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- + Soup company's CHP journey
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IPEX



from the **EDITOR**

ANTHONY CAPKUN

Dean's report not OK

Upon turning in his review of the Ontario College of Trades, Tony Dean said his recommendations “will result in even better support for skilled tradespeople across Ontario,” but neither the Electrical Contractors Association of Ontario nor Ontario Electrical League agree 100% with Dean’s assertion. In fact, a few of his recommendations may actually hurt the electrical trade.

Dean suggests that Scope of Practice (SoP) overlaps exist between various trades, so perhaps trades that are applying to become compulsory might, in future, apply to have only the core portions of their SoPs deemed compulsory, leaving peripheral overlapping elements voluntary.

“That’s flawed thinking, and will lead to an erosion of existing compulsory trades and splintering of those trades—to the detriment of public and worker safety,” says ECAO’s Jeff Koller. “There is a big difference between turning a screwdriver on wood or drywall and turning a screwdriver in proximity to high-voltage electricity.”

OEL’s Stephen Sell agrees this could further erode the electrical trade’s SoP. “There are examples from history where certain sectors of electrical have been taken out of the [SoP] for electricians,” says Sell. “The main one I hear about a lot of times is fire alarms, which used to be part of the electrical SoP.”

Dean also suggests the Ontario Labour Relations Board (OLRB) could play a role as an appeal mechanism for enforcement activity carried out under the authority of Ontario College of Trades and Apprenticeship Act, 2009 (OCTAA).

“The problem is that the OLRB exists to enforce the Ontario Labour Relations Act, which exists to settle workplace disputes only in the unionized sector,” says Koller. When you get ticketed/fined by OCoT, the only issue at hand is whether someone broke the law. “It’s like taking a speeding ticket, laid under the Highway Traffic Act, and having the OLRB hear the appeal for that,” Koller explains. “It doesn’t work.”

Should the OLRB actually become some kind of adjudicator, then it should be OCTAA—not historic precedence—that guides its decisions, Koller advises.

A final area of concern for Koller is Dean’s suggestion that, when it comes to trade (re)classification reviews, the minister appoint a panel of experts who “would be individuals without an affiliation with a trade or a particular trade sector”.

“So, in other words, people that have nothing to do with the industry are going to be given an adjudicative role in terms of determining the future of the construction industry and the trades,” says Koller.

If you share ECAO and OEL’s concerns, contact your MPP, and do it before the province brings forward legislative changes this Spring that implement Dean’s recommendations. **EB**

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Ted Doherty, president of **Intralec Electrical Products Ltd.** (intralec.com), has retired and is succeeded by his business partner, **Murray Chamney** (photo), who remains as president and

CEO. Doherty has worked for Intralec since 1977, in inside sales, as an outside rep, sales manager and, finally, president (since 1999). Three new partners are joining as owners: **Cindy Doherty** will assume the role of COO, **Greg Moylett** is appointed VP distribution sales, and **John Hadley** will serve as VP construction sales. PHOTO A. CAPKUN



Linda Bertoldi—a senior partner in **Borden Ladner Gervais LLP's** (www.blg.com) Toronto office—is the recipient of APPRO's 2015 Hedley Palmer Award, which was presented to

her at the 27th annual Canadian Power Conference. The Hedley Palmer Award is the highest honour bestowed annually in the power generation business in Canada, according to APPRO. PHOTO A. CAPKUN



Rich Stinson has assumed the role of **Southwire's** (U.S.) CEO and president, following a transition period from **Stu Thorn**, who retired after 16 years leading the company. Stinson boasts

more than three decades in the electrical industry, according to Southwire (www.southwire.com). He joins Southwire from **Eaton**, where he managed power distribution assembly, industrial controls, electrical assembly and power distribution divisions.

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Over 2200 people took in the sights and sounds at the Solar Canada 2015 conference and exposition in Toronto where 80 exhibitors from around the world showed off the latest in products and technology, and we were there to capture it. Check out our gallery at tinyurl.com/j57umr6.

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Barb Denham has joined the **Standard Products** (www.standardpro.com) sales team as a Calgary-based lighting specialist for the company's southern Alberta region. Denham has

over 15 years of experience in sales in the lighting industry, Standard says.

Dennis B. Cummings has joined **Venture Lighting International** (www.venturelighting.com) as the Canadian sales manager, reporting to **Ken Hawley**, VP sales & marketing. Cummings has more than 30 years of electrical industry knowledge and expertise, says Venture, having held positions with Dialight, EGS Electrical Group and Graybar.



Burndy (www.burndy.com) has promoted **Stewart Gale** to vice-president of sales and marketing. He reports to **David Smith**, vice-president and general manager at Burndy U.S. Gale joined

Burndy in 2011 as a senior product manager and was promoted to key account manager in 2013.

JudyLynn Archer, president and CEO of **Women Building Futures** (www.womenbuildingfutures.com), is the new face on the board of governors for NAIT (Northern Alberta Institute of Technology), responsible for the management and operation of the Edmonton-based polytechnic. NAIT presented Archer with an honorary Construction Engineering Technology degree in 2006.



John Garrison Jr. is now CEO & president of **Terex Corp** (www.terex.com), succeeding **Ronald DeFeo**. Garrison joins Terex from **Textron**, where he served as president & CEO of their

Bell Helicopter Segment. **EB**

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Texcan more than doubles its Vancouver footprint



PHOTO COURTESY SONEPAR CANADA.

Wire and cable distributor Texcan (texcan.com)—a division of Sonepar Canada—has opened its new 105,000-sf head office and warehouse in Surrey, B.C.

Texcan president Chris Golf says this new facility “has more than doubled our Vancouver footprint and cements our commitment to serve the B.C. marketplace”.

The Surrey location is accessible to all major transportation routes, says Texcan, and features mobile cutting technology, industrial-sized cutting equipment and real-time inventory management. The facility also consists of nine loading bays and separate shipping & receiving offices.

Visit the new branch located at 10449 120th Street.

Electrocuted machine tech costs Ideal Drain Tile \$110K

Ideal Drain Tile Ltd.—a manufacturer of high-density polyethylene (HDPE) pipe—pleaded guilty and was fined \$110,000 in the death of a worker who was working alone and received a fatal electrical shock.

Ontario’s Ministry of Labour reports that, in July 2013, a worker at the company’s premises in Thorndale was working alone on a machine from an elevated forklift platform. There was no operator at the controls of the forklift, and the machine being worked on was not powered off.

