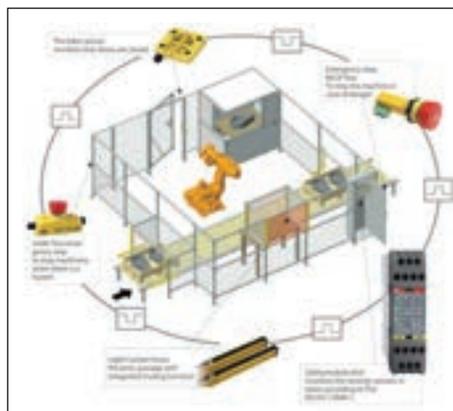
- Magnetic reed safety switches rely on the strength of the coded magnet to hold the safety contacts in their "safe" state. Slight misalignment, machine vibrations or metallic interference reduces this holding strength
- Vibration can cause "contact bounce" meaning 1 of the 2 safety contacts has changed state for a brief moment resulting in costly down time
- Single channel faults are very difficult to troubleshoot, identify and rectify – requiring the cycling of all doors until the fault is found

Mechanical switches

- Mechanical keyed interlock switches are Safety Category 1 devices – keys can break, fall off, become lost or remain engaged causing the machine to continue to run in an unsafe condition
- Sagging doors can become misaligned and cause unwanted wear on components—heads can be broken, removed, loosened, rotated or fall off and the switch will again keep the system operational in an unsafe condition



The Eden sensor was developed to eliminate the costly and potentially dangerous problems associated with using Mechanical Keyed Interlock Safety Switches and Non-Contact Magnetic Safety Switches. Eden offers control reliability and maintains the highest level of safety at reduced costs that allow companies to remain competitive in the global marketplace.



The Vital 1 Controller was developed to address the shortcomings of safety relay technology, reduce the need for multiple safety relays, and offer an enhanced level of safety that conventional safety relays cannot. Using our proprietary dynamic pulse technology, Vital can accommodate up to 30 safety devices, detect faults at the time of occurrence, and meet the highest level* of safety.

Vital 1 comes standard with LEDs and output for diagnostics.

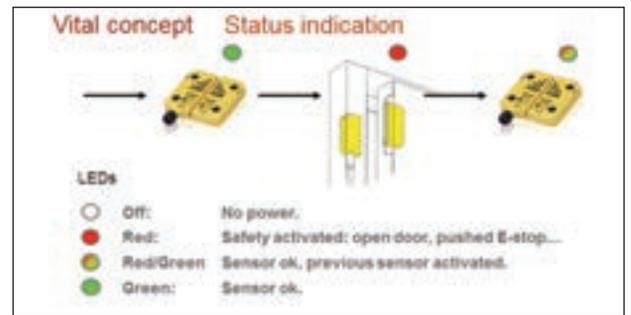
Dynamic pulse technology allows for single channel wiring eliminating nearly 50% of wiring

points compared to conventional dual channel systems.

Cycling power, replacing the controller, or opening other devices will not fool the Vital.

A Tina device adapts safety sensors with mechanical positive forced disconnecting contacts, such as emergency stops, switches and light grids/curtains with dual outputs to the dynamic safety circuit in Vital.

Tina is available in several versions depending on the type of safety component that is connected to the Vital circuit. Also available is a bypassing unit, three connector blocks with 2, 4 or 8 M12 connectors, and a blind plug for unused connections. As an accessory there is a Y-connector for series or parallel connection and even for connection of light beams with separate transmitter and receiver. Tina units are also included in emergency stop models Smile Tina and INCA Tina.



Douglas Critch
Field Support Technologist
Jokab Safety Products
Phone: 519-982-1744
douglas.l.critch@ca.abb.com



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Vital is the heart of a solution which makes it possible to install/connect many different types of safety device in the same safety circuit and still achieve PL e according to EN ISO 13849-1. The Vital module is based upon a dynamic single-channel concept as opposed to conventional dual-channel safety relays. Up to 30 dynamic sensors can be connected directly in the safety circuit and be supervised by only one Vital module. The Vital therefore replaces several safety relays. Safety components with output contacts can be connected to the Vital via low cost Tina adaptors. www.abb.ca/lowvoltage

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ABB wins \$75 million HVDC order with Hydro Quebec and New England utility

ABB (www.abb.com) has won orders worth around \$75 million from Hydro-Quebec and New England's National Grid to refurbish three high-voltage direct current (HVDC) converter stations.

The multi-terminal HVDC link between Quebec and New England was the world's first such link to be put into service between 1990 and 1992, says ABB. The company will now replace the 20-year-old control and protection systems with new modular advanced control systems (MACH) for HVDC equipment.

The link has a total transfer capacity of 2000MW and spans a distance of 1500 km from the La Grande II hydroelectric generating complex near James Bay in eastern Canada, via Nicolet (a substation located on the south shore



of the St. Lawrence), down to Sandy Pond near Boston, Mass.

The project scope also includes refurbishing two cable transition stations, and a control and protection system replica for a test centre in Canada. The stations are scheduled to go in operation in stages, and will be completed by 2016.

Ontario's develops its first integrated OH&S strategy



Ontario's Ministry of Labour (www.labour.gov.on.ca/english) has developed what it calls the province's first integrated strategy to prevent injuries and improve the delivery of workplace health and safety. It aims to guide the ministry in setting priorities to prevent injuries and create a culture where health & safety are at the centre of every workplace. The strategy includes actions to:

- Support small businesses with new resources to keep workers safe.
- Ensure that all workers, especially those most at risk, receive the help they need.
- Make the delivery of health & safety services more effective and efficient.
- Raise awareness among Ontarians about ways to stay safe and healthy at work.
- Foster compliance with workplace health & safety regulations.

This is the province's first integrated health & safety strategy, says the government, and builds on recent Ministry of Labour initiatives to protect workers and keep them safe at work, including:

- introducing mandatory health & safety training for workers and supervisors
- creating task groups for small businesses and for vulnerable workers to address occupational health & safety issues
- weekend and after-hours workplace inspections

The government says it heard from more than 1250 consultation participants and received 220 responses to the consultation paper it released back in March 2013.

Schneider, Siemens, Philips and GE among 2014 Global 100

Corporate Knights—a Toronto-based media and investment advisory company—released its Global 100 Most Sustainable Corporations in the World (Global 100) index for 2014, and a few familiar

industry players are on the list.

Congratulations to Schneider Electric SA (#10, www.schneider-electric.com), Siemens AG (#27, www.siemens.ca), Koninklijke Philips Electronics NV (#48, www.philips.com) and General Electric (#59, www.ge.com).

"Schneider Electric progresses again in the Global 100 Most Sustainable Corporations ranking," said Jean-Pascal Tricoire, chair and CEO, Schneider Electric. "Integrating the Top 10 ranking this year and emerging as the leader in our industry is a strong incentive and encouragement to increase our engagement in sustainability."

Inclusion in the Global 100 index is determined using 12 quantitative sustainability indicators, including the amount of revenue companies generate per unit of energy consumption, the ratio of CEO to average worker salary, and lost-time injury rate.

"The Global 100 follows a rules-based index construction methodology," said Doug Morrow, managing director at Corporate Knights. "We unpack 'sustainability' into its component parts, and build the index from the ground up using clearly defined ratios and performance indicators."

NWT Energy Action Plan focuses on efficiency and alternative energy

Investments in energy efficiency programs, developing alternative energy systems, and reducing the high cost of energy in the Northwest Territories are highlights of the NWT Energy Action Plan, released by the Ministerial Energy Coordinating and Climate Change Committee-of-Cabinet (MECC).

The Energy Plan presents a three-year action plan and a long-term vision. It was developed in conjunction with the NWT Power System Plan, also released today by the Northwest Territories Energy Corp., a business development subsidiary of the Northwest Territories Hydro Corp. The Power System Plan provides a long-term outlook and vision for the territory's electricity infrastructure needs over the next 20 years.

"The Energy Action Plan builds on the success we have seen over the past few years due to our investments in energy conservation, efficiency and renewable energy development," said Premier Bob McLeod, chair of the MECC. "Residents and businesses need affordable and reliable energy, and this

plan shows where we need to make investments in the short term to help residents and communities reduce their energy use and costs."

The NWT Power System Plan proposes short-term actions aligned with the Energy Plan and a long-term vision for the NWT electricity system.

"Expanding the NWT grid to connect our existing hydro systems with communities, industry and the rest of Canada will create the backbone transmission infrastructure necessary to transform our energy system, support the potential expansion of the Taltson Hydro facility, and unlock our enormous hydro potential," said Michael Miltenberger, minister responsible for the NT Power Corp.

NECA welcomes Electrical Contractors Association of BC as 'CECA Pacific'



The U.S.-based National Electrical Contractors Association (NECA, www.necanet.org) welcomed

the Electrical Contractors Association of British Columbia (ECABC, www.eca.bc.ca) as its newest International Chapter.

There are now 11 NECA International Chapters—organizations whose purposes are "substantially similar to those of NECA", representing members engaged in the business of electrical contracting, but located outside the United States of America or its territories.

NECA says it began establishing International Chapters about two decades ago, each of which is a national or provincial trade association for electrical contractors within its own country.

ECABC's membership consists of union-affiliated contractors, open shop contractors, manufacturers and distributors across three chapters: Interior BC (Prince George), Vancouver and Vancouver Island. ECABC is also a member of CECA (Canadian Electrical Contractors Association), and is being designated 'CECA Pacific' on NECANet and in the NECA Book.

Emerson to buy remaining stake from SPX

Emerson announced it has signed an agreement to acquire SPX's 44.5% minority interest in EGS Electrical Group, giving it 100% ownership of the business. Emerson and SPX have jointly held the business since 1997, with Emerson responsible for operational management and consolidation of results in its Industrial Automation segment.

