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**GET
GROUNDED
BEFORE
CHRISTMAS**

with Thomas & Betts
on page 5.

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- + Top considerations when buying a thermal imager
- + Arc flash risk assessment in the workplace
- + Class 2 power and datacom circuits

BEYOND THE LOOK: LIGHTING AND SECURITY

How the right lighting can deter crime and pay dividends. P.10

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from the **EDITOR**

ANTHONY CAPKUN

Write your MP! Support Canada Prompt Payment Act

The Senate of Canada unanimously passed Bill S-224 “Canada Prompt Payment Act” yet, according to National Trade Contractors Coalition of Canada (ntccc.ca) chair John Galt, “Our organization has heard some common pushbacks that miss the point about where the real problems exist.”

Construction contractors are strongly encouraged to contact their MPs using the Example Letter available on EBMag.com (direct link tinyurl.com/yamgknc8) to help Bill S-224 become reality.

“This legislation is incredibly important to a sector that employs 1.2 million Canadians,” writes Galt in the Example Letter. “Payment delays currently lead to layoffs, fewer investments in capital, fewer competitive bids on projects, fewer apprentices trained and hired, and bankruptcies in the worst cases.”



Centre Block, Parliament Hill (Ottawa). PHOTO BY

SAFFRON BLAZE, MACKENZIE.CO.

The Example Letter also contains an Appendix addressing myths and misconceptions regarding prompt payment. For example, in addressing the concern that the Bill may be unconstitutional, NTCCC’s response is:

During the Senate committee hearings, a prominent constitutional expert testified that this Bill, in his expert opinion, was constitutionally “bulletproof”.

Remember to *customize* the Example Letter for your own MP. To find out who that is, visit:

ourcommons.ca/Parliamentarians/en/members

“It is our firm belief that the only way to solve the problem of payment delays is through enforceable legislation,” writes Galt. “The status quo has never worked for subcontractors, so there is no reason to believe that it will work in the future.” **EB**

Thanks ECA of Alberta and Terry Milot, ECAA provincial legislation chair and chair of Alberta Trade Contractors Coalition, for sharing this information news via ECAA’s “The Spark” newsletter, September 2017.

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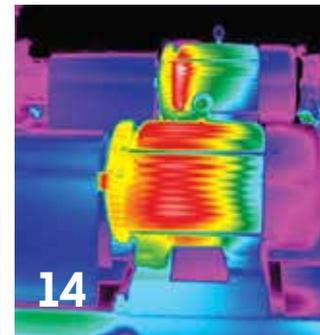
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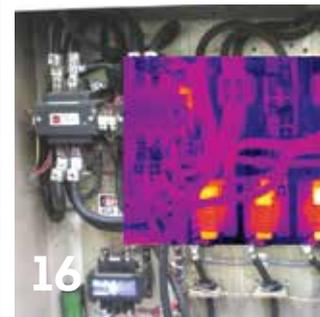
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Jail time and \$50K in fines for illegal work in Milton homes

Earlier this summer, a contractor was sentenced in a Burlington, Ont., court to five days in jail and ordered to pay \$40,000 in fines (plus a 25% victim fine surcharge) for doing electrical work illegally.

"We are very pleased to see that the court has sent a strong message which, we hope, will deter others in the underground economy who consider working outside the law," said Scott Saint of Ontario's Electrical Safety Authority.

According to ESA, David John—who has been known to operate as Kenchiku Developments Inc. and Skookum Developments—was found guilty on two counts of working without an electrical contractor's licence and two counts of failing to apply for an electrical inspection.

The charges were related to illegal electrical work done in homes in Milton, Ont.—specifically, the installation of interior and exterior pot lights.

ESA believes the severity of the fines and jail time sends a clear message that electrical work in Ontario must only be done with an electrical contractor's licence and in compliance with the Ontario Electrical Safety Code.

"Homeowners need to know that electrical work done outside the law—even for something as commonplace as pot lights—is a safety risk if not done properly, and it's illegal," said Saint.

In Ontario, only licensed electrical contractors are legally allowed to conduct electrical work for hire.

BC Safety Authority introducing "enhancements" to FSR program



BC Safety Authority (now Technical Safety BC) is introducing "a number of enhancements" to the electrical

field safety representative (FSR) program, including the introduction of a 3-year renewal cycle for all certificate classes.

To offset the cost of administering renewals and other enhancements to the program, BCSA is proposing a renewal fee of \$100 per 3-year cycle. Public commentary so far ranges from:

It makes common sense that FSR renewal fees go through every three years...

A great saving for the consumer and less cost for the BC Safety Authority. Am in full support of the change!

to more negative, such as:

I worked hard to earn my FSR. Any charge added to keep my record [is] simply a cash grab and punitive. This is not a needed service, and the charge would be taxing me for trying to [advance] safe standards at work.

You will be able to apply to renew your certificate beginning December 22, 2017.

DC "hot stick" developed for first responder, electrician safety



Nance Ericson (left) and Bruce Warmack of ORNL test the DC Hot Stick on a hybrid electric vehicle. PHOTO: CARLOS JONES, ORNL

With more volts than ever in electric vehicles (EVs) and solar-panelled rooftops, first responder and electrical worker safety is a growing concern. Researchers at Oak Ridge National Laboratory (ORNL in the U.S.) are addressing this challenge with a probe that detects DC energy.

"If you can imagine... in an accident, a vehicle may be splayed open, and first responders need to know whether the car is carrying a charge before they can even touch it, much less cut through cables and extract a victim," explained ORNL (ornl.gov) lead scientist Bruce Warmack. "That much voltage is potentially lethal, and can cause arc flash hazards or trigger explosions."

The patent-pending DC "hot stick" not only detects DC voltage, but ensures the probe is properly tapped into the electrical lines being tested by penetrating cable insulation and making contact with a conductor. It then indicates whether a cable is fully discharged of energy.

One of their challenges was dealing with DC voltage, which is more difficult to work with than AC, Warmack says.

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“Change your thinking, change your outcome” at OEL’s 2017 Conference



Sid Ridgley.

PHOTO A. CAPKUN.

The White Oaks in Niagara-on-the-Lake was a fitting venue for the Ontario Electrical League’s (oel.org) annual conference—particularly as the organization is celebrating its 95th anniversary this year—and EBMag was there to take in the celebration, as well as the education.

“People are angry. People are not sure who they can trust,” said keynote speaker Sid Ridgley during his presentation, “Further, Faster, Improved and Different”.

However, Sid noted, this is a positive. “There is great opportunity for businesses like ours because we can be trusted and we are credible. We need to let people know that.”

He also advised delegates to think like their customers, citing the example of a guy going into to hardware store to buy a drill, when what he really needs is a hole.

“Change your thinking, change your outcome,” Sid said. “You are more than just a supplier of labour for electrical work.”

Bryan Tuckey, president & CEO of BILD (Building Industry & Land Development Association), told delegates, “We are at the lowest housing inventory in history” when referring to Ontario’s Golden Horseshoe Region. There are very few single-family detached homes being built, and the province has an aggressive plan for expanding/protecting green spaces.

On Day 2, contractor business coach and EBMag columnist Andrew Houston walked delegates through the things they need to start doing—as business owners, not tradespeople—to build a better business... one that makes you money while providing you with more free time. The Contractor Panel discussion confirmed this need.