A plug and thermocouple had been removed from the machine and the plug had been disassembled. With the plug’s parts removed, the prongs of the plug were exposed. The thermocouple would have been measuring the air temperature when removed, and the air temperature would have been below the set-point. This triggered the machine’s control panel to send power to the plug to heat the machine back to the set-point temperature.

The worker was found unresponsive on the elevated platform with the exposed and burnt prongs of the plug in hand. The

cause of death was electrocution.

The technician had been provided generic lockout training but had not been trained on how to specifically lock out the machine he was working on.

Ideal Drain Tile Ltd. pleaded guilty to failing as an employer to comply with the provisions of Ontario Regulation 851/90 (Industrial Establishments Regulation); specifically, failing to ensure that the controls of the forklift were attended to and operated by another worker while a worker was on the elevated platform.

In addition to the fine, the court imposed a 25% victim fine surcharge, which is credited to a provincial government fund to assist victims of crime.

Student money stress? Apply to EFC Scholarship Program

Electro-Federation Canada (EFC) and its members have launched the 2016 EFC (www.electrofed.com) Scholarship Program, providing \$136,000 in financial support to university and college students.

“This program addresses the need to engage bright young talent in our industry and to demonstrate the Canadian electrical industry as a viable career choice. It also provides an opportunity for students to interact with EFC members and learn about innovation in our industry,” said Joris Myny, chair of the 2016 program and a senior VP with Siemens Canada.

Now entering its 21st year, 53 scholarships will be awarded this September. EFC says since inception the program has funded Canadian university and college students’ education with over one million dollars.

The deadline to apply is May 31, 2016. Visit efcscholarship.fluidreview.com.

Stelpro invests \$750K to robotify baseboard production



PHOTO COURTESY STELPRO

With the goal of increasing productivity and reducing production costs, Stelpro (www.stelpro.com)—a Quebec-based manufacturer of integrated heating solutions—is investing \$750,000 to automate baseboard manufacturing at its Saint-Bruno-de-Montarville facility.

“Of all the methods we have used to remain competitive, the [robotification] and automation of our manufacturing processes have taken on greater and greater importance in our business strategy,” said Francois Séguin, VP of operations. He added that the St-Bruno plant is operating at full capacity, manufacturing over 800,000 units annually.

“Our employees are the key to our success and, for us, automating manufacturing procedures is not synonymous with cutting jobs,” he said. “Thanks to the savings resulting from increased productivity, we’ll be able to keep current jobs, as certain employees will be reassigned to other duties within the plant.”

In the near-term, Séguin feels robotification may even create some specialized jobs, such as programmer or automation engineer.

St. John’s Sentinel Alert secures \$525K in seed round financing

Sentinel Alert (St. John’s, N.L.)—a provider of sensor-based safety software that aims to reduce worker accidents—says it has closed \$525,000 in seed round financing.

The investment came from Pelorus Venture Capital (\$250,000), which manages Venture Newfoundland & Labrador; equity investment firm Killick Capital; and a private angel investor.

“We want to use technology to help make people’s lives better at work, and Pelorus Venture Capital (www.pelorusventure.com) and Killick Capital both support that mission,” said Sarah Murphy, Sentinel Alert (sentinelalert.co) co-founder and CEO. “Their investment and expertise in our target industries will allow us to grow our staff and operations throughout Canada and the U.S. over the next year.”

According to Sentinel’s LinkedIn profile, “Our solution understands worker habits in the field and can detect the very moment something goes wrong.”



Edmonton's Hillview School gets NAIT solar PV treatment



Tim Matthews, NAIT Alternative Energy Technology program. PHOTO COURTESY NAIT

Students and staff of Northern Alberta Institute of Technology (www.nait.ca) have designed and installed a solar photovoltaic array on the roof of Hillview School to help children learn about alternative energy production (and get some power for the school, to boot).

The project is a collaborative effort between NAIT's Alternative Energy Technology program, Hillview School, Edmonton Public Schools and the City of Edmonton. It was funded through a \$26,000 EcoCity Edmonton community sustainability grant, and piloted in 2014 as the Neighbourhood Action Program. The funding covered the cost of the equipment and curriculum design.

The 12-module, 3kW array, is capable of producing 4MWh a year, says NAIT. Real-time data from the array—including up-to-the-minute information on how much energy is being produced—is available to students and the general public.

Individual Champion sponsor Spotlight

Electrical Business launched the **Electrical Safety Champion Awards** program last year to recognize Canadians for their efforts, but also deserving of praise are the industry players who step up to support the program by becoming a sponsor. Long-established in electrical safety circles, the *Individual Champion* category sponsor is **I-Gard** (www.i-gard.com), whose core competence is in the application of high-resistance grounding (HRG) technology in combination with a product portfolio that helps industrial customers reduce arc flash hazards.

Its latest HRG innovation boasts active arc mitigation via an arc pressure sensor, which reduces the likelihood (and magnitude) of an arc flash—all in a single product. Coming soon is an arc flash dampening system that, in effect, uses an impedance in conjunction with an arc quencher to interrupt, control and limit an arc flash to below 1.2 cal/cm².

"Whether a facility is looking to convert from an outdated and unsafe ungrounded electrical system—or change over from the traditional solidly grounded system with inherent arc flash risk to a safer HRG system—we have the products, personnel and experience to help," says Andrew Cochran, president.

Welcome aboard, I-Gard, and thanks for supporting the 2nd annual Electrical Safety Champion Awards program, which launches March 1, 2016! To learn more about becoming a sponsor, nominating someone, our 2015 winners, etc., visit EBMag.com/esca.



"This applied research project provided our students with a valuable opportunity to gain real-world experience while making a meaningful contribution to the community," said Dr. Jim Sandercock, chair, NAIT

Alternative Energy Technology program. "Under the supervision of NAIT staff, they took this from a concept to reality." **EB**

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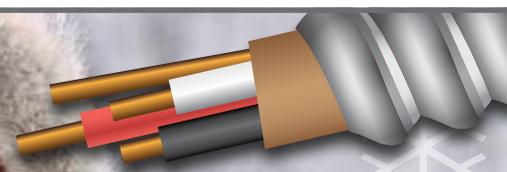
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No shortage of solutions... but will government listen?

These comments follow our news item posted January 12, 2016, at EBMag.com, "How would YOU kill the underground economy in residential construction?" (tinyurl.com/hnjbgo7).

YOU HAVE TO remove the demand, which is from homeowners struggling to make ends meet and looking for a money-saving option. GST was the worst thing that ever happened to the construction industry. High permit costs is the second. WorkSafe and other imposed overhead is the third.