"We are excited for EGS to become a wholly-owned business of Emerson," said chair and CEO David N. Farr. "Emerging opportunities with our Process Management and Industrial Automation businesses make this the right time to assume full ownership and realize the synergies possible as a fully integrated business of Emerson."

The transaction is expected to close within two months, subject to required regulatory approvals; the purchase price will be \$571 million. **EB**

ELECTRONICS

in your buildings don't like power problems

Ron Auvil

In my role as a senior project technician, I spend a lot of time in buildings diagnosing problems. My responsibilities involve electronic controls on HVAC equipment. I also try to help the customer by diagnosing common problems with other equipment, which might include telephone systems, elevators, security equipment and life safety systems.

Admittedly, I can be a little slow to note a common denominator while working on problems with these various systems but, over a period of time, I have noticed something that repeats itself over and over again: problems due to power! Approximately 25% to 35% of the service calls I get are somehow related to a power issue of one type or another.

Prevalence of electronics

It does not take a genius to recognize that almost every major subsystem in today's commercial buildings has some type of solid-state electronics package installed. Virtually every HVAC unit purchased today has an electronics board in the control panel. Ditto for security, fire and life safety systems. Digital telephone and computer network systems are the same.

Regardless of system type, the common element is the electronics. Another factor in this electronics equation is that there are 'old' electronics and 'new' electronics. Some electronic systems in today's building equipment were installed 20 or more years ago, and are even more susceptible to problems.

All of the electronic systems mentioned above can have problems due to power. Many electronics and device manufacturers will claim an amount of tolerance to power problems; many will say that a fault due to power "should not happen". Unfortunately, the nice tech support folks on the other end of the telephone are not stuck on an elevator or listening to the fire alarms going off after a thunderstorm.

Typical power scenarios

Anyone working in a field utilizing electronics in a building should be able to easily recognize the scenarios that affect the power to the electronics. These scenarios typically are very repetitive in the building and, in some cases, occur frequently.



A flexible current probe is wrapped around the motor leads at a variable speed drive so the current can be measured with a clamp meter. This shows whether a variable speed drive has been damaged by a lightning strike.

Lightning strike

One of the most common scenarios is a lightning strike. The prevalence of this problem will depend greatly on your location and climate. I happen to live in the southeastern United States, which is famous for summer thunderstorms in the afternoon. My personal rule of thumb is that after a thunderstorm moves through I will get at least one or two calls from a building that are lightning related. Sometimes I can even watch weather radar and know exactly which of my buildings will be calling.

Lightning can cause a whole host of problems. Keep in mind that a lot of the electronics, especially HVAC equipment, is located on the roof or outside the building. This makes it even more susceptible to lightning. When lightning is the culprit, its effects can be catastrophic. In many cases the electronics are wiped out, with visible burn marks and a burned smell.

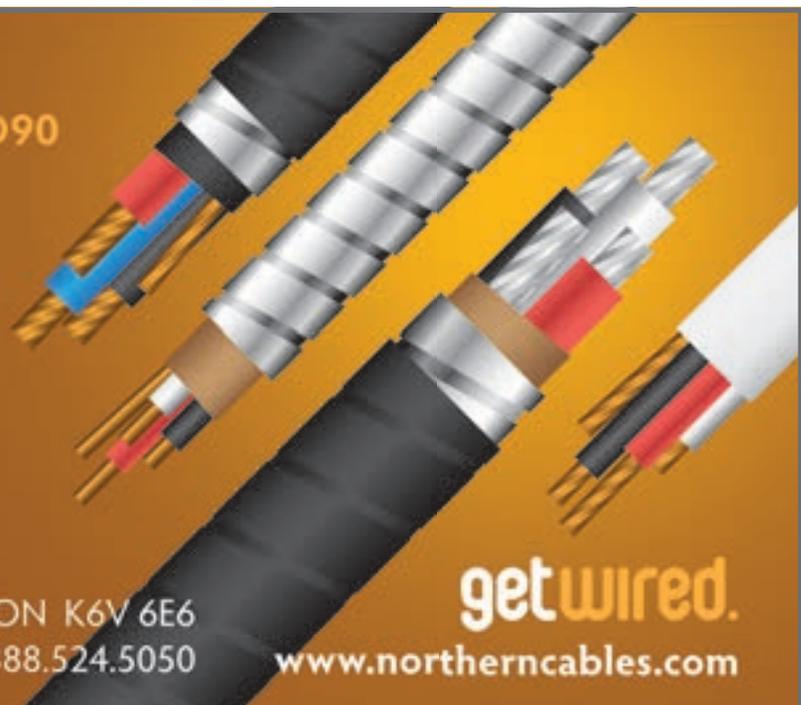
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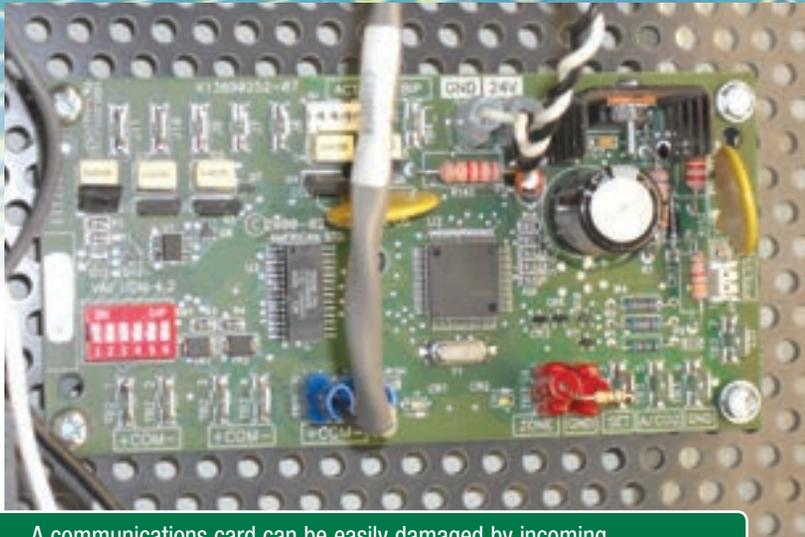
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A communications card can be easily damaged by incoming power problems. Burn marks on the electronics and a burning smell are indicators.



The controller power supply voltage is being checked with a milliamp clamp meter. Power problems can affect the power supply and cause the controller to malfunction or fail.

Moving the electronics, as well as better lightning protection and grounding, can help.

If a computer program is running on an electronic chip in the device (EEPROM or Flash ROM) it may be wiped clean by the lightning strike and start up 'stupid' (not operate at all). I have a building with old 1990s electronics that had to be reprogrammed after every major thunderstorm. It is not uncommon, after a power problem, for 1% to 5% of the devices on a building automation system network to not communicate or function properly.

Recently, I received a call about the fireman's panel in a building not functioning. This building had suffered from many power problems in the recent past, usually one every two weeks or so. The electronic controller in the panel had faulted out and had to be replaced. Obviously this was a critical system. The electronic controller was replaced and

started up. It worked for a few seconds, then rebooted every 10 seconds. The incoming power was turning On and Off every 10 seconds.

I could hear a clicking noise and traced it to an uninterruptible power supply (UPS) in the ceiling. The continuous power problems had damaged the UPS and caused it to cycle On and Off. Left as is, the life safety panel would not function properly and the new controller would be damaged. We had to replace the damaged UPS as well. The fireman's panel then functioned properly.

Power loss/generator testing

Another problem is power loss. There can be many causes of a power loss, including utility problems, maintenance lapses, device surges and others. Depending on the condition that caused it, an electronic device may not recover properly after the power is restored.

When a power loss occurs, the backup generator will start after a short time delay. I happen to work in hospitals a lot and, by code, the backup generators have to start within 10 seconds after utility power loss. Also by code, the backup generators are tested once per month. Important building electronic devices are on this backup power circuit. Depending on the causes, there may be power surges as well as voltage and current problems as the generators start, which may cause electronic circuit problems. It is not uncommon for 1% percent of electronic devices to have some kind of problem after the generator test is performed.

When a system is critical, a small UPS is installed at the electronic device power supply. In this way, the device does not really ever see a power failure. Another advantage of some UPS systems is they may also provide some surge protection.

Another time-tested technique is to just reboot the device, usually by removing power until it is completely off, then turning the power On again.

Utility problems

A large number of problems with electronic devices are due to the power utility. These problems can be more systemic, ongoing and difficult to solve. They are also unique in that some utilities will not readily acknowledge power problems. In the event of continuous, repetitive power problems with no apparent cause such as lightning, you suspect utility problems.

In my experience, one of the main indicators is the location of the utility power feed. Some of the utilities feed power to a building from a substation that is distant and has other large customers on it. A problem with one or more customers on the same power feed will show itself in building power problems. Often, the different facilities will experience the same power problems and symptoms.

Should you suspect utility problems, the best solution may be to install power quality measuring equipment at the building to show what the problem is and when it occurred. This is often enough to go back to the utility and ask for an adjustment, or even a reimbursement in some cases.

Summary

As we have seen, power problems have a bad effect on electronic devices. To detect a power problem, a technician will first check out the power supply to a device to make sure it is functioning properly. If left uncorrected, these power problems will cause electronic devices to fail, causing critical building systems to operate improperly. **EB**

Ron Auvil is a senior instructional consultant for a major HVAC/controls manufacturer, specializing in staff and workforce performance issues. An author and curriculum developer, Ron has worked with some of the world's largest companies, providing custom training on improving the operations of their environmental systems. His clients have included NASA, the Pentagon and the University of South Carolina.