Finally, Mark Taylor discussed ESA’s “risk-based oversight”: a project to evolve the agency’s regulatory and inspection oversight regime. It involves a greater use of audit-based principles and safety data to drive inspection processes. Essentially, inspection activities are focused where electrical safety risks are the highest.

For more coverage and our photo gallery, visit EBMag.com (direct link tinyurl.com/y76dbvdu).



Wayne Hand, dean, BCIT School of Construction and Environment; Phil Davis, operations manager, E2 Inc.; Cristian Suvagau, senior engineer, BC Hydro; Steve Moores, dean of Trades and Apprenticeships, Okanagan College. PHOTO COURTESY EJTC ENTERPRISES INC.

NALCTP advanced lighting controls training available to BC electricians

British Columbia electricians now have access to a training program in advanced lighting controls via EJTC Enterprises (E2 Inc.), the BC Institute of Technology and Okanagan College.

Properly installed and maintained, advanced lighting controls (e.g. occupancy sensors) have reduced energy costs related to lighting by 25% or more for commercial, industrial and institutional users, say the partners, but a shortage of qualified installers “has created uncertainty in the construction market and slowed the spread of this technology”.

“Only the proper installation of new technologies will yield the results customers are looking for in terms of energy savings and occupant productivity and comfort,” said BC Hydro’s Dr. Cristian Suvagau. “[The program] will help electricians and electrical contractors install advanced lighting controls at the highest quality level.”

In 2014, BC Hydro (bchydro.com) formed a working group to bring the National Advanced Lighting Controls Training Program (NALCTP) to Canada, which was launched four years earlier in California by a consortium of utilities, manufacturers, IBEW and community colleges. The program trains qualified electricians in the planning, installation and operation of advanced lighting controls systems.

Through the working group process and contacts in California, E2 Inc. (ejtc.org) became the primary licence-holder of NALCTP in Canada, and led the adaptation of the program to the CE Code. E2 Inc. is a training partnership between the Electrical Contractors Association of British Columbia (eca.bc.ca) and IBEW Local 213 (ibew213.org).

Under the agreement, E2 Inc. will provide “train the trainer” services to instructors from BCIT and Okanagan College, and will certify successful candidates as NALCTP trainers. The colleges will provide training to qualified electricians; that is, those who hold a provincial or territorial CofQ.

Training at Okanagan College (okanagan.bc.ca) will take place in the Electrical Trades Department, a part of the college’s Trades and Apprenticeship Centre. BCIT, meantime, will offer NALCTP through its School of Construction and the Environment (bcit.ca).

Drexan appoints EWEL as Master Distributor for Western Canada



Electrical Wholesalers Edmonton Ltd. (EWEL) has been appointed the exclusive, authorized stocking Master Distributor for all Drexan Energy Systems Inc. products throughout the provinces of British Columbia, Alberta and Saskatchewan.

Drexan (drexan.com) is a manufacturer of self-regulating heating cables for freeze protection and process temperature maintenance in both regular and hazardous areas. The manufacturer has R&D facilities in Vancouver and advanced manufacturing in Kelowna, B.C., reports EWEL.

“We’re all in with Drexan,” said EWEL principal and COO Terry Black. “We’ve got the product chops, the selection and the resources to make this work for everyone—especially our customers.”

Founded in 1975, EWEL (ewel.ca) is a Western Canadian-owned and operated electrical wholesaler serving residential, commercial, institutional and industrial sectors. **EB**

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Arc flash risk assessment in the workplace

Method 2 of 2: Arc flash incident energy analysis method

Having covered risk assessment procedures (RAPs) for shock & arc flash (i.e. PPE category method) in previous editions, the last RAP to cover in CSA Z462-15 “Workplace electrical safety” is the arc flash incident energy analysis method.

The method most commonly relies on IEEE 1584-02 “Guide for performing arc flash hazard calculations”. (An updated edition has been in the works for some time, and is expected in 2018.) Clause 4.3.5.4.2 in CSA Z462-15 references the incident energy analysis method. Of the three RAPs in Z462, this one requires the fewest number of steps.

It is important to note the incident energy exposure level shall be based on the working distance of a worker’s face and chest area from a prospective arc source for the specific task being performed.

Be certain the worker’s hands are also considered in your arc flash RAP, as they are usually far closer to potential arc flash energy than the face and chest area. In fact, try running your IEEE 1584 calculations at the oft-used 18 inches to get your value; now, change the 18-in. value to just 2 in. (for a worker’s hands) and note the massive change in energy.

Be certain the worker’s hands are also considered in your arc flash RAP, as they are usually far closer to potential arc flash energy than the face and chest area.

Without question, voltage-rated gloves—including the protective leathers—are fabulous as both arc flash and shock PPE. As a mandatory best practice, make sure your workers are wearing them on energized or potentially energized equipment.

Once a comprehensive IEEE 1584 calculation has been completed, the incident energy in cal/cm² and arc flash boundary values will be known. Use Z462 Annex H, Table H.2 (not Clause H.2) to select your arc-rated clothing and other PPE accordingly. There are three levels, as noted in Annex H, Table H.2.

- less than 1.2 cal/cm²
- greater than or equal to 1.2 cal/cm² (to 12 cal/cm²)
- 12 cal/cm² or greater

Do not leave out the second step in the risk assessment portion of this procedure. Using IEEE 1584 completes Step #1 of the RAP because it identifies the hazard. Asking risk-based questions—such as those found in CSA Z462 Clause 4.3.2.2.4 “Normal operation”—reveals important information for high-level electrical job planning, such as:

- Has the equipment been properly installed?
- Has the equipment been properly maintained?
- Are all the equipment doors closed and secured?
- Are all the equipment covers in place and secured?
- Is there any evidence of impending failure?

The IEEE 1584 value in cal/cm² (as per Clause 4.3.2.2.4)—in addition to any of the answers you get to the questions above from your experienced electrical workers, supervisors and managers—lead you to Step #3 of the RAP, which is to document the procedural steps for executing electrical work safely (hierarchy of risk control methods).

I have a few final thoughts you should always consider when using the arc flash incident energy analysis method.

It is critical to have a fully qualified, competent and experienced person performing these calculations. Comprehensive data collection needs to be done in the field, not at a desk. This is, again, a mandatory best practice.

Most importantly, when your IEEE 1584 calculations are done very well but they are not 100% aligned with quality and regular

electrical maintenance best practices, you have accomplished very little. Quality maintenance is directly proportional to the timing of the upstream tripping/clearing devices. When your breakers or relays, for example, do not operate as per your design specs and setting sheets, you have likely wasted most of your monetary resources for that project.

For maintenance on overcurrent protective devices, see also Z462 Clause 5.2.4 and Annex B, and CSA Z463-13 “Guideline on maintenance of electrical systems” for best practices and guidance. In fact, CSA Z463 will soon be upgraded from being a Guideline to a Standard.

As noted in my last column, refer to Z462 Clause 4.3.5.4.1, which states that only one of the methods described in Clauses 4.3.5.4.2 and 4.3.5.4.3 shall be used for the selection of PPE. Either method—but not both—may be used on the same piece of equipment.