It is not the legitimate contractor who has priced himself out of the formula: it is the government. — *Simon*

UNTIL HOMEOWNERS SUFFER consequences, this will never end. The root cause is that the HST is too high. A lot of homeowners want to do things right, and they would... if the tax were under 10%.

The real trouble is that, once they realize they can save 13% HST in Ontario plus ESA costs, homeowners look to hire an electrician, not a Licensed Electrical Con-

tractor. And these same people are afforded protection by the Consumer Protection Act and insurance, too.

Let's face it: the government really only cares about lost revenue, and that's because they have a spending problem. And it's only a matter of time before Uber starts offering light installers or basic electrical repairs. — *Rob S.*

\$15 BILLION? I'LL bet it is at least double that. The driving force for the underground economy is taxation and, until people realize this and do something to correct it, the issue will only continue to escalate.

As soon as new regulations are put into place, the government has to employ more people to enforce them, hence a higher tax burden on the legitimate businesses. This is the same for the entire underground economy, be it tobacco, alcohol, etc. — *Doug*

"ACCORDING TO THE ministry, the underground economy accounts for \$15 billion in lost economic activity in Ontario each year." It's not lost at all. Someone is still getting paid. Someone is providing for their family. It's not fair to taxpayers, though... — *Jonathan*

finishing their basement without permits.

CUT THE COST of residential permits across the board. Have homeowners sign declarations when a house is sold that no work has been done without permits, and hold them accountable. We have had enough deaths, mould issues, CO poisoning, and injuries in Ontario because of incompetent people. — *Luke B.*

AS A SMALL electrical contractor for over 30 years, I lost work many times because I wouldn't do jobs for "cash, no GST" or even "contract". — *Electrician*

THIS IS AN easy fix: create a safety inspection certificate for houses similar to vehicle safety checks that must be issued before a sale can take place. Only valid, licensed contractors can issue the certificates, and the owners and buyers are responsible for providing the information before the sale can take place. — *Worknman*

Feeling safer isn't necessarily being safer

This comment follows our news item posted February 1, 2016, at EBMag.com, "Pedestrians feel safer under White streetlights than Sodium-Yellow" (tinyurl.com/hxxd9yd).

IT IS GOOD to see data on safety perception, and Canadian-based research would be interesting. From other studies we know more illumination often does not create safer environments; especially glare and high contrast can blind people, create road hazards and invite crime. With light at night also come negative health and ecological impacts. Good (safe) urban outdoor lighting should, therefore, be not too bright, exhibit no glare, use cutoffs to avoid light trespass, and have a warmer colour than early-generation LEDs. — *Allard S. EB*



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GET RID OF the HST for non-commercial projects. Hold the homeowner responsible for not hiring licensed and regulated trades. Stop the big box stores from selling electrical, plumbing, heating/cooling products to non-regulated people. Mandatory building and electrical inspections when a house is sold. Set up a registry for building and trade products. People die in house fires because some idiot's friend's brother knows how to do wiring.

Have the Ministry of Labour, Ontario College of Trades, Electrical Safety Authority and building departments work weekends... I guarantee that if someone has lumber sitting in their driveway, they're

We always welcome your comments, insights and article ideas.

For submitting his idea for an upcoming article, we sent Jeff H. (Toronto, Ont.) an M12 Fuel Impact driver, courtesy of our friends at Milwaukee Tool (milwaukeetool.com).

And for his rant about octagonal boxes, we sent Ottawa's Pascal B. a FatMax tape measure, courtesy of our friends at StanleyBlack&Decker (stanleyblackanddecker.com), and an adjustable drywall hole cutter and lineman's pliers with crimper, both courtesy Milwaukee. A special thanks to our prize sponsors!

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A DIGITAL VISION = FUTURISTIC INTEGRATION

Plan Group helps Humber Hospital
make waves with incredible
interoperability / **BY RENÉE FRANCOEUR**

It's not just a new hospital, but North America's first *fully digital* hospital, complete with hall-cruising robots and electrochromic windows, among other modern features. And it's right here in Canada.

Located in Toronto, Humber River Hospital officially opened its doors in October 2015 after over 43 months of construction and planning.

It was "an enormous task," says Dave Lonsdale, project director at Plan Group, the electrical contractor for the 1.8 million-sf job. "This is really the latest and greatest as far as hospitals go."

Plan Group had the job of installing and integrating "anything with wires or fiber optics", Lonsdale says, and had 475 crewmembers on the ground at the peak of construction.

"Right from putting the proposal together, we were involved with assisting the design engineers—primarily on the electrical side—and, to some degree, the architectural and construction sides, too," he says, noting they not only had to come up with competitive pricing and product offerings, but also



**HUMBER
RIVER**

is North America's
first fully digital
hospital

bear in mind the project's tight timeline—which they met.

"The design itself is a challenge, but to fill in the plan is another challenge: like where the receptacles go, the sinks, everything, and then getting the owner to sign off on that," Lonsdale says. "Not an easy task with over 5000 rooms, and so you have to go over every room—plus the nurses' stations—and get everything in the right place. It's huge. Because we have to get that information out first before we can give it to the tradespeople to build."

The wonder of workflow automation

For Glen Landry, Plan Group's vice-president of ICAT (Information, Communications & Automated Technologies), the Humber River project connected the building's "physical and digital characteristics to create a new level of staff and patient experience". And that was done through what Landry calls workflow automation: one of Plan Group's main responsibilities and the component that really takes the facility to new heights.



Workflow automation processes for the facility were developed in coordination between Plan Group and the hospital over four years worth of meetings, says Lonsdale. The owners were up-to-date on new smart building systems as seen at tradeshow, but that meant some of their requests were "so cutting-edge that it required new programming to be developed, and this can be taxing on the other systems".

Even with the best-of-the-best products installed, "from a system perspective, they're still just independent systems on their own," Landry explains. "The hospital's digital vision required us to take all these systems, get them integrated and interoperable so they can work together seamlessly".

This level of interoperability hasn't been done anywhere else before, Landry says. "Once we were able to get all the systems—building, clinical and business—to talk to one another, then we were able to leverage the sensor data to really put software in for automated workflows. And that's the concept... the mapping process that makes it all work."



▲ Humber River Hospital, with its bright and artistic exterior, amalgamates three former hospitals and opened its doors in October 2015, after over 43 months of construction. PHOTO COURTESY PLAN GROUP.

◀ The AGVs park in their “home spot” by the elevators to charge while not in use. They deliver medicines, food and supplies to hospital staff. PHOTO COURTESY PLAN GROUP.

