

Electrical Business

APRIL 2011



■ Also in this issue...

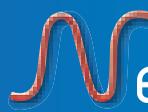
- Why K-Rated transformers matter
- Smart grids for energy distribution
- Boost your wind farm's success

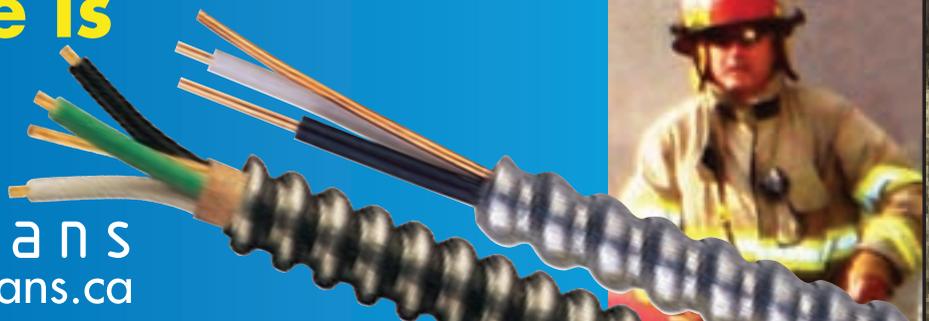
What you need to know about **wireless lighting** controls

Special
Lightfair
2011 Issue

PM # 40065710

**Nexans AC90 Cable is
Low Smoke and
Zero Halogen**

 **nexans**
www.nexans.ca





Bright ideas for office buildings

Using lighting effectively in an office building creates an attractive and productive environment for your employees and clients.

STANDARD offers energy efficient lighting solutions for your lobby, open or enclosed office spaces, hallways, and conference rooms.

By using the right light for the right application you can:

- Create accommodating lobbies and reception areas
- Encourage productivity and reduce glare
- Reduce energy and maintenance costs
- Decrease disruptions due to maintenance



STANDARD's retrofit solutions will enhance employee comfort and increase productivity while using energy efficient lighting.

Lighting the Way for a Greener Tomorrow

Think about the future... choose energy efficient lighting today!

www.standardpro.com



Inspectors in Saskatoon and apprentices in Durham



We need to get at least 10 apprentices to sign on for the first pilot session this fall.

In my note from February 2011, “Make it a year of self-promotion”, I encouraged you, our readers, to contact me with your stories, news, events, etc., and I’m happy to report you are taking me up on that offer, and in greater numbers than ever. Thanks!

Did you know the International Association of Electrical Inspectors (IAEI) has a Prairie Chapter? Neither did I... not until I heard from David Pilon of SaskPower. He was reading one of our E-Line newsletters last month, and noticed the sentence at the bottom of the Calendar of Events that reads: “Got an event to promote? E-mail the editor...”. So he did.

He told me the IAEI does, in fact, have a Prairie Chapter, and it’s hosting an event in Saskatoon at the end of March (yes, it will have passed by the time you read this). As it so happens, EBMag is attending the Alberta Electrical League’s (AEL’s) Learning Expo in Red Deer—you guessed it—at the end of March. Well, isn’t that just perfect timing! On my way back from Red Deer, I can easily pop into Saskatoon to meet some new friends at the IAEI Prairie Chapter.

Had it not been for David’s note, I would have flown right over Saskatchewan, completely oblivious to the gathering in Saskatoon. Thanks, David!

Meantime, I received word of something really interesting going on at Durham College in Ontario.

“Durham College has recently developed an online

program that would allow apprentices to do the academic part of their training from home similar to a lot of other training programs. It is approved by the Ontario Ministry,” writes K.W. “This is a fantastic option for companies and apprentices who can’t afford to have their lives and businesses disrupted by large chunks of time off. Apprentices from remote areas of the province would not have to travel to a college that offers these courses that requires living away from home, or long commutes.”

K.W. is right. This is a fantastic option, but it comes with one small caveat: “We need to get at least 10 apprentices to sign on for the first pilot session this fall”.

Stuff like this is so great, I can’t help but try my best to get the word out.

While it’s too late for you to check out Saskatoon, it’s not too late for you or someone you know to take advantage of the opportunity at Durham College. Again, they need at least 10 apprentices for the pilot project. I will be meeting with the folks at Durham to get more information about the program (which will likely be on our website by the time you read this), but feel free to contact me to put you in touch with them.

Thanks again for reading and, like David and K.W. above, stay in touch. **EB**

Contents

7 Why do K-Rated transformers matter?

Transformers serving nonlinear loads have increased winding temperatures due to harmonic currents generated by those loads, which can overheat and result in a shortened transformer lifespan. Meanwhile the “K-Factor” conveys its ability to serve varying degrees of nonlinear loads without exceeding the rated temperature rise limits.

12 Outlawing electric resistance heat?

In an attempt to use more efficient heating systems, many builders and home owners have been moving away from electric resistance (ER) heating—a misconception that some argue couldn’t be further from the truth given the future emerging trends. Check out the rationale behind opting for ER heating here.

16 Why your wind farm’s success depends on grounding transformers

The grounding transformer is often a neglected component of the wind farm but think again—millions of dollars in liability and loss can be attributed to ground-fault arcing, so grounding-related issues should top the checklists of any electrical contractor developing a wind farm.

34 Smart grids for energy distribution

A large-scale implementation of a smart grid network offers enormous potential for greater energy efficiency. Much of the optimism surrounding this potential comes from the possibility of having real-time data about energy production, transmission, distribution and consumption.



DEPARTMENTS

- 5 Industry News
- 10 From The Legal Desk
Amendments to Construction Lien Act simplify practice... or do they?
- 11 Mind Your Safety
Kill the permit, not the homebuyer
- 19 Calendar
- 36 Products
High-Voltage Power Cables
- 38 Code File
High-Voltage Power Cables
- 38 The Code Conundrum

page 36



On the cover and page 23

What you need to know about wireless lighting controls

Radio-frequency (RF) wireless communication is emerging as a significant lighting control technology, often as a viable alternative to hardwired controls in commercial building applications, but are there any real benefits to the system? What are they?