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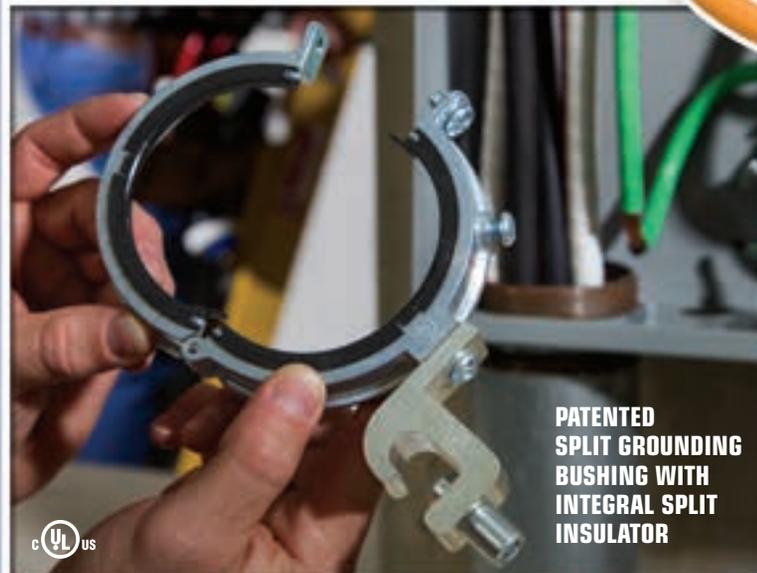
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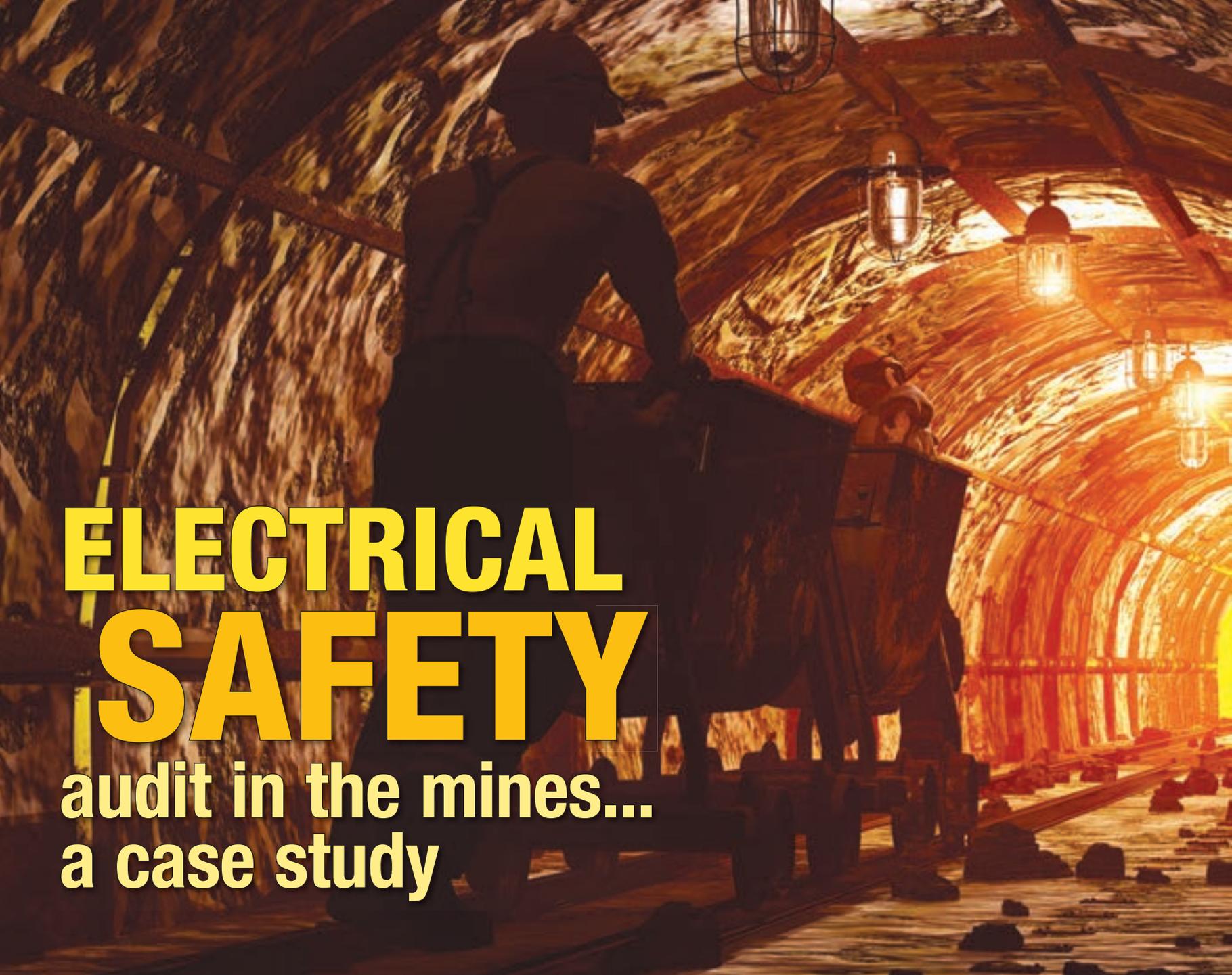
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ELECTRICAL SAFETY

audit in the mines... a case study

Terry Becker, P.Eng.

Experience is the most valuable lesson. Different industry sectors have attempted to interpret and implement practices using the CSA Z462 “Workplace electrical safety” standard as well as other applicable standards or guidelines but, from travelling across Canada and performing electrical safety audits, it is apparent we need to do a better job managing workplace electrical safety.

Here I will highlight the current state of workplace electrical safety at one company within the mining sector. Experience shows that, in many cases, a company’s ability to properly manage electrical hazards has been limited by the amount of correct information made available to them. Most companies take an approach that typically doesn’t include the development and application of an electrical safety program (ESP).

This article will reinforce my findings and provide specific references. The goal is to ensure all workers in the workplace are not exposed to electrical hazards. When avoidance is not practicable by establishing an electrically safe work condition, then the risk related to the energized electrical work task performed needs to be reduced to as low as reasonably practicable (ALARP).

Why companies perform electrical safety audits

To have sustainable performance of the control measures you implement to mitigate or reduce the risk of worker exposure to electrical hazards, it is critical that you perform at least an annual internal electrical safety audit or an external electrical safety audit every three years.

From your interpretation of the available standards and your actual implementation, you must check to ensure the anticipated risk reduction is actually real.

Mining sector case study

While performing a detailed external electrical safety audit in the mining sector using the validation and verification techniques of interviews, documentation review and inspections/observations, I measured the success of the implementation of available controls.

Background

The mining sector company has a large underground mine, surface mill and related surface facilities. The company had completed an engineering incident energy analysis study, and detailed arc flash and shock warning labels had

been applied to power distribution equipment. Arc-rated clothing, rubber insulating gloves with leather protectors, hot sticks and test equipment had been procured. Training had not been consistently provided to all qualified electrical workers, and no training at all had been provided to non-electrical workers.

OH&S regulations

The applicable OH&S regs are very stringent with respect to worker safety in the mining sector. There is a general requirement to identify workplace hazards and take action to protect workers. Electrical hazards are not specifically identified within the requirements outlined by the regulator, in this case.

The company did have an overall comprehensive Occupational Health & Safety Management System (OHSMS) with a very detailed risk assessment process. The overall OHSMS included a detailed requirement for a field level hazard assessment (FLHA). Work tasks are controlled with a detailed Computerized Maintenance Management System (CMMS). There is a requirement to audit the overall OHSMS. The company had chosen to use CSA Z462 with respect to managing electrical hazards.



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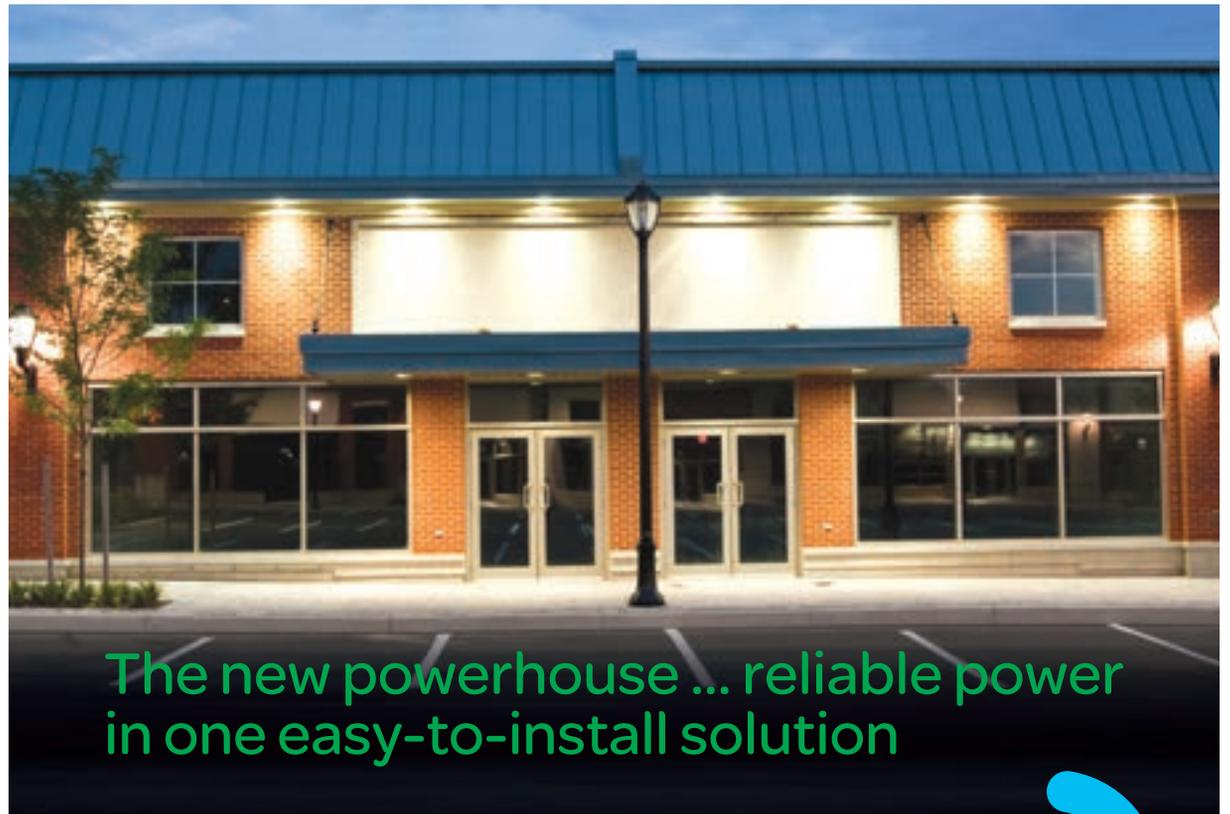
Findings

