

Electrical Business

DECEMBER 2013

A new
electrical box
for ICF
is on
page 5.



■ Also in this issue...

- Electricians' tools you can make
- Achieving better outcomes with energy intelligence
- New SPE-900 guideline for solar PV rooftops

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I am giving you the opportunity to reach a national, professional electrical audience directly.

I give up! (this page)

We are celebrating our 50th anniversary next year, and we have some big things planned for inside the pages of Electrical Business, online at EBMag.com and out in Canada's electrical community.

Some of those plans are starting right away with this issue. A few of the articles specifically ask for your feedback and participation, and I encourage you to give it. (There might be a nice little prize waiting for you on the other side!)

Because our relevance and longevity are in no small part because of you, I am handing over this page, the Editor Greeting, to guest editors—guest readers—over the course of 2014. I am giving **you** the opportunity to reach a national, professional electrical audience directly; telling your story in your own voice in the pages of Canada's premier electrical publication.

Just think of the possibilities! Maybe you're a lineman wondering what more we need to do to ensure everyone comes home safe from a job. Maybe you're a supervisor with some ideas of your own on how to get everyone to first understand, then

actually use, the right personal protective equipment on the job. Perhaps you are an instructor at one of our colleges or training institutes, and you have some ideas as to how we go about improving the apprenticeship system in Canada.

I could go on, but you get the point.

And it doesn't matter to me whether you are a company of one or of 1000, nor your location in this great land. Consider yourself officially invited! RSVP to me by giving me a call or sending me an email.

On a personal note, 2014 also marks my 10-year anniversary as editor of this magazine, no, *institution*. But, like the owner of a fine watch, I am not so much EBMag's editor as I am its caretaker, so a heartfelt thanks to you for your support and encouragement these last 10 years. Please enjoy a safe and festive holiday season! **EB**



On the cover and page 26

"Empowering the future... today!"

Our cover shows elementary students participating in "Try-A-Trade", a highlight of Skills Canada's launch of National Skilled Trades & Technology Week last month.

But they're not alone in advancing skills issues.

(PHOTO A. CAPKUN)

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Downtown Toronto landmark Brookfield Place—known for its marble floors and walls, luxurious wood trim and bronze light fittings in the main floor lobby—recently stunned the community with an award-winning new lease on life.

16 Frozen foods never looked so good

As part of an eight-year cycle that mandates LED lighting upgrades be made at the time of each store renovation, specialty frozen food retailer M&M Meat Shops franchises are replacing T10 fluorescents with LED systems promising huge rewards.

17 Achieving business outcomes with energy intelligence

Investing in energy-efficient equipment with low carbon footprints and implementing building control systems are all important contributors to trimming energy use. However, major benefits can be derived from more detailed and focused management of energy consumption.

21 SPE-900 Guideline addresses solar PV rooftop safety and structure

The popularity of solar PV rooftops has created a need for guidance on their installations, given many building codes in Canada do not address relevant safety and structural issues. Enter SPE-900, "Solar Photovoltaic Rooftop-Installation Best Practices".

22 Electricians' tools you can make

Having good tools is a great way to boost productivity, but electrician tools can be quite expensive. The good news is jobsite efficiency can be greatly enhanced by using simple tools that you yourself can make.

28 Labelling key to managing and maintaining installations

Professionals take great pride in the quality of their electrical, telecom and datacom installations. Sometimes overlooked in these projects, however, is the need to accurately document and trace the installation with durable, clearly marked labels.

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Kenworth T880 concludes its 2013 Canadian road tour

Canadian truck owners and operators got a first-hand look at the new Kenworth T880 during the 2013 Kenworth Road Tour (www.kenworth.com), which made its first Canadian stop in September with a visit to Langley in British Columbia. "The Kenworth Road Tour generated excitement among customers for Kenworth's newest vocational model, the Kenworth T880, which is now available for order and enters production this fall," said Alan Fennimore, Kenworth vocational marketing manager, who headed the tour.

RECALL: Cooper Crouse-Hinds ceiling boxes

Thanks to the U.S.'s Consumer Products Safety Commission (CPSC, www.cpsc.gov) for letting us know Cooper Crouse-Hinds (www.crousehinds.com) is recalling certain ceiling boxes designed to support ceiling light fixtures, which can crack, causing the light fixture to fall from the ceiling, posing an impact hazard to consumers.

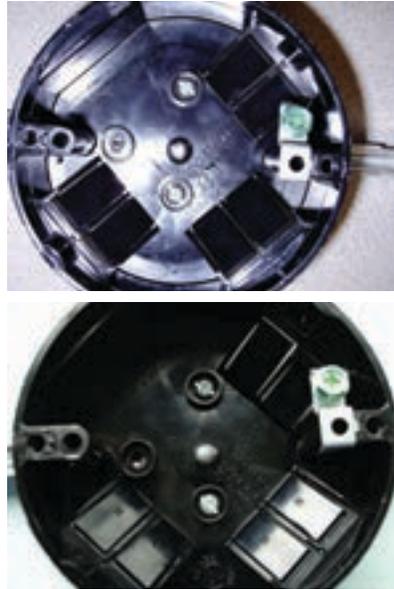
This recall involves five models of Cooper Crouse-Hinds non-metallic, polycarbonate ceiling boxes with manufacturer or part numbers:

- TP16002
- TP16022
- TP16023
- TP16122
- TP16307

The black, round ceiling boxes are 1.5-in. to 2.25-in. deep and

measure between 3.5-in. and 4-in. in diameter. "CROUSE-HINDS" and "14.8 CU. IN." or "20.8 CU. IN." appear inside the box. The part number is on the product's packaging. About 22,400 units are involved in this recall. We are unsure how many, if any, made it into Canada. Cooper Crouse-Hinds is aware of one ceiling box cracking. No injuries have been reported. They were manufactured in the States, and entered the market through electrical supply stores and sales to commercial contractors, professional installers and other end users by authorized distributors from December 2012 to April 2013 for between \$1.50 and \$4.00.

Consumers should contact Cooper Crouse-Hinds to determine whether their product



PHOTOS COURTESY CPSC.

is recalled and whether they will receive a full refund, free replacement or free repair of the ceiling box. If unable to determine via phone, the company will send a rep to conduct onsite identification.

RECALL: Ryobi P113 dual-chemistry battery chargers (RA-36465)



PHOTOS COURTESY HEALTH CANADA.

Ryobi P113 dual-chemistry battery chargers, which can overheat, posing a potential fire and burn hazard to consumers.

One World has received 25 reports, including one from Canada, of the P113 charger overheating, resulting in reports of property damage to the charger and its surroundings, such as workbenches, countertops and carpeting. No injuries were reported.

The chargers are designed for use with both NiCad and Li-ion portable power tool batteries. The charger is green and grey, and was sold both individually and as part of a kit. "Ryobi" is printed in white lettering on

the front of the charger. The model number and date code can be found on the data plate on the bottom of the charger. Only model P113 chargers with date codes between 0731 and 0852—without a nine digit part number—are affected.

The recall involves about 49,686 sold in Canada exclusively at Home Depot between September 2007 and December 2009. They were manufactured in China.

Consumers should remove any battery from the charger, stop using it and unplug it, and contact One World for a replacement at (800) 597-9624, or visit them online (www.ryobitools.com/safety_notice).

Thanks to Health Canada (healthycanadians.gc.ca) for letting us know One World Technologies Inc. is recalling

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More **news** can be found online. Visit us at **EBMag.com**



IEEE to develop P2100.1 for wireless power and charging systems



IEEE (standards.ieee.org) announced the IEEE Wireless Power and Charging Systems Working Group (WPCS-WG). It follows the creation of the Power Matters Alliance (PMA), established as an IEEE Standards Association (IEEE-SA) Industry Connections program in 2012 to advance smart and energy-efficient wireless power.

The IEEE WG is developing the IEEE P2100.1 Standard Specifications for Wireless Power and Charging Systems, the first in a series of anticipated standards addressing parallel wireless power and charging technology specifications. Seeking to establish an interoperable standard that will allow users to wirelessly power and recharge smartphones and other mobile devices, the group's work will begin in early 2014.

"Meeting the power demands of billions of devices worldwide calls for a new paradigm—one that does for power what the internet did for data," said Clif Barber, IEEE Wireless Power and Charging Systems WG chair and PMA technical director. "IEEE P2100.1 will facilitate reliable, broad-scale access to wireless power and charging, preserving the freedom that mobile users expect and demand. We are very pleased to be getting this important work underway."

IEEE P2100.1 will establish parallel specs for wireless power and charging for both transmitter and receiver devices, with an initial focus on inductive (or tightly) coupled technologies. When completed and approved, IEEE P2100.1 will offer advantages and benefits in a range of markets, says IEEE, including consumer electronics and appliances, electric vehicles, medical devices and more. As the interest in loosely coupled systems increases, the working group will adapt to focus on this technology and incorporate this into the standard as well.

Wireless power and charging implementations had previously been restricted to proprietary, non-standardized deployments

that do not define interfaces between components. IEEE P2100.1 aims to incorporate multiple wireless power and charging technologies, and build on the work that industry organizations have done to help drive interoperability with a spectrum of devices and help

reduce end-user confusion that could impede ubiquitous adoption of the technology.

"Wireless power and charging is a concept whose time has come. However, rapid development and deployment of the required wireless infrastructure will be key to its acceptance in the

market, and standards are a critical underpinning of that infrastructure," said Konstantinos Karachalios, managing director, IEEE-SA. "Supporting the effort to make IEEE P2100.1 broadly interoperable requires that accord be achieved among the many stakeholders involved in this effort."

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No additional parts to engage or remove



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Leviton expanding LED lighting capabilities with JCC acquisition



Leviton (www.leviton.com) has acquired JCC Advanced Lighting (www.jcc.co.uk), a United Kingdom-based player in LED lighting for a variety of residential and commercial applications.

“Since our beginnings more than a century ago, Leviton has built a reputation on innovation and product development, so adding a market-leading advanced lighting solutions business like JCC makes strategic sense for our global expansion,” said Don Hendler, CEO of Leviton.

Integrating JCC’s energy-efficient LED lighting into Leviton’s smart solutions provides an opportunity to develop the next-generation of intelligent design, says the company. Through the work of the combined companies, customers will be able to receive more-efficient lighting solutions, boasts Leviton, including the incorporation of occupancy sensors and dimmers.

JCC will operate as a wholly owned subsidiary of Leviton, maintaining operations in the UK. The company will continue to be led by Richard Adey, who will report directly to Daryoush Larizadeh, Leviton’s COO.

Gescan donates thousands to Calgary Foundation and Town of High River



Gescan West (www.gescan.com)—a division of Sonepar Canada (soneparcanada.com)—announced a donation of \$60,000 to be distributed to both The Calgary Foundation (bit.ly/17mDB2Q) and The Town of High River Disaster Relief Fund. Working with these organizations ensures the donated money will reach the communities who are in the greatest need during this rebuilding phase, says Gescan.

“Gescan strives to contribute and have a positive impact in the communities it is a part of,” said Jeff Derkuch, president of Gescan West. “It is time for us to focus our attention and energies on how we can help clean up and rebuild homes and our communities. Here at Gescan we are trying to do our small part in helping Alberta families rebuild and recover during these trying times.”

Gescan West was originally a division of Canadian General Electric Co. Ltd., established in the early 1920s. Sonepar Group purchased Gescan in October 1989.

British Columbia targets trades training at 10 post-secondary institutions

BC’s advanced education minister, Amrik Virk, has announced \$1.8 million in one-time funding for 456 foundation seats in targeted trades-training at 10 public post-secondary institutions.

“Trades will continue to be a vital component of our economy now and even more so in the future,” said Virk. “In addition to targeting specific trades, the funding also supports the trades discovery program that gives young people an insight into what can be an exciting career, and will put a paycheque in their back pocket.”

The minister made the announcement during a visit to Northwest Community College’s Terrace campus, where he was joined by college president Denise Henning, staff, students and industry representatives while visiting the college’s trades training facilities.

Foundation training programs provide students with the basic knowledge and skills needed for entry into a particular occupation. Students receive credit for the first level of apprenticeship training in a specific field by the Industry Training Authority once they have successfully completed the foundation program.