Special Lightfair 2011 Issue

- 22 Lightfair shines a spotlight... on Philly?
- 23 What you need to know about wireless lighting controls
- 27 Lighting Products
- 28 Guidelines on the application of dimming to high-intensity discharge lamps





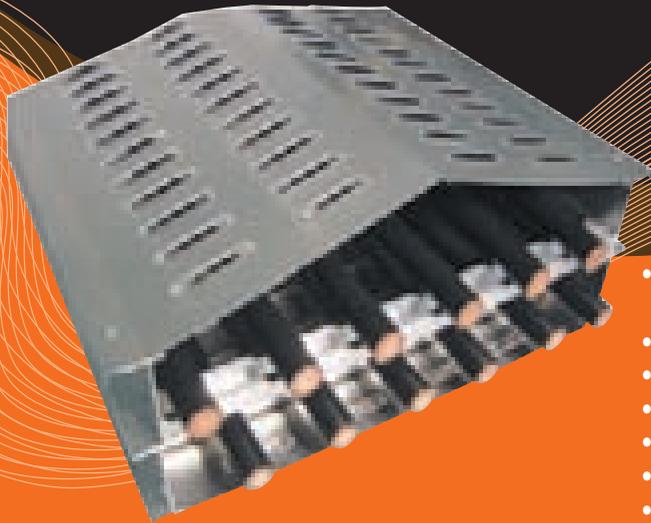
There is a ton of news and updates at the newly renovated **EBMag.com**. And be sure to follow our Tweets on Twitter (twitter.com/ebmag) to find out whenever there's something new on our website.



MAXIAMP[®]

CABLE BUS FEEDER SYSTEM

The Most Technically Advanced Electrical Power Delivery System



- Free Air Ampacity Rating in ABOVE and BELOW GROUND Installations*
- Up to 8000 AMP / 600 V to 230 kV
- Reduced Power Losses
- Lowest Cost System
- Suppresses EMF's
- Expandable Enclosure
- Easy & Quick Installation
- Underwater Installations

*Patent Pending 



Replaces BUS DUCT, ARMoured CABLE IN TRAY, UNDERGROUND DUCT BANK, DIRECT BURIED and CONDUIT SYSTEMS

United Wire & Cable's expertise in cable and enclosure design, manufacture and application engineering ensures a reliable, versatile and cost effective MAXIAMP[®] cable bus system.

For further information please email us at: sales@unitedwc.com
Tel: (905) 771-0099 or 1-800-265-8697 • Fax: (905) 771-1658 or 1 800-461-4689 • www.unitedwc.com

Going to great lengths to serve you



Electrical Business

April 2011 • Volume 47 • Issue 4

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

Editor

Anthony Capkun - acapkun@annexweb.com

Associate Editor

Alyssa Dalton - adalton@annexweb.com

Publisher

John MacPherson - jmacpherson@annexweb.com

Account Manager

Scott Hoy - shoy@annexweb.com

Art Director

Svetlana Avrutin - savrutin@annexweb.com

Production Manager

Alice Chen - achen@annexweb.com

Creative Director

Einar Rice - erice@annexweb.com

Subscriber Customer Service Representative

Donna Koivisto - dkoivisto@annexweb.com

President

Mike Fredericks - mfedericks@annexweb.com

PUBLICATION MAIL AGREEMENT #40065710
RETURN UNDELIVERABLE CANADIAN ADDRESSES
TO CIRCULATION DEPT.
240 EDWARD STREET, AURORA, ON L4G 3S9
e-mail - dkoivisto@annexweb.com

United States Second Class Postage Paid at Lewiston, NY
(USPS-741-470) US POSTMASTER: Send address changes to
ELECTRICAL BUSINESS, P.O. Box 8145, Lewiston, NY 14092

Printed in Canada
ISSN 0013-4244

CIRCULATION
e-mail: dkoivisto@annexweb.com
Tel: 905-727-0077
Fax: 905-727-0017
Mail: 240 Edward Street, Aurora, ON L4G 3S9

SUBSCRIPTION RATES:

Canada: Single issue \$7.00 • Ten issues: \$35.00

(includes tax)

USA: \$59.00 (US) and International: \$75.00 (US) per year

Occasionally, Electrical Business will mail information on behalf of industry-related groups whose products and services we believe may be of interest to you. If you prefer not to receive this information, please contact our circulation department in any of the four ways listed above.

The contents of Electrical Business are copyright ©2011 by Annex Publishing & Printing Inc. and may not be reproduced in whole or part without written consent. Annex Publishing & Printing Inc. disclaims any warranty as to the accuracy, completeness or currency of the contents of this publication and disclaims all liability in respect of the results of any action taken or not taken in reliance upon information in this publication.

We acknowledge the financial support of the Government of Canada through the Canada Periodical Fund (CPF) for our publishing activities.



Vancouver mayor's concern for electrical safety prompted by shocked canines

Lois E. Jackson, chair of Metro Vancouver and Mayor of Delta, convened with Power Survey Company president Tom Catanese in downtown Vancouver to discuss the dangers of contact voltage and how the city can prevent injuries and death to its residents and pets. They also toured one of the company's mobile testing trucks and discussed the need for proactive testing to detect electric danger spots before more incidents occur.

Contact voltage is an unintentional connection between a power distribution system and public surfaces, like sidewalks, that can cause deadly shocks. In January, 'Sierra', a mastiff, was shocked by faulty underground wiring in Vancouver. This year also marks the seventh anniversary of the death of Jodie Lane, a 30-year-old who media reports say was electrocuted by a junction box while walking her two dogs in New York.

Catanese discussed the widespread lethal voltage hazards uncovered during Power Survey's brief mobile contact voltage sampling in Vancouver, Delta and surrounding areas. He added: "We work side by side with utilities, municipalities, and utility regulators to enhance public safety and electric infrastructure maintenance."

Power Survey Company has been retained by Utilities and Municipalities in Ontario and more than 20 U.S. states to find hazardous streetlights, sidewalks, manhole covers and other publicly accessible surfaces and structures that pose a threat to both humans and animals.

"I will be asking Delta's Chief Administrative Officer to report on our municipality's preparations with regard to public electrical safety, and I call on other Metro Vancouver Mayors to do the same," said Jackson. "New technologies can make a real difference, and can turn this rare, but often fatal problem, into something that can be avoided."

"With all the rain that Vancouver sees per year, we are at a higher risk for electrical accidents—especially if there is salt on the sidewalks or if ponds and runoff penetrate defective electrical equipment," added Rachel Sentes, the owner of a border collie who was shocked in 2004.

Innovative Solutions for a Sustainable Workforce

The Electricity Sector Council's (ESC's) 2011 Bright Futures in Canada Conference entitled "Innovative Solutions for a Sustainable Workforce" will be held at the InterContinental Toronto Centre Hotel from May 24-26, and EBMag will be there.