An OH&S management system audit is a systematic, structured approach to ensure the 'system' is performing as intended. All available preventive and protective control measures that have been implemented are reviewed and assessed against the expected performance—in this case, CSA Z462. At the completion of the electrical safety audit, some of the findings identified included:

- The existing OHSMS did not include any content related to electrical hazards. Incident investigation did not include information specific to electrical hazards. There was no identified process of emergency response to an electrical incident and no documented process of emergency release of a shock victim. A comprehensive lockout practice was established and followed.
- The existing FLHA process did not identify shock or arc flash. Workers were not identifying the electrical

- hazards and documenting the correct controls e.g. application of shock approach boundaries, the arc flash boundary, use of a procedure and selection of personal protective equipment (PPE), tools and equipment.
- An energized electrical work permit (EEWP) system had not been implemented.
- A single person was the champion for electrical safety at the mine.
- Contractors' hazard identification processes had not been checked to confirm they were properly identifying electrical hazards and implementing appropriate controls.

- The 2-Second Rule was not used in the engineering incident energy analysis study.
- No formal electrical safety program was developed and implemented.
- Worker knowledge was not current to the requirements of CSA Z462 with respect to applicable boundaries, terms and phrases required to identify the electrical hazards and take appropriate action to implement control measures. Training had not been documented in a training matrix and provided at a regular frequency. No training had been provided to non-electrical workers.



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- Maintenance shops were using some damaged extension cords.
- Risk assessment specific to an energized electrical work task was not being completed.
- Electrical-specific PPE, tools and equipment were available, but some rubber insulating gloves were found not to have been tested within the last six months. An excessive number of hot sticks were procured (over 20 when probably only five

were required). No rescue hot sticks were available.

- Arc flash suit hoods did not have hood ventilation systems.
- It was uncertain whether qualified electrical workers were actually wearing the arc flash suits when required.

Recommendations

The outcome of the detailed external electrical safety audit

recommended that a formal electrical safety program be developed and implemented, and that it becomes the focal point for effective and sustainable management of electrical hazards. Specific recommendations included:

- Ensure the implemented electrical safety program provides details on electrical incident investigation and electrical-specific emergency

response requirements.

- Ensure an electrical safety training matrix is developed and used to manage training requirements.
- Ensure contractors are included in the requirements of the electrical safety program.
- Ensure specific policies with respect to energized electrical work are documented (e.g. working alone, no jewelry policy, etc.).
- Update the engineering incident energy analysis to use the 2-Second Rule and further review mitigation with a target of 65 cal/cm² incident energy level or less.
- Implement an energized electrical work permit (EEWP) system.
- Update the FLHA process and implement an electrical hazard-specific FLHA complementary to the overall FLHA. Ensure qualified electrical workers complete a documented electrical hazard analysis for every energized electrical work task.
- Ensure the overall risk assessment process is applied to energized electrical work tasks.
- Implement eLearning as an effective training tool at the remote mine site.
- Review existing procedures and update them, or develop new procedures for use.
- Inventory all electrical-specific PPE, tools and equipment available.
- Improve PPE inventory management; reduce quantity of hot sticks.
- Upgrade existing arc flash suits, and arc-rated face shields.
- Implement a formal preventive maintenance process for testing rubber insulating gloves and hot sticks.

Conclusion

Upon completing the external electrical safety audit, the mining company realized they were uncertain whether the controls implemented were actually appropriate and effective. The outcome of the audit clearly identified significant gaps in performance and effective implementation of the available preventive and protective control measures.

On a go-forward basis, the mining company will implement its own annual internal electrical safety audits. A comprehensive Plan, Do, Check, Act process will be implemented with the adopted electrical safety program. **EB**

Terry Becker is a subject matter expert and the owner of ESPS Electrical Safety Program Solutions Inc., a provider of electrical safety consulting services and products. He has over 20 years of experience as an electrical engineer working in both engineering consulting, and for large industrial oil & gas corporations. Terry is the first past vice-chair of the CSA Z462 Technical Committee, and a Professional Engineer in the provinces of Alberta, British Columbia and Ontario. He is also a member of IEEE, NFPA 70E, CSA, NFPA, CSSE, CanWEA and PMI.

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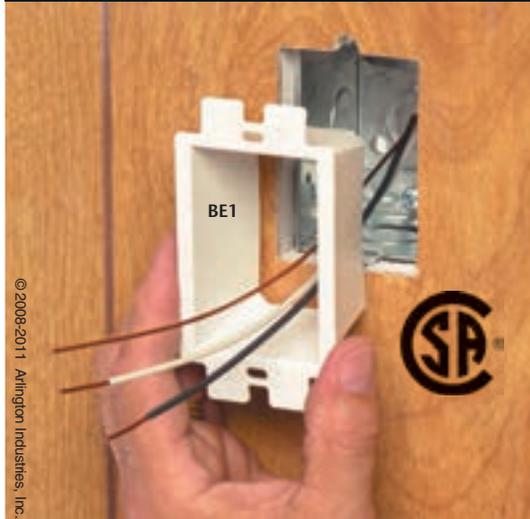
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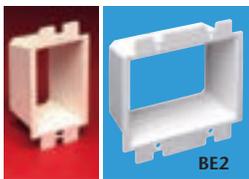
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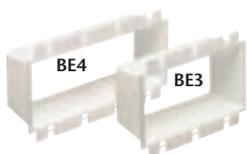
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cut energy consumption and cost by half

Devin Sikorski

Running leaner and greener is a top priority for companies globally as facility managers look for solutions to help mitigate the rising cost of electricity. While equipment and process enhancements are often the primary targets for efficiency upgrades, many companies have discovered that upgrading to more energy-efficient lighting is one of the quickest and most effective ways to reach both financial and environmental goals.



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LED, or light-emitting diode, technology has emerged as one of the most attractive retrofit solutions for delivering immediate performance improvements and cost savings. In fact, LED lighting technology is the most reliable and efficient lighting solution practically available for both industrial and commercial applications, including hazardous locations. Delivering immediate and quantifiable results, LED lighting generates substantial cost savings that can deliver immediate and quantifiable results in as little as one year.

Cut energy costs by more than half

LEDs are the most efficient lighting source available for commercial and industrial use, consuming nearly 70% less energy than conventional technology such as metal halides, high-pressure sodium, incandescent and mercury vapor fixtures. This major reduction in electricity use translates directly into significant bottom-line cost savings, particularly in regions where energy costs are high.

In addition to consuming fewer watts per fixture, LEDs also provide improved color rendering and incorporate more precise optics, directing a crisp and clear white light specifically where it's needed for even greater efficiency compared to conventional fixtures like metal halide. This combination often means that fewer LEDs can be used to light the same area, for even larger energy savings.

For example, at the G.S. Dunn dry mustard plant in Hamilton, Ont., the company replaced 18 of its 450W metal halide units with an equal number of 150W high-performance LED fixtures, for a 72% reduction in per-fixture energy costs. In addition, since LED fixtures don't require the same lengthy warm-up period as traditional fixtures, G.S. Dunn was able to outfit the new LEDs with motion sensors, reducing the burn time of many fixtures from 24 hours a day to 9 hours.

In Arkansas, the Zero Mountain cold storage facility cut 1.3 million kWh per year off its energy bill by switching from metal halides to LED fixtures at two facilities, saving more than \$100,000 in electricity costs alone. These substantial savings allowed Zero Mountain to take advantage of yet another energy-efficiency benefit of switching to LEDs: many utility providers offer rebate incentives for companies who switch to high-efficiency lighting. In Zero Mountain's case, Southwestern Electric

Power Company (SWEPCO) offered a custom rebate that offset approximately 30% of the total project cost, including installation.

The dramatic energy savings also offers significant environmental benefits. Fewer kilowatt hours consumed translates into fewer CO2 emissions—an important factor for companies looking to reduce their environment footprint, adopt more sustainable operations or achieve LEED certification.

At the Lanxess butyl rubber plant in Singapore, the company opted for LEDs as part of the design for a new 200,000 sq. meter facility on Jurong Island, saving 1.15 million kWh annually for a reduction in consumption, cost and carbon emissions of roughly 55%. As a result, the company realized an ROI in just 18 months.