“A skilled workforce is a key driver of BC’s economic growth and, with one million jobs to fill in BC by 2020, it has never been more important to prepare British Columbians with the right skills,” said Shirley Bond, minister of jobs, tourism and skills training and responsible for labour. “Foundation training programs are a great example of how government is taking action through the BC Jobs Plan and the Skills and Training Plan (bit.ly/1cGFCwQ) to support training opportunities and ensure British Columbians are first in line for jobs.”

In total, the \$1.8 million will create 456 student spaces in 2013-14 with \$1.6 million allocated for priority foundation programs. The remainder will be allocated to the pilot trades discovery programs at four of the 10 institutions.



Photo (from left to right): Elder Sharon Bryant of the Tsimshian Nation; Denise Henning, president and CEO of Northwest Community College; Minister Virk; Michelle Bryant of Ridley Terminals Inc.; Dave O’Leary, vice-president of Institutional Advancement, Northwest Community College.

The post-secondary institutions receiving funding specific to Electrical include:

- **Camosun College**
(Victoria Interurban campus): 54 seats
- **Kwantlen Polytechnic University**
(Cloverdale campus): 16 seats
- **Okanagan College**
(Kelowna campus): 54 seats
- **College of the Rockies**
(Cranbrook campus): 16 seats
- **North West Community College**
(Prince Rupert campus): 16 seats

Philips cites breach of contract; taking legal action against Funai

Citing breach of contract, Royal Philips (www.philips.com) is terminating its agreement with Funai Electric Co. Ltd. for the transfer of its Audio, Video, Multimedia and Accessories business. Moreover, the company says it will take legal action to recover damages caused by Funai.

“We regret that we have to take this action, but we do so to protect our business and the interests of all our stakeholders,” said Philips CEO Frans van Houten. Philips will investigate other opportunities for this business, which will continue to run as a stand-alone entity called WOOX Innovations.

Philips announced the agreement with Funai back in January 2013. Since signing, Philips says it has been working hard to prepare the business for transfer in the second half of this year—a process now complete. Meantime, Philips says Funai has refused to take the necessary steps to enable completion of the transaction and the transfer of the business.

This announcement does not impact Philips’ existing agreements with Funai in North America and Mexico, adds the company.

Fitness club electrical contractor not fit to renovate, says ESA

In October, Anthony Ianniello of Niagara Falls, Ont.—an unlicensed electrical contractor—was convicted in a St. Catharines court on charges related to performing electrical work illegally.

According to the Electrical Safety Authority (ESA, www.esasafe.com), Ianniello (working under the company name Guardian Security) completed an electrical installation of 100 devices—including lighting and electrical outlets—as part of a fitness club renovation.

He did not hold a valid electrical contractor licence and was not legally allowed to perform the electrical work. Under Ontario Regulation 570/05, only licensed electrical contractors are permitted to contract to perform electrical work in Ontario.

Ianniello was found guilty on one count of performing electrical work without an electrical contractor’s licence, and one count of failing to apply for an application for inspection.

Markham's new Lutron experience centre now open

Back in February we told you about a new Lutron (www.lutron.com) experience centre coming to Toronto, Ont., and in October, EBMag attended its grand opening. Located in Markham, Ont., the centre showcases a variety of wireless lighting and shading control solutions for commercial spaces.

Although the Canadian facility will be Lutron's eighth Experience Centre in North America, it is the first outside of the U.S.

"To me, it was a very obvious choice to put it here in Toronto, for two reasons," said company president and CEO Mike Pessina, as he addressed the crowd. The first, he mentioned, is due to the "booming economy" in the city.

"And number two, this is really a specification epicentre for our company and for the world. There's a lot of specifications being written out of Toronto that are going global," said Pessina.

Ground-breaking on the 2800-sf facility (certified as LEED Gold)—a commercial experience centre and specification office—began this February.

"We're very committed and focused on growing the business in Canada," he continued, adding that Lutron's dedication to the Canadian market has "never been stronger".

Visit bit.ly/1ehcegN to see our video from the event.



PHOTOS BY A. DALTON

It's decided: BC's technologists & technicians can tackle some electrical work

BC Safety Authority (BCSA, www.safetyauthority.ca) says the association for Applied Science Technologists and Technicians of BC's (ASTTBC's, www.asttbc.org) Electrical Work Practitioner (EWP) training program has received final recognition, meaning ASTTBC technologists and technicians will be eligible to apply for a BCSA credential to perform a restricted scope of electrical work within specialized fields.

Specifically, BCSA says the Provincial Safety Manager has reviewed the materials submitted by ASTTBC regarding its Electrical Work Practitioner (EWP) training program, and determined that the programs for EL1 and EL2 certification meet all conditions imposed by BCSA.

"The ability to recognize and identify technologists and technicians who are authorized to perform this limited scope of work enables uniform monitoring and enforcement of regulatory requirements for performance of electrical work under the Safety Standards Act," said Ulrich Janisch,

provincial safety manager, Electrical.

In authorizing this program, the provincial safety manager has stated that individuals who obtain a BCSA credential under a recognized training program will not be granted broad certification as electrical workers, says the authority, and will not be a replacement for electrical workers who have obtained credentials issued under existing training programs, such as the electrical Red Seal program.

ASTTBC-trained workers will only be granted permission to perform tasks involving electrical work being performed under a permit and under the supervision of a field safety representative, and only where the work is within the scope of specialized training for technologists and technicians. Employers will still be required to utilize qualified electrical workers where the work requires the broad scope of training and experience gained by qualified electrical workers.

Under the terms and conditions for approval, ASTTBC will be required to continue consulting with industry stakeholders to identify opportunities for continued

program enhancement, says BCSA. ASTTBC will also be required to conduct education programs for employers of technologists and technicians to promote improved understanding on the scope and restrictions for performance of electrical work by technologists and technicians.

ASTTBC members completing the ASTTBC's EWP training program will be required to apply for and obtain permission from BCSA before they will be authorized to perform electrical work in accordance with Electrical Safety Regulation, Section 4(1)(b). BCSA will recognize proof of completing the ASTTBC training program to qualify for permission. To further address industry's concerns about safety, BCSA will set terms and conditions on the work that may be performed.

Development of BCSA's application and credentialing processes is under way, and expected to be completed early 2014. BCSA will make an announcement as to when ASTTBC technologists and technicians will be able to begin applying for the new, limited scope BCSA credential.

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Royal Building Products relocating Surrey facility to Langley

Royal Building Products (www.royalbuildingproducts.com) is moving its PVC pipe fittings facility in Surrey, B.C., about 40 km east to Langley, which will continue to manufacture PVC fittings measuring from 1/2-in. to 36-in.

diameter for all product groups.

The new location also will distribute a range of moulded and fabricated solutions for municipal, plumbing and electrical markets directly to Royal's customers in western Canada, says the company, and it will continue to fabricate custom fittings for customers across Canada.

"Our new location is optimal for manufacturing and storing more than 1000 fabricated and injection-moulded fittings products that Royal supplies," said Lorne Smyth, vice-president, business development and marketing for Royal's Pipe and Fittings Solutions business. "This new location, with proximity to the Trans Canada Highway, will provide

easier pick-up for customers in the lower mainland of British Columbia, as well as easier carrier access for shipments across Canada."

The entire team of manufacturing employees will be relocating to the new facility, as well as the administration, customer service and sales teams.

Actuant selling Gardner Bender and remaining Electrical Segment brands

Actuant Corp. (www.actuant.com/electrical) announced it is selling its Electrical Segment—which includes a variety of products under the Gardner Bender, Maringo, Mastervolt, Acme and Turner Electric brand names—to Sentinel Capital Partners for \$258 million in cash, subject to working capital and other closing adjustments.

The transaction is expected to be completed within 45 days, subject to customary closing conditions.

In June, Actuant announced its board had authorized a plan to commence a divestiture process for the Electrical Segment to "refocus on the remaining businesses and better position the company to take advantage of its core competencies, current business model and global growth trends".

The Electrical Segment primarily serves the retail DIY, marine, industrial OEM and wholesale electrical markets. The segment employs about 1000 and operates from six locations, with headquarters in Menomonee Falls, Wisc.

IKEA purchasing Alberta's 46MW Oldman 2 Wind Farm

Mainstream Renewable Power (www.mainstreamrp.com) has closed a deal to sell its 46MW Oldman 2 Wind Farm, located in Alberta, to furniture retailer IKEA (www.ikea.com/ca).

"Partnering with corporations who want to own wind and solar plant is a very exciting and growing part of Mainstream's global business," said Mainstream chief executive Eddie O'Connor.

Mainstream has commenced construction of the project at a cost of about \$90 million, and it is expected to be operational in the autumn of 2014. At that point, IKEA will purchase the plant. As part of the deal, Mainstream will continue to operate and maintain the wind farm on behalf of IKEA for its lifespan.

Wind energy is a key part of IKEA Group's sustainability strategy of generating as much renewable energy as it consumes by 2020, explains Mainstream. The project will be wholly owned by IKEA Canada, making it the largest wind farm owned by a Canadian retailer. **EB**



LED Drivers and Modules

LED Module

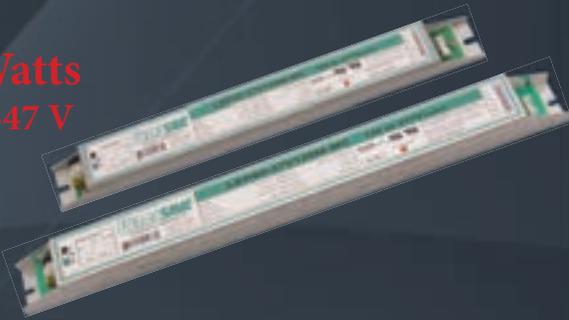
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LEducation 8
March 18-19, 2014, New York, N.Y.
Visit www.leducation.org

NAILD 37th Annual Conference
*National Association of Independent
Lighting Distributors*
April 6-9, 2014, Ft. Lauderdale, Fla.
Visit www.naild.org

The Work Truck Show
(and NTEA 50th Anniversary)
National Truck Equipment Association
March 4-7, 2014, Indianapolis, Ind.
Visit www.ntea.com



AEL Electrical Learning Expo
Alberta Electrical League
March 19, 2014,
Edmonton, Alta.
Visit [albertaelectricalleague.com/
learning-expo](http://albertaelectricalleague.com/learning-expo)



**All-Energy Canada
Exhibition & Conference**
April 9-10, 2014, Toronto, Ont.
Visit www.all-energy.ca



IN CASE YOU MISSED IT...

PHOTOS • EBMag has wrapped up its 2013 Partners in Training tour, which started this spring in Saskatoon and Dartmouth, and concluded this fall in Sudbury and Toronto (Mississauga). Visit bit.ly/1iKUSGz.

VIDEO • EBMag speaks to Lorne Hedges of Schneider Electric about its EV initiative: Charge the World. Visit bit.ly/17pgXZc.

PHOTOS • The Canadian Wind Energy Association's (CanWEA's) 29th Annual Conference and Exhibition drew more than 1500 delegates in the wind energy business. Visit bit.ly/1b13o13.

VIDEO • It's high time we reframed the argument for electric vehicles into one of consumer desire, not social activism—it's time to sexy-up the electric vehicle. Visit bit.ly/1b9Pusi.