Bright Futures is the national conference dedicated to the electricity and renewable energy industry workforce. Within the next five years, says

ESC, this sector will experience labour shortages due to the pending retirement of skilled workers and a massive regeneration of the electricity infrastructure. According to the projections of the ESC 2008 "Powering Up the Future Study", electricity organizations will experience an annual shortfall of between 3000 and 4500 workers by 2012.

In an effort to meet the needs for a skilled, safe and sustainable workforce, the ESC's 2011 Bright Futures in Canada Conference will provide industry



Nexus Wireless



See NEXUS RF in action at Lightfair 2011 – Booth #3831

With a remotely-managed wireless system, the building manager can see the real-time status of the entire emergency lighting and exit sign system, schedule monthly and annual tests for designated time, run system diagnostics, perform required functional tests, generate maintenance logs and run compliance reports quickly and easily all from a central control unit. Compared to manual management, automated monitoring is more efficient and less costly and provides higher quality data that is not subject to human error.



www.nexus-system.com

Thomas & Betts

stakeholders with innovative and practical solutions to the human resources challenges they face. The two-day, interactive event will feature notable speakers who will share the latest and most advanced initiatives designed to mitigate the current and future labour shortage.

Conference attendees will hear about ESC research and program initiatives, and gain ground on key human resource strategies to develop a skilled, safe and sustainable workforce now and in the future.

Visit www.brightfutures.ca.

Take Back the Light surpasses 2-million milestone—ahead of schedule!

Canada's first mercury-containing lamp stewardship program, Take back the Light, says it has exceeded its first milestone—the safe recycling of more than 2 million lamps—six months ahead of schedule.

Designed for the ICI (industrial, commercial, institutional) sector, the program was developed by the Recycling Council of Ontario (RCO), and launched in June 2008 with the original expectation that it

would recover and recycle 1 million lamps by 2011.

“Two million lamps represents more than 60 kg (130 lbs) of mercury captured and diverted from disposal,” said Jo-Anne St. Godard, executive director of RCO.

According to RCO, Take Back the Light was developed as a response to the government's decision to phase out incandescent lamps to mandate the use of more energy efficient lighting—a decision RCO believed could potentially result in more mercury-containing lamps in the garbage and in the environment. The fear is that since fluorescent lamps contain mercury, disposing them in landfills can result in mercury leaching into the soil, lakes and streams and possibly affecting aquatic flora, fish, wildlife and humans.

“We worked intensively for 2 years to introduce a market-based, environmentally safe program for recycling the component parts from fluorescent lamps and the results have substantiated our belief that responsible purchasing and end-of-life management is key to environmental protection,” said St. Godard.

The Ontario Ministry of the Environment funded both the pilot study and the program development.

“The Take Back the Light program makes Ontario a leader in lamp recycling and keeps hazardous waste out of landfills,” said John Wilkinson, minister of environment. “The Ontario Ministry of the Environment is proud to have supported the development of this innovative program that encourages consumers, suppliers and manufacturers to work together to help reduce waste.”

Nova Scotia awards Black and McDonald contract to convert HPS streetlights to LED

Nova Scotia says it will soon be conserving more energy, saving money and reducing greenhouse gas by using LED lights to illuminate roads. The province has awarded Black and McDonald Limited a \$3,199,500 contract to convert another 2500 high pressure sodium (HPS) lights throughout the province to LED lights.

“With this substantial investment, we are moving to a more sustainable way of lighting our highways,” said Bill

continued on page 8

FLIR
E-SERIES
A Brand New Line

Groundbreaking Performance & Affordability
Superior Point & Shoot Thermal Imagery
Built-in Digital Camera & Laser Pointer
Mobile Device Wi-Fi Connectivity
Large Bright Touchscreen

- Superior Thermal Imaging
- Improved Digital Camera – 3 megapixel
- Bright LED lamp that doubles as a flashlight
- New! Large Landscape Touchscreen - 3.5" display
- New! Wi-Fi Connectivity
- FLIR View App
- Laser Pointer Accurate Temperature Measurements – Accuracy calibrated within 2% or +/- 2°C
- Scalable P-i-P & Thermal Fusion – Multiple Measurements
- MeterLink
- Annotation
- InstantReport – Generate a professional PDF

1-800-613-0507 x24 / x25
email IRCanada@flir.com | www.flirthermography.ca

Buy an Infrared Thermal Camera
FLIR E60 and get a FREE
METERLINK Meter or iPod Touch 8Gb

Why do K-Rated transformers matter?

The reason why some prefer them over oversized, derated conventional transformers



Suzette Albert

In recent years there has been an increasing awareness of the issue of power harmonics, stirred by the proliferation of sensitive electronics, high-powered computers, and more sophisticated equipment deployed in the industrial environment.

In an electrical power system, harmonics are current and voltage with frequencies that are integer multiples of the fundamental power frequency. That is, in a power system with a fundamental frequency of 60Hz, the second harmonic is 120Hz, the third harmonic is 180Hz, etc. Harmonics have no useful purpose, yet contribute to losses and lower system efficiency. Harmonics return over the neutral and are dissipated as heat in cables and load devices.

Transformers serving nonlinear loads have increased winding temperatures due to harmonic currents generated by those loads. This overheating likely will result in a shortened service life for the transformer. For example, operating a transformer at 10°C above its insulation-rated class will cause approximately a 50-percent reduction in the life of the transformer. If the over temperature gets high enough or lasts long enough, the transformer will prematurely fail.

Other warning signs of harmonics include: overheated neutral conductors and panels, unexplained tripping of circuit breakers, line voltage distortion, equipment failure, electrical fires, control equipment mis-operation, and interference on communication lines.

Figure 1

Load	K-Factor
Electronic discharge lighting	15-20
LEDs with optical output filter	15-20
Welders	15-20
Industrial heating equipment	15-20
PCs and solid state controls	15-20
Information processing equipment	15-20
Imp. (PMS)	15-20
LEDs without optical filtering	15-20
Multiple unbalanced circuits in ground return area of health care facilities and classrooms in hotels, etc.	15-20
Multiple unbalanced circuits supply imp. (operation or control equipment in an operating or processing line)	15-20
Multiple unbalanced loads	15-20
Small power motor drives	15-20
Variable speed drives	15-20

The “K-Factor” conveys a transformer’s ability to serve varying degrees of nonlinear loads without exceeding the rated temperature rise limits. For any given nonlinear load, if the harmonic current components are known, the K-Factor can be calculated and compared to the transformer’s nameplate K-Factor. As long as the load K-Factor is equal to or less than the transformer’s rated K-Factor, the transformer does not need to be derated. The higher the K-Factor, the more non-linear loads the transformer can handle. The actual formula to determine K-Factor takes into account the frequency and current intensity of each individual harmonic (Figure 1).