Eliminate maintenance costs

In addition to reducing energy consumption and cost, the long-life performance of modern LED fixtures can virtually eliminate maintenance, delivering additional major savings that contribute to overall bottom line benefits.

Featuring a solid-state design with no delicate filament or other bulb to break, LEDs are a much more durable lighting solution that offers dependable performance for a decade or more, with some manufacturers now offering a 10-year warranty. This long-life reliability can reduce annual maintenance expenses by tens of thousands of dollars and free up staff to perform more mission-critical duties than simply changing light bulbs.

In one instance, a major oil company was able to reduce annual operating costs by nearly \$125,000 per year by retrofitting its refinery with LED lights, based almost entirely on maintenance savings. By replacing 100 of its 400W metal halides with 146W LED fixtures, the company reduced maintenance expenses by \$105,000 and cut energy costs by an additional \$17,500—major savings that will continue to add up over the lifetime of the fixtures.

At the U.S. Pipe foundry in Union City, Calif., installing new LED fixtures saved the company roughly \$29,300 in annual maintenance costs, in addition to cutting the total energy consumption for the facility by almost 75% and saving over 325,000 kWh per year. Plus, with no hazardous materials to recycle or dispose, LEDs save on these hidden costs of maintenance as well.

The bottom line on savings

Between the energy efficiency, maintenance savings and overall lower total cost of ownership—not to

mention potential rebates and incentives—LED technology has already proven to be the most cost-effective alternative to conventional lighting systems in commercial applications. With advanced features like motion sensors and a more durable design, LED lighting provides extended performance that can deliver significant savings, fast ROI and outstanding performance.

Upgrading to LED lighting in virtually any environment can deliver fast payback periods—less than a year in some cases—that mean any savings accrued after that go straight to the bottom line. With numerous products now commercially available to fit a wide

variety of applications, many companies worldwide have already realized the benefits of LED technology and have become more proactive in its adoption. Future improvements in the technology and the integration of advanced dimming, remote monitoring and smart lighting solutions for monitoring and control will enable facility facilities to further maximize the efficiency of their lighting systems while generating even greater energy and cost savings. **EB**

Devin Sikorski is a marketing associate with Dialight (www.dialight.com).

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3 Steps for avoiding merger meltdown

The easiest time to change is when we are in crisis mode. It's human nature to resist change unless a decisive moment forces our hand. During a merger, transition can be overwhelming for employees and problematic for companies to manage.

Leadership expert and internationally acclaimed business consultant Susan Steinbrecher puts it this way: "During a merger or an acquisition, there is usually a disproportionate amount of time and money spent on the financial due diligence and, sadly, very limited resources are allocated to the 'people' due diligence. But numbers don't make a merger work; people do".

Steinbrecher says that "people capital" can make a merger thrive—or take a dive—and maintains there are three steps for effectively navigating the storm.

Step 1: Clash of the cultures

"Most companies think they can easily assimilate two completely different company cultures into one. This can be a recipe for disaster," says Steinbrecher. When you take the time to explore the similarities and distinctions of both company cultures, you can conceive a more effective communication strategy.

Tip: Share best practices of both companies—not just of the acquiring firm—and leave the corporate ego at the door.

Step 2: Communicate

"Bottom line: managers need to communicate more, show more empathy, have open forum conversations, allow employees to vent and, yes, even show their emotions at times," maintains Steinbrecher.

This generates a healthier forum rather than an environment filled with disgruntled employees who may not be at their best under duress. They may even take it upon themselves to attempt to sabotage the business.

"If your employees are working in a service role, would you want them to be stressed out and insecure or, worse, angry and upset? Wouldn't it be better if they were on an even keel and, ultimately, more productive? At the end of the day, people want to be heard. They want their questions answered, and their fears identified and addressed. When a company leader cannot provide answers or refuses to communicate, it forces people to make up their own 'story'. This has a spiral effect leading to a major impact on employees' mental health."

Steinbrecher says it's most important to address the emotional aspect of the merger before the business side. "Get their hearts before their minds," she says. "What do you imagine your employees are thinking and feeling? They are scared and upset and may have lost their friends to downsizing or

wonder if they're next on the chopping block. If they've already lost a close friend due to the merger, they may feel like they have lost a family member: it can be traumatic."

Address the 800-lb gorilla in the room, head-on. The more you engage them, the more you will disarm them, giving you the opportunity to engage their minds. Summon up the courage to answer the difficult questions, even when you don't have definitive answers. This will engender the utmost respect for you, the leader.

Tip: If you don't have answers, don't change the subject. Simply say: "I don't have that answer for you today, but my commitment to you is that as soon as I have it, I will get back to you. Here is what I can tell you now".

Tip: Explain what is happening and why, which is particularly important in any new decision that affects employees.

Tip: Communicate in more personal settings of smaller groups or round tables, which will impart a sense of encouragement and support.

Step 3: The four energy quadrants

When you are a leader involved in a merger or acquisition, it is imperative you take particularly good care of yourself so your energy reserves do not become depleted. Of equal importance is the health of your employees so as to ensure they are operating at optimum capacity.

Steinbrecher says the four quadrants of energy that must be addressed are: physical, mental, emotional and spiritual.

Physical: If you observe a physical deficit, you will notice fatigue. Pay close attention to proper diet, sleep and exercise.

Mental: Employees become distracted when there is a mental energy deficit, so involve them in decisions whenever possible, and make sure they are clear on your expectations.

Emotional: An emotional deficit pertains to negative thoughts, which can be tackled through proper communication.

Spiritual: A spiritual deficit shows up as lack of motivation and sense of purpose. By offering reassurance and encouragement, you uphold resolve and enthusiasm. **EB**

Mark Borkowski is president of Toronto-based Mercantile Mergers & Acquisitions Corp., which specializes in the sale of mid-market companies. Acquisition search represents a portion of its activity. Visit him at www.mercantilemergersacquisitions.com.

The *Apple-ization* of smart submeters

How pervasive consumer technology can benefit you

Richard Morgan

One of the quickest ways to raise the eyebrows of today's smartphone-wielding generation is to show them a picture of earliest cell phones from the 1980s. It's easy to forget that these brick-like devices were once the height of innovation, now that so many of us run our personal and professional lives from a piece of kit that is smaller than our hand.

But the pace of change and innovation that has characterized personal mobile technology has been notable in its absence from other areas—metering energy consumption being one of them. If we look to the installed base of electricity meters across North America, for example, much of the technology dates back to the era of phones shaped like brick houses.

It's not that innovation has been absent from the industry. Far from it. Submeters, like phones, have gotten smart. There have been plenty of advances in the way that data about energy usage is gathered, cleansed, distributed and analyzed to help organizations identify their consumption levels and reduce them accordingly. There is far more real-time monitoring and opportunity for interaction with that data than the first manufacturers of energy meters could have imagined.

But, until now, the drive for wider deployment of smart submeters has largely been absent. After all, North America has enjoyed decades of relatively low-cost energy and, in such an environment, there is little incentive to reduce consumption. Standard meters have done a perfectly adequate job of measuring consumption for billing purposes and, so, they have remained as is.

But that's changing. Rising energy prices are a global phenomenon and, for many organizations, they have become a profit-sapping budget line. Reducing energy consumption is a key way of controlling costs and maintaining profit margins in a difficult economic environment.

Bringing visibility into the invisible

At the same time, a number of government directives on carbon emissions and energy consumption are starting to emerge. Achieving compliance with these requirements generally requires a new system or method for energy management to be monitored effectively so that any improvements can be measured and verified.

In light of these changes, it is becoming clear that the installed meter base is not up to the task. Too many organizations do not have the visibility needed to make useful evaluations as to how, when and why they use energy in every part of their business and in every location. They have an overall figure—usually too high for comfort—but not the granularity that tells them why a store in Wilmington uses twice the power as an equivalent outlet in Winnipeg; or that an unexpected dip in the Southwest division's profits is caused by a new maintenance team leaving the lights on all night.

Equally, there is no way of knowing whether reduced power consumption in the Vancouver office is due to an energy management program or the late onset of fall and a delay in switching on the heating system.

Fortunately, the transformation from mechanical meter to smart submeter over the past 30 years has been accompanied by similar levels of innovation in meter design, installation and commissioning functions. Not only does the technology now exist to deliver this level of data and analysis to facilities and operations managers and heads of finance, it has never been easier to get such technology installed onsite.

So we see submeters that are highly modular. Like the old submeters, they provide the information from individual circuits so users can



distinguish between power used by the chiller cabinet and that used by the bakery oven, for example. But, being modular, they can monitor up to 20 circuits from a single location. Such meters cut down on cabling requirements as there is only one device to connect; they save space and overcome the practical hurdles of retrofitting in cramped cupboard-like electrical rooms and, in a major rollout, they can reduce installation time by up to half. For organizations with a geographically dispersed estate, that's a pretty major saving.

But meters are also being designed with the end user in mind. So they offer exactly the level of functionality needed for the task, but don't require an advanced degree in engineering to install. Test pages on installation, for example, mean that electricians can tell whether the meter is working at the time of installation rather than running remote tests afterward. They include phase indicators to make sure the right electrical phase is connected, pulse test functions to check that cabling is complete, and an ability to auto-diagnose whether the accompanying current transducers are installed correctly.

Software makes 'em smart

But, like the smartphone, the most profound change in metering technology over the past 30 years is that the real value derived from metering hardware is that it houses incredibly sophisticated software. This software is the real game-changer.

So there are meters that contain data verification algorithms for improving the reliability of the data they send out. If energy management programs are to be effective, they must be based on accurate data that correctly reflects usage patterns. Too often in the past, this information has been compromised. With the latest smart submeters, data analytics packages are fed only with cleansed, relevant and accurate information.