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in Training returns in 2014:

- Edmonton • Winnipeg • Ottawa
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OEN Luncheon Series: Bruce Campbell, IESO president and CEO
Ontario Energy Network
January 8, 2014, Toronto, Ont.
Visit www.ontarioenergynetwork.org

BICSI Winter Conference & Exhibition
February 2-6, 2014, Orlando, Fla.
Visit www.bicsi.org

IEEE IAS Electrical Safety Workshop (ESW)
February 4-7, 2014, San Diego, Calif.
Visit www.ehw.ieee.org/cmte/ias-esw



NEMRA Annual Conference
*National Electrical Manufacturers
Representatives Association*
February 5-8, 2014, Atlanta, Ga.
Visit www.nemra.org/Conference.aspx

ECAA Annual Convention
*Electrical Contractors Association
of Alberta*
February 15-27, 2014, South America
Visit www.ecaa.ab.ca

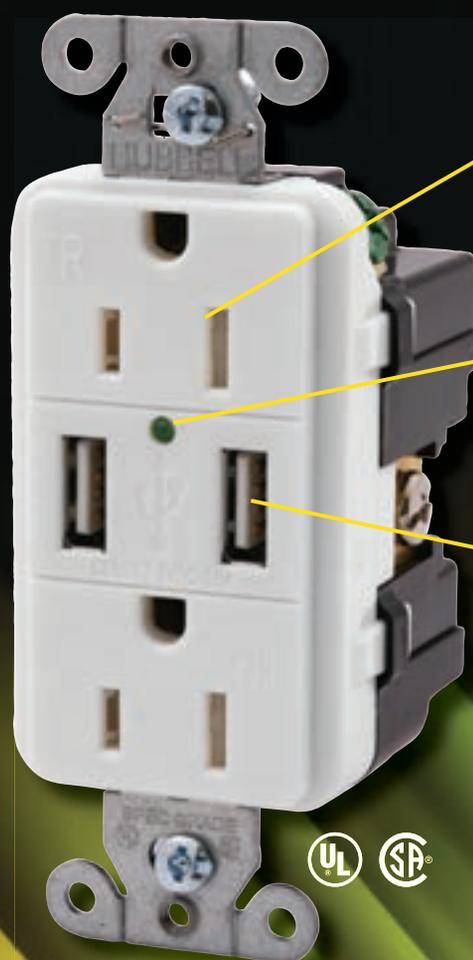
IEEE Electrical Safety, Technical & Mega Projects Workshop (ESTMP)
March 3-5, 2014, Calgary, Alta.
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EBMag has learned (from the Standards Council of Canada, SCC, www.scc.ca) of the passing of **George William Lawrence**. According to the council, Lawrence had a distinguished career as an electrical engineer, and dedicated much of his professional life to the development and improvement of electrical standards. Lawrence occupied a number of positions within Northern Telecom Canada from 1946-1980. He represented the wire and cable industry in the development of the Canadian Electrical Code, and retired in 1980 as director of technology for the wire and cable division. He joined CSA (Canadian Standards Association, www.csagroup.org) in 1980 as manager of the Electrical, Electronics and Communications Group. He was then appointed vice-president of CSA's Standards Division from 1983 to 1992. In 1994, he was honoured with SCC's Jean P. Carriere Award, the highest Canadian tribute available in the field, says the council.

Nexans Canada Inc. (www.nexans.ca) has announced **Intralec Electrical Products Ltd.** (www.intralec.com) will be its manufacturer's representative for Ontario effective November 1, 2013. "Nexans will have broader coverage in the Ontario market

to better service our customers' needs," said **Janet Rainford**, director, inside sales and marketing, Energy Division, Nexans Canada Inc. Intralec has been serving the Ontario market since 1977, and is headquartered at 1200 Cardiff Blvd., Unit 1, Mississauga ON L5S 1P6. According to Murray Chamney, Intralec is the first Canadian representative to be hired by Nexans.



Gianna Manes

Electricity Human Resources Canada (EHRC) named **Gianna Manes** of **Enmax Corp.** as the winner of its CEO of the

Year award, due to her "exceptional leadership" and "dedication to her employees", particularly as she led Enmax's relief response to the June 2013 Alberta floods. EHRC presented Manes her award as part of its Conference and Inaugural Awards Gala "Empowering the Future Today", along with four other award category winners:

- Emerging Leader: **Brad Dennis, Ontario Power Generation**
- Innovation in HR Practices (Educational or Training Institution): **Algonquin College of Applied Arts and Technology**
- Innovation in HR Practices

- (Employer): **Hydro Ottawa**; and
- Workplace Diversity Champion: **Ontario Power Generation, Integrated Approach to Diversity—Creating Impact Through Partnership**

Ideal Industries (www.idealindustries.ca) has appointed **Dorothy Heckle** to the position of channel marketing manager, where she is responsible for developing and facilitating channel-specific marketing programs to drive growth within the Ideal distribution network, as well as oversee advertising, publicity, social media and website initiatives. Heckle joins Ideal after an eight-year career with Newell Rubbermaid, where she progressed through roles as brand manager, global brand manager and senior channel manager. "As Ideal continues to expand its presence in a variety of markets, we wanted to put in place an experienced and knowledgeable professional to ensure our brand remains fresh, innovative and consistent throughout all our business units," said **Joe Saganowich**, vice-president, Ideal Electrical Distribution Group. "Our long-term, proven commitment to the Ideal distribution channel means that her new role is central to the success of our business."

Banvil2000 (banvil2000.com)—a supplier of fan and lighting products serving Canadian and American dealers and distributors since 1974—has appointed **Brydan Sales** of Edmonton as its new agent for the province of Alberta. To get in touch with Brydan Sales, contact **Dan Eaton** at dan@brydansales.com or (780) 328-1520, or visit Brydan at 2181 - 78st Street, Edmonton, Alta., T6K 2E4. Meanwhile, Banvil2000 has also appointed **Telmec Sales** of Ottawa, Ont., as its agent for the Ottawa Region. Get in touch with **Derrick Mccoleman** at dmccoleman@contactdelage.com or **Gilles Degrandpre** at gdegrandpre@contactdelage.com, or visit Telmec Sales at: 30 Concourse Gate, Unit 2, Ottawa, ON K2E 7V7, 613-725-0327.

Philips Lighting Canada (www.philips.com/lightingcanada)



Steve Stanton

announced some changes to its Central Region Sales organization, starting with the appointment of Steve Stanton to the role

of territory manager. **Angelo Miceli**, specification sales manager, will continue to lead the region's spec team while assuming responsibility for managing the Toronto Quotations group. **Paul Adams** assumes the position of distribution and contractor sales manager in the GTA (Greater Toronto Area). Adams has tremendous knowledge of, and insight into, the GTA construction and project market, says Philips, and will "provide leadership in this highly competitive and strategic arena". **Rick Hill**, agent sales manager, will continue to support Philips' independent agent network, and reports directly to **Steve Stanton**. "These changes support Philips' commitment to provide our customers with a complete portfolio of best-in-class lighting products through an integrated solutions-focused sales team," said **Pierre Legare**, vice-president, professional sales, Philips Lighting Canada. "We wish the team much success as they transition into their new roles and responsibilities." **EB**

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Video

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Don't wait for lenders to give you their plan

You probably won't like it!

Access to capital/liquidity (cash flow) is critical for the growth and survival of business. You would think this would be top of mind for entrepreneurs but, sadly, it is not in most cases.

In my experience, increasing sales and production with an eye to costs is paramount. Entrepreneurs are typically very optimistic and charge ahead with only a sketch of a plan for operating the business.

Ultimately, I have seen high-growth businesses get into trouble due to one or more of the following reasons:

1. Accounts Receivables are not collected in a timely fashion. Collection is secondary to securing new customers and increasing sales to existing ones.
2. Inventory levels increase at a level far greater than sales. The prospect of deals entices unneeded bulk buying.
3. Because of these issues, Trade Payable days increase. Suppliers start to get nervous as their payments are delayed.

The typical fallback position to this is use the operating line of credit to make up for the liquidity issues a company faces. The bank's line of credit is designed to assist with business liquidity, provided the company is operating under the lending and covenant parameters as set by the bank's/lender's offer of finance. It is designed to address liquidity for the current assets section of the balance sheet.

Too many entrepreneurs view the line of credit as an open vault door where the company, without restriction, can access funds for whatever reason. For example, using the line of credit for equipment purchases, payment of bonuses, buying of businesses, etc.

In addition to the covenants monitored by the bank, line of credit utilization is also closely scrutinized. When the line remains near the authorized level for a length of time, the bank will request that utilization be lowered, and will want to see fluctuating activity with the balance.

Finally, what most businesses and the entrepreneurs fail to recognize, is the line of credit is *demand financing*. This means the lending facility is granted at the pleasure of the bank and can be called at any time, for any reason. Again, I know of examples where the financing has been called, or the company put in special loans, with little to no notice.

Typically, there are warning signs: increasing calls from the bank account manager, or letters requesting either financial improvement or lower utilization by a certain time. When these are not satisfactorily met, then further action from the bank/lender will undoubtedly commence.

It is vitally important for the borrower to present a strategy to the bank outlining what the plans will be for the upcoming year. It is also important to explain results, either good or bad, and offer definitive courses of action to correct/refocus, especially when there has been a difficult year.

As a former lender, I have seen businesses submit year-end financial statements without even cover letter; no explanation, no plan... just dreadful results.

It takes some practice, but thinking like a public company and providing updates and reports on the business—good and bad—enables you to build trust between yourself and your bank/lender. Managers who get into this routine tell me that is a great discipline, forcing them to focus on all aspects of the business, including matters of cash flow/liquidity.



Entrepreneurs are generally reluctant to impart bad news but, speaking as a former commercial lender, it is easier to deal with bad issues rather than have ugly surprises thrust upon you. Lenders do not like problems (who does?), but will work with companies who are forthright with results and have realistic plans for correcting issues.

Don't be afraid to ask for concessions, higher limits or better rates, especially when there are well-founded reasons for doing so. But communication is the key. You need money, and they have it.

Failure to provide meaningful reports to your stakeholders, investors and lenders could jeopardize your sources of liquidity, choking off needed funds and hampering growth. Be proactive: don't wait for lenders to give you *their* plan. You probably won't like it. **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.



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Award-winning lighting retrofit gives Toronto landmark stunning facelift



Kevin Morrison

Exquisite downtown Toronto landmark Brookfield Place—known for its marble floors and walls, luxurious wood trim and beautiful bronze light fittings in the main floor lobby—recently stunned the architectural community with an award-winning new lease on life.

After several years of consideration, Brookfield Office Properties saw an opportunity to extenuate the inherent beauty of the original architectural design created by celebrated Toronto design firm Bregman & Hamann Architects.

“The old mercury vapour lighting system posed a number of problems. It was expensive to operate, was not environmentally friendly due to the mercury content and the overall quality of light was below current industry expectations,” said Peter Frith, general manager, technical services for Brookfield Office Properties. “The mercury vapour lamps burned at different light intensities throughout their life cycle, creating poor

light quality and a greenish-yellow colour cast over the wood panels and marble floors. The general effect was inconsistent light colours that produced a lethargic and dated look.”

After careful review with lighting consulting firm Marcel Dion Lighting Design and Toronto-based custom lighting manufacturer Illumineer Ltd., Brookfield chose a ceramic metal-halide lighting solution that would improve the light quality and significantly reduce their energy costs.

“Achieving better light quality is not as simple as replacing lamps,” said Gerald Lue, owner and Manager of Illumineer Ltd. “The challenge was to improve the light quality and energy efficiency without it turning into a major construction project. The goal for Illumineer and Marcel was to get the best-quality light at one watt or less per square foot while retaining the original bronze lamp fittings and avoiding any damage to the original architecture and ceiling.”

The fixtures were designed to utilize previous mounting provisions to minimize the cost of installation while improving the ROI, reducing overall maintenance costs and environmental impact.

Custom reflectors had to be created for each of the 700 light fixtures to maximize the light produced from each lamp. The metal halide lamp, combined with the custom reflectors built by Illumineer, created energy savings of 75%, equating to approximately \$60,000 savings per year. The lamps operate at one watt per square foot compared to 4.1 watts per square foot used

by the original mercury vapour lamps.

“The vision that I had for the space was to highlight the beauty of the marble, the wood and the original light fittings,” said Marcel Dion, lighting consultant. “The mercury vapour lamps had a colour rendering index (CRI) of 50 compared to the new ceramic metal halide lamps that have a CRI of 92. That’s amazing light quality for such a low operating cost. You can actually see the natural beauty of the original marble floors intended by the architects, and people look and feel better in the new light.”

This installation comes as Natural Resources Canada (NRCAN) is working to implement new performance regulations for mercury vapour ballasts that would set at a minimum efficiency standard of 95%.

“This new standard will shift the Canadian market to better-quality and more-efficient options than mercury vapour ballasts,” said Pierrette LeBlanc, senior standards engineer from NRCAN. “Mercury vapour lamps are not regulated at this time but, as the ballasts are phased out, people will switch to a more-efficient mercury-free-type of ballast and lighting system. Environment Canada is currently working on regulations that would limit the amount of mercury in lamps.”