K-Factor rated transformers are preferred over oversized (derated) conventional transformers because they are designed to supply nonlinear loads, are equipped with 200 percent rated neutral bus, and are likely to be smaller and less expensive. Disadvantages of an over-sized standard transformer may include the requirement for a higher short-circuit rating on circuit breakers and the drawing of a higher inrush current. Derating a standard transformer is only a temporary fix that often translates into lower efficiency operation. **EB**

Suzette Albert is the power quality product manager at SolaHD, www.solahd.com. For more information about SolaHD K-Factor rated transformers, please call 877-999-7652 or e-mail egseg.customerservice@emerson.com.

Canadian manufacturer specializing in AC90 (Cu & Al) ACWU90, TECK90, NMD90

The Armoured Cable Specialists

northern cables

INCORPORATED

P.O. Box 1564, 50 California Avenue, Brockville, ON K6V 6E6
Tel: 613.345.1594 Fax: 613.345.3147 Toll Free: 1.888.524.5050

www.northerncables.com

getwired.

continued from page 6

Estabrooks, Transportation and Infrastructure Renewal minister. “As one of the first provinces to undertake such a large scale conversion of highway lights, Nova Scotia is a leader when it comes to using green technology and supporting local innovative companies.”

“The ability to use locally manufactured lighting products provides additional benefits to many Nova Scotia workers and their families and the goals of this project align with our corporate environmental initiatives and philosophy,” added division manager, Donald Hiltz.

The LED fixtures will be manufactured and supplied by Amherst-based LED Roadway Lighting Limited.

“The fixtures supplied by LED Roadway Lighting (LRL) will deliver substantial energy savings and significantly reduce maintenance costs, as well as provide improved illumination on highways,” said company CEO, Chuck Cartmill. “Clients worldwide are embracing our robust technology. At present, LRL has more than 250 municipal and utility installations in 10 countries. This project will be a great showcase for our technology to the global audience and other departments of highways.”

2012 IEEE IAS Mega Projects Workshop: Call for presentations

The IEEE Industry Applications Society is accepting proposals for presentation at the Electrical Safety, Technical and Mega Projects Workshop to be held in March 2012 in Edmonton, Alta. The workshop provides a forum for exchanging and advancing industry knowledge in the areas of electrical safety, engineering design, system reliability and the implementation and execution of mega projects.

The workshop focuses on sharing innovative concepts and successes, as well as lessons learned, in the areas of: 1) advancing state of the art knowledge and best practices, 2) stimulating innovation in

creating the next generation of technology, and 3) design and implementation of mega projects.

The workshop committee will consider conducting a tutorial on a subject consistent with the mission of the ESTMP conference. This tutorial would be intended to provide workshop attendees with an opportunity to expand their knowledge on the subjects of safety, technical, and mega projects.

In addition, three panel discussions are planned as part of the workshop related to the following proposed topic areas: CSA Z462 and IEEE 1584: misapplication and misunderstanding; owner’s perspective and project challenges; and consulting world challenges and opportunities (suggestions for other topics are welcome).

For more information on presentations, panel discussions or to submit proposals, contact technical committee chair, Richard Loiselle at rloiselle@suncor.com or (403) 296-5354.

There are opportunities to sponsor such items as breakfasts, coffee breaks, lunch, presenters gifts, audio visual aids, printing of the workshop material, CDs, hospitality suites, social events, etc. as well as participate in the exhibition. For further information, contact sponsorship chair, Bert Neish at robert.neish@shell.com or (403) 510-6068.

For information on exhibiting, contact exhibition chair Ken Martin at kmartin@brodwell.com or (403) 689-7601. Visit www.ieee.org/estmp.

Electrical College of Canada offers pre-apprentice to Six Nations community

Grand River Employment and Training, an Aboriginal organization specializing in employment and training for the Six Nations of the Grand River Territory has announced a strategic partnership that will offer electrical pre-apprentice program to the local community through the Electrical College of Canada.

“In order to address this skill trade educational opportunity, we knew we had to find a partner that would be able to offer the training and education that suited our needs,” said Erin Monture, OSTTC Manager, Ogwehonwe Skills and Trades Training Centre. “We met with the Electrical College of Canada last year, and as a result of their experience and track record, a strategic partnership to offer electrical training within the Six Nations community was formed.”

One year later, 11 Six Nations students have successfully graduated from the pre-apprenticeship program.

“We are thrilled that Six Nations has chosen the Electrical College of Canada to deliver its pre-apprenticeship program to the Six Nations community,” said Ralph Cerasuolo, director of the Ontario-based college. “Classes are offered on-site at the Six Nations reserve with a 1 to 12 teacher-student ratio. We are extremely proud to say that the first graduating class average was eighty-four percent and the students were excited and engaged in creating this new opportunity for themselves.”

Get ready for Viva La Loma Golf Tourney 2011

Join Vickery Electric’s “virtual” fundraising golf tournament at Royal Ashburn Golf Club starting May 2011 in support of the first trade school in the Dominican Republic.

In 2008, in support of the Rotary Sunrise, local groups participated in a fundraiser generating enough money to build the first trade school in the Dominican Republic. Some 1800 students have graduated over the years. The building is up, and now it’s time to buy equipment!

“The folks at Whitby Rotary Sunrise did an exceptional job in the construction of the facility in Consuelo, Dominican Republic—a very poor community with little and diminishing opportunity, until now,” says John Vickery. “It is very important that we continue the effort and ensure the self sustainability of this new institution. Rotary should be congratulated and supported here. This effort shows real promise.”

The tournament will run the entire summer, and participants will choose the date on which they will play. All monies contributed by participants will be donated to the trade school to fund equipment and materials required. For more information, contact John Vickery at john@vickeryelectric.com or (905) 260-3934. **EB**

- Wireless Controls for Dimming of Pulse Start Metal Halide
- Reduces Energy Consumption and Carbon Emissions
- Monitoring and Control Across the Internet

Ballastronix inc.®
by **VENTURE™**

THE SYSTEMS APPROACH: BALLASTRONIX® BALLASTS AND VENTURE LIGHTING™ LAMPS

800-265-2690

Available from electrical and lighting distributors across Canada. Contact your local sales agent. Visit our website to find an agent near you.