Equally, meter communications have been transformed in recent years. There is less and less need for proprietary communication protocols, as IP and related standards are included in meter design to make it much easier to interface with energy management software and building control solutions. The wide-scale use of IP also makes it straightforward to access usage information from a web browser or transfer data in standard file formats to specified file locations in the existing IT infrastructure.

In other words, innovations in metering technology make it easy to integrate the data analytics and management information they produce with existing business software. For energy or facilities managers trying to convince the CFO of the need for an upgrade, that can be a powerful argument.

It also provides a strong degree of futureproofing. With new innovative meters, upgrades are achieved by updates to firmware rather than replacing meters, and changes can be handled remotely. Combine that with a modular design, and it's possible for a store to be refitted or a building to undergo a change of use without reinstalling the entire metering base. Instead, the relevant modules can be remotely commissioned or decommissioned to accommodate the new use.

So forget the idea that meters are a complex engineering challenge. That picture is as relevant to today's market as the brick-like phones of the 1980s. Smart submeter manufacturers have adopted the consumer technology playbook: get smart, get easy and stay innovative. It's a win-win for them, and a win-win for their customers. ■

Richard Morgan is sales director at ND Metering Solutions (www.ndmeter.co.uk).

A
GLIMPSE
INTO

TAIWAN

LED LIGHTING PLAYERS

Alyssa Dalton

After 15 hours of flying, I had finally arrived in Taipei, the capital of Taiwan and a cultural and business hub. It's a land where bright neon signs light up the evening sky, where businesses small and large populate the downtown core, and hundreds of scooters cruise the roads everyday.

Last November, I had the great pleasure of being invited on an exclusive press tour in Taiwan to visit select LED lighting manufacturers in advance of the Taiwan International Lighting Show (TILS) 2014. Running March 20-23, TILS coincides with LED Taiwan—an LED manufacturing-focused show—to bring together more than 250 players rooted in the Asian lighting market.

As the only North American media present at the press tour, I was granted a rare opportunity to see how these companies have evolved within this dynamic industry.

Becoming an international player

Mean Well has the most global presence of all the manufacturers I met on the tour. Headquartered in Taipei, the company is a standard switching power supply manufacturer with product lines offering AC/DC switching power supplies, DC/DC converters, DC/AC inverters and battery chargers. The company boasts 200 distributors and 2000 employees from its five offices: Calif., U.S.A.; Amstelveen, Netherlands; GuangZhou and SuZhou, China; and Taipei, Taiwan.

Founder Jerry Lin established the OEM business in PC power supplies in 1982, but after just four years, he was determined to leave the highly competitive OEM market to pursue a self-owned brand for 0.5W~18,000W power supply solutions. "At the time, the industrial standard switching power supply market was very small, so the decision was very dangerous. Now we see that this was quite an intelligent decision because we can build our own brand and our own channels," said Yvonne Chen, marketing supervisor.

"We have a lot of product variety but our total quantity for each model is very small," which helps satisfy a diverse customer base in LED lighting, LED display, telecom, automation control, instruments, medical, security and solar energy applications, added Ted Cheng, marketing manager.

For customized solutions, clients can use the CDM (Cooperate Design Manufacturer) program to combine specific requirements into newly designed products.

The company has been working steadily to grow its North American presence over the last two decades. With the goal of becoming a truly global distribution centre, Mean Well opened its U.S.A. sales office in Fremont, Calif., in August 1999 to provide local engineering and technical support, as well as a local

Asian neighbours shed light on an ever-changing industry

warehouse for just-in-time delivery. CUL and UL product testing is also conducted in the nearby San Jose area.

The newly-introduced HVGC-150-350A power supply, featuring a 65W~150W input range with constant current output, is designed specifically for use in Canada. The unit promises up to 91% efficiency and protection against short circuits, over-voltage and

overheating, and will be highlighted at TILS 2014 as part of Mean Well's approach to one-stop shopping for power supplies.

Growing veggies with lights?

I found it very interesting that two of the nine companies I visited specialize in hydroponics—the process of growing plants in sand or liquid without soil. Entire teams are devoted to experimenting with different indoor temperatures, plant types and water fertilizer, while others work to design LED lights that sun the plants.

I first met with NuPolar-Lights, an LED design and packaging manufacturer that specializes in three types of plant lighting—home and office; greenhouse; and cleanroom (LED plant factory)—as well as custom-made light spectrums, light bars and fixtures for different plant types.

NuPolar boasts it offers the world's first hybrid chip-on-board (COB) LED light technology and offers fixtures that enable about 50% less energy usage than other similar products. Not just for use in hydroponics, NuPolar products are suitable for use in aquarium lights, medical surgical lamps, refrigeration lights and ink UV curing lamps.

NuPolar is committed to exploring how to optimize the LED spectrum to design and create the ideal light sources for plants, said Kaling Ting, associate vice president. She continued by describing the LED plant factory as a revolutionary point in agriculture, as it can regulate plant production and price, shorten growth cycles, and reduce the use of pesticides—all of which can be difficult to achieve through traditional farming.

The company plans to move into a larger facility this year, complete with a larger space for its plant factory testing and a lobby transformed into a restaurant, which serves—what else?—house-grown vegetables.

Recalls are an industry turning point

Nan Ya Photonics Inc. (NYPI), a subsidiary company of Formosa Plastics Group, said it operates the world's first automated production line for 7W LED bulbs. Producing an estimated 400,000 bulbs a month, the line was introduced in 2012 to help lower labour costs and maintain quality control—the latter being one of the most prominent challenges the lighting industry is now facing, according to Bor-Jen Wu, company president.

"The regulation of LEDs is not strictly implemented," said Wu. "In this industry, I think the government should stand up" to police the quality of these products.

Mean Well recently launched the HVGC-150-350A power supply, designed specifically for Canada.



He continued by saying recalls from large international lighting manufacturers act as a wake-up call for smaller, localized businesses. "This is a turning point for the industry because it shows we should all be concerned with developing products with high quality. We shouldn't bring shortcuts to our products," he noted.

The company also produces LED wafers and blue, green and unsorted chips for use in consumer electronic products, such as indicator lights, indoor/outdoor displays, decoration lamps, automobile lights and traffic signals, as well as back-lights for the keypad/screen in mobile phones. With some UL certified products under its belt, NYPI said it is actively working to achieve cUL certification.

Working in the cloud

The second oldest of the companies I visited, Avertionics, was established in 1986 for wire-harness and cable assembly projects. The company has since expanded to specialize in protection devices, sensors, cables, cable assemblies and connectors; meanwhile the Avin brand was introduced in 2007 as a lighting business focused on energy-saving technology.

"Energy-efficient lighting systems should be functional, economical and comfortable, while considering the impact on the surrounding environment," said Patricia Lee, sales manager. "In order to enhance the user's convenience, we are working to set up lighting management platforms in the cloud."

Earlier this year, Avertionics introduced the Avin smart lighting wireless control system, which uses different control modes to adjust and monitor light levels, energy usage and occupancy comfort. The wireless network is suitable for use in residential, commercial and industrial facilities and can be configured to control up to 20 different zones. Smartphone and tablet apps for dimmers and wireless lighting systems are also in the works for remote operation.

The company has recently delved into the hydroponics business and sells warehouse-grown vegetables and herbs to Taiwanese restaurants and gourmet supermarkets. During my tour of Avertionics' plant factory, I was able to see workers harvest lettuce from the warehouse and package them up for shipment to a local grocery store.

Staying close to home

Taiwan Tang Hua—more commonly known as TTH-LED—is a manufacturer and supplier of indoor and outdoor LED lights, with a focus on high-end products. Each of its four factories in Asia have the ability to produce 30,000 bulbs and 20,000 tubes each day.

CEO Brand Tang welcomed me to a table full of locally grown fruit, sweets and hot tea, as his brother and general manager Jermaine Tang, showed off various LED lamps and tubes, including the T8 tube: a fixture available in 30 cm, 60 cm, 90 cm, 120 cm and 150 cm lengths, boasting a heat sink along the back of the tube and no shading when lit.

Zhenjiang, China, has announced it will be working with TTH-LED for a city-wide street light replacement project, to be completed over the next several years. No further details of the installation have been made public.

While its products are not available in Canada, the company maintains that breaking into the North America market is its next goal. Angela Hung, of the international business department, added, "Canada is an awesome place that we haven't yet put our feet into, but we look forward to it."

Headquartered in Taipei, Young Star Lighting originally started selling raw LED chips in 2001, but the highly competitive marketplace has geared the



PHOTOS BY A. DALTON

Here is a peek into the testing room at Nan Ya Photonics (above) headquarters.



At NuPolar-Lights, researchers are tabulating growth results of plants in an LED plant factory.

company's direction toward designing, manufacturing and selling completed lamps, said Victor Tung, project manager. He estimated only 10% of Young Star Lighting is now dedicated to selling raw lamp chips.

With almost 10 years spent on researching and designing solutions to enhance heat dissipation, the "small but strong" company says it offers lamps with increased lifespan and lumens, as well as LED lamps that prevent overheating with an automatic shut-off feature should the lamp fan fail.

Young Star is only active in Asian and European markets, but Tung said he hopes to turn it into a true international business. "In the beginning, our company cannot afford such kinds of certification [...] but we have a lot of enquires from North America," he said. "As we get more money, the North American market will always be our target."

The optical advantage

"As the LED lighting industry grows, this means great business potential for companies like us," said Jim Weng, sales section supervisor, America region. "Us" refers to Ledlink, a designer and manufacturer of secondary optics with a suite of solutions for clients such as Philips, Cree, Acuity Brands, Osram, Samsung, Sharp and more.