The new lighting system created for Brookfield Place has recently won several awards, including an Energy and Environmental Design Award from the Illumination Engineering Society (IES) Toronto Chapter and, more recently, the system also won the national 2013 IES Illumination Award of Merit. **EB**

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When specialty frozen food retailer M&M Meat Shops began developing a new strategy to become more competitive, it explored various store improvement projects that would enhance shopper experience, build the bottom line, and could be replicated across its 430 franchise locations as part of a multi-year renovation mandate.

The grocer found one cost-cutting answer in LED refrigerated display lighting for reach-in cases, which promise to save the retailer about \$600,000 in lighting costs annually once installations are complete. In this case, M&M settled on GE's Immersion RV40 LED system.

As part of an eight-year cycle that mandates LED lighting upgrades be made at the time of each store renovation, franchises are replacing T10 fluorescents with LED systems. A typical location containing 15 glass freezer doors will reduce direct energy consumption by nearly 6000 kWh annually, says GE, while also using less indirect energy as the result of fewer freezer compressor cycles—an additional 2700 kWh reduction. At a \$0.10/kWh rate and 12 hours of operation a day, the average M&M Meat Shops location is expected to save about \$870 a year in lighting energy costs.

The LED refrigerated display lighting solution will also eliminate the maintenance cost of replacement ballasts and high-output fluorescent lamps. With the LED lighting carrying an expected five-year service life, M&M Meat Shops anticipates annual upkeep will be reduced 97% as the result of virtually zero bulb and ballast replacements—an approximate \$525 savings per store.

This brings combined energy and maintenance reductions to nearly \$1400 for each franchisee to complete its lighting upgrade. To date, 150 M&M Meat Shops locations have made

the switch—a combined \$210,000 annual lighting cost savings, which are expected to grow to about \$600,000 a year across all 430 stores when the renovation cycle is complete.

M&M Meat Shops worked with Canadian distributor HD Supply Litemor to develop the program and source the LED retail lighting systems. "We've been working with M&M Meat Shops for years, and we knew their lighting system was getting too expensive to maintain," said George Thomson, sales manager for HD Supply. "The old T10 fluorescents are not as efficient, and they're labour-intensive. Plus, fluorescents don't typically perform well in cold environments, but LED lights love the cold. It was a no-brainer."

Most installations have been completed within one day, by only one or two electricians. Additionally, shelving and food products remain in place while the retrofit is being made.

Dianne Chalmers, senior manager of construction at M&M Meat Shops, says some franchisees are applying their energy cost savings toward financing the new LED lighting and, once the financing period has ended, the savings will convert to positive cash flow. Provincial and local power rebates also help shorten each store's payback; for example, the rebate savings are up to 80% in Nova Scotia.

"The rebates have really helped us get a jump on the renovations and encouraged some franchisees to make updates before their mandated time," Chalmers says. "The money franchisees are saving on energy costs are helping to pay for the renovations themselves. Plus, the updates are making the stores more valuable and giving them more worth. We're really happy with this program."

— With files from GE

Achieving business outcomes with energy intelligence

Spencer Rigler

Energy spend can have a dramatic impact on the bottom line, especially where operating margins are tight. Energy usage and building control data can prove a gold mine of information when harnessed the right way.

Efficiency and sustainability are critical to businesses today. Rising energy bills, greater price volatility and stricter regulation concerning energy consumption and carbon emissions are familiar challenges, all adding unpredictability to the cost base. This has ensured energy management is a strategic priority for any business operating multiple sites in the retail, industrial or commercial sector.

Conventional approaches to energy management use meter readings, analytics and reporting to verify billing accuracy and to forecast demand so that energy is procured at a better price point. Although many businesses have successfully achieved a basic level of cost savings year-over-year as a result, the challenge now is to fine tune so as to ensure these savings are sustainable, and prevent 'savings drift' whereby initial efficiency gains are gradually lost due to lack of staff engagement.

At the same time, businesses are taking simple steps to improve the energy efficiency of their sites. Given that buildings represent 32% of total final energy consumption (according to the International Energy Agency [IEA]), typical measures tend to include ensuring lights and HVAC are switched Off outside of business hours.

Investing in energy-efficient equipment with low carbon footprints, and implementing building control systems are all important contributors to trimming energy use. However, major benefits can be derived from more detailed and focused management of energy consumption, generating significantly more savings.

Ask any store manager where they believe they can save energy and they immediately look up at the lights. Likewise, energy managers diligently monitor usage and bills to bolster their negotiating position with suppliers, but they lack the tools to drill into exactly How, Where and Why energy is consumed throughout the enterprise. While these are tangible energy-saving efforts, they are neither focused nor managed, making it difficult to achieve a guaranteed and sustainable energy-reduction program.

What lies beneath

Focusing on energy procurement rather than the causes of inefficiency is false economy; it's like driving around to find the lowest price for fuel but not servicing the car regularly. A small saving is made on the fuel purchase, but the benefit is lost because more fuel has been burned as the result of an engine running inefficiently.

There are many instances of this disconnect between cost and efficiency within commercial premises. For example, the main operational criterion for refrigeration units (one of the greatest consumers of energy) is to keep goods at a certain temperature to comply with food safety standards. Sensors monitor the units to ensure the correct temperature is being maintained, but the data from these sensors will not show whether the unit is consuming more energy than it should.

For example, refrigeration units often become stressed due to a faulty pump or blocked ventilation grill, but when their energy consumption is not being monitored locally, the fault would only become apparent when the unit is serviced. Since it is unlikely that the fault would be reported to the energy manager, it becomes a hidden energy cost for the business, in addition to an increase in life cycle cost due to energy inefficiency.

Another common scenario is where automated HVAC controls are overridden in response to sudden changes in the weather, only for staff to forget to enable them again once conditions return to normal. When this scenario is repeated across hundreds of sites for any length



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of time, the cost to the business can be substantial. Research by the UK's Carbon Trust suggests that up to 90% of HVAC building control systems are inadequate in some way, costing industry and commerce more than €580 million per year in additional energy costs.

Turning static data into actionable intelligence

Businesses with multiple sites will have hundreds if not thousands of points measuring electricity, gas and water consumption. They will also employ controls to manage the operation of building services, such as HVAC, lighting and water, while some also have more advanced asset management software in place to help optimize asset life cycles. These systems generate vast volumes of data, but are typically operated in silos, resulting in a lack of visibility across the site estate.

Despite the fact that building controls and asset management systems were never intended for logging consumption data specifically, the information stored within these systems can provide telling insights into the inner workings of a business. For example: the building temperature at an individual site at a specific time and on a particular day; whether equipment has been left On overnight; where automatic HVAC controls have been overridden.

Similarly, asset management systems contain a wealth of information, such as whether the filters on refrigeration units have been cleaned, how regularly coolant is being topped up, and whether the sensors fitted to the refrigerator doors detect how long they are being left Open or are serviced regularly.

Businesses that have been using these types of systems for many years are sitting on vast data mines relating to their energy usage and physical assets.

Correlating energy data across assets gives

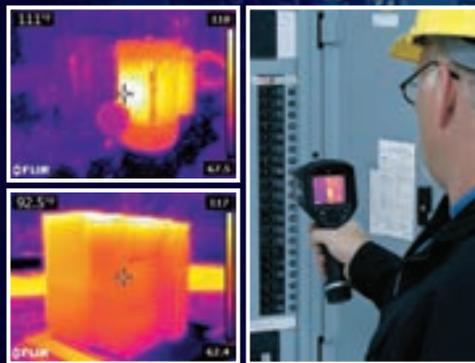
businesses an opportunity to make informed decisions on how to manage from an energy and, ultimately, cost perspective. Many companies are now in a position to make operational decisions from an energy usage perspective, a very important approach to reducing cost in the business.

Advanced energy management systems have, therefore, evolved to combine, standardize and analyze this data in a user-friendly fashion. They employ easy-to-understand graphical dashboards that allow

users to cross-reference a rise in energy consumption (a.k.a. energy exception) with building controls and asset information to identify the root cause and decide on a response or action. In other words, energy management has gone from being an information-based analytical platform to an action-orientated intelligence platform.

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Tracking and sustainability

Energy dashboards include an array of options for compiling and presenting information to enable companies to view and track energy performance at asset, site or estate level. They allow staff to track and benchmark the energy performance of their site against multiple locations in their region. Are they in the Top or Bottom 10? Knowing where you stand in comparison to your peers drives behaviour and attitude toward energy management.

Key Performance Indicator (KPI) selection criteria are available, including comparison of similar-sized locations, performance against previous years or normalization parameters, such as store size, footfall or outside temperature. Moreover, the fact that energy management information can now be accessed from almost any device at any time empowers staff to become energy managers at their own sites or stores.

With this level of global visibility, users are able to unlock the hidden patterns in their organization's energy consumption and improve business performance. They can uncover both major areas for change and the granular details where individual actions can make a big difference. For example, identifying that the reason for a rise in energy consumption is due to doors on the refrigerators being left Open for 60 hours last week rather than the usual 45 hours, and asking staff to ensure they are kept closed.

Gathering diagnostic data from an end location, combining it with other information to create an energy exception, then providing a set of actions according to asset type provides users with more intensive and interactive energy management engagement than conventional systems. This is essential to achieving sustainable savings, since real-world experience shows that efficiency programs lose momentum without constant

attention, and savings can dip by 2% to 4% annually as a result.

Keeping track of actions and outcomes is also vital to sustaining energy savings. This is why businesses need to ensure that energy management is accompanied by project tracking tools that can quantify success and ensure continuous savings are made. This is particularly important in tracking ROI, where large capital investments have been made in projects with forecast efficiency savings.

Why it pays to be a bean counter

Energy management touches many different areas, and innovation continues at pace. Some organizations are providing energy data on flatscreen TVs in staff areas, and making graphs and metrics available on mobile and tablet devices to help individual workers, store managers and business units work together to achieve a sustainable energy-reduction program.

Priorities differ according to local market needs, but the primary goal for businesses is to mitigate the impact of energy cost on profit margins and minimize financial risk. Those that have not yet implemented an energy management program can achieve significant savings straight off. A fashion retailer in Europe has realized savings of just over 5% on a five-store pilot simply by ensuring the lighting and air-conditioning were switched Off outside of hours—something that only became visible from the energy profile. Following full implementation, payback was achieved in less than 12 months.

Such efficiency gains can have a direct impact on the bottom line for established companies with energy management aspirations; with energy costs generally tracking a company's size, savings can run into €multi-millions.

Think about it: save €1000 of your energy bill and, with an operating margin of 2%, it's the equivalent of having to sell €50,000 of merchandise. Imagine asking a store manager to deliver additional sales of this magnitude, or focus on engaging staff with energy-saving measures using dashboards. One retailer did exactly this, deploying across 2000 stores and delivering savings in the region of 1.5% to 2.5%.

There are plenty of additional opportunities to be found using an action-orientated and joined-up approach to energy management. There are advanced users who are currently working at a 25-30% energy reduction on their baseline through actions they have taken over a number of years. Others are successfully extending the life cycle of assets and maximizing the efficiency of their maintenance contracts using the energy intelligence their systems provide.

Businesses have traditionally approached energy

consumption as a fixed overhead, but the real opportunities lie in approaching it as a variable cost that can be tightly controlled to increase the competitiveness and effectiveness of operations, and the business as a whole. **EB**

Spencer Rigler is with Elster Energy ICT (www.energyict.com), a provider of energy management solutions with offices in Belgium (HQ), Australia, France, Germany, the Netherlands, the United Kingdom and the United States.

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No problem in selection of conductors

Contrary to Ark Tsisserev's assertion in his letter published in the September issue of Electrical Business (page 10), it is fully within the Electrical Safety Authority's rights to provide clarifications that permit alternative approaches to meet a code requirement.



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The Electrical Safety Authority, as the authority having jurisdiction (AHJ) over the Ontario Electrical Safety Code, has the right and obligation to provide clarifications.

Clarifications and interpretations published in Bulletins could prescribe alternative approaches to meet a Code requirement or intent and ensure safety is not compromised. Other AHJs in other provinces exercise that same privilege.

—Ted Olechna, director, codes and standards, chief engineer, Electrical Safety Authority

Where is Bombardier's supervision?