VentureLighting.com/Canada



© 2011 Venture Lighting International. Venture Lighting is a registered trademark of Venture Lighting International. LeafNut is a trademark of Harvard Engineering PLC.

VLC-0011A2-0111

EAT•N

The power of fusion.



1874



1886

1893



1899

1906



1908



1911



1962



1963



1983



1990



1998



1999

EAT•N

Powering Business Worldwide

There's a certain energy at Eaton. It's the power of uniting some of the world's most respected names to build a brand you can trust to meet every power management need. The energy created supports our commitment to powering business worldwide.

From power distribution to power quality and control, Eaton allows you to proactively manage your complete power system by providing electrical solutions that make your applications safer, more reliable, and highly efficient. Visit www.eatoncanada.ca.

Celebrating
100 YEARS
Ideals that Endure

All of the above are trademarks of Eaton Corporation or its affiliates. Eaton has a license to use the Westinghouse brand name in Asia Pacific. ©2011 Eaton Corporation.



Amendments to Construction Lien Act simplify practice

... or do they?

With the proclamation of Bill 68 into law on October 25, 2010, [S. 2010 c. 16] the Ontario legislature has tried to rectify legislative problems with the Construction Lien Act [RSO 1990 c. C-30 as amended] (“the Act”) and simplify business in the province. It remains to be seen whether this stated purpose has been accomplished.

But what have past legislative amendments shown us? Below are some of the more important examples:

1 | The *Kennedy Electric* Rule: Named for the decision in *Kennedy Electric Ltd. v Rumble Automation Inc.*, the case relates to the definition of “improvement” contained in the Act. Kennedy had supplied a massive amount of equipment to the Ford plant in St. Marys, Ont., mostly of the robotic equipment required to create an automotive assembly line. There was some evidence that part, but not all, of the equipment was bolted to the floor of the plant. An “improvement” as defined by the Act at that time was:

- (a) any alteration, addition or repair to, or
- (b) any construction, erection or installation on, any land, and includes demolition or removal of any building, structure or works or any part thereof, and ‘improved’ has a corresponding meaning.

Basing his decision almost solely on a strict interpretation of this language, Justice Killeen of the Superior Court (2004 CANLII 47787) held that

the work done by Kennedy couldn’t be considered as lienable, because what was installed wasn’t permanent and wouldn’t affect the land in any way—the equipment could be removed and the building used for some other purpose, notwithstanding that to do so would be an arduous and expensive process.

Appeals to Divisional Court (2006 CANLII 16836) and the Ontario Court of Appeal (2007) 285 DLR (4th) 466, were unsuccessful, although judges at both levels expressed sympathy with Kennedy’s predicament and said the language of the statute could be read either way.

In Bill 68, the definition of “improvement” expanded to read:

‘improvement’ means, in respect of any land (a) any alteration, addition or repair to the land; (b) any construction, erection or installation on the land or on any building, structure, or works on the land that is essential to the normal or intended use of the land, building, structure or works, or (c) the complete or partial demolition, or removal of any building, structure or works on the land.

Although the new language attempts to broaden the definition to assist suppliers and contractors in similar positions, adding in new terms and combinations should keep lawyers happily busy for a long time. COD is still the best way to go.

2 | Another important amendment is the addition of s. 33.1, an entirely new provision which relates to condominiums exclusively. Owners, before

registering the declarations for their new condos, must also register a notice if they are aware of any unpaid lien claimants or potential lien claimants, containing the name and address of the owner and any potential claimant who performed work on the property within the 90 days preceding the registration of the declaration. Any owner who fails to do so is liable to any lien claimant/potential lien claimant, who is thereby caused damages.

3 | The next amendment stems from confusion from the wording of s. 34(6) of the old Act. This required the registration or, where appropriate, service, of an affidavit of verification of the lien, by the lien claimant or someone else having knowledge of the facts set out in the lien, and affirming them to be true. The Court of Appeal had held, in *Venditti v. Petriglia* (1989) 33 CLR 1 that the failure to register such an affidavit was fatal to the lien and could not be corrected under the curative provisions. However when the Land Registration Reform Act was amended in 2000, it eliminated the need of registering an affidavit of verification. In practice, some lawyers had them signed nonetheless and kept them in their file, some served them separately on the other parties together with a courtesy ‘notice copy’ of the claim itself, and some simply chose to disregard the provisions of s. 34(6) entirely. It was the general opinion that where the Act required actual service of the lien (government-owned property, roadways etc.) the affidavit should still be served with it. The amending legislation corrects the confusion by eliminating the requirement of the affidavit entirely.

Hopefully these amendments will result in savings of time and money for lien claimants and their lawyers. **EB**

Stephen Tatrallyay is certified by the Law Society as a specialist in Construction Law, and has been president of the Canadian College of Construction Lawyers (CCCL) and both the National and Ontario branches of the Construction Law Section of the Bar Association. He practices in Stratford, Ont., and can be reached at (519) 271-6360 or statrallyay@rogers.com.



BBP™31 SIGN & LABEL PRINTER

FAST, SIMPLE AND POWERFULLY VERSATILE.

THE WAY LABEL MAKING SHOULD BE.

- Simple to operate
- Packed with functionalities
- Touch & drag label design
- Stand alone operation

And the best part? This printer makes labels in two steps. All you need to do is just type and hit print – it’s really that easy.

SAMPLE PACK & ONLINE DEMO VIDEOS

www.BradyCanada.ca/bbp31



BRADY

WHEN PERFORMANCE MATTERS MOST™

SD1115



Dave Smith |

mind your safety **EB**

Kill the permit, not the homebuyer

During the electrification of Canada, there weren't enough electricians to go around and a system of homeowner permits was created which persists today. My father and uncles, all skilled mechanics, able to solve electrical problems on machinery, would readily state they "don't know a damn thing about A/C" and wouldn't think of doing their home electrical work.

Most people now have been through classes explaining electricity, are experienced connecting computers and are willing to install electrical devices. In my non-electrical worker arc flash courses I asked how many have ever installed plugs, lights, etc. At least 80 percent said they had, while 30 to 40 percent admitted to wiring basements and more. As I teach how easily electrical fires are caused, many are surprised.