As always, it is crucial you refer to CSA Z462-15, as it contains specific details, notes and workflow that should be embedded in your business’ electrical-specific, documented procedures. **EB**

A subject-matter expert on electrical safety, Mike Doherty is an independent electrical safety consultant and trainer for eHazard in Canada, the president and owner of Blue Arc Electrical Safety Technologies Inc., and now technical advisor for eWorkSAFE in Canada. He is a licensed electrician and an IEEE senior member, and has served as the Technical Committee chair for CSA Z462 since its inception in 2006. His specialties include electrical safety management, consulting, training, auditing and electrical incident investigations. Mike can be reached at mike.doherty@e-hazard.com.

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“SMART, DRIVEN, UNWAVERING”

Recapping AD North American Meeting / ANTHONY CAPKUN

We’ve returned from the 2017 North American Meeting of AD’s Electrical Supply Division (adhq.com). Again, the highlight was celebrating this year’s Spirit of Independence Award recipients. Congratulations to the following Canadian distributors and suppliers:

CANADIAN MEMBER OF THE YEAR FOR PERFORMANCE (UNDER \$10 MILLION)

- **WINNER:** Gimpel Electric Supply Ltd. (Ontario, gimpel-electric.com)
- **1st runner-up:** Harwell Electric Supply (Ontario, harwellelectric.com)
- **2nd runner-up:** Gray Electric (Quebec, grayelectrique.com)

CANADIAN MEMBER OF THE YEAR FOR PERFORMANCE (OVER \$10 MILLION)

- **WINNER:** Electrimat Ltée (Quebec, electrimat.com)
- **1st runner-up:** ElectroZad Supply (Ontario, electrozad.com)
- **2nd runner-up:** Eddy Group Ltd. (Nova Scotia, eddygroup.com)

CANADIAN SUPPLIER OF THE YEAR FOR PERFORMANCE (UNDER \$5 MILLION)

- **WINNER:** Dimplex (dimplex.com)
- **1st runner-up:** Burndy (burndy.com)
- **2nd runner-up:** Generac (generac.com)

CANADIAN SUPPLIER OF THE YEAR FOR PERFORMANCE (OVER \$5 MILLION)

- **WINNER:** Kidde (kidde.com)
- **1st runner-up:** Electro Cables (electrocables.com)
- **2nd runner-up:** RC Lighting (rclighting.ca)

GIVING BACK AWARD

- Though it did not win, Standard Products (standardpro.com) was among the nominees for this award. Kudos!

Keynote address

“Every year, AD members outgrow the market and, every year, AD Suppliers outgrow the market with us,” said AD CEO Bill Weisberg earlier that day during his keynote.

The theme, if you will, of this year’s meeting was #ADSTRONG. During his keynote, while contemplating what makes independ-



Electrimat Ltée accepts award for Canadian Member of the Year for Performance (Over \$10 million).

ent distributors strong, Weisberg distilled his thoughts down to these three points:

- Smart
- Driven
- Unwavering

These three qualities separate those who achieve sustainable success from those who do not, noted Weisberg, adding AD members are smart about both people and business, with emotional intelligence, and the smarts to know they can never stop learning.

“We don’t think life is easy; we don’t think the world owes us anything. We are driven.”

And, on the third point, Weisberg explained “unwavering” does not mean avoiding changing with the times, but rather being unwavering in your core beliefs and principles.

“Storms come to every life, to every business,” said Weisberg. “Will you prevail? It depends on the strength of your foundation.”

Back to the awards

At the conclusion of the awards ceremony, Weisberg took a moment to go off-script to recognize and thank Jim Milne, AD Canada’s outgoing president, who has been leading the organization for roughly five years, since Independent Electrical Distributors (IED) merged with AD Canada. You will be missed!

With over 3800 branches from 550+ independently owned members, Affiliated Distributors says it is North America’s largest marketing/buying group for construction and industrial supplies. It has achieved annual sales of \$34 billion US across seven industries and three countries.

AD Electrical Supply Division’s next North American Meeting is slated for October 29-31, 2018, at the Gaylord Texan Resort in Grapevine, right outside Dallas. **EB**



Paul Shillington of Gimpel Electric accepts award for Canadian Member of the Year for Performance (Under \$10 million).



Tim Kennedy accepts award for Canadian Supplier of the Year for Performance (Under \$5 million) on behalf of Dimplex.



Kidde Canada accepts award for Canadian Supplier of the Year for Performance (Over \$5 million).



AD CEO Bill Weisberg recognized and thanked Jim Milne (photo), AD Canada’s outgoing president, who has been leading the organization for roughly five years.



CONSIDER LIGHTING FOR BOTH OCCUPANTS AND SECURITY SYSTEMS

LATIF JAMANI

Beyond the look that lighting adds to a building, it must also serve the greater purpose of adding security to a property. Lighting is the primary deterrent of crime on any property, so when it comes to building an effective security system, it plays a critical role.

During the design and decision-making process for security lighting, there can be a disconnect between selecting the technology (primarily cameras) and adding light to the space. These decisions are made for the same areas:

- entrances and exits
- public spaces
- perimeter areas
- shared spaces
- parking areas

These choices can be made concurrently during the planning stages for new construction. However, when updating the security and lighting of an existing building, lighting selection often comes after both camera selection and placement have been established. This results in poor visibility and can lead to issues obtaining useful footage in the event of a crime.

Lighting for people, property and spaces

The Illuminating Engineering Society’s (IES) “Guideline for Security Lighting for People, Property, and Public Spaces” recommends a vertical illuminance of 5-8 lux or lumen/m², or a luminance ratio of 4:1 for facial recognition, and to be able to read the body language of a person “as either familiar, unfamiliar, or threatening at a distance of at least 9 m from the viewer”.

IES also has average recommendations for the illuminance of certain spaces, including the following areas:¹

Area	Horiz. Illuminance (Lux)	Vert. Illuminance (Lux)
Building facades/exterior	-	5-20
Office building interiors	10	-
Parking facilities (open)	30 (60 for surrounding sidewalks, footpaths and grounds)	5-8
Parking facilities/garages (covered)	60	5-8
Parking facilities/garages (gathering points)	50	5-8
Multi-family residence common areas	30	5-8
Multi-family residence common mailbox area	100	-
Emergency services (e.g. hospital) outdoor areas	30	5-8
Hotel/motel parking areas	30	5-8
Hotel/motel sidewalks and grounds	10	5-8

On the other hand, the selection of security cameras depends on the decision-maker’s budget and preference. Sometimes they choose the highest-quality equipment available, which may have the ability to capture images in low light. Lower-quality cameras, however, may require additional lighting to capture clear images. Since cameras cost more and require a higher investment per unit compared to lighting, the choice of camera, number of units and



◀ While the lighting selection process is usually done with the human experience in mind, time and consideration should also be given to how these decisions impact the surveillance system being installed on the property.

This ensures every possible camera angle will be lit well enough to capture the best and most useful image possible.

Colour and source are important

Another important consideration for selecting light sources for use with security cameras is colour. IES regards Colour Rendering Index (CRI) as the most important measurement of colour. CRI “measures the degree of colour shift objects undergo when illuminated by a particular light source as compared with the same objects when lighted by a reference source of comparable colour temperature”.³ Light sources with a CRI of 50 or higher (usually white light) are best for accurate colour identification. These include standard incandescents, tungsten halogens, fluorescents and metal halide.