The following Comments were published online at EBMag.com under the news item "Bombardier fined \$140,000 after worker contacts live conductor" (tinyurl.com/mqt4rue).

I see a trend where more and more responsibility for a person's safety is placed on the employer. What about personal responsibility for one's own safety? Is that a lost concept? Why does it need a law to force a person to wear safety gear when it's common sense?

Of course, the article has too much missing information to make any specific comments about the incident.

— Ray Rockl

As an electrical contractor and the owner of an electrical company, I have a responsibility to teach my young (and sometimes not-so-young) apprentices the proper procedures when working on live switchgear or live electrical circuits. I wonder why there was not adequate supervision and/or training to keep this worker safe.

I know that, in the real world, accidents do happen, but every single accident *can* be avoided.

I hope that this young worker heals up with no lasting issues due to this accident, but I also hope that Bombardier rethinks its position on worker safety so we don't have any future issues.

— Marcel Panjer

A very sad occurrence re. Bombardier young worker. We assume he was not an electrician-in-training... where was the procedure for doing this current check? Where was supervision for this young person working in a live cabinet? Again we see overall neglect of unseen electricity.

— Roy Tonks

Tidy profit = continued illegal work

The following Comment was published online at EBMag.com under the news item "Fitness club electrical contractor not fit to renovate, says ESA" (tinyurl.com/kaage3r).

Not bad. He made a tidy profit, and only had to pay \$1500 in expenses for working illegally, and no liability insurance probably as well. He will continue.

— Rick

Cover photo takes the wrong path



I don't know if you wanted to show the proper way to make measurements (or obvious errors) with the picture on your cover of the September [2013] issue. The employee wears a full face shield with ear plugs hanging on his shoulders. He also has one hand on the meter and the other on the meter leads, giving a clear current path through his heart.

— Michel T., Quebec EB

SPE-900 Guideline addresses solar PV rooftop safety and structure



Victoria Alleyne

The popularity of solar photovoltaic (PV) rooftops has created a need for guidance on their installations, given many building codes in Canada do not address relevant PV safety and structural issues.

A lack of guidance in this area can expose installers and first responders (i.e. firefighters) needing rooftop access to residential and non-residential buildings to unnecessary risks. Thankfully, the new CSA Group document, “SPE-900, Solar Photovoltaic Rooftop-Installation Best Practices”, provides guidance and best practices for the design and installation of PV rooftop systems in a number of important areas.

Fire risks

Designers are guided on evaluating how the integration of PV modules on a building affects the roof's fire performance characteristics. The National Building Code of Canada (NBCC) requires roof coverings regulated under Division B, Part 3 to have a Class A, B or C Classification to protect the roof-covering material from ignition in the event of exposure to fire originating from sources outside the building.

Guidance related to the requirements in ULC 1703, CSA C22.2 No 61730-1 and 61730-2, and CAN/ULC-S107 is included. Precautionary steps related to stand-off-mounted PV systems as they relate to the NBCC classification are also noted.

Lightning strikes

For direct or indirect lightning strikes, SPE-900 provides precautions for surge arrestors and lightning protection in buildings where there is a critical nature to the power distribution system. Since the design and installation methods used in installing a photovoltaic system can help reduce the level of risk associated with lightning-induced surges, design considerations related to AC wiring, module wiring (string and parallel string) and power cabling are included in the guideline. Precautionary information

related to the strength and bonding for the racking is also covered.

Maintenance

SPE-900 recommends best practices for providing safe working conditions for maintenance, inspection and service personnel. A useful log sheet to record the inspection results for the components of a photovoltaic system is included in Annex D. Risks related to climbing and avalanches are also included.

Structural guidelines

The structural clause in SPE-900 was the result of a review of Canadian and international building codes and guidelines; at the time of publication, there were few, if any, specific requirements related to roof-mounted photovoltaic modules and racks. Therefore, the largest section of the guideline is related to structural design. The publication's structural guidelines provide an interpretation of existing code provisions and best practices for the structural engineering aspects of roof-mounted solar PV systems for both new and existing construction.

Loading conditions

When a solar photovoltaic system is installed on a rooftop, it is important that it be designed to resist dead, live and other loads, and to recognize that it influences the loading conditions for which the building would have otherwise been designed in the absence of the PV system.

Because the NBCC doesn't explicitly define loads on photovoltaic systems, nor their influence on the defined building loading, detailed consideration for dead loads is included.

PV modules and racks

The guide includes consideration for the design and structural resistance of photovoltaic modules and racks. Because sliding and overturning problems are unique to ballasted racks, a section with best practices for the design of

such systems is included.

Designers are provided with information for various types of building components, including wood frame, prefabricated wood trusses, open web steel joists, steel frames/decks, concrete suspended slabs, hollow-core precast slabs, etc.

Waterproofing

SPE-900 also discusses waterproofing and the durability of photovoltaic integration on commercial roofs before, during and after installation to minimize any unintentional adverse effects due to the waterproofing functionality of the roof assembly.

Electrical

Because solar photovoltaic electrical issues are addressed by the Canadian Electrical Code Part I, Sections 50 and 64, SPE-900 does not duplicate these requirements, but rather points the user to the relevant sections in the code.

Likewise, the guideline does not include aspects covered in NFPA 70, Article 690. As always, local authorities having jurisdiction are the touchpoint for electrical and structural permit requirements for photovoltaic rooftop installations, as specific requirements may vary by jurisdiction.

Future development

As a future development, CSA Group has worked with stakeholders and is evaluating the need to develop the SPE-900 guideline into a standard for both rooftop and ground-mount photovoltaic installations. In evaluating this opportunity, CSA Group would look into any existing documents related to fire and building construction to avoid conflicting requirements.

For more information on this guideline contact the author via email or through CSA Communities. To purchase SPE-900, visit shopcsa.ca. 

Victoria Alleyne is project manager, renewable energy with CSA Group, and can be reached at victoria.alleyne@csagroup.org.

Necessity is the mother of invention

Electricians' tools you can make

David Herres

When it comes electrical work, the plan should be to cut labour cost as much as possible without reducing the quality of the job, especially with regard to safety of coworkers, end users and the public. One of the best ways for accomplishing this is having good tools.

But electrician tools can be quite expensive, especially high-end testers, hydraulic benders and other specialized equipment. The good news is jobsite efficiency can be greatly enhanced by using simple tools that you yourself can make.

Once you get into the mindset of creating your own task-specific jigs, fixtures and gadgets, you will find yourself coming up with new ideas and clever innovations. Here are a few ideas to get you started; then, see what you can invent.

1. Sawhorse work centre

The virtue of this convenient electrician helper is that it is light and low to the ground, making it easy to carry around the worksite and store in the shop. Make the four legs 26-in. long, with 22° bevel cuts, parallel at top and bottom. The work surface can be a 30-in. 2x6. Position each pair of legs so the sharp edges touch at the centre line of the 2x6, 2 in. in from the ends. Use galvanized drywall screws throughout.

Attach 1/2-in. trapezoidal plywood gussets on the outside of each pair of legs. Push these gussets up tight against the 2x6 for extra support. Make a 1x4 pine shelf attached to the inside bottom of each gusset, and attach light strips to both edges of the shelf so that it can be used to hold small parts and tools on the job. Drill holes for screwdrivers and the like.

On a table saw, cut two V-blocks 6-in. long



Modify a short cord to facilitate valid current measurement using a clamp-on ammeter.



A quick and easy way to heat PVC conduit to make no-kink bends.



Protect yourself from shock when handling wires with questionable insulation.



Here is a time-saver when you need to test Edison base bulbs frequently.



This mouse carved out of a piece of foam works every time.



When none of your gear pullers are suitable for the size and shape of the application, try making a hardwood wedge (best used in pairs). Sand and wax it to maximize effectiveness.

PHOTOS BY JUDITH HOWCROFT

and mount them at each end of the work surface to hold PVC conduit and EMT while cutting.

To the outside of the legs, attach 1/2-in. EMT clips. A short length of EMT will hold spools of wire for installation in raceway. Have the pipe extend beyond the end of the sawhorse and mount the clips sufficiently high should you plan to use it for Romex.

This simple work centre greatly enhances worksite productivity when installing branch circuits in metal or PVC raceway.

2. DC polarity tester

Most modern multimeters automatically compensate for polarity when in DC volt mode, so it doesn't matter how the probes are connected, but there are instances when it is necessary to know which probe is positive: for example, when using a multimeter in the ohms mode to test a semiconductor.

For this operation, the black lead—when connected to the common meter terminal—provides a 3vDC negative bias that is applied to the semiconductor. But some meter manufacturers reverse this conventional polarity. It is helpful to ascertain the polarity of the probes in advance so you know whether they are providing forward or reverse bias. You may want to check polarity when troubleshooting automotive or photovoltaic system wiring.

Should you have an extra probe, cut the lead and solder in a diode. Over the diode and exposed leads, slide the jacket from a short segment of Cat 5e data cable to protect the diode and insulate the

lead. The diode will conduct when the anode is connected to the positive terminal. Verify polarity and check that the diode is good by touching the terminals of a dry cell, and colour code the probe if necessary.

The power rating of the diode is not critical when low-level voltage measurements are being made, because the multimeter in the voltmeter mode is a high-impedance instrument that draws negligible current.

This probe is helpful in troubleshooting power supplies in small electronic equipment and also for checking out the DC bus of a variable frequency drive (VFD) that controls the 3-phase motor found throughout modern industrial facilities.

3. Splitter for use with clamp-on ammeter

The multimeter has a milliamp function, but electricians rarely use this mode because it cannot deal with significant current levels and, also, because it involves cutting open the circuit so the meter can be connected in series with the load. The entire current in the circuit flows through the meter.

A very useful instrument is the clamp-on ammeter. Rather than measuring current directly, it measures the magnetic flux surrounding any current-carrying conductor. It works for AC as well as DC, and the instrument can handle currents up to 100 or more amps. You open the jaws and close them around the wire in question. It does not matter whether the conductor is exactly centred within the jaws or passes through at an angle. The display is stable and easy to read and, overall, the instrument is user-friendly.

What's your clever idea?

Have you got a clever idea for a labour-saving tool or device that you don't see here? Share it with EBMag! Tell us what it is, what it does and how you came up with the idea. Send us close-up photos and, ideally, a photo or two of you using it. Want to really impress us? Send us a video with you using it! Email the editor at acapkun@annexweb.com with all the details.

We'll ask readers to help us pick the best one(s), and winners get a prize from EBMag.

The old analogue models work fine but, today, most electricians prefer the digital version. The Hold function is useful for recording peak usage within a time frame and, should you have three clamp-on meters, you can use them to check for three-phase imbalance during a workshift or overnight.

In using the clamp-on ammeter, it is not possible to measure the conductors within a cable or cord when they consist of a hot wire and a neutral, or three individual phase conductors. The currents flowing in opposing directions will cancel out, making for a Zero reading, regardless of the load. You have to clamp around a single conductor to get a meaningful measurement. You can remove the cover at a service enclosure or junction box, or dig out a single conductor at a motor terminal box to take this measurement.

When the equipment is cord-and-plug connected (often the situation with tools and appliances), you can make a splitter. Make up a short cord of adequate ampacity with plug at one end and connector at the other. Slit the jacket for about 8 in. near the midpoint of the cord; pull out the wires and cut away the excess jacket and paper strip. This device permits access to a single conductor so that useful current measurements can be made.

4. Conduit cleaner

It is often desirable to install wiring inside a concrete slab or wall. PVC conduit is best, but metal raceway is sometimes used. The protruding stub is taped over so that concrete does not enter during the pour. Sometimes, a blob gets into the conduit, and this makes the installation of conductors extremely difficult. At the same time, it is inconceivable to break up and remove a big block of concrete that is part of a building under construction. Here's an easy way to remove the obstruction:

Cut a length of steel fish tape off the reel. Remove the hooked end and cut it to a point. Chuck up the piece in a portable (preferably impact) drill, feed it into the raceway and see if you can break up the obstruction. This procedure works a good proportion of the time.

Raceway work—installing first the pipe and then the wire—is part science and part art. The next two items on our agenda fall into this category.