Monitor, monitor on the wall...

An example can be found bedside: patients have access to an integrated terminal—there’s one in every inpatient room—which connects them to the care team so they can video conference with their doctors and nurses, control their own room lights and temperature, order food, make

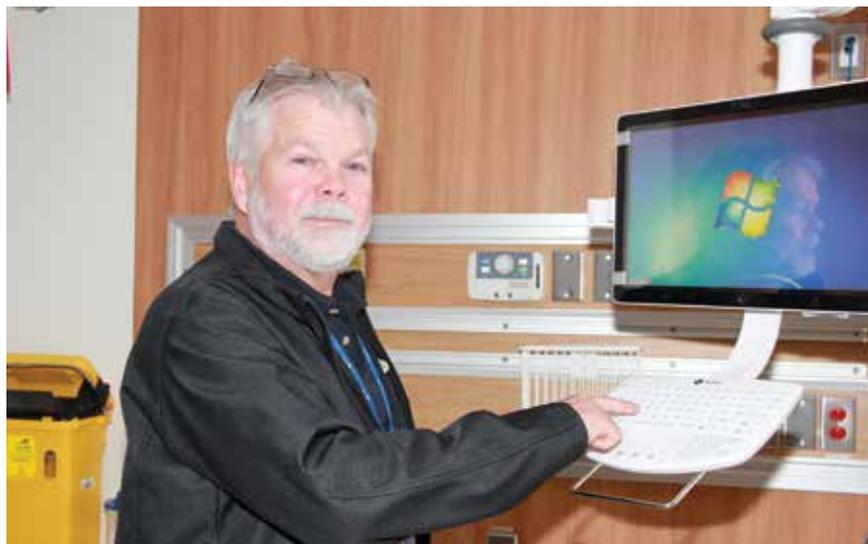
calls outside the hospital, etc.

A nurse call button no longer solely goes to the nurses’ station, Lonsdale adds, but directly to their hand-held devices, and code calls—such as a code blue—can be sent directly to the code teams through their hand-held devices.

“So workflow automation con-

43

months of construction to complete



Plan Group’s Dave Lonsdale tinkers with the highly-integrated bedside terminal in one of the last patient rooms to be finished.

OCT. 19, 2015

Humber River Hospital officially opened

nects signage, wayfinding, communications and nurse call in one seamless package,” Landry says.

Every type of monitor (e.g. information, wayfinding, television, bedside) was installed and programmed by Plan Group. To ensure workflow automation was successful, Plan had numerous meetings with the manufacturers of the various products they were installing.

Take, for example, the real-time locating system (RTLS) manufactured by Elpas: its devices appear as small black circles on the ceiling that can track assets such as wheelchairs, gurneys and computers. The system also interacts with the security system—a different product manufactured by Johnson Controls—enabling the hospital to use ‘wander guard’ technology to enhance the safety of newborns and some patients.

Other systems at work include unified communications, handled by Avaya, and the enterprise service bus (ESB) from ThoughtWire. The ESB was a key one, Landry says, as it’s used to perform all the interoperability connections.



Plan Group had the job of installing and integrating “anything with wires or fiber optics”, Lonsdale says, and had 475 crewmembers on the ground at the peak of construction.

Robotic porters & charged glass

One of the more noticeable accessories the hospital acquired is its fleet of automated guided vehicles (AGVs), which can be heard whizzing independently down the hallways as they deliver food, medications and supplies to staff. (If you’re nearby, you’ll hear “Vehicle approaching” repeated in a monotone female voice.) The AGVs use wireless access points throughout the building (there’s about 1300 of them, according to Landry) to navigate, park and recharge themselves.

The windows are another impressive feature. Patients don’t have to worry about window shades because the glass boasts electrochromic technology.

“The windows react to a very small electric charge, which is controlled by the patient through their bedside terminal. By adjusting the level of voltage, the window opacity lightens or darkens accordingly,” Lonsdale explains. “When rooms are unoccupied, sensors on the roof track the sun according to season and time of day and automatically tint the glass to help cool the building in summer and let more sun in during the winter for heat... So we wired that up as well and integrated it with the building automation system and bedside terminals.”

Overall, the design principles the hospital wanted to follow—lean, green and digital—were achieved, Landry says.



A worker picks his way through a maze of pipe during construction.

1.8
MILLION-SF
total size of Humber River Hospital

475
Plan Group crewmembers onsite during peak construction

To be an integrator

“The key is to make a collaborative environment when you’re taking on something like this,” Landry says. “You need to understand how everything communicates and the messages they have in every system in order to make intelligent decisions around workflows.”

Plan Group feels it has more than proved it’s not just an installer but, Landry says, “an experienced integrator as well”.

“We’ve been taking on a significant role within a lot of these complex projects and know that as it gets more complicated, there’s that expectation from the owner that these systems integrate,” Landry says. “We’re already doing structured cabling and power, and providing a lot of the systems, so doing this kind of work was the next logical step for our organization to take complete control over the integration process. It’s very synergetic to where we’ve been and what we’ve grown from.” **EB**

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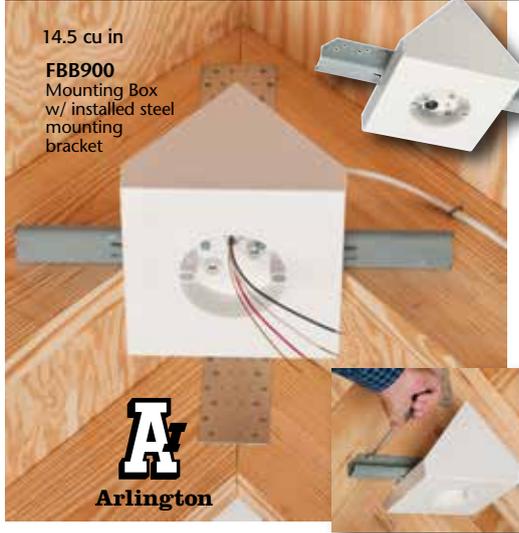
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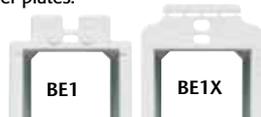


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BE1X Trimmable.
Fits standard wall plates.