When we are engaged in the lighting design process, and working with the surveillance system that is being put into place, the areas most often addressed are entrances and exits, alleyways, driveways (which are areas that show perimeter access), as well as building enclosure access points (doors, windows, loading docks, parkade doors). The goal is to capture the maximum angle where the light fixture can be placed in a way to project maximum light output for the camera while reducing glare.

A great lighting option for general security—as well as making sure the areas are well-lit for security cameras—are LEDs, which provide a better-quality of light for security purposes as compared to, say, incandescents. The white light from LEDs makes for a better environment for users of the space, and works well for lighting an area where surveillance cameras are installed. LEDs also have a higher lumen output per watt, giving brighter light with lower wattage, saving on electricity consumption. They also have a longer lifespan, saving on maintenance and overall costs.

placement must be well-planned to maximize this investment.

While the lighting selection process is usually done with the human experience in mind, time and consideration should also be given to how these decisions impact the surveillance system being installed on the property. The colour, levels and placement of lighting can work against security cameras when the decisions are not made in unison.

Consider camera specs

For example, a camera that captures images in low light should probably be placed away from brightly lit areas. Motion sensor cameras should be placed near motion sensor lighting to properly secure an area. Cameras that need lighting assistance must have lighting nearby that is sufficient to illuminate the area without producing glare.

Closed-circuit television (CCTV) or video surveillance systems do specify their lux ratings. The lux rating indicates the minimum amount of light needed to capture a usable picture, as well as the amount of

Lighting is the primary deterrent of crime on any property, so when it comes to building an effective security system, it plays a critical role.

light required for full video. Cameras can be tested in the areas in which they are going to be installed. Also, the amount of light needed for the camera can be determined with this equation from IES:²

$$E = \frac{\pi LT}{4N^2}$$

where

E = Illuminance on the image sensor, lm/m² (lm/ft²)

L = Luminance of scene (cd/m²) (cd/ft²)

T = Transmittance of lens (usually 0.70 to 0.90)

N = F-number or F-stop of the lens

Illuminance (lux) meters are used to measure luminance, which is the amount of light that will hit the area where a camera is intended to be placed. If the camera being considered is not fixed, it is recommended that the light is measured from all possible directions at which the camera will be pointing.



The selection of security cameras depends on the decision-maker's budget and preference. PHOTO: GETTYIMAGES.CA

Right approach pays dividends

Since improving the lighting around properties can work to deter crime in general, it may reduce the need for installing additional security cameras in certain areas, helping to reduce costs. Keeping the access points of all buildings well-lit—especially ones in densely populated areas—can help deter criminal activity. Since breaking into a building can take time, criminals will want to avoid spending too much time in areas of high visibility and, therefore, move on.

Good lighting also benefits users of these buildings—such as residents of an apartment building or guests of a hotel—as they will have a better sense of safety and security around the building.

Take, for example, an apartment building with basic exterior lighting. The goal is to improve security as well as increase general feelings of safety around the building. An inexpensive way to do this is to increase the light levels in the areas around the building's access points (front and rear entrances, parking garages). Check whether the building meets the recommended vertical illuminance of between 5-20 Lux, and adjust accordingly.

In common areas inside the building, make sure that the horizontal illuminance is at 30 Lux, and 100 Lux at the common mailbox area. If the building already has surveillance cameras installed in these areas, assess any changes that occurred as a result of the improved lighting before considering adding any more. In most cases, updating the lighting of buildings works to improve security without having to spend more on increasing the number

of security cameras.

Having well-lit buildings can also pay dividends for property owners. Whitestone Properties—a company that owns apartment buildings in Edmonton—recently had the exterior lighting of its buildings updated to make them more safe and secure.

“The tenants seem quite happy with the improved appearance at night,” says Whitestone’s James Knull. “There are no creepy, shadowed spots at night anymore, and we have received lots of positive feedback.” Since updating their exterior lighting,

they have seen a decrease in illegal dumping and car-related crime. “In the winter, when it gets dark closer to 5 pm, we have had a much easier time with prospective tenants appearing for showings and filling out applications during evening showings.”

Security systems for any property must have elements that work together to be effective. This also empowers security personnel to do their jobs well by giving them a visual of certain areas of the property. By having all the elements of a security system designed to work together, the return on investment will be maximized. Most

importantly, the property and its occupants will be kept safe and secure. **EB**

However, when updating the security and lighting of an existing building, lighting selection often comes after both camera selection and placement have been established.

Notes

1. “Guideline for Security Lighting for People, Property, and Public Spaces”, Illuminating Engineering Society, p. 7-12.
2. As above, p. 58.
3. As above, p. 16.

Latif Jamani is the president of Calgary Lighting Products (calgarylightingproducts.com), which specializes in commercial solutions, energy audits and LED retrofits.

The following Comments respond to our report “Jail time and \$50K in fines for illegal work in Milton homes”.



IF YOU STOP selling electrical products to people who don’t possess a valid Electrical Contractors License, you automatically control the industry and stop situations like the one above. No access to product = limited chance of an illegal installation.

In a registered system, were an item to be sold to a Licensed Electrical Contractor, it could be traced were it ever to get into an unauthorized installation or be provided to an unauthorized installer.

If that was the case, then throw them all in jail.
— Leonard F.

I DON’T TYPICALLY revel in other peoples’ misery... but this is great! As the Master Electrician of record for my licensed electrical contracting company, I am held accountable for all installations—even when done by a licensed electrician.

I would like to see homeowners suffer some consequences, too. As ESA [Electrical Safety Authority] transitions to more of a risk-based business model, more money will be available for enforcement... I hope!
— Robert S.

The following Comment responds to Tatjana Dinic’s Code File column, “Solar PV systems: Upcoming changes to Section 64”.



I AM A Master Electrician with 45 years of experience. One of my #1 complaints is that many electricians do not have an updated code book; their electrical code knowledge dates back to the time they obtained their electrical licence!

I always appreciate the new code book whenever I attend a code update course. Unfortunately, not everyone is able to attend these courses, or may miss a year or two of them.

It would be [advantageous] to include an updated code book (or electronic version) along with the annual licence renewal. — Don F.

The following Comment responds to our report “BC Safety Authority introducing ‘enhancements’ to electrical FSR program”.

PERHAPS THE GOVERNMENT is looking somewhere else to make up the revenue lost by cutting taxes to big corporations. Again, we the contractors and small business will be footing the bill.
— CELSO L.



The following Comment responds to our report “Nova Scotia Power upgrading Lequille hydro plant”.



THE FIRST LINE in your article is incorrect. It reads: “Nova Scotia Power is investing nearly \$4 million to upgrade the Lequille hydroelectric system...” It should read: “Nova Scotia Power ratepayers are investing nearly \$4 million to upgrade the Lequille hydroelectric system...” — Archie S. **EB**

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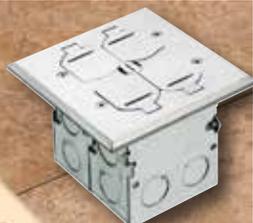
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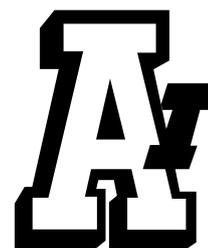
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5010AST	.550 to .850	.590 to .920	.610 to .780	1/2" Flex	10/3 to 8/3
505010AST	.650 to .850		.590 to .820		

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PLANNING A STRATEGY FOR SOLVING (AND AVOIDING) POWER QUALITY PROBLEMS

PETER KRATOCHVIL, C.TECH.