5. Mouse made at jobsite

A raceway run is to be assembled as a complete system, including the connections at both ends, before the conductors are installed. These are some of the variables that determine the difficulty of pulling wires:

- Diameter and type of raceway.
- Length and number of bends

between pull points.

- Type, size and number of wires, solid or stranded.
- Use of wire-pulling lubricant and pull rope.

An easy pull, where it is a short, straight run of a small number of solid conductors, is merely a matter of pushing the wires through. Moderate to difficult installations require a pull rope, which can be fed into the conduit piece by piece as it is assembled. An alternative is to use a piston, which is also called a mouse, consisting of a rubber cylinder with an attached hook.

Fasten a string to it (not the final pull rope but rather

a much lighter line); go to the first pull box and use a vacuum to pull mouse and string through the conduit. Insert the mouse into the next segment of the raceway and proceed in the same manner. The light string can be used to pull a heavier nylon rope that will pull the conductors. You can buy a flat ribbon with numbers printed on it for attaching to the mouse; for a long pull with many bends, the ribbon will tell you how much wire will be needed.

On the jobsite, you may find you don't have the right-sized mouse. Here's the innovation: you can make your own. Carve it out of a piece of foam insulation

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board. Push an eyebolt through it and attach a washer and nut. This will save you a trip to the distributor in the middle of a busy workday.

6. PVC conduit bender

PVC conduit is a less-expensive alternative to EMT raceway but, because of greater expansion and contraction with changes in temperature, it may not be satisfactory in many outdoor applications—particularly long horizontal runs on the outside of a building. It is, however, the material of choice for underground and concrete embedded work.

Factory-made bends are available in 90°, 45° and 22°, but there are times when you need an odd angle or custom offset. Any bend must be gradual and uniform or it will materially reduce the inside diameter. In smaller sizes, good results can often be achieved by using an EMT bender, next size up. Go twice as far as usual, and the PVC will spring back to the desired angle.

In many cases, heat is required. An ordinary propane torch will not work. No matter how carefully you try to apply the heat, it will not spread uniformly, resulting in kinking and loss of cross-sectional area. Various specialized tools are available. An electric blanket-type

device with Velcro strips is designed to fasten around a short segment of PVC conduit and provide a slow, uniform amount of heat that softens the pipe just the right amount so it can be easily and precisely bent by hand. The disadvantage is the tool is pricey. Moreover, the fine heating element tends to burn out, and cannot be easily repaired.

Other PVC benders have been devised. One type uses a vehicle exhaust, but this can be problematic due to petroleum residue on the conduit and wire insulation.

Here is a home-brewed solution that does not involve a capital outlay for most individuals: hold the piece to be bent above a charcoal grill with a nice bed of coals. Slowly rotate the pipe so the PVC heats uniformly. Practice on scrap cut-offs until you become adept. Offset bends can be easily made by grasping the conduit near the two ends and pushing them toward the centre, simultaneously moving the ends in opposite directions while keeping them parallel.

When heated, PVC is said to emit carcinogenic fumes, so be sure to perform the operation outside when there is a breeze, and stay upwind. Use just enough heat to make the pipe workable.

7. Incandescent bulb tester

Maintenance electricians in large commercial or industrial facilities frequently need to test incandescent or self-ballasted fluorescent bulbs that go into standard Edison-base sockets. A quick test set-up can be mounted on the wall at the workbench. Slit one side of a porcelain lamp base shell using a hacksaw. When connected to a 120V branch circuit, this device allows you to quickly test a bulb without having to screw it in.

(T8 and similar fluorescent bulbs cannot be conveniently tested without getting involved with the high-ionizing voltage. Ohmmeter measurements don't work. Prior to doing a ballast replacement, the usual procedure is to install new bulbs when a fluorescent fixture is out or flickering, or when the ends of the bulbs have started to darken. As fluorescent bulbs age, they draw more current, causing the ballast to overheat. In a large facility, it is more economical to change fluorescent bulbs on a regular schedule as opposed to waiting for symptoms to develop.)

8. Live-wire insertion tool

It is sometimes impractical to power down an entire row of fluorescent fixtures. After doing



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a ballast change, it may be necessary to handle the high-voltage secondary wires so as to prevent them from getting pinched when replacing the cover. An inconspicuous nick in one of these wires could cause quite a jolt that would be hazardous, especially when you are at the top of a tall ladder.

As a safeguard, make a V-notch at the end of a short hardwood dowel. This will permit you to push in the wires without contacting them. A larger version of the same tool, made from a short length of broomstick, is useful for moving larger-gauge conductors when you don't feel right about touching them.

When it comes to exposure to shock or arc flash, the best practice is to put in place as many redundant layers of protection as possible. First and foremost, disconnect and lockout the power supply. Then, use tools and meters that are insulated for the circuit voltage. Wear rated and inspected gloves. Stand on a dry rubber mat or other surface that has a low ground potential. Where there is a possibility or arc flash, wear protective clothing of the appropriate rating.

9. Hardwood hub puller

Gear pullers generally work quite well for removing stubborn hubs and pulleys from motor shafts. An example is the hub that is part of a furnace blower where it has to be separated before working on the motor. But, sometimes, the puller is not the right shape or configuration for a particular job, and penetrating oil and pry bars are to no avail.

Use a band saw to make hardwood wedges that can be placed behind the hub and tapped with a hammer. Paraffin wax and a smoothly sanded finish make these wedges more effective. It is helpful to have a variety of shapes and sizes on hand.

10. Homemade GFCI tester

The test button on some GFCIs tests the mechanical trip mechanism, but you never know whether the GFCI is within electrical specs. The GFCI measures the incoming current on the hot conductor and outgoing current on the neutral. It compares these amounts and, when there is a difference, there is fault current that could be passing through a person and going to ground, not back through the neutral.

The correct tripping point is 4mA to 6mA, so a comprehensive test procedure would be to first simulate a fault current that is less than 4mA and verify the GFCI does not trip, then simulate a fault current that is more than 6 mA and verify that it does.

Separate trip and no-trip devices are made up in the same way, only with different values for the resistors. Use your Ohm's Law Wheel to calculate the correct resistance and wattage for each resistor.

To make these devices, use standard attachment plugs. Connect the resistors between hot terminals and equipment grounds, which first must be verified in the GFCIs being tested, using a standard plug-in circuit analyzer.

What's the next Big Thing?

There's nothing like always having the right tool on

hand, no matter what you're working on or where, but we all know that's not always the case. Against the backdrop of increased expectations of high productivity and reduced labour costs, necessity becomes the mother of invention. And, who knows? You may even invent the next Big Thing in electrician productivity. **EB**

A regular contributor to Electrical Business, David Herres is a Master electrician and author of nearly 40 articles on electrical and telecom wiring. He recently authored "2011 National Electrical Code: Chapter-by-Chapter", published by McGraw-Hill and available at Amazon.com.

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How are Canadian associations addressing skills shortages?

Anthony Capkun

With headlines such as “Don’t downplay Canada’s skilled trades shortage, insists BuildForce”, “Manitoba offers Entrepreneurship in the Skilled Trades initiative”, “Canadian Construction Association weighs in on skills training discussions”, “Saskatchewan supports trades centre at Parkland Regional College in Yorkton” and “British Columbia targets trades training at 10 post-secondary institutions”, it is clear the skilled trades discussion is not simply a regional matter, but one of interest to all of Canada... and all Canadians.

(These headlines, by the way, are news items we uploaded to EBMag.com in just the last several weeks! I cannot imagine how much press the issue has received in other media.)

Unlike the weather—a topic on which everyone has an opinion but about which no one can do anything—Skills Canada and Electricity Human Resources Canada (EHRC, formerly Electricity Sector Council) are tackling the issue of impending skills trade shortages head-on: one generically, the other sector specifically.

I recently attended two events important to both organizations—the launch of National Skilled Trades & Technology Week and EHRC’s “Empowering the Future Today” conference—to learn about the challenges they (and we) face, and their game plans for success.

Targeting youth

Skills Canada’s National Skilled Trades and Technology Week encourages youth to consider careers in skilled trades and technology. At the flagship launch event at Centennial College, several hundred local students took part in interactive Try-a-Trade and Technology activities and workshops (as seen on the cover of this issue). Other activities aimed at engaging young Canadians to consider skilled trades took place across Canada.

“In this current economy where there’s a high rate of youth unemployment, high school students have to be especially proactive regarding their curriculum choices,” said Shaun Thorson, CEO of Skills Canada, who noted that many students are choosing to opt out of foundational courses (e.g. maths and sciences) far too early in the education process. Unbeknownst to them or their parents, they are jeopardizing their career choices.

“There’s a misconception among students—and even guidance counselors—that it’s okay to skip the advanced Math and English courses if students are bound for the trades,” said Ann Buller, president and CEO of Centennial College. “Yet, cars today have more computing power on board than the system that guided Apollo astronauts to the moon. Technicians have to diagnose and resolve issues with sophisticated computer systems quickly and accurately. That only happens when the technician has a thorough understanding of the science at work under the hood.”

EHRC’s keynote speaker and former provincial parliamentarian, Sean Conway, echoed this sentiment when he quoted the head of Duke Energy: “I run a high-tech company disguised as a utility!”.

Where Conway is concerned, we still have “significant cultural barriers to getting more people involved in the [electricity] sector. There are still a lot of parents pushing kids away from skilled trades”. He feels we need to have a more European appreciation of skilled trades, where “there’s a great guild culture”.

Canada is suffering from an “hourglass workforce”, noted Conway, but what’s that? Picture an hourglass: at the top are all our baby boomers and knowledge workers, and they’re doing very well with respect to income; at the bottom are all the entry-level jobs that present poor income prospects; in the middle—the leanest section of the hourglass—is our Middle Class, which has experienced contraction over the years and is under great economic stress.

HR for electricity sector

Emanuel DaRosa has his work cut out for him. The CEO of Northwest Territories Power Corp. says he faces stiff competition for talent from government, diamond mines, the oil & gas sector, etc. and, because NWT has the second-lowest median age in the country at 32 years, he’s dealing with an age group that rates a good work/life balance higher than remuneration. “They like to move around,” said DaRosa of this generation, and “not get locked into the same job for more than five years.”

Tim Mitchell, president and CEO of Ontario Power Generation (OPG), described its skilled trades initiative for its Matagami Project, where they needed “1700 or so skilled workers”. OPG partnered with Moose Cree First Nation for the project, giving them a 25% ownership stake and creating a non-profit organization to deliver transferable skills training for the project.

The president and CEO of Hydro One, Carmine Marcello, emphasized the “main thing is finding people with the right attitude”, as skills can be taught. He also observed that a person’s passion, while not overtly electricity-sector related, may be brought to bear in the industry. For example, he noted, “We have animal behaviorists... people who try to figure out how to keep animals out of our gear”. Not industry-specific, but a useful skill nonetheless.

A highlight for me was listening to Earl Ludlow, president & CEO of Newfoundland Power Inc. Although he oversees a major utility, he’s got that straightforward, *down’ome* Newfie way of saying it like it is.

“I think we’re winning the war for talent,” he said confidently, noting that 20 years ago, Newfoundland & Labrador “was no place to be” but, these days, “there’s tons of opportunity on the books... let alone what’s being discussed!”. He explained the utility has a high percentage of apprentices to

At Centennial College in Toronto, Ont., Skills Canada launched National Skilled Trades & Technology Week, raising awareness of opportunities in the skilled trades.



There are still a lot of parents pushing kids away from skilled trades, noted EHRC keynote speaker, Sean Conway.



“Take your ace employees who will retire in a few years and put them full time into mentorship and knowledge transfer,” advised Earl Ludlow, president & CEO of Newfoundland Power Inc.



Who are women’s role models when it comes to the electrical sector? “There’s no ‘Nuclear-Operator Barbie’,” joked Amy Darnell who, at 27 years, is an authorized nuclear operator (ANO) at Bruce Power.

full-timers, warning that it takes about eight years to create a “good Red Seal journeyman”.

Knowledge management

And the key is start right away with knowledge transfer, noted Ludlow, and not wait until your key people have retired. “Take your ace employees who will retire in a few years and put them *full time* into mentorship and knowledge transfer,” he advised.