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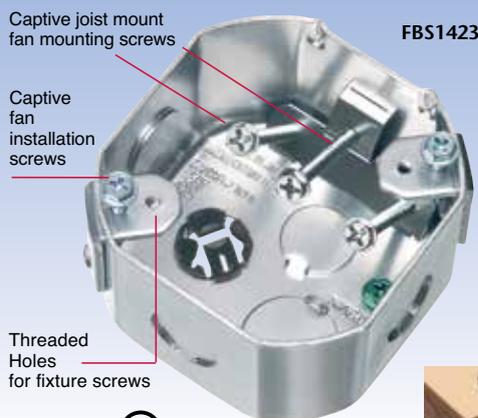
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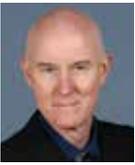


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How do our educators teach electrical safety?

I recently had the pleasure of speaking to the electrical and powerline students at Cambrian College in Sudbury, Ont. As part of my discussion, I provided a comprehensive overview of identifying electrical hazards, assessing risk and implementing risk controls according to industry best practices.

But more than anything else, I tried to impress upon them the importance of executing their work safely—not just for their own well-being, but to help prospective employers understand the value they bring as a safety-conscious workforce. A safe workplace is just good business.

While at the college, I spoke with Orest Stanecky, electrical professor with the college (who had organized my visit), and Marcia Ranger, an electrical engineering professor, to get their insights as educators on the matter of teaching electrical safety.

MARCIA: My number one goal is to impress upon the students the importance of safety—holding them to a high standard in shop class, and treating shop as I would a jobsite. The first challenge is they don't really see shop as a jobsite... it's "just school". We also have to set the right example ourselves.

OREST: It is challenging to teach electrical safety, especially to a new student who may be very inexperienced. Some of them go through life protected and sheltered, so they don't fully appreciate the safety procedures that exist to protect them.

MARCIA: We teach safety theory, but then we enforce it in shop class. Infractions, like not wearing your PPE, result in students being asked to leave class, or taking



marks off for not being locked out.

OREST: It's hard to explain to students that they may be working in an industrial plant for many hours per day and, possibly, spending the next 30 years in that career. The student is coming from a classroom environment—clean, comfortable and air-conditioned—but that's not the real world for an apprentice or electrician!

MARCIA: The "I'm invincible" mentality is present in many students, and they end up working alongside some electricians and linesmen who have been in the trade a long time and have become complacent.

OREST: Mature students entering the field of electricity are usually familiar with expectations but, sometimes, have developed bad habits that need to be corrected. You know, "I've always done it like that" or "That's the way I was taught to do it". So they've been doing it unsafely for years, but they've

Young apprentices starting out don't want to create waves or stir up trouble. They won't speak up. It goes back to the company and the value it places on safety.

been lucky, which is why teaching them *the right way* can be a challenge.

MARCIA: Another challenge is that, once they get out into the field as young apprentices, they are afraid to speak up when they see something unsafe, or are asked to work unsafely. They are afraid they will lose their job.

OREST: Young apprentices starting out don't want to create waves or stir up trouble. They won't speak up. If they are on probation, they could be gone before you know it. It goes back

to the company and the value it places on safety.

MARCIA: I tell my students that an employer who asks you to do something you know is wrong or unsafe—who finds a way to fire you because you refuse to do it—is not an employer they want to work for, anyway. But that's hard for a young person to do or understand.

OREST: People need to look after each other on the job. We all follow sports teams and talk about the importance of winning streaks when our team is doing well. Let's get winning streaks going for our own work teams and company. Everyone wins, at work and at home.

MARCIA: I was 31 when I started my apprenticeship, and I had the confidence to speak up. This was around the time when 5-point harnesses were first being enforced, and I remember being on scissor lifts with old-timers who told me they didn't need a harness. I would respectfully ask them to put it on anyway, just for my sake.

OREST: There are a number of methods for getting a job done, but we try to instill the message that the safe way *is the most correct way*... even when it takes longer. **EB**

A subject-matter expert on electrical safety, Mike Doherty is the director of learning & continual improvement at Shermco Industries Canada Inc. He is a licensed electrician and an IEEE senior member, and has served as the Technical Committee chair for CSA Z462 since its inception. His specialties include electrical safety and health & safety management, maintenance, consulting, training, auditing and electrical incident investigations. Mike can be reached at mldoherty@shermco.com.



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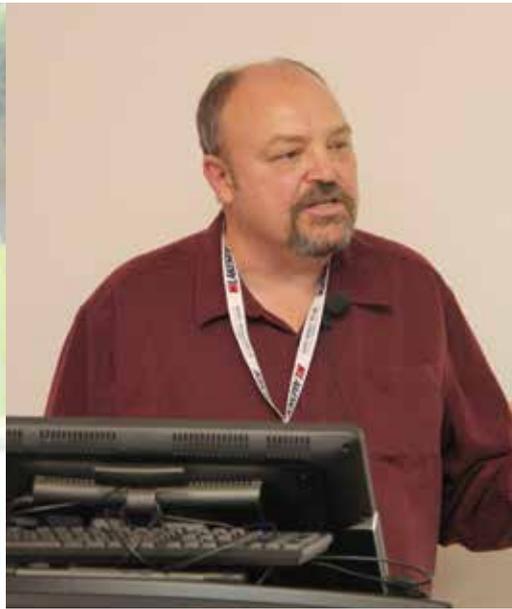
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CHP AND SELF-SUSTAINING POWER GENERATION

One soup company is taking power into its own hands / **ANTHONY CAPKUN**



Rajiv Anand, VP sales & business development for Lakeside Process Controls.



Douglas Dittburner, chief engineer & power services manager at the Campbell Company of Canada.



Martin Lensink, principal, CEM Engineering.

Energy-thirsty facilities must consider alternative energy solutions to remain competitive, and forward-thinking sustainability officers are looking toward a combined heat & power (CHP) system to provide more flexibility and the capability to generate their own power.

That was the takeaway from a CHP Symposium hosted by Emerson, which helped guests outline the methods that are essential to implementing an effective CHP solution... a solution that will function at optimum performance levels while providing a healthy ROI.

CHP cogeneration can help enable facilities to unlock cost savings, particularly when thermal energy (heat) requirements are considered in conjunction with electrical power requirements.

Campbell Soup's CHP journey

Among the speakers was Douglas Dittburner, chief engineer and power services manager at the Campbell Company of Canada, who referred to the company's Toronto location as the "Plant of the Future".

The food & beverage processing industry is the largest manufacturing employer in Canada with 290,000 people, says Emerson. The industry produces \$92.9 billion of value annually, and invests about \$2 billion/year in capital expenditures, with about 80% of the total in machinery and equipment.