To avoid power quality problems, as well as solve existing PQ ones, it is necessary for us to understand the type of loads on the electrical distribution system. Understanding the principle operations of the load and the characteristic distortion it produces—whether it be transients, harmonics or electromagnetic interference (EMI)—is extremely important.

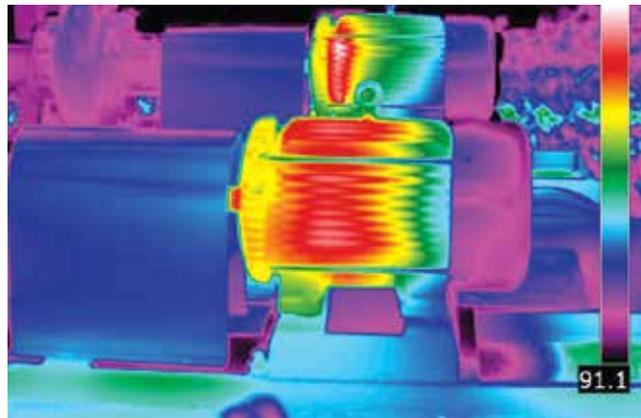
For example, radio frequency welders will cause radiated RF that may interfere with the operation of some other equipment. Fast-switching IGBT-type (insulated-gate bipolar transistor) drive systems may introduce transients into the system. By understanding the principle operation of the loads and their interactions with other loads we can proactively plan a strategy to avoid potential problems.

Besides understanding the characteristics of the load, it is also important to be mindful of the load's sensitivity to disturbances.

Part of planning a strategy to avoid problems, then, is to be very familiar with the electrical distribution system... its strengths and weaknesses, such as the short-circuit capacities at the common point of coupling. It is also necessary to understand there are different mitigation techniques for different problems.

Reviewing the basics

Before I get into an in-depth study of the electrical distribution system, I should emphasize and confirm some basic prudent wiring methods for electronically sensitive loads. For example, a common neutral for a single-phase load on a 3Ø 4-wire system plus the integrity of the grounding system determine whether we are solidly or resistively grounded. All of these things are important in trying to come up with a strategy for



Infrared scan of a motor overheating. A typical indication of a power quality issue.

Radio frequency welders will cause radiated RF that may interfere with the operation of some other equipment.

designing a reliable distribution from a power quality perspective.

While there are a variety of solutions on the market for mitigating/correcting PQ issues, installing the mitigating equipment is a trial-and-error method at the best when we don't understand the problem we're facing. Rather than improve the situation, we frequently make it worse.

Harmonic standards, EMI/EMC (electromagnetic compatibility) standards establish recommended PQ practices that set limits on some power quality disturbances. The application of these guidelines is sometimes very vague and, as a result, it is very easy to install mitigation equipment that will either not do the job or shift the problem elsewhere within the distribution system.

All mitigation equipment is designed with a definite purpose to correct one of the power quality aspects, but there is no silver bullet that will fix all electrical disturbances. (If anyone makes this claim, they are trying to defy the laws of nature!)

There is no silver bullet

With the first generation of variable frequency drives (VFDs), for

example, it was recommended to install an isolation transformer instead of a distribution XFMR on the supply side of the drive. The isolation XFMR served the purpose of dropping the voltage from 600V to 480V, since most of the VFDs are designed for 480V (mostly to satisfy the U.S. market... the market in Canada was not big enough to provide a 600V at the time). The isolation XFMR seemed to avoid a problem that eventually reared its ugly head when 600V drives became available.

With the new generation of VFDs, it wasn't necessary to use the isolation XFMR on the line-side of the drive and, as a result, the drives started to malfunction; in multiple drive installations, one drive would destroy another.

It was natural to assume that installing an isolation XFMR on the line-side would resolve the problem, but it did not; on a 1:1 ratio of the isolation XFMR, the impedance would not be the same as it was from 480V to 600V. Therefore, trying to mitigate that problem with an isolation XFMR was unsuccessful and, in many cases, made the situation worse.

The "isolation transformer solution" was unnecessarily expensive when a 3% or 5% inductance series reactor would have very nicely solved the problem at a fraction of the cost.

Rules of thumb for power quality

Here are some suggestions when planning a reliable distribution system for electronically sensitive equipment.

1. Avoid common neutrals on a 3Ø 4-wire system.
2. De-rate or use K-rated transformers.
3. Run dedicated circuits from the common point of coupling to the sensitive load.

- Utilize surge suppression on the branches, as well as the distribution panels, of the system.
- Use a single-point grounding system as opposed to a daisy chain-type.
- Increase the size of the grounding wire to the next size up from the minimum size recommended by the code.
- Use natural phase-shifting cancellation of harmonics by XFRM configuration or use of zig-zag transformers.
- Provide physical separation between power-carrying conductors, data lines and communication lines.

Plan prudently

Because of differences in philosophies between engineers (e.g. electrical versus telecom), as well as wiring methods that are outdated for powering electronically sensitive equipment, you can expect power quality problems to arise with sensitive loads in

the distribution system—even after the precautions taken above.

The electronic environment is changing much faster than the electrical distribution system upon which it operates and relies. It is almost impossible to keep up with the changes in technology, and wholly impractical for the electrical distribution system to even try to keep pace.

As a result, we end up with power quality problems and accept them as a part of doing business, but we shouldn't. PQ problems are frustrating and they add to the cost of doing business, especially when you consider something tangible like excessive scrap rates and lost production.

In many cases, modifications or upgrades in equipment cause PQ problems because they weren't thoroughly investigated for the impact they might have on the electrical distribution system and its present operation. When upgrading equipment or automating production lines, it is necessary to assess the possible inter-

action between the existing system and the new or upgraded equipment prior to implementation.

Adhering to some of these suggestions can help you avoid a lot of problems right from the planning stages of the distribution system. It is always cheaper to plan prudently than to troubleshoot a problem after it occurs. Ultimately, don't do anything until you investigate, understand and/or rule out the possibility of interaction. **EB**

We end up with power quality problems and accept them as a part of doing business, but we shouldn't.

Peter Kratochvil, C.Tech., currently serves as a technical advisor to Cos Phi (CosPhi.com), a specialist in the design and manufacture of power factor and power quality correction equipment (Hensall, Ont.), and a company he once owned before retiring. Prior to starting Cos Phi in 1990, Peter spent 15 years operating an electrical maintenance business specializing in electrical troubleshooting. He holds a Master Electrician Licence (Construction & Industrial) and Certified Technician (C.Tech.) designation. He also has a diploma in Technical Education from the University of Western Ontario, and has held an Ontario Teachers Certificate since 1982. Peter has first-hand experience in troubleshooting and providing solutions to a variety of electrical environments, such as pulp and paper, large commercial and industrial businesses, aircraft and offshore oil rigs.

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Professional tools are rugged, long-lasting and save you time. PHOTO: GETTYIMAGES.CA

TOP CONSIDERATIONS WHEN BUYING A THERMAL IMAGER

SAT SANDHU

Not all thermal imagers (a.k.a. infrared [IR] cameras) are created equal. While advertisements and promotions may present specifications that, at first glance, make imagers seem like one and the same, many factors make up a quality thermal imager—one that can withstand the rigours of day after day work in harsh environments.