The idea of knowledge transfer/management was a pervasive theme in EHRC’s conference, so I attended the session “Developing your Organization’s Knowledge Strategy”. Led by Vivian Yoanidis of Hydro One and Blake Melnick of the Knowledge Management Institute of Canada (KMIC), the session asked the question:

Knowledge is the only critical asset in an organization that walks out your door every day. What are you doing to make sure it is retained and leveraged within your organization?

Melnick explained a “knowledge strategy must be part of your corporate strategy”, adding that knowledge management (KM) is not about managing knowledge, but managing knowledge processes (i.e. the ones you use that ensure successful knowledge transfer).

Attracting women to the sector

Did you know there’s a move afoot to get more women into the electricity workforce? Well, there is, and it’s multi-faceted.

During EHRC’s panel discussion “Attracting and Retaining Women in the Electricity Industry”, I learned more about the association’s Bridging the Gap initiative, which is aimed specifically at getting females interested in the sector, primarily through a series of inspirational videos showcasing women in the industry.

Panelist Cheryl Cottrill, executive director of a group called Women in Nuclear, discussed some of the initiatives with which WiN is involved. She said the group has a great partnership with Skills Canada in Ontario and New Brunswick, and has started a science club for girls in Grades 4 through 7 with the aim of igniting a “lifelong STEM [science, technology, engineering and mathematics] passion”.

In truth, much of what the panelists discussed could apply to either gender (i.e. promoting skilled trades while kids are young, convincing parents it’s okay to get into the trades, etc.) but perhaps the biggest difference is the fact that women have so fewer role models in those positions. Who do they look up to?

Perhaps one of those role models will be Amy Darnell who, at 27 years,

had just completed five years of specialized training to become an authorized nuclear operator (ANO) at Bruce Power. Darnell admitted that she didn’t plan on becoming an ANO. Nothing at school or in the media tipped her off to a career in electricity. “There’s no ‘Nuclear-Operator Barbie,’” she joked.

Darnell initially went off to university thinking she might get into

medicine, but it wasn’t her cup of tea. Then she learned of the ANO program from her father, who was just going into ANO training himself. And rather than try to dissuade her from joining him, Darnell’s father was supportive of her choice. Kudos to him; as the father of a clever little girl myself, I want her to know that, yes, she too can run a nuclear reactor.

“The electricity sector offers a lot of hope for skilled, high-paying jobs,” said Conway, adding we have to “take recruitment to the streets”. We have to target parents, kids, community leaders, etc., and speak their language. “In this labour market, consider a 13-, 14- or 15-year-old girl... How do we speak to them? How do we speak their language?” **EB**

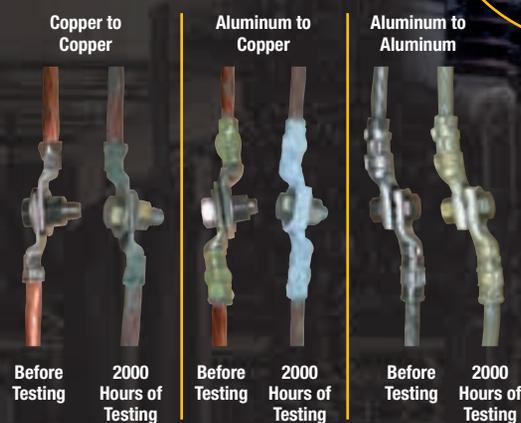
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The study and its results are outlined in our publication “Connecting with Copper is Connecting with Trust”. Please contact us for your copy and information on electrical wire and cable seminars.



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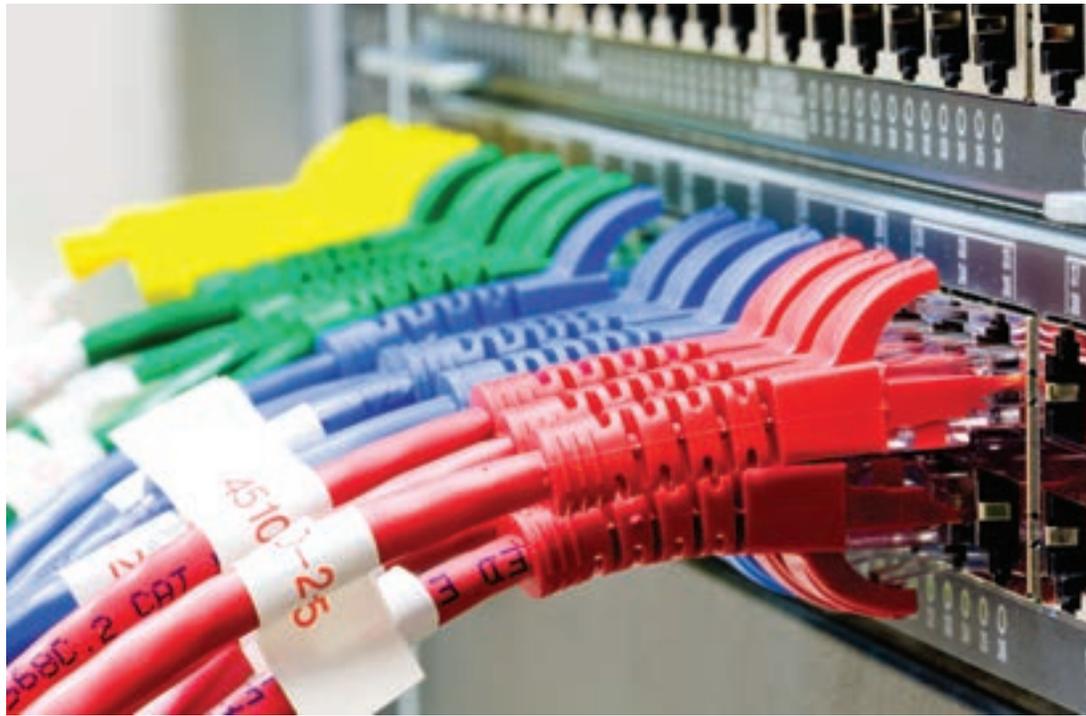
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PROFESSIONAL LABELLING key to managing and maintaining electrical and networking installations

Craig Robinson

Be they large or small, professional contractors and installers take great pride in the quality and performance of their electrical, telecom and datacom system installations. One area that is sometimes overlooked in these projects, however, is the need to accurately document and trace the installed wires, cables and key components with durable, clearly marked labels.

Why is labelling important? For one thing, it helps to futureproof the installation by simplifying troubleshooting and the inevitable moves, adds and changes (MACs) likely to occur over time. The main purpose of using labels as part of a cable management and maintenance system is to accelerate tracing and initiate problem-solving measures and repairs as quickly as possible. Without a proper labelling system in place, troubleshooting and cable tracing can be time-consuming and expensive, whether the work is performed by the end user's maintenance or IT staff, or an external contractor.

Labelling the key components of the installed system does not have to be complicated. For specific guidelines, refer to the ANSI/TIA 606-B.1 "Standard for identification and labelling", which was approved in April 2012. While not mandatory, the standard provides clear specifications for labelling and administration best practices across all premise classes.

Clear, accurate labelling designed to endure over the long term is the hallmark of a professional installation and an essential part of an efficient cable management strategy. Complete, end-to-end labelling of electrical and network systems provides greater quality assurance for the end user as well as warranty assurance for the contractor and installer.

Industrial labelling tools

If you have not kept up with new developments in industrial-grade hand-held labelling tools, now is the time to check them out. With the advent of a smart, onsite labelling tools, the days of using tape and markers are over, and even the days of pre-printing labels on the computer are fading.

The relatively low cost and customized high performance of today's industrial hand-held labelling tools make them well worth the investment. Some of the newer labellers available today are feature-rich, with download capacity and ability to print 2-D barcodes, QR codes and hundreds of common industry symbols, as well as text and pre-programmed labels.

In addition, hand-held tools are obviously portable and convenient, and extremely easy to use without technical training. Some are versatile enough to create various types of labels for the entire installation, from electrical and control panels to wiring and cabling, and patch panels, punch blocks, faceplates, outlet covers and more.

For onsite work crews, you can select a thermal transfer labeller with smart keys offering shortcuts for creating cable wrap, cable flag, faceplate, patch panel and serialized or sequential labels. For large projects and high-volume serialized printing, there are desktop models that can be networked to your PC so you can download and store data from common databases for use in labels printed in the field.

And you definitely want to select a labelling system that allows easy swap-out of tape cassettes, enabling work crews to change label colours, sizes and adhesive types in seconds, thereby increasing productivity.

Industrial-grade labelling

Whether you are working on an existing facility or new construction, it is important to use labels designed to last. This means choosing strong, durable, laminated labels that will remain affixed and clearly legible for years to come.

There's a big difference between printing a label from the computer and using professional-quality tapes. Look for industrial label tapes specifically designed to conform to wire and cable, without smearing, fading or detaching over time. Thermal transfer label printers are favoured by professionals because they use heat technology to create laminated labels that resist water, heat and abrasion.

There are many different types of tapes, and you'll want to select those with the flexibility to wrap around thin patch cord cables with ease, and the adhesive quality to remain affixed to cables, faceplates, control boxes and other surfaces. Be aware that some tapes are designed for use as asset tags or ID labels on flat surfaces only, and while they're great for outdoor equipment and harsh environments, they are not designed to bend and adhere to cable.

Additional features that can be found in today's best-in-class hand-held labelling tools and labels include:

- Rugged construction.
- Comfortable, easy to hold and operate.
- QWERTY-style keyboard and intuitive navigation to enable speedy printing of high-resolution labels with just a few keystrokes.
- Built-in datacom and electrical templates and symbols can also simplify label creation and formatting.
- Large backlit LCD display can show menus, label formats and print previews.
- Interchangeable drop-in tape cassettes allow for rapid changeover in the field.
- Labels available in a range of colours, sizes and adhesive types. Some labels are tamperproof, leaving a permanent pattern when the label is removed or repositioned. Some label printers are designed to handle heat-shrink tubing.
- A multilingual user interface allows work crews to configure menus and navigation in different languages.

The mark of professionalism

Implementing a smart, clear labelling scheme to your installations

enables more efficient cable management and sends a strong signal to your customers. Accurate labelling is a relatively simple and cost-effective way to mark your work—and your company—as top-quality and highly professional, which is a powerful way to generate repeat business and more jobs going forward. **EB**

Craig Robinson is manager, sales & business development with Brother Mobile Solutions (www.brother.com), a provider of printing products for electrical contractors, and other mobile workforce applications.

Are you a neat-freak?

Are you pleased with the way you label your work? Is it the mark of a professional job? Send us a photo of your neat-freak installation! Email the editor at acapkun@annexweb.com with all the details. We'll ask readers to help us pick the best one(s), and winners get a prize from EBMag.



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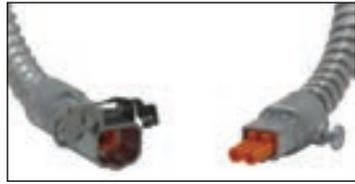
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Ideal Industries' Met-Con connector for replacing LED modules

Ideal Industries has introduced the Met-Con connector for the LED market that houses its PowerPlug 182S 2-pole luminaire disconnect. Equipped with a connector latch, the enclosure enables electricians to easily replace LED modules located in the air handling



space without the use of tools, says the company. To make the replacement, users pull down the module, undo the latch,

and disconnect the Met-Con to cut power from the luminaire. The Met-Con is exclusively designed to fit Ideal 182S 2-pole disconnects for 18-22AWG wire sizes, and is tested for use in Class 2 LED modules applications to UL 1598 Luminaires Standard.

IDEAL INDUSTRIES
www.idealindustries.com

Shat-R-Shield launches Ironclad 66 vapour tight fixtures



Shat-R-Shield has announced the Ironclad 66 series of industrial grade vapour tight fixtures, boasting a rugged design to withstand extreme conditions in harsh environments where moisture, dust, dirt and humidity are present. The Ironclad 66 series is rated NEMA 4X, NEMA 5, IP66, UL, cUL, and are USDA and UL Wet Location approved, making it ideal for applications such as industrial, cold storage, tunnels, bridges, subways, parking garages, food processing plants, loading docks, refineries, construction sites and waste water treatment plants, says the company.