The Campbell's plant in the west end of Toronto opened in August 1931 and produces over 12.5 million adjusted cases of soup annually. Two-thirds of Campbell Canada's ingredients (fresh carrots, potatoes, and mushrooms) come from within



No. of people employed by Canada's food & beverage processing industry

three hours' drive of the plant, and is the first Campbell plant in North America producing an aseptic carton product.

Dittburner is proactive about saving energy. Leaks in air lines can become a huge drain on energy, for example, which is why Dittburner weekly gives away lunches to employees who find and report leaks in those lines.

When asked about Campbell's CHP journey, Dittburner said it actually began almost 20 years ago.

"The first time we looked at CHP, it was structured as a public-private partnership but, ultimately, did not go through due to the high level of complexity involved. The second time, a boiler change consumed a lot of the available capital. The third time was the charm!" he said.

He cited several reasons for the renewed interest in CHP, not the least



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of which were significant Ontario Power Authority incentives (OPA, now merged with IESO), but also overall reliability and reduced reliance on the grid.

“The plant experienced three significant and expensive (particularly because of the aseptic packaging process) power outages over the last six years.”

“The benefits were undeniable; the economics looked good and the environmental benefits aligned with our corporate mission. Our direct competitors include Campbell’s sister plants, co-packagers and competing soup companies,” explained Dittburner. “A CHP system makes us more competitive as a manufacturer in Ontario in terms of ‘conversion cost’ per case of soup. This large productivity and cost savings keeps this location more competitive in the years to come. Other benefits include improved plant reliability, as the CHP system produces the required steam, and the boiler can remain as a redundant backup.”

Dittburner was quick to explain the company was not alone in this undertaking, retaining the help of CEM Engineering (St. Catharines, Ont.), which performed the detailed engineering study and guided Campbell’s through procurement and project execution.

The 4.8MW CHP system was slated for start-up in December 2015. “This will produce the majority of the facility’s electricity and steam, and save us a material amount of money annually,” said Dittburner. “The government incentives allowed Campbell’s to purchase a new and larger turbine. Without the funding, we would have purchased a smaller, second-hand unit that would produce noticeably less savings.”

Dittburner reported the CHP project will produce about 92% of the facility’s electricity and 93% of its steam annually (though it will use about 40% more natural gas). They were able to secure \$5.1 million in incentives for the \$12.4-million project.

The nuances of your CHP journey

Getting in touch with your electric local distribution company (LDC) and natural gas provider is an important



Dittburner (photo, centre) says the most critical step when pursuing a CHP project is to ensure you have the right buy-in from all stakeholders across the company.

action item, Dittburner advised. If you plan to operate in an anti-islanding mode (i.e. you feed power to the grid, and/or receive power to supplement your CHP system), you need work with the LDC to determine the fault capacity and tolerance in your local grid. “The LDC reserves the right to limit or restrict your interconnection capacity if it poses any risk to the existing grid or the LDC’s existing customers.”

Regarding your gas utility, ensure there is an adequate supply and pressure of gas available to your facility in anticipation of your future demand. “Campbell’s CHP system incorporates a turbine, so we installed an Emerson fuel gas booster to feed pressurized natural gas into the turbine to generate power.”

Martin Lensink, principal with CEM Engineering, explained how important it is to make the case for CHP to your audience in a language they understand, and there are three vital components to doing this successfully:

1. Technical feasibility
2. Financial feasibility
3. Implement-ability

Lensink said that the biggest challenge, by far, is electrical interconnection. “We have 48 Hydro One Networks transformer stations with no short circuit capacity because the solar/wind guys have eaten it all up,” he noted. “If they get there first, they get it all.”

But there are other issues to consider, too, such as noise/air compliance, available space, natural gas volume/pressure, buried services and soil conditions.

12.5 MILLION

Cases of soup (adjusted) produced by Campbell’s plant in Toronto’s West end

\$5.1 MILLION

Incentives secured for Campbell’s \$12.4-million CHP project

Get buy-in and take action

When advising others considering a CHP system, Dittburner said the “most critical step is to ensure that you have the right buy-in from all stakeholders across the company; this project would not have gone through without the full support of management and the senior executive team at world headquarters”.

“As you put together your business case, ensure you have prepared for all questions that could derail your plan, and do a worst-case scenarios analysis,” explained Dittburner, such as building out best and worst cases for fuel costs, electrical costs for 20+ years. “Does your proposal still hold?”

Closing out the day was Rajiv Anand, VP sales & business development for Lakeside Process Controls, who encouraged delegates to act on energy initiatives. He pointed to the 12th annual report published by the Task Force on Competitiveness, Productivity & Economic Progress, which finds the Province of Ontario is not living up to its economic potential. In fact, it still stands 19th among 28 global peers, the same ranking it achieved 12 years ago.

Which means Ontario is less attractive to businesses than competing jurisdictions, concluded Anand, so “the cost of doing nothing outweighs the cost of being proactive and becoming competitive”. **EB**



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MEGA-SIZED, EXTREME-SCALE SUMR WIND TURBINES INSPIRED BY PALM TREES

Can you imagine a wind turbine blade longer than two football fields? Neither can we, but researchers at Sandia National Laboratories can not only can imagine it, they're designing it.

"Exascale turbines take advantage of economies of scale," said Todd Griffith, lead blade designer on the project and technical lead for Sandia's Offshore Wind Energy Program.

Sandia is researching what it calls the extreme-scale Segmented Ultralight Morphing Rotor (SUMR)—a low-cost, offshore 50MW turbine requiring a rotor blade more than 650-ft long, which would be 2.5x longer than any existing wind turbine blade. The work is funded by the U.S. Department of Energy's (DoE) Advanced Research Projects Agency-Energy program.

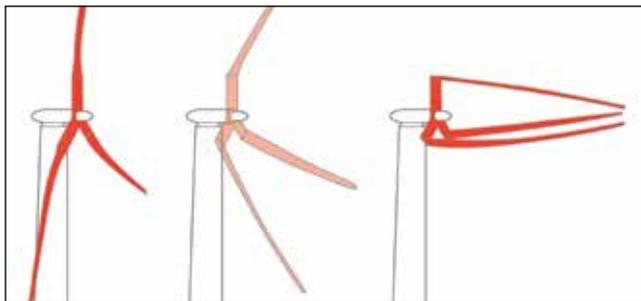
The research team is led by the University of Virginia and includes Sandia and researchers from the universities of Illinois and Colorado, the Colorado School of Mines and the National Renewable Energy Laboratory (NREL). Corporate advisory partners include Dominion Resources, General Electric Co., Siemens AG and Vestas Wind Systems.