I believe we should either eliminate homeowner permits or seriously upgrade the standard to obtain them because too many people *don't know what they are doing*. If you buy a house with a basement finished after that house was built, the homeowner likely wired it. I have heard too many descriptions of accidents waiting to happen that would be an insult to a first-year apprentice.

The insurance industry should be taking note of this. If somebody buys a house in good faith with a finished basement, who would realize it was wired by some crappy handyman? A young fellow I know installed some of his own receptacles. When I asked if he made good connections, he claimed, "It hasn't been burned down yet!". When I replied "No, they never do right away," he looked at me and tried to determine whether I was joking. When he saw that I wasn't, it was clear he did not know what to say.

An acquaintance purchased a home in Calgary and checked the electrical panel to ensure the house was wired with copper wire. Imagine their chagrin later to find aluminum wiring to the devices. Some rat bag SOB wired it entirely in aluminum except for the home runs where there would be numerous copper to aluminum connections. How many thousands of houses have been wired like this by other rat bag SOB's?

We have hundreds, if not thousands, of homes with glowing connections throughout Canada based upon the crappy handiwork of skinflints discounting the value of trained electricians. We run our cars to failure—the brakes until they squeal and the alternator into darkness—but running home electrical systems to failure can mean fire and tragedies.

There is an opportunity for residential

We have hundreds, if not thousands, of homes with glowing connections throughout Canada based upon the crappy handiwork of skinflints discounting the value of trained electricians.

electrical contractors to develop a home electrical inspection package which insurance companies should embrace, CSA should support, and inspection branches should adopt. This should be a condition of insurance on change of ownership or every 10 years; as for the homeowners permit, it is time to either send it the way of the dodo bird or force the crappy triers to prove competence.

Until next time, be ready, be careful and be safe. © **EB**

NOTE: If you are a residential contractor or insurance company and support developing a home inspection package, please contact the author. We can petition CSA to create a committee to develop a home inspection standard, and that will only save lives and losses.

Canada Training Group has been providing consulting services to industry since 1980; Dave Smith, the president, can be reached at davesmith@canada-training-group.ca. At www.canada-training-group.ca, you will find this article (and others) available to you. Feel free to use them to support your own safety program and other initiatives.

The Perfect Solution...

The new HPS SPARTAN™ series of industrial control transformers are ideally suited for general purpose, industrial and light duty loads.

Designed for applications where high inrush or machine tool duty are not necessary, the HPS Spartan control transformer offers an efficient and economical solution.

- Primary and secondary terminal blocks utilize a combination slot/Phillips screw with a SEMS washer
- VA range from 50 VA to 5000 VA
- 10 standard voltage groups
- Superior insulating materials
- Premium packaging
- 15 year warranty

HPS SPARTAN™
Industrial Open Core & Coil
Control Transformer



Hammond Power Solutions Inc.
Your First Source for Transformers

www.hammondpowersolutions.com 888-798-8882

A tradition of innovation.



STAR TECK®

A pioneer in the design of teck cable fittings, the **Thomas & Betts STAR TECK®** product line remains an indisputable industry standard to this day.

All **STAR TECK®** fittings are designed and manufactured in Canada for Canada.

STAR TECK® cable fittings.
A tradition of industry firsts.

Thomas & Betts

Outlawing electric resistance heat?

Consider some opposing facts and new ideas instead

Kristyn Clayton

There is a significant move to eliminate electric resistance (ER) heating as an option for builders and home owners in the current cycle of the International Energy Conservation Code. It is apparently thought by some that this form of heating is not efficient—a thought which couldn't be a more wrongly misconstrued notion given the facts of the matter and the future emerging trends. A list of those facts is presented briefly here in an effort to avoid the extremely unfortunate annihilation of a technology that has so much promise in the world of green buildings.

Fact One: The actual conversion of electricity to heat via a resistive element is nearly 100% efficient. Other commonly used forms of heating equipment run from 20% to perhaps 60% efficient.

Fact Two: The inefficiency presumption attached to electric resistance heating is that it takes more electricity to fully heat a space than it does for other types of equipment, which it can if not installed or used thoughtfully. The error in this thought process is that electric resistance heating should be applied and utilized in the same manner as other heating equipment. It should not be and usually isn't.

Fact Three: Other sources of heating almost always use forced air to distribute the heat within the space. Forced air introduces an increased risk to health and is difficult to maintain for cleanliness and adequate supply. Electric resistance heating can use forced air, but it doesn't have to.

Fact Four: Modeling of energy use in buildings demonstrates that ER heat is more costly than other sources of heat. Automatically starting a heat pump in the morning before anybody is awake or present in a building usually requires electric resistance heating to achieve the desired temperature in a timely fashion – but this isn't taken into account or modeled as such in the cost comparisons.

Now from Hammond Manufacturing

ENCLOSURE COST SAVINGS

Virtually every standard industrial enclosure needs to be modified by your staff for final use - holes, cutouts, painting, and more. Hammond Manufacturing can affordably provide ready to use enclosures to your specifications, saving you this additional labour time and cost.




Modification services:

- Durable Powdercoat Paint Colours - Hammond standards, RAL, and custom colour matching
- Laser/CNC Holes & Cutouts - conduit openings, position holes, equipment cutouts, etc.
- Mounting options - various studs, strut, tapped holes, etc.
- Dimensional changes
- Accessory assembly - windows, handles, lighting, climate control, etc.

Contact your Hammond Distributor or visit us online at www.hammondmtg.com for all your enclosure needs.

HAMMOND MANUFACTURING

Hammond Manufacturing Co. Ltd
304 Edinburgh Road North
Georgina, Ontario N1H 1E8

Tel: (519) 825-2960 or (800) 416-5779
Fax: (519) 825-5715
sales@hammond.com
www.hammondmtg.com

Quality Canadian Products

Fact Five: Alternative energy sources and new heating technologies rely on ER heat because it is quiet, clean and easy to adapt to a myriad of new technologies. The combination of Facts one and four make ER heat the ideal candidate to heat spaces with renewable energy sources.

So why then do certain energy code-savvy folks want to outlaw ER heat? Because on paper, it looks like it saves lots of energy. In computer models, which is how energy savings is accounted for presently, the saving of energy attributed to different equipment doesn't usually allow for controlling them in different manners. That means if you use a heat pump to heat and cool a house 24 hours a day with no break for opening a window, or shutting it down when not needed, then you have to assume that ER heat is used the same way in the computer model. This is simply not true. Most of the time ER heat is used only when and where it is needed. Newer more sophisticated controls actually improve the use of ER heat and can properly assign zones in spaces where there now is only one big zone such as in a house or condominium.