“Infrared cameras that combine visible light and infrared images allow operators to quickly locate and identify potential problems.”

The next time you’re shopping for a thermal imaging camera, it’s a good idea to closely compare specs, features and quality of construction. It can spare you from making the wrong choice and ending up with a camera that will give you no more than an *entertaining* view in infrared, rather than a professional tool you can use daily in industry.

Lower-quality thermal imaging devices tend to be breakable and un-rated in drop tests. While those imagers may look the part, they often impersonate industrial-worthy tools, as they tend to lack adequate image resolution and built-in battery monitoring, and require a cumbersome workflow to collect and save image data.

Professional tools are rugged, long-lasting and save you time. In addition, a professional tool will be able to focus and capture images through IR windows. When properly installed, these windows provide a safer and time-efficient way to inspect electrical equipment by virtually eliminating the need to open cabinet doors.

Look for the following features to ensure you end up with an imager that’s up to the task.

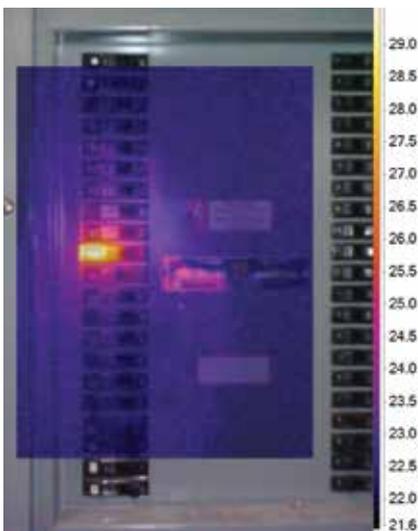
RUGGEDNESS, SURVIVABILITY AND FORM FACTOR

Lower-quality IR cameras often cannot withstand repeated use or even an accidental tumble. Tools designed for professionals, however, should be tough enough to operate in harsh environments. Considering a manufacturer’s reputation for quality construction is an important factor when evaluating products.

When I talk about ruggedness, it’s more than expecting the unit to work after being dropped on the floor. The build quality is important, down to the most minute details. How well does the snap on the battery door close? Does the camera’s handle have an ergonomic grip with good weight distribution? Does the lens cover provide the right amount of protection?

DIFFERENT FOCUS OPTIONS

A blurry IR image can give you data that may not truly reflect the appropriate level of criticality of the components under inspection. Fixed-focus cameras offer point-and-shoot technology that are generally in focus on targets at a certain distance and beyond. Performing scans with fixed-focus is often faster than with manual focus, but can be less precise.



For better-quality images, you need more detector pixels properly focused on the target.

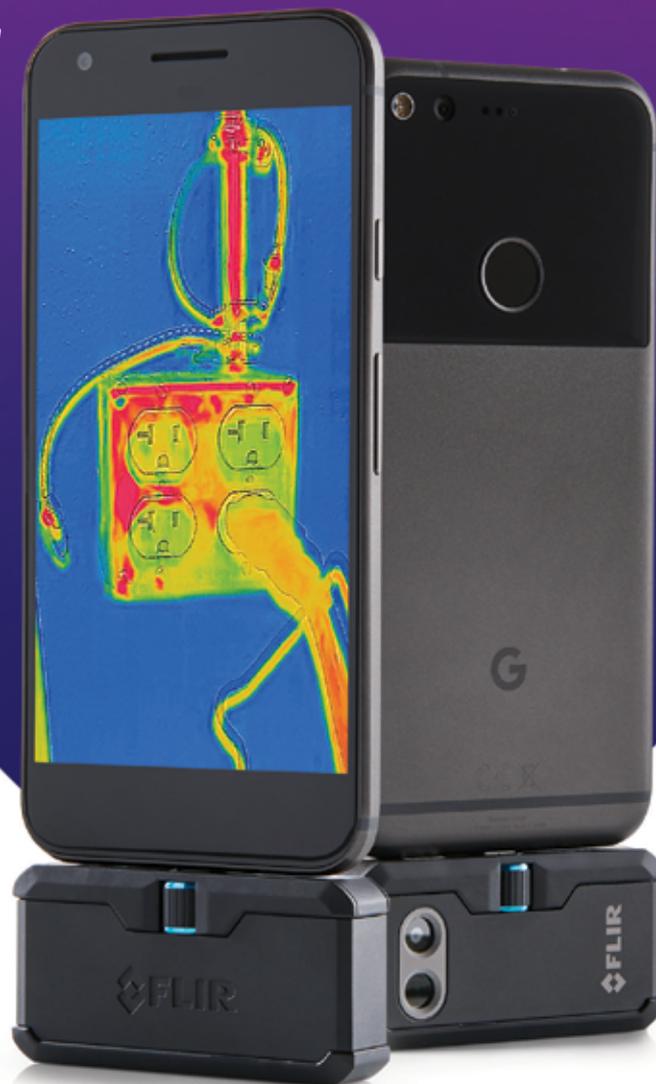
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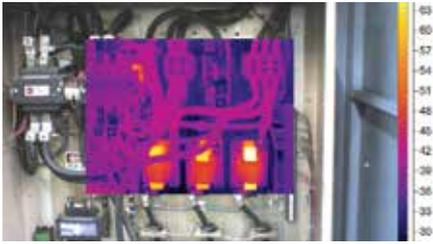
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Software helps enhance and clarify images, adds analysis and empowers teams to share professional-looking reports across different applications and industries.



Infrared cameras that combine visible light and infrared images allow operators to quickly locate and identify potential problems.

With a higher-resolution product, the ability to precisely focus the camera becomes critical. Cameras with adjustable or manual focus can focus much closer to the target, often from 15 cm (6 in.) and beyond. They can also obtain much sharper images and more-accurate results from further distances. For even more precision, some infrared cameras come with a built-in laser pointer to help pinpoint your exact image target.

BLENDED VISIBLE LIGHT AND INFRARED IMAGES

Infrared cameras that combine visible light and infrared images allow operators to quickly locate and identify potential problems. Essentially, this means the camera blends the two images together, pixel for pixel, in a single display, making it easier to see the source of a heat issue. This feature automatically captures a digital visible light image at the same time as an IR image. A technician using the camera can then view the image in full infrared, full visible light or in several degrees of blending.

BATTERY LIFE AND MONITORING

A thermal imager should allow you to monitor your battery charge to

“An out-of-focus image can produce a temperature measurement that is off by 20 degrees or more.”

“Software helps enhance and clarify images, adds analysis and empowers teams to share professional-looking reports across different applications and industries.”

avoid unexpected power loss. The best thermal imagers use rechargeable lithium-ion batteries, which provide high energy density and are slow to discharge. In addition, Li-ion technology typically delivers a 5-year operating life, and often can be recycled. To maximize the life of Li-ion packs, a good rule is to use them to full discharge then fully recharge them the first 5-10 times.

ADVANCED DIAGNOSIS AND REPORTING SOFTWARE

Software helps enhance and clarify images, adds analysis and empowers teams to share professional-looking reports across different applications and industries. Software can be used as a tool to analyze, enhance and fine-tune thermal images before sharing with managers. Robust software allows users to make adjustments to optimize image quality and display findings with features like multiple image formats, ability to combine visible light and IR images, and custom reports.