Established in March 2008, the company strives to help customers reach the highest level of performance and change beam patterns and angles to adapt to different uses, said Claire Lai, deputy sales manager. Optical design is Ledlink's market advantage, she noted, adding that Ledlink offers strong in-house capabilities for optical design and simulation, mould design and tooling, and manufacturing.

Ledlink plans to showcase a new bulb at TILS 2014. "We don't have the traditional 'new product'. When our customers have new products, then we need to redesign our own optic lenses," explained Lai.

Customers in North America can get their hands on Ledlink products through Mouser Electronics and Future Lighting Solutions.

"We are expecting more and more LED applications in the [global]



market, especially in the North American regions because there are some subsidizations for street lighting,” said Weng. “[In 2012], we only had two sales-people in charge of the North American region, but [in 2013], we brought it up to five, and in 2014, we are expecting more.”

My next stop was Edison Opto, an LED packaging house offering a diverse product line ranging from 1W to 100W, single-chip to multi-chip, and high flux to high CRI. According to Lucy Chen, sales manager, it was the company’s goal for ultimate product customization that

inspired the launch of the Lighting Design Manufacturing Service (LDMS) several years ago. The program provides customized design and production services, including thermal management, electrical schemes, mechanical refinement and optical optimization. It is the first program of its kind, said Chen.

A brightly lit showroom displayed the new Edison Opto PLCC 5630 high-voltage series, which boasts reduced luminaire costs and a compact size. Suitable for use in LED bulbs and tube lights, the series will be featured at the Edison Opto booth in TILS 2014.

Since becoming a member of the Zhaga Consortium in 2012, Chen said the company is committed to developing products to Zhaga specifications, as “LED modularization will become the market trend”. An LM-80 certified testing lab and U.S. sales office in California have also been established to help tap into North American markets.

Testing, testing

Established in March 2002, Top Hi-Tech (THT-EX) specializes in explosion-proof and waterproof lights, ranging from 20W to 400W for use in Zone 1, 2, 21 and 22.

The emphasis on R&D is evident, as 40% of employees stem from the R&D department, led by a corporate management team with more than 18 years of R&D and manufacturing experience. Together, the team developed THT-EX’s signature lighting design—a transformerless design that incorporates a bridge rectifier and current limit IC to increase engineering efficiency up to 90%, said Doris Hsiao, vice president of sales.

“Because of our technology background, we are the expert for product design housings that are waterproof to IP67 and IP68. The advantage of the explosion-proof lighting we have is that we use high-quality LED solutions,” she said, referring to the driverless chip-on-board (COB) design with AC input feature which claims to limit power supply malfunctions and reduce energy consumption.

Hsiao told me promoting customer safety and zero-incident environments is one of the company’s top priorities. Products must pass a 24-hour waterproof test, 1000-hour burn test and humidity test to ensure the quality standard is met, and 72~240 hours of salt spray testing...“each product will be tested 100% before it’s released,” she added.

Summary

While Asia is often stereotyped to be a major contributor of poor-quality products, the companies I met with in Taiwan all boasted certified, professional workplaces with heavy regulation. Some even said it is this misconception that serves as a motivator in its fight against the global spread of unsafe, faulty and counterfeit goods. For choosing authorized partners and promoting stringent testing, I applaud these businesses for their concerted efforts.

Thanks again to Taiwan Trade Center Vancouver (TTCV) and Taiwan External Trade Development Council (TAITRA) for the invitation. To learn more about TILS or LED Taiwan, please contact TAITRA at www.taitra.org.tw. 



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Nedco West Manufacturer Rep of the Year (BC) 2013: Ed Atkinson, Thomas & Betts

EBMag was in Vancouver for Nedco West's annual general meeting and tradeshow (west.nedco.ca), which included a dinner recognizing the firm's TrueBlue award winners for 2013. Congratulations to the following:

- Most-Improved Branch: **Nedco Nanaimo**
- Excellence in Customer Service: **Mark Shaw, Nedco Regina**
- Agent of the Year (AB/MW): **Prolux**
- Agent of the Year (BC): **Mac's II**
- Manufacturer Rep of the Year (AB/MW): **Kyle Wooley, Burndy Canada**
- Manufacturer Rep of the Year (BC): **Ed Atkinson, Thomas & Betts**
- Salesperson of the Year: **Barry McCabe, Nedco Richmond**
- Top Channel Partner: **Leviton**
- Supplier of the Year: **Osram Sylvania**
- Branch Manager of the Year (TIE): **Paul Matthews (Nedco Nanaimo) and Kevin Holbeche (Nedco Vancouver)**
- Branch of the Year: **Nedco Fort McMurray**



Steve Fraser

Kevin Mallory, vice president & general manager of **Hubbell Canada LP** (www.hubbellonline.com), announced the promotion of **Steve Fraser** to director of

sales for Hubbell Electrical Systems in Canada. "Steve possesses a wealth of experience with respect to our products, customers and markets," said Mallory. "He has successfully led the HES sales organization as national sales manager since May 2004, and is well positioned to carry our business forward."

Arkady (Ark) Tsisserev—formerly of Stantec and former electrical safety manager, chief electrical inspector & city electrician for the City of Vancouver—is launching his own firm, **EFS Engineering Solutions Ltd.**, an electrical and fire safety consulting company. He currently chairs the technical committee for CEC development, CSA Steering Committee for the requirements of electrical safety, and represents Canada on the NEC and IEC code committees. Ark can be reached at ark.tsisserev@gmail.com.

After 21 years of service, **Jeff Hall**, senior vice-president and CEO of Rexel Canada Electrical (www.rexel.ca), has decided to retire effective February 28. Jeff joined the business in 1992 as vice-president logistics and was promoted to vice-president of the Westburne banner in 2003. He has been CEO of Rexel Canada since July 2005. Upon retirement, Jeff will be named board chair and

member of the Rexel Group Executive Committee (Comex). Meantime, **Roger Little** has been appointed CEO, Rexel Canada, effective March 1. Roger joined the Westburne organization in Canada in 1995 as an automation specialist, and has been the general manager of four Westburne divisions, and was appointed vice-president of the Westburne banner in January 2012.



Roger Little

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IN CASE YOU MISSED IT...

VIDEO • Mersen has extended its HelioProtection program with an electronic protection system against electrocution hazards on solar photovoltaic (PV) installations. Visit bit.ly/1eAsAxt.

PHOTOS • At a special luncheon held by the Ontario Energy Network (OEN), Sunnybrook Burn Unit was presented with a \$20,000 donation. Visit bit.ly/1aXnIoW.

PHOTOS • Check out scenes from CanSIA Solar Canada Conference 2013. Visit bit.ly/KftmX2.



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February 15-27, South America
Visit www.ecaa.ab.ca

Electrical Safety, Technical & Mega Projects Workshop (ESTMP)
March 3-5, Calgary, Alta.
Visit ewh.ieee.org/soc/ias/tmp



NETA's PowerTest
InterNational Electrical Testing Association
March 3-6, Denver, Colo.
Visit www.powertest.org

The Work Truck Show (and NTEA 50th Anniversary)
National Truck Equipment Association
March 4-7, Indianapolis, Ind.
Visit www.ntea.com



LEducation 8
March 18-19, New York, N.Y.
Visit www.leducation.org

AEL Electrical Learning Expo
Alberta Electrical League
March 19, Edmonton, Alta.
Visit albertaelectricalleague.com/learning-expo



NAILD 37th Annual Conference
National Association of Independent Lighting Distributors
April 6-9, Ft. Lauderdale, Fla.
Visit www.naild.org

All-Energy Canada Exhibition & Conference
April 9-10, Toronto, Ont.
Visit www.all-energy.ca



Truck World
April 10-12, Toronto, Ont.
Visit www.truckworld.ca



CanWEA Western Forum 2014
Canadian Wind Energy Association
April 14-15, Calgary, Alta.
Visit www.canwea.ca

IEEE PES Transmission & Distribution Conference & Expo
IEEE Power & Energy Society
April 14-17, Chicago, Ill.
Visit www.ieseet-d.org

EFC AGM & Leadership Program 2014
Electro-Federation Canada
April 16, Brampton, Ont.
Visit www.electrofed.com/newsroom/events



Fulham announces street lamp globe retrofit kit



Fulham has expanded its induction retrofit kit offering with the street lamp globe induction conversion kit (cURus) for glass and polycarbonate fixture types. These are recommended for most standard globe fixtures used in parks and recreational facilities, historical and landmark areas, campuses, theme parks, museums and municipal areas, with operating temperature parameters of -20C to 40C in an enclosed fixture (0 to 50C in an open fixture). The retrofit kit includes Fulham's High-Horse brand induction generator and a Fulham screw-in mogul or medium based bulb-shaped induction lamp (depending on wattage).

FULHAM
www.fulham.com

Ledzworld boasts industry's first 2000 lumen, single source LED PAR38



Ledzworld says it has introduced the industry's first 2000 lumen, single-source LED PAR38 lamp, serving as a replacement lamp for ceramic metal halide (CMH) bulbs in retrofit projects in commercial buildings, hotels, restaurants, museums and other like applications. Using optical simulation software, Ledzworld's Reduced Glare Optical Technology (RGOT) promises maximum extraction of lumens and intensity from the LED, while meeting the required beam angle and international package outline dimensions. Dimmers are also compatible with the lamp.