If heat pump controls are set on automatic, then it will heat and cool and ventilate to maintain a certain temperature. This is a very wasteful strategy but a very common one. The narrow settings of automatic controls have led us down a path of wastefully heating our homes and offices when it is simply not necessary.

Current applications and new efficiency oriented ideas for using ER heat efficiently are important to understand. These ideas will keep it a viable resource for spaces that can't use forced air for a variety of reasons, for geographic locations that don't have natural gas as a fuel option and for connecting to renewable energy power sources for the best of all worlds.

Idea 1: Integrating heating in other building



We should not be punishing the 100% efficient end product but should be turning our focus on the delivery system (utility efficiency) and on being less spoiled.

components is a growing technology that considers placement of heating elements within walls, windows, floors and ceilings. This is not new, but makes so much sense, and is being expanded and applied in wonderful new products. Instead of heating every room with hot air which transfers out of the inefficient shell of the building, why not block the transfer of cold air from the outside to the inside with highly insulating elements and then provide a little extra heat to finish the job? Comfort would still be the result, but locating the action at the source of heat transfer, i.e. the walls, windows and roofs, instead of waiting for cold air to enter the space then working to heat it up as we do now is the most inefficient idea of all.

Idea 2: Automating all of our heating and cooling systems so we don't have to exert any effort is a double edged sword. The good edge is that we can use automation to set back the temperatures at night and during periods of low occupancy so that energy isn't wasted, at least in the idealistic computer models. The bad edge has too many facets that simply aren't outweighing the good edge in real practice. Since there isn't a comprehensive effort to measure and verify savings, we don't really know what the total savings are. Samples say that efficiently designed and constructed buildings work the way they are modeled in perhaps 50 to 80% of the time. This is partly due to poor construction techniques that aren't tested, human interference and the controls technology currently installed. Automatic controls rely on a "deadband" which is the temperature range when no heating or cooling is being used to maintain temperature. If a deadband range is zero degrees, then the equipment is used all of the time not revealing any savings. Typically deadband ranges are 2 to 4 degrees. Humans can withstand a much greater deadband if it is left up to them to manually control the equipment. So removing the human control element in order to provide optimal comfort 100% of the time is wasteful. We are simply spoiled.

Idea 3: It is time to look at what is best for regions and neighborhoods and individuals, not codify and standardize one solution for all. Areas of the country that are able to use electric resistance heat efficiently show a significantly lower amount of energy use per square foot of space than other areas that need a lot of constant space heating. The technology is now available to measure and verify the actual use of energy very easily and not rely on guesstimates from computer modeling. Incentives to keep heating energy use low can also get us away from the mentality that we need a perfectly conditioned

DANGERS OF dirty power
Who is your front line of defense?

SurgePure stops catastrophic failures of computers, automation controls, HVAC systems, electronic lighting controls, office equipment and factory machinery. Prevents "data loss" and glitches on communications lines, and reduces long term degradation and extends the life of electronic equipment, motors and electrical system components.

**Highest Surge Capacities in the Industry
Non-Degrading Single Element Design**

- Lifetime Warranty*
- LISTED - UL 1449, 3rd Edition
- SCCR-200kAIC on all models

*on all Mach 2 models and higher

U.S.A. 1.866.959.7873
www.surgepure.com

Canada 1.877.833.5440
www.surgepure.ca

SurgePure®
ETL LISTED US

The 'source' of the ER heat ban

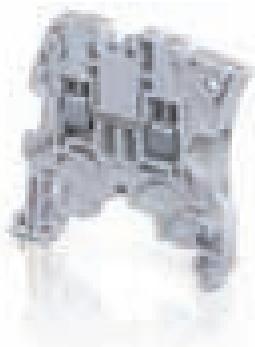
Recently there was an attempt to ban electric resistance (ER) heating outright in the 2012 International Energy Conservation Code (IECC) hearing process. The attempt failed, but brought to light areas that already exist in the IECC and other energy conservation codes that need closer examination. Why for instance are there punitive multipliers for what utilities the consumer hooks up to at the site of the building? Why do these multipliers favour the burning of natural gas at a building site over the burning of coal or the use of nuclear fuel at the source generation site as if the consumer has a choice? If we consider those code realities at face value, then it would appear that the IECC and other codes are becoming energy selection

codes instead of energy conservation code as their names suggest. While this is applicable to a green construction and real estate development codes, it is not applicable to a building conservation code. The distinct differences between energy conservation, energy efficiency and clean energy are becoming blurred in a code that should only be applied to one building's energy conservation capability. The sad truth is that the blurring of those distinctions are forcing ER heat to become an illegal and ostracized technology.

For the time being, however, ER heat is safe and remains a viable option in a limited capacity for residential heat. The limitations for its applicability remain and



Rediscover the art of connection?
Definitely.



A high quality terminal block should stay discrete. But does that mean you should deprive yourself of a touch of modernism and not seek to improve on today's standard? Certainly not. As a recognized specialist in terminal blocks for the last 50 years, ABB has used all their expertise to create an innovative asymmetrical SNK terminal block that is more user-friendly than ever before. Its patented design, specifically conceived to make it easy to connect and identify, to assemble and maintain, marking an important step in the history of connections. www.abb.ca/lowvoltage

ABB Canada
Low Voltage Products
Tel.: 1-800-567-0283

Power and productivity
for a better world™



space 100% of the time, especially if it means money in our pockets.

The final idea therefore is up to the next generation of heating design engineers and consumers. We have pampered ourselves into a place that is wasting lots of energy. What are the other ideas out there that can take us to the next level? How can we be sure that we are saving energy and not following a path that isn't very efficient, but looks good on a computer screen or in an estimated, simulated report? We should not be punishing the 100% efficient end product but should be turning our focus on the delivery system (utility efficiency) and on being less spoiled. Achieving energy independence and deep conservation will not occur automatically, nor without conscience effort by the consumer.