WIRELESS IMAGE UPLOAD AND SHARING

Viewing thermal images from your camera on your smartphone or computer can be an important factor, depending on the work you do. Wireless sharing can save time by showing potential issues to clients or offsite co-workers. This can enable faster decision-making and real-time collaboration. Wasting time on frequent back-and-forth trips to your shop is not how you want to spend your day.

IMAGE QUALITY TO SEE ISSUES CLEARLY

The focus of an infrared camera directly affects the accuracy of the temperature measurement calculation data that is captured. An out-of-focus image can produce a temperature measurement that is off by 20 degrees or more. For better-quality images, you need more detector pixels properly focused on the target.

Field-of-view (FOV) is the area the imager sees at a given moment. Naturally, a camera with a wider FOV displays a larger area. When two cameras operate with the same detector resolution, but one has a tighter FOV, the latter will typically produce images with more detail.

ROBUST MEMORY

As anyone with a digital camera knows, images can use up memory in a hurry, so look for an IR camera with sufficient onboard memory for your needs. Going further, it’s better for a camera to have gigabytes-worth of memory storage for maintaining a database of thermal images that can be used for consistent and comparative machine diagnoses over time.

Also consider that you may be in the field for extended periods and unable to upload until later. A removable SD card allows you to have easy access to saved images, as well as extra storage.

INFRARED WINDOW COMPATIBILITY

Some IR cameras have such limited capabilities that their resolution and FOV might not be suitable for capturing a good image or apparent temperature data through infrared windows. IR windows are built to exacting specs and special materials that allow thermal imagers to capture images of energized equipment through a port installed in an electrical cabinet door. Since the images are taken without opening cabinet doors, the windows provide a far safer working environment—a solid barrier between the thermographer conducting an inspection and the live conductors.

These windows also make inspecting equipment more efficient. But the camera’s resolution, and particularly the FOV, must still be capable of handling the correct angle to capture the information you need for a valid inspection, so keep that in mind when shopping. Some lesser cameras may not have a wide-enough FOV, so it’s a good idea to research that spec before purchasing.

When shopping

When looking for an infrared camera to serve your electrical needs, it’s a good idea to first determine your applications, then look for a camera that suits them. Like many types of equipment, you often get what you pay for, so make sure you compare features and specs to ensure the camera you buy meets your needs for many years to come. **EB**

Sat Sandhu is a thermography services manager for Fluke, covering Europe, the Middle East and Africa (EMEA), and Asia Pacific. Sat has worked in electronics design and thermal imaging for over 36 years. Visit fluke.com/infrared.

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TACKLE THE CODE CONUNDRUM IF YOU DARE!

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

Compiled by Ray Yousef, code engineer

Ontario's Electrical Safety Authority • esasafe.com

QUESTION 1

Motor disconnecting means shall not be of a type that is electrically operated, either automatically or by remote control.

- a) True b) False

QUESTION 2

Overhead consumer's service conductors shall not be less than _____ copper wire.

- a) #12 AWG b) #10 AWG c) #8 AWG d) None of the above

QUESTION 3

Where conductors are used in exposed wiring and are subject to corrosive liquids or vapours in a Category 2 location, they shall be of a type with corrosion-resistant protection and be located more than _____ horizontally from floors, decks or stairs.

- a) 1.0 m b) 1.5 m c) 2.0 m d) 2.5 m

ANSWERS Electrical Business, September 2017

Question 1

When a two-conductor NMS cable is used for a switch loop, and the connections are made so that the black wire is the return conductor from the switch to the outlet, does the CE Code require you to tape the white wire with black tape at the switch?

- b) No.** Rule 4-036(2).

Question 2

What is the minimum distance for spacing between supports for electrical non-metallic tubing?

- c) 1.0 m.** Rule 12-1504.

Question 3

The CE Code does not allow Class 2 circuits to be installed underground.

- b) False.** Rule 16-226(1).

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1 • Apprentice **0** • Bricklayer ???

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Electrical Business Magazine is pleased to welcome two new members to the team: **Jacquie Rankin** and **Ellen Cools**. Possessing 20+ years of advertising experience, Jacquie joins EBMag as account manager, reporting to **John**

MacPherson, publisher. She can be reached at 647-280-5885 (cell), jrankin@annexweb.com and 416-510-5230 (desk). Ellen, meantime, is a recent graduate of McGill University, with a passion for writing and communications. She reports to **Anthony Capkun**, EBMag's editor. Both Jacquie and Ellen look forward to immersing themselves in the industry and meeting you at upcoming events.

Don Gosen, former president of **Gosen Electric Ltd.** (gosenelectric.ca), is the new chair of **Ontario College of Trades'** board of governors (collegeoftrades.ca). Don operated Gosen Electric for 38 years after taking over from his father in 1977. He is a graduate of Conestoga College, a licensed Master Electrician, former president of the **Ontario Electrical League** (oel.org) and past chair of both the **Grand Valley Construction Association** and the **Council of Ontario Construction Associations**. He currently works as an electrical instructor at **Conestoga College**. Meantime, **George Gritzotis** has been appointed OCoT registrar and CEO, effective October 16, 2017, replacing **David Tsubouchi**.



Congratulations to the special award winners at **Ontario Electrical League's** 2017 annual conference. **Don Medeglia** of **Electrical Safety Authority** was recognized as Inspector of the Year (2016). There were four recipients of the Hall of Fame award: **Gord McBrien**, **Peter D'Uva**, **Janet Small** (photo, left) and **Richard Cullis** (posthumous). Finally, the Richard Cullis Leadership Award was

presented to **Rob Sloan**. OEL is celebrating its 95th anniversary this year (oel.org). For our coverage of the spring conference, visit EBMAG.com (direct link tinyurl.com/y76dbvdu).

Hammond Power Solutions has appointed **Jay Tucker** as business development manager, who previously served as the company's Western Region sales manager. Replacing Jay in that role is **Rick Fassbinder**, who resides in Salt Lake City, Utah. HPS says Rick has been in the electrical industry for a number of years, most recently as the Western Region manager for **Meltric**. Rick is also a licensed electrical contractor. Hammond Power Solutions (hammondpowersolutions.com) is a supplier of dry-type standard and custom electrical engineered magnetics, electrical dry-type and cast-resin transformers.

Service Wire (servicewire.com)—a supplier of wire and related products—announced **Seth Cook** is its sales rep for British Columbia, though he is based in the company's, Culloden, W.Va., sales office. **Kerith Richards**, meantime, is now serving customers in Alberta, Manitoba, New Brunswick, Newfoundland & Labrador, Nova Scotia, Ontario, Prince Edward Island, Quebec and Saskatchewan. **EB**

WAC Lighting introduces DUO AC LED light bar with colour option



WAC Lighting introduces the DUO AC 120V LED light bar with colour option, which features a reflector that diffuses the light from the LED sources inside the mixing chamber to create evenly distributed illumination, the company says. The light bar features a switch that allows users to alternate the colour temperature from 2700K to 3000K, depending on the application and user preferences. It can be directly mounted to surfaces such as cabinets, shelves and other display and utilitarian spaces. Using an electronic low voltage dimmer (ELV) or TRIAC dimmer, the light dims down "smoothly, glare-free and continuously." The company also says the bar is made of extruded aluminum "for optimal thermal management," and, with a 1-in. profile, features multiple knockouts "for ease of wiring."
waclighting.com