Sandia's previous work on 13MW systems uses 328-ft blades on which the initial SUMR designs are based. While a 50MW horizontal wind turbine is beyond the size of any current design, Sandia says, studies show that load alignment can dramatically reduce peak stresses and fatigue on the blades. This reduces costs and allows construction of blades big enough for a 50MW system.

Most current U.S. wind turbines produce power in the 1MW to 2MW range, with blades about 165-ft long, while the largest commercially avail-



Todd Griffith shows a cross-section of a 50m blade, which is part of the pathway to the 200m exascale turbines being planned under a DOE ARPA-E-funded program. The huge turbines could be the basis for 50MW offshore wind energy installations in the years ahead. PHOTO BY RANDY MONTOYA.



Sandia's 100m blade is the basis for the Segmented Ultralight Morphing Rotor (SUMR), a low-cost offshore 50-MW wind turbine. At dangerous wind speeds, the blades are stowed and aligned with the wind direction, reducing the risk of damage. At lower wind speeds, the blades spread out more to maximize energy production. ILLUSTRATION COURTESY TREVORJOHNSTON.COM/POPULAR SCIENCE.

able turbine is rated at 8MW with 262-ft long blades.

"The U.S. has great offshore wind energy potential, but offshore installations are expensive, so larger turbines are needed to capture that energy at an affordable cost," Griffith said.

But barriers remain before designers can scale up to a 50MW turbine.

"Conventional upwind blades are expensive to manufacture, deploy and maintain beyond 10-15MW. They must be stiff to avoid fatigue and eliminate the risk of tower strikes in strong gusts. Those stiff blades are heavy, and their mass, which is directly related to cost, becomes even more problematic at the extreme scale due to gravity loads and other changes," Griffith explained.

He said the new blades could be more easily and cost-effectively manufactured in segments, avoiding the scale of equipment needed for transport and assembly of blades built as single units.

The exascale turbines would be sited downwind, unlike conventional turbines that are configured with the rotor blades upwind of the tower.

SUMR's load alignment is bio-inspired by the way palm trees move in storms. The lightweight, segmented trunk approximates a series of cylindrical shells that bend in the wind while retaining segment stiffness. This alignment radically reduces the mass required for blade stiffening by reducing the forces on the blades using the palm-tree inspired load-alignment approach.

Segmented turbine blades have a significant advantage in parts of the world at risk for severe storms, such as hurricanes, where offshore turbines must withstand wind speeds over 200 mph. The blades align themselves to reduce cantilever forces on the blade through a trunnion hinge near the hub that responds to changes in wind speed.

"At dangerous wind speeds, the blades are stowed and aligned with the wind direction, reducing the risk of damage. At lower wind speeds, the blades spread out more to maximize energy production," Griffith said. **EB**

650+ FEET

Length of extreme-scale Segmented Ultralight Morphing Rotor (SUMR) wind turbine blade

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New mounting plates from Global Tech



Global Tech LED's line of universal mounting plates features nine units for retrofit. They come in multiple styles such as shoe-box, post-top and high-bay, with four pre-drilled, slotted and pre-bent, adjustable mounting arms. Each has soft start, 0-10V control port and is dimming compatible.

GLOBAL TECH
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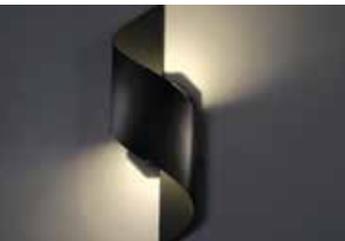
MaxLite cooler and freezer lamps



MaxLite's LED cooler and freezer lamps are offered in a colour temperature of 4100K and feature a low mounting height. They come in four lengths, ranging from 36 in. to 72 in., with corresponding outputs of 8W to 23W. Engineered to operate at 24vdc, MaxLite says the LEDs combine with an external constant voltage driver to provide a life of 50,000 hrs at L70 standards.

MAXLITE
www.maxlite.com

Modern Forms Helix wall sconce



Featuring "dramatic curves and contours", Modern Forms says its indoor/outdoor LED Helix wall sconce is "sleek and

commanding", delivering "interest-generating" illumination with uplights and downlights. IP65 rated for wet locations, Helix is 8W and hand-formed of heavy-gauge aluminum.

MODERN FORMS
www.modernforms.com

Halco Lighting floodlight series

Halco Lighting Technologies has introduced the LED floodlight series, as replacements for 100W, 175W and 400W HID fixtures. The series is constructed from die-cast aluminum and fixtures are supplied with a voltage sensing 100V-277V dimmable driver and 0-10V dimming standard.

HALCO LIGHTING
www.halcolighting.com

Osram's Lightify integrates with Wink



Consumers can now build a more intelligent, connected home by integrating Lightify LED tunable white bulbs with the Wink platform, Osram Sylvania says. Lightify wirelessly syncs with an existing Wi-Fi network to deliver lighting that can be controlled by a smartphone or tablet via the Wink Hub. Both products are available online and in Home Depot stores.

OSRAM SYLVANIA
www.sylvania.com

Trov LED from EcoSense

EcoSense says its Trov LED is like a "playground" in its flexibility. Its "flip-to-flat" hinge allows it to be adjusted 180 degrees, making it "the thinnest line voltage linear on the market today," the company claims. Flip-to-flat is also available with 24 different beam angle options, measuring at 35mm.

ECOSENSE
ecosenselighting.com

Carlo Gavazzi RGx1P proportional output controllers



Upon input from an analogue signal, Carlo Gavazzi says its RGx1P proportional output controller calculates and delivers output power without the need for an additional interface device. Apart from three full cycle switching modes for basic heating applications, the RG series also features full cycle control for shortwave infrared heaters, phase angle switching mode for resistive heaters, light dimming and speed control of AC fans and soft starting for heating elements with low cold state resistance.

CARLO GAVAZZI
www.gavazzionline.com

GE's RXi-XR IPC for railway controls



GE says the RXi-XR Industrial PC (IPC) rugged computer will help ensure railway control systems "maintain reliable operation". It features fanless, solid-state design and industrial-strength components, GE says, to meet EN50155 standards for electromagnetic, temperature, shock and vibration compatibility in railway applications.

GE
www.geautomation.com

Kollmorgen's 32kW servo drive

Kollmorgen says its 32kW drive in the AKD platform is one of the "most power dense" on the market, consuming only 576 cm² of panel space. The company says the platform has a



0.67µs current loop: about 100 times the industry-standard speeds of 62.5µs. The platform also supports ethernet /IP, Profinet, etherCAT, Modbus TCP, CANopen, SERCOS III, SynQnet, and TCP/IP.