SHAT-R-SHIELD
www.shatshield.com

Eye Lighting launches into social media



Eye Lighting has taken its communications online through Facebook, Twitter, LinkedIn and YouTube videos in an effort to better engage with its customers. Through its digital media strategy, Eye Lighting says it will build stronger customer relations and improve its ability to meet its client's needs for both its commercial and utility lighting products. Customers can connect with the company through its contact page: www.eyelighting.com/socialmedia. "Since beginning our social strategy, we have already seen a significant increase in followers and likes from new customers," said Rob Freitag, VP marketing for the company.
EYE LIGHTING
www.eyelighting.com



"An energy audit helped us identify opportunities to save money by reducing electricity use."

Mike Bannon,
 VP of Production, Tempo Plastics

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**Contempo and American Revolution
luminaires now in LED**

Acuity Brands says its post-top decorative Contempo and American Revolution luminaires from American Electric Lighting are now available in LED. The Contempo and American Revolution luminaires feature an LED light engine rated for more than 100,000 hours at a 25C ambient. Its electronic multi-volt driver is rated for a minimum of 50,000 hours and up to 100,000 hours at 25C. A standard surge protection device and optional solid-state lighting photocontrol

help protect against electrical disturbances, including lightning. Downward lumens promise the same performance as up to a typical 150W HPS platform, with the fixtures available with six lumen packages and multiple distributions. The LED luminaires are offered with numerous options, including various optics, paint colours and colour temperatures of 3000K, 4000K or 5000K.

**AMERICAN ELECTRIC
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www.americanelectricleighting.com

**World's first biologically corrected
LED light bulbs: Definity Digital**

Lighting Science launched Definity Digital, calling it the world's first line of biologically corrected lighting with

products specifically designed to improve sleep, support natural melatonin production, boost alertness, accelerate plant growth and protect wildlife. Based on patented LED digital technology, the light bulbs fit into conventional sockets and provide bright white light with added health benefits. The Definity Digital line includes Good Night, Awake & Alert, MyNature Grow and MyNature Coastal. Good Night uses spectrum filtering to reduce melatonin-suppressing blue light; Awake & Alert emits a blue-enriched light to increase energy, promote alertness and enhance performance; MyNature Grow in traditional Purple or True White promotes healthy plant growth from seedling to flowering and fruiting; and MyNature Coastal offers beachfront lighting that is less disruptive to wildlife,

including turtle hatchlings.

**LIGHTING SCIENCE
GROUP**

www.lsgc.com

**MaxLite LED security light now
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Now Energy Star qualified, the 14W LED security light from MaxLite illuminates outdoor commercial and industrial environments and claims to help minimize accidents, deter crime, and improve the appearance and value of businesses. The fixture with dusk-to-dawn PhotoCell offers a 50,000-hour life and 5000K daylight CCT in an architectural bronze finish, and is thermally managed by aluminum components in the LED module that transfer heat to the die cast aluminum backplate.

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Schneider offers MDS switchboard exclusively to the Canadian market



Designed and manufactured entirely in Canada, Schneider Electric's new multi-distribution switchboard (MDS) is available in multiple, pre-designed configurations, and is suitable for applications in which space is at a premium. At 30-in. wide, the smallest MDS option is 29% smaller than other switchboards offered by Schneider, making it a suitable solution for small- to mid-sized commercial customers requiring up to 1200 amps. The MDS is configured to order and manufactured in multiple plants across Canada, ensuring it is shipped quickly to customers. A key aspect of the MDS design was to improve wiring and feeder space, says the company; MDS is free-standing for either single section or multiple section applications with several choices of distribution panels in the main

section. Tin-plated aluminum or silver-plated copper bus material is available to meet a range of budgets. The MDS is tested and certified to CSA 22.2 No. 31 and meets Canadian utility requirements.

SCHNEIDER ELECTRIC
www.schneider-electric.com

FLIR CM83 clamp meter boasts enhanced power analysis and VFD diagnostics

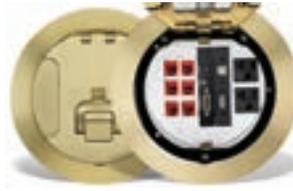


FLIR Systems has unveiled the CM83 power clamp meter, designed specifically for technicians who need advanced power analysis capabilities, it says. For power-related diagnostics, the CM83 features Harmonics Mode to find noise from different electrical

sources; Phase Rotation to confirm phase orientation of three-phase systems; and Inrush Current to detect start-up related transients. The tool also has VFD mode for analyzing non-sinusoidal waveforms and noisy signals on VFD-controlled equipment. A built-in LED worklight illuminates dimly lit work areas.

FLIR
www.flir.com

Hubbell SystemOne recessed 6-in. & 8-in. fire rated poke-throughs



Hubbell SystemOne recessed 6-in. and 8-in. fire rated poke-throughs boast capacity, aesthetics, and installation ease, while accommodating various power, data, and audio video connections. According to the company, the 6-in. and 8-in. core hole products offer one of the industry's most complete array of architectural finishes including brushed aluminum, as well as nickel, brass, or bronze plating providing superior durability. The poke-through feature recessed connectivity, a low profile flange, and egress doors that hinge inwards.

HUBBELL
www.hubbell-wiring.com

New Ridgid website lets you rate and review products

Ridgid has launched a new website that boasts, says the company, a responsive design that works on any internet-enabled device. The new site dynamically scales larger and smaller, depending on the device type and its orientation



(horizontal or vertical) when in use. Additionally, the site boasts a cleaner, simplified navigation and product registration, says Ridgid, along with improved product and distributor search capabilities. The most exciting new feature is the ability for customers to review, rate and ask questions about specific products, says the company. In addition to helping professional tool users research which tools to purchase and how to use them, this information will help shape future product and accessory development, adds Ridgid.

RIDGID
www.ridgid.com

Control full dimming range with Cooper Wiring's Aspire RF smart dimmer



Eaton's Cooper Wiring Devices has released its Aspire RF Z-wave-based smart dimmer, allowing users to remotely control and monitor the full dimming range of their lighting for all common load types, including LED, CFL, incandescent, magnetic low voltage and electronic low voltage. Designed for residential and light commercial applications, the smart dimmer system master can replace regular switches to provide local and remote On/Off, dim and bright control without having to overhaul wiring, says the company. Additionally, the Aspire RF's new, all-load dimmer features increased flexibility with programmable functions, multi-location control and safety features, such as child lockout and panic mode.

COOPER WIRING DEVICES
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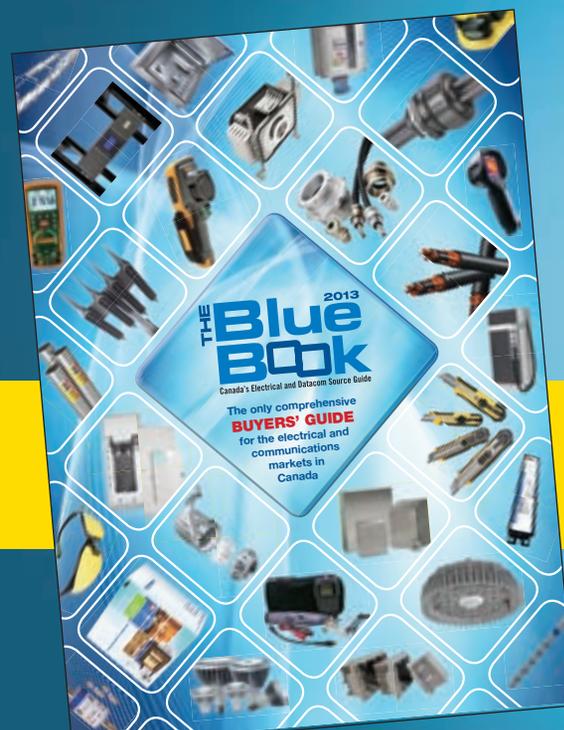
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THE Blue Book 2014

Canada's Electrical and Datacom Source Guide

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CEC-Part 1 and additional required reading

The Canadian Electrical Code, Part I is a voluntary standard for adoption and enforcement (and amendment) by Canada's provinces and territories. We rely on it to provide guidance on the installation of electrical wiring and equipment. Its stated purpose is preventing electrical fire and shock hazards, but not all of its requirements are between its covers. Sometimes, we must delve into other publications to obtain more complete information.

Rule 12-012 provides, in great detail, requirements for installing high- and low-voltage underground conductors, and their allowable ampacities (Table 53). At the end of this lengthy rule we find Rule 12-012(13) which advises us that, when an installation falls outside the scope of this rule, we must go to the underground standard, CAN/CSA-C22.3 No. 7.

Rule 36-300 and Table 51 provide minimum grounding conductor requirements for substations over 750V for minimum copper wire sizes based on the available short-circuit current and fault current duration. A footnote to Table 51 indicates wire sizes have been calculated using the IEEE Guide for Safety in AC Substation Grounding; ANSI/IEEE No. 80. Table 52 provides maximum step and touch voltages in and around

substations for several types of earth. You will note that a footnote to this table specifies that its values have been calculated using ANSI/IEEE Standard No. 80.

CEC Rules 36-304 and 36-306 stipulate that maximum ground resistance for substations over 7500V must be calculated based on available fault current levels and earth resistivities. Appendix B identifies the CEA Research Report 249-D-541 as the approved method of working out substation grounding electrode design. That document, in turn, references ANSI/IEEE No. 80, which contains all of the formulae necessary for controlling step and touch voltages, and conformance to Table 52.

Rule 32-200 requires that fire pump conductors be protected against fire exposure and to provide continued operation in compliance with the National Building Code of Canada. The rule refers us to Appendix B, which elaborates on the rule: when called upon, fire and life safety systems must continue to operate for at least one hour. Checking Appendix B, we note it makes reference to NFPA No. 80 as a further source of information for the installation of fire pump wiring.

Rule 36-108 and Table 31 list minimum horizontal spacings between overhead

conductors on pole lines for voltages up to 69kV. A Table 31 footnote shows the table does not cover voltages over 69kV and pole spans greater than 50 m. For that information, we are referred to the CSA overhead lines standard CAN/CSA-C22.3 No. 1.

Rule 36-110 and Table 32 provide vertical clearances for live parts up to 230kV for indoor and outdoor substations for areas accessible only to pedestrians and vehicles. The vertical outdoor clearances are based on location (i.e. light or heavy snow area). Appendix B tells us this information should be obtained from the Meteorological Service of Canada, Environment Canada or the Atlas of Canada, published by Natural Resources Canada.

Rule 18-000 is the scope paragraph of Section 18 Hazardous Locations. This rule refers to Appendix B, which displays a long list of documents affecting the design of hazardous locations containing explosive gas atmospheres, combustible dusts or ignitable fibres. It shows three Tables listing the applicable reference publications:

- A: Documents generally applicable to all classes of hazardous locations.
- B: Documents applicable specifically to Class I hazardous locations.
- C: Documents applicable specifically to Class II hazardous locations. **EB**

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 January'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

Wiring systems supplied by an ungrounded supply shall be equipped with a suitable ground fault detection device to indicate the presence of a ground fault.

- a) True b) False

Question 2

The rating of disconnecting means for an X-ray machine with a momentary rating of 170A and long term rating of 60A shall be:

- a) 60A b) 80A c) 100A d) 200A

Question 3

Luminaires, with a minimum weight of [], are required to be installed so that the branch circuit wiring connections and the bonding connections are accessible for inspection without removing the luminaire support

- a) 2.7 kg b) 4.5 kg c) 13.0 kg d) 23.0 kg

Answers: EBMag November 2013

Q-1: What is the maximum continuous load permitted on a service switch if marked for continuous operation at 80% and is supplied by multi-conductor cable?

- b) 80%. Ref. Rule 8-104(5).**

Q-2: For general power and lighting circuits, the maximum rating of overcurrent protection for No. 10AWG copper conductor is:

- d) 30A. Ref. Rule 14-104(2).**

Q-3: Where receptacles of type 5-20R are installed on recreational vehicle lots, the CEC requires them to be protected by GFCI of Class A type.

- a) True. Ref. Rule 72-110(4).**

After some 15 years writing Code File for us, Les Stoch is taking a well-deserved break. We cannot thank him enough for his years of expert input. Be sure to visit L. Stoch & Associates online at www.lstoch.ca.



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