LEDZWORLD
www.ledzworld.com

Lighting Science debuting Bluetooth-controlled Rhythm downlight

Lighting Science debuted new lighting products that can be controlled via Bluetooth-powered mobile apps "to optimize healthy living and efficient illumination" at the 2014 International CES, held last month in Las Vegas, Nev. The Rhythm downlight fits in any standard recessed lighting housing and provides "dynamic circadian lighting capabilities" that automatically adjust the light's properties to optimize

sleep or wakefulness, depending on the users' needs and schedule. The downlight features a companion mobile app that prompts the user to answer questions about their schedule, lifestyle and habits. The light then sets user experience based on those answers. For example, when the user needs to begin preparing for sleep, the light will emit less 'blue' light, which hampers the production of melatonin.

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Fluke Ti200, Ti300 and Ti400 IR cameras with LaserSharp Auto Focus

The new Fluke Ti200, Ti300 and Ti400 infrared cameras claim to offer advanced connectivity and accuracy to maximize productivity in the field with its LaserSharp Auto Focus—a laser to pinpoint where the camera should focus. The cameras connect to the Fluke CNX wireless system, allowing them to be used as a main unit to view live measurements of up to five wireless modules

(e.g. AC current or voltage modules) on its screen and integrate the data into the infrared image. As well, the images can be transferred from the cameras directly to PCs, an iPad or iPhone than imported into Fluke SmartView software to produce reports.

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NEMA releases ADP 2-2013 on circuit breaker systems testing

The National Electrical Manufacturers Association (NEMA) has published a white paper, NEMA ADP 2-2013 Molded Case Circuit Breaker Systems Testing with Conductors. Molded case circuit breakers are designed to protect rated conductors and in particular, insulated wire, says NEMA, adding that it is necessary to test circuit breakers with wire to demonstrate that protection. NEMA ADP 2 discusses the necessity to test circuit breakers with wire to demonstrate that protection. The standard tests (as defined in UL 489) include overload and thermal tests, endurance followed by low level short circuit interrupting tests, and standard low level short circuit interrupting tests.

NEMA
www.nema.org

Platinum Tools T62 Recon test set updated with RJ11/12 connector



Platinum Tools has upgraded its Recon test set (p/n T62), which now includes a new protection boot and a direct RJ11/12 no-fault (6x6) connector, allowing for telephone line testing without a modular adapter (banjo). It also boasts more line condition and status information than any other telephone line tester in the world. The T62 offers a menu for measuring data, actively monitoring and detection of high line voltages, as well as a Digi-Secure feature that helps protect digital lines from disruption by outside test equipment.

PLATINUM TOOLS
www.platinumtools.com

AEMC introduces the 200A micro-ohmmeter 6292



The AEMC high current micro-ohmmeter model 6292 measures low contact resistances on high voltage circuit breakers, switches, busbars, and other locations with user-selectable test currents from 5A to 200A. The model is powered from 120V or 230V, 50/60Hz, and incorporates optimized filters and protection for measurements in electrical substations. To guarantee measurement accuracy, the model features a state-of-the-art signal amplification system, offset-free with high long-term stability, explains AEMC, adding that it also offers a backlit alphanumeric LCD display to show resistance readings with up to 4.5 digit resolution. It is water resistant and can be used in poor weather conditions (IP54 with closed lid).
AEMC
www.aemc.com

3M announces sensed termination QX-series



The 3M Electrical Markets Division has released a sensing solution which it says will provide power utilities with real-time monitoring to support grid automation in underground distribution networks. The 3M sensed termination QX-series supports applications such as volt/VAR optimization (VVO), fault detection, isolation and restoration (FDIR), asset management and load balancing. The sensed termination is designed to provide highly accurate voltage and current data through simple retrofits of existing power equipment, such as switchgear and transformers, says 3M, adding that this data is a key requirement for enhancing the reliability and efficiency of the grid.
3M
www.3m.com

E2S publishes 384-page warning signals catalogue



E2S has published a 384-page catalogue to present its portfolio of signalling products, offering specifications including hazardous area classifications, performance data, third party approvals, dimensional diagrams and part code configuration. All the latest products launched this year are included. The GNEx range has been extended with the introduction of new alarm horn sounders and PA loudspeakers with GRP enclosures. In the BEx range the new radial, omni-directional BExS110-R alarm horn sounder and BExCS110-05-R combined audible & visual signal are now available as is the new BExH120D-R 'Belltronic'; electro mechanical alternative to the traditional bell.
E2S
www.e2swarningsignals.com

Megger TTR20 tester measures turns ratio and excitation current



Megger now offers a hand-held, battery-operated TTR tester (transformer turns ratio), which will measure turns ratio, polarity and excitation current in single-phase and three-phase transformers, current and potential transformers as well as voltage regulators. The TTR20 is capable of measuring high turns ratio of 10,000:1 with the lowest excitation voltage and excitation current up to 100 mA, adds Megger. According to the company, it is an ideal utility tool for performing QA on incoming transformers, transformer-manufacturing environments and meter shops, and wind and solar applications.
MEGGER
www.megger.com

Torbram Electric launches TES app for Apple, Android devices



Torbram Electric Supply says it has introduced its TES mobile application—a tool “jam-packed” with features to help contractors save time on and off the jobsite. The app has options to call or e-mail a TES branch, as well as turn-by-turn navigation to get customers right to the door. Users can stay up to date on branch events, and new products and specials. It can be downloaded for free for Apple and Android devices.
TORBRAM ELECTRIC SUPPLY
www.torbramelectric.com

HD Electric DVI-100 and DVI-500 voltage indicators



HD Electric says its DVI-100 and DVI-500 digital voltage indicators are designed to be used on both transmission and distribution systems in overhead and underground applications up to 500kV. An LED display shows voltage with a 2 or 3-digit readout. In addition, an audible alarm alerts the user to the presence of voltage above 100vAC. Models are also available with an option to measure elbow test points.
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What do you mean I have no ground?

How old is your home, and what type of main water line do you have? Is it lead? Copper? Plastic? When your home is older than 20-30 years and has plastic water lines, you may want to ask the question, “Is my electrical service adequately grounded?”. As an electrical contractor, however, you must ask the question: Is this service adequately bonded?

Houses all across Canada used lead and copper water mains to provide publicly treated water to residences as recently as the 1990s. As far back as 1962, 10-114 of the CEC had required:

where a continuous electrically conductive underground public water main system, including conductive service piping run therefrom to the premises, is available, it shall be used as the grounding electrode.

This rule required the contractor to install his electrical service and ground the identified conductor to the water main. In 2002, the CEC still referred to the metal water piping system and well casings as a grounding electrode, and all other means as artificial grounding electrodes. This has been the accepted method of installing and grounding the electrical services ever since.

As the electrical distribution system grew and expanded into areas where it had not previously been, the water meter was sometimes a long way from the electrical panel. In some jurisdictions, it was ‘accepted’ that the service could also be grounded to the water line close to the panel so long as the interconnecting water piping was a continuous metallic system, and the water meter was jumpered.

In 1975, requirements for receptacles in residences came into being. At this time, 26-700 allowed the grounding terminal of grounding-type receptacles installed in existing installations to be bonded to a metallic raceway, cable sheath, separate conductor, or to an adjacent cold water line.

Prior to 1986, water lines and solder used on copper water lines may have contained lead. With bans on the use of lead, communities large and small have in recent years undertaken programs to replace water mains in older residential subdivisions. In my experience, public water utilities are replacing the lead and copper water mains with plastic ones. Homeowners and plumbers are modifying the water systems using plastic water lines and adapters, unaware that—at the same time—they are creating a potential hazard for people

working on or with the electrical system.

In some of these installations, the water utilities are abandoning the old water mains. This method maintains the grounding system integrity; however, in a few subdivisions, we are discovering that the old systems have been removed and the grounding system compromised.

Having no ground is not safe, as you could have a potential difference between the earth and the equipment, or you could have a severe incident in the event of a ground potential rise.

The objective of the Canadian Electrical Code is to establish safety standards for the installation and maintenance of electrical equipment. In its preparation, consideration has been given to the prevention of fire and shock hazards, as well as proper maintenance and operation. As professional installers, maintainers, designers or users, we need to ensure that we understand what we are doing and that we are doing it safely. **EB**

David Pilon has been an electrical inspector with SaskPower since 2000, and is currently the vice-chair of the Canadian Certified Electrical Inspector (CCEI) committee of the International Association of Electrical Inspectors (IAEI), Canadian Section. David can be reached at dpilon@saskpower.com.

Questions and answers compiled by the Electrical Safety Authority | VISIT WWW.ESASAFE.COM

Tackle The Code Conundrum... if you dare!

Answers to this month's questions in March's Electrical Business.

How did you do with the last quiz? Are you a...

Master Electrician ? (3 of 3)
 Journeyman ? (2 of 3)
 Apprentice ? (1 of 3)
 Plumber ?! (0 of 3)

Question 1
 For interconnection of power production sources, means of isolation shall be provided:
 a) to isolate utility feeders.
 b) to isolate renewable energy sources.
 c) to isolate all sources of supply.

Question 2
 Overhead consumer's service conductors shall not be less than [] aluminum wire
 a) #12 AWG c) #8 AWG
 b) #10 AWG d) None of the above

Question 3
 Type FCC systems shall not be used where subject to corrosive vapours or liquids.
 a) True b) False

Answers: EBMag January 2014

Q-1: A plate grounding electrode shall be installed so it is in direct contact with exterior soil at no less than [] below grade level.
c) 600 mm. Ref. Rule 10-700(2)(b)(i).

Q-2: Single-throw knife switches shall be mounted with their bases in [].
b) a vertical plane. Ref. Rule 14-502(1).

Q-3: Flexible cord type STOW is suitable for interconnection of photovoltaic panels within an array.
a) True. Ref. Rule 50-018(2), Table 11.

Always consult the electrical inspection authority in your province/territory for more specific interpretations.

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