KOLLMORGEN
www.kollmorgen.com

Ideal Industries' 490 multimeters



Ideal Industries is now offering its 490 series datalogging digital multimeter with a "hardened all-weather" housing for industrial environments. The company says the 490 lets electricians troubleshoot problems in industrial applications and has auto-sensing functions, a backlit LCD and toggle operation. Two models are available: the entry-level 61-497 and the 61-498.

IDEAL INDUSTRIES
www.idealindustries.ca

Jomac's Ford Transit chassis body

Jomac Ltd. says it is bringing an all-aluminum, fully-optimized service body for the Ford Transit chassis cab to market. This body is lighter weight and offers over 30 cubic ft of additional storage space in comparison with any competitive product, according to Jomac, as well as a payload capacity of up to 4500 lb.

JOMAC
jomacLtd.com

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www.esasafe.com

QUESTION 1

The radius of the curve on the inner edge of bends made on smooth aluminum-sheathed cable shall be not less than ____ times the external diameter of the sheath for cable more than 19 mm, but not more than 38 mm in external diameter.

- a) 9 b) 10 c) 12 d) 15

QUESTION 2

For banks, the minimum ampacity for service or feeder conductors shall be based on a basic load of ____ W/m² of the area of the building based on outside dimensions, plus other special lighting loads, equipment loads, heating and air-conditioning loads.

- a) 15 b) 20 c) 25 d) 30

QUESTION 3

The overload protection is not required for a 2-hp, manually starting motor connected to a 240V branch circuit with adequate overcurrent protection.

- a) True b) False

ANSWERS Electrical Business, February 2016

Question 1

All space within 6 metres horizontally (in any direction) from dip tanks and their drain boards, with the space extending to a height of 1 metre above the dip tank and drain board, is considered Class I, Zone 2.

- b) False. Rule 20-402(1).

Question 2

It is permitted to supply power to an industrial establishment with two or more supply services of the same voltage.

- a) True. Rule 6-102(1).

Question 3

The minimum system grounding conductor for DC systems shall be No. 8AWG copper or No. 6AWG aluminum.

- b) False. Rule 10-810(3).

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Rule 4-006 and size of conductors

We've explored several changes in CE Code Rule 4-006, but here I will focus on Subrule (1) and the crucial change that clarifies its intent and application. The terminology has changed from "the maximum allowable ampacity" to "the minimum size of conductor used shall be".

In addition, the following was added to the Appendix B Note:

This Rule is not intended to address conductor allowable ampacity (see Rule 4-004).

Regardless of conductor allowable ampacities determined by other rules in this code (for underground conductors, flexible cords, portable power cables, DLO cables, and conductors with higher temperature ratings, etc.), it is intended that the minimum conductor size be based on the requirements of this rule.

These changes highlight Rule 4-006's ultimate intent—to ensure the size of the conductor used is not smaller than that with which the equipment was tested; otherwise, there is a risk of overheating equipment terminations.

Rule 4-006 does not prevent the use of conductors having a temperature rating (e.g. 90°C) in excess of the equipment termination temperature (e.g. 75°C), but

it does require such conductors to have their installed ampacities limited to the equipment termination temperature.

With this in mind, let's analyze the application of correction factors in a typical scenario: conductors with an insulation temperature rating of 90°C are terminating on equipment with a termination temperature rating of 75°C. We need to apply correction factors (Tables 5A, B, C or D) to these conductors.

A simple but stringent approach is to apply correction factors to the 75°C ampacity of the conductor, but an *alternative approach in Ontario* (Bulletin 4-12) permits applying the correction factors to the 90°C ampacity of the conductor, with some conditions, explained below. (This approach complies with the intent of Rule 4-006 and harmonizes with the U.S. National Electrical Code [NEC].)

When correction factors are applied to 90°C-rated conductors terminating on equipment with a termination temperature rating of 75°C, the installed ampacity of such conductors shall be the lesser of:

- the corrected 90°C ampacity (e.g. Table 5C factors x 90°C ampacity column of Table 2)
- the conductor 75°C ampacity (e.g. 75°C ampacity column of Table 2)

The rationale for this approach is that equipment marked with a

RULE 4-006

does not prevent the use of conductors having a temperature rating in excess of the equipment termination temperature.

termination temperature rating is tested with conductors rated at that temperature. When the installed ampacity of the conductor used does not exceed that with which the equipment is tested, there will be no impact on the ability to dissipate heat from the termination. When the selected conductors are sized larger than that with which the equipment is tested, there are absolutely no safety concerns in applying correction factors to the conductors' rated ampacity.

Let's look at a numerical example and determine whether the installation below is compliant:

A panel feeds two loads with #6 AWG T90 nylon conductors installed in EMT. Additional details include:

- 60A breaker, panelboard marked 60°C/75°C
- 3-phase 208V
- Load connections 75°C
- Load 60A, non-continuous

Because of the 90°C rating of the conductors, deration factors from Table 5C due to 6 current-carrying conductors in a conduit are permitted to be

applied to the 90°C ampacity. The derated ampacity of #6 AWG T90 nylon conductors is 60A ($75A \cdot 0.8 = 60A$).

To satisfy Rule 4-006, compare the derated ampacity (60A) to the ampacity corresponding to the termination temperature of the equipment (65A at 75°C). The smaller value is the ampacity of the installed conductor. Therefore, the installed conductor ampacity is 60A.

So the #6 AWG conductors are physically large enough to dissipate the heat at the termination (4-006) as the 60A installed ampacity is less than 65A (Table 2 75°C). The installed ampacity of the #6 AWG conductors is sufficient for the load, as the load is 60A and the installed ampacity of the #6 AWG conductors is 60A. Finally, the #6 AWG conductors are adequately protected by the 60A circuit breaker (14-104).

The above installation is, therefore, considered code-compliant from an Ontario perspective. Please check with your own AHJ before proceeding with this alternative approach. **EB**

Nansy Hanna is the director for Engineering & Program Development at Electrical Safety Authority (ESA) where, among other things, she is responsible for product safety, code development, improving harmonization and alternative compliance, worker safety, and aging infrastructure programs. She is a LEED-Accredited Professional and a member of CSA CE Code-Part I, Sections 24, 32, 46, 50 and 64. Nansy can be reached at nansy.hanna@electricalsafety.on.ca.



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