Bosch launches GLI18V-300 and GLI12V-300 Max Worklights



Bosch has launched two cordless worklights that "can go virtually anywhere," the company says. The GLI18V can provide up to 10 hours of illumination (using a 2.0 Ah Bosch SlimPack battery) and features articulating action, which allows the user to angle the light in several positions. Compatible with all Bosch

18V Lithium-ion batteries, the light has six LEDs emitting 300 lumens, can fold for "carry-along convenience," and weighs less than 0.69 lbs. (without the battery). An included hanger allows the light to be mounted or positioned overhead. Meanwhile, the GLI12V-300 offers up to six hours of runtime (using a 2.0 Ah battery), weighs 0.35 lbs. (without the battery) and also uses six LEDs, which emit 300 lumens. A hook is included for hanging, though the worklight is also six-sided for "flexible" positioning, Bosch says.
boschtools.com

Contech adds several sizes to its Adjustable series



Contech Lighting has added three new sizes to its Adjustable series: the 4-in. Round, the 4-in. Square and 6-in. Round, which deliver up to 3400 lumens. Users can choose from spot, medium and flood beam optics. The products also feature fully lockable adjustment mechanisms allowing for a 45-degree tilt and 360-degree rotational adjustment. Each Adjustable comes with six wattage/lumen packages and dimming capabilities.
con-techlighting.com

Bosch launches multi-grip 18V recip saw GSA18V-125

Bosch has launched a multi-grip reciprocating saw that combines an "advanced" handle design with an 18V Bosch EC brushless motor and orbital/non-orbital action. The GSA18V-125 saw delivers 0-2500 strokes per minute with a 1-1/4-in. stroke length. It features an ergonomic design for manoeuvrability,

maximum-speed dial for speed control, tool-less blade-change system and integrated counterbalance technology to limit vibration. Bosch says the tool is "the first cordless reciprocating saw to feature three orbital settings (0-1-2), which allows users to select the aggressiveness of the stroke".



boschtools.com

Burndy expands Hydent with compression pulling heads

Burndy has added compression pulling heads to its Hydent family of com-



pression connectors. There are six heads for wires ranging from #1 AWG to 1000 kcmil for both aluminum and copper. The products are available in 5 lanyard lengths, which prevents overlay when pulling multiple wires simultaneously, Burndy says. The pulling heads have been tested for use with the 644 series of die-less installation tooling "to help minimize installation time and minimize the amount of installation tooling requirements," the company says.
burndy.com

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CODE file

TATJANA DINIC, P.ENG.

Class 2 power and datacom circuits

Rules in Section 16 (New 16-300 series added) of the upcoming CE Code 2018 have been amended to include requirements for Class 2 power and datacom circuits. Although the new requirements do not reference “Power-over-Ethernet” (PoE) terminology, an Appendix B Note is added to explain the “Class 2 power and data communication circuit” is based on the concept known as PoE, introduced by the IEEE 802.3 series of standards.

Some background

PoE is not a new technology. Originally serving as the backbone for voice-over IP (VoIP) systems, this technology has grown to power other office systems. The range of PoE’s application continues to grow steadily due to its increasing power-carrying capacity. It was at 7 watts 17 years ago; today, it is at 60W. With its low power consumption, LED lighting technology has expanded the scope of applications for LV systems, including PoE.

The applicable certification standards followed the technology. The IEEE 802.3 series of standards originally limited the delivered power to only 15.4W; later, however, the limit was increased to 25.5W, then two additional power types were introduced: up to 55W (Type 3) and up to 90W-100W (Type 4).

CE Code 16-300 series

For this application, a power/data circuit is considered a pair of insulated conductors (often twisted) or a pair of conductors within a common cable assembly

(marked as being suitable for the application) stretching from power sourcing equipment to a powered device. (This recognizes that more than one pair of conductors in parallel in one cable assembly may supply one powered device.)

Examples of these power/data cable applications include extra-low-voltage lighting systems, closed-circuit television systems (CCTV), wireless access points (WAPs), distributed antenna systems (DASs), and building automation systems (BASs). The typical example is 4-pair ethernet cable with 8P8C modular jacks/plugs (8 position-8 contact) connectors, typically rated 1.3A max. per conductor.

New Rule 16-320 explains the Class 2 power/data circuit shall be supplied from power sourcing equipment with an output limited to 100V•A and to 60Vdc.

Safety concerns arose regarding power/data cable bundling; because they now carry increased current and power, these cables experience greater heating. To address these concerns, new Rule 16-330 clarifies cable and conductor ampacity, and application of de-rating factors.

There are different requirements for Class 2 power/data cables marked with “-LP”, limited power-type cables and communication cables not marked with “-LP”, specified in Subrule (2) and (3), respectively. For communication cables marked with “-LP”, the maximum current that each insulated conductor is permitted to carry shall be limited to the current rating marked on the cable. For communication cables not marked with “-LP”, the ampacity of each conductor

is specified in new Table 60.

Limited-power cables are suitable for carrying both power and data. Limited power cables are marked with the cable type designation, followed by “-LP” and “(x.x A)”, where x.x is the current rating in amperes of each conductor in that cable.

For example, a cable marked Type CMG-LP(0.5A), 23 AWG would be suitable to carry 0.5A per conductor, regardless of the number of cables in a bundle. Type CMG, 23 AWG in a 7-cable bundle could carry up to 1.2A per conductor (based on Table 60, 60°C rating).

Where communications equipment rated at 60W or less is powered by a communications cable having a minimum conductor size of 24 AWG, it shall not be required to comply with bundling requirements.

Where Class 2 power/data cables are installed in an ambient temperature exceeding 30°C, the correction factors of Table 5A shall apply.

One of the answers not provided in the new Rules is about approval requirements for products connected to the output of power sourcing equipment with an output limited to 100V•A and to 60Vdc (which exceeds Class 2 power supply limits). As always, remember to check with your local authority’s approval requirements. **EB**

Always consult your AHJ for more specific interpretations.

Tatjana Dinic, P.Eng., is the acting 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, and aging infrastructure programs. She is a Professional Engineer with an M. Eng. from the University of Toronto, and a member of CE Code-Part I, Sections 4, 10 and 30. Tatjana can be reached at tatjana.dinic@electricalsafety.on.ca.

In the July/August 2017 ed. of EBMag, the Code File column referred to the upcoming 2018 CE Code as the 25th edition when, in fact, it is the 24th edition. Thanks B.G. for spotting the error!

CALENDAR

EPEC: Electrical Power & Energy Conference

IEEE Canada

October 22-25, Saskatoon

Visit epec2017.ieee.ca

EB EFC Future Forum “The Evolution of Customers”

Electro-Federation Canada

October 25, Brampton, Ont.

Visit electrofed.com/events

Electrical Safety in Construction Workshop

National Academy of Construction and IEEE IAS

Electrical Safety Committee (Construction Subcommittee)

October 25-26,

Washington, D.C.

Visit cvent.com/d/t5q3mv

16th Annual Health and Safety Conference • Alberta

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Society of Alberta

October 26-27, Banff, Alta.

Visit hsconference.ca

EB The Cost of Workforce Drugs on Your Bottom Line Webinar • Online

October 31

Visit EBMag.com/webinars

LINK Conference

BC Electrical Association

November 1-2, Vancouver

Visit bcea.bc.ca

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