So let's focus our efforts on the real issues of source pollution and excess use and not on outlawing a proven technology that is being mishandled in software runs and maligned blindly and irresponsibly. **EB**

Kristyn Clayton is the owner of Green House Effects, a company that seeks to better the environment by offering practical sustainability consulting to interested and committed businesses and individuals. Her career work includes commercial construction management, energy conservation advocacy and regulation, sustainability consulting and teaching in all of those subjects. She is a Washington State Building Code Council Member—appointed by the governor—representing commercial and industrial general contractors, responsible for oversight of the building codes and related policies of the state. As chair of the Energy Code Technical Advisory Group for the council she helps to guide the process of energy codes. She has a B.S. in electrical engineering from the University of Virginia, and an M.S. in architecture from Washington State University. Visit energyconservationconsulting.net.

are hidden behind prescriptive requirements, software modeling fuel use multipliers and target energy use values, all of which are based on other technologies that use natural gas as the primary fuel or forced air-based heat rejection equipment. What has crept into the energy conservation codes is a bias against electricity as the primary fuel source for any building because of the generating fuel mix or "source". This does not seem at all fair to the building owner given that the supply of electricity and the availability of other fuel sources varies drastically throughout the United States and is still a monopoly commodity in most regions.

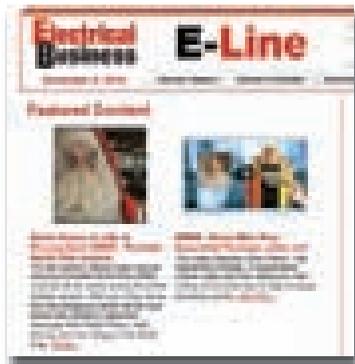
There is hope. More innovation with ER heat in building integrated systems, plus the move toward a net-zero building construction that can use ER heat in small quantities can reinvent ER heat and secure the future for this simple, clean heat

source. These pathways cannot develop fast enough for many reasons but take money, consumer acceptance and an economy that fosters widespread availability.

Unfortunately, the short-sighted attempt to ban ER heat in the home or office will continue as threatened by those promoting it. It is time that industries like the ER heating industry jump in with both feet to keep their products alive and to keep the energy conservation codes focused on building use and not on utility supply. Unless there is a great deal more success at removing these unfair code provisions that are increasingly limiting ER heat, eventually it will be obsolete. If your company is an ER heat product manufacturer you can no longer afford to sit back and hope things change. It is now necessary to become involved in your local energy code adoption process as if your industry's life depends on it—because, frankly, it does. **EB**

Electrical Business

**EBMag's
bi-weekly
newsletter**



**E-Line:
Your Industry
News Broadcast**

E-Line delivers unique, timely information that "fills the void" between editions of Electrical Business.



**Sign up at
www.EBMag.com
– it's FREE!**

Ferraz Shawmut
is
now

MERSEN

We've shortened our name. And increased your expertise in the safe and reliable transmission, distribution, and control of power.



What's in a name? More products, solutions, and support than you've ever had before to keep everything running safely. Changing our name changes the game, giving you all of Ferraz Shawmut plus even more resources to increase your expertise in the protection of power electronics, controls, transmission, and distribution. Ready for the next level? It's waiting for you at fsisnowmersen.com/us/CAEB1

ca-ferrazshawmut.mersen.com

Mersen Canada Toronto Inc.
Toronto, ON
T: 416.252.9371



Why your wind farm's

success depends on grounding transformers

Curt Collins

The grounding transformer is a commonly neglected component of the wind farm — shunted off to a sidebar issue. However, those who neglect to adequately plan for grounding transformers do so at their peril. In reality, millions of dollars in liability and loss can be attributed to ground-fault arcing, so grounding-related issues should top the checklists of any electrical contractor developing a wind farm.

Proper construction to meet the specific needs of wind farms is absolutely essential. In addition, be sure your grounding transformer considers such essential parameters as primary voltage, size needed to carry the rated continuous primary phase current without exceeding temperature limits, and fault current and duration. Finally, select from among the variety of options available based on the application's site-specific needs.

What is a grounding transformer and why is it needed on wind farms?

Simply put, a grounding transformer is used to provide a ground path to either an ungrounded Wye or a delta-connected system. Grounding transformers are typically used to:

- Provide a relatively low impedance path to ground, thereby maintaining the system neutral at or near ground potential.
- Limit the magnitude of transient over voltages when re-striking ground faults occur.
- Provide a source of ground fault current during line-to-ground faults.
- Permit the connection of phase to neutral loads when desired.

If a single line-to-ground fault occurs on an ungrounded or isolated system, no return path exists for the fault current, so no current flows. The system will continue to operate, but the other two un-faulted lines will rise in voltage by the square root of 3, resulting in overstressing of the transformer insulation and other associated components on the system by 173 percent. Metal Oxide Varistors (MOVs), solid state devices used to suppress voltage surges/spikes (lightning arresters), are particularly susceptible to damage from heating by leakage across the blocks even if the voltage increase is not sufficient to flash over. A grounding transformer provides a ground path to prevent this.

Grounding transformers are essential for large multi-turbine wind farms, where the substation transformer frequently provides the sole ground source for the distribution system. A grounding transformer placed on the turbine string provides a ground path in the event the string becomes isolated from the system ground.

When a ground fault on a collector cable causes the substation circuit breaker for that cable to open, the wind turbine string becomes isolated from the ground source. The turbines don't always detect this fault or the fact that the string is isolated and ungrounded, the generators continue to energize the collector cable, and the voltages between the un-faulted cables and the ground rise far above the normal voltage magnitude. The resulting costs can be staggering. The loss of revenue alone for a string of 10 turbines can exceed \$10,000 per day. Considering removal and replacement, costs of equipment could approach an additional \$40,000 per transformer.

For example, a typical wind farm configuration is somewhat analogous to a carriage wheel with a ring, hub and spokes. The wheel's outer ring is like the fence around the wind farm and the hub in the center is where the collector is located, which connects to the grid. The spokes are radial lines where each wind turbines sit. Typically each radial string of turbines will connect to a grounding transformer (Figure 1).

Proper grounding transformer construction

Grounding transformers are normally constructed with one of two configurations: a *Zig-Zag* (Zn)-connected winding with or without an auxiliary winding, or a Wye (Ynd)-connected winding with a delta-connected secondary that may or may not be used to supply auxiliary power. Figure 2 shows these two possible configurations. The current trend in wind farm designs is toward the Wye-connected primary with a delta secondary (b). There are several reasons why the two-winding Wye-connected grounding transformers are seemingly more popular than Zig-Zag designs:

- Though not actually the case, two-winding transformers are perceived to be more readily available for replacement or upgrade.
- Lack of familiarity with the design basics required for the Zig-Zag configuration means designers tend to fall back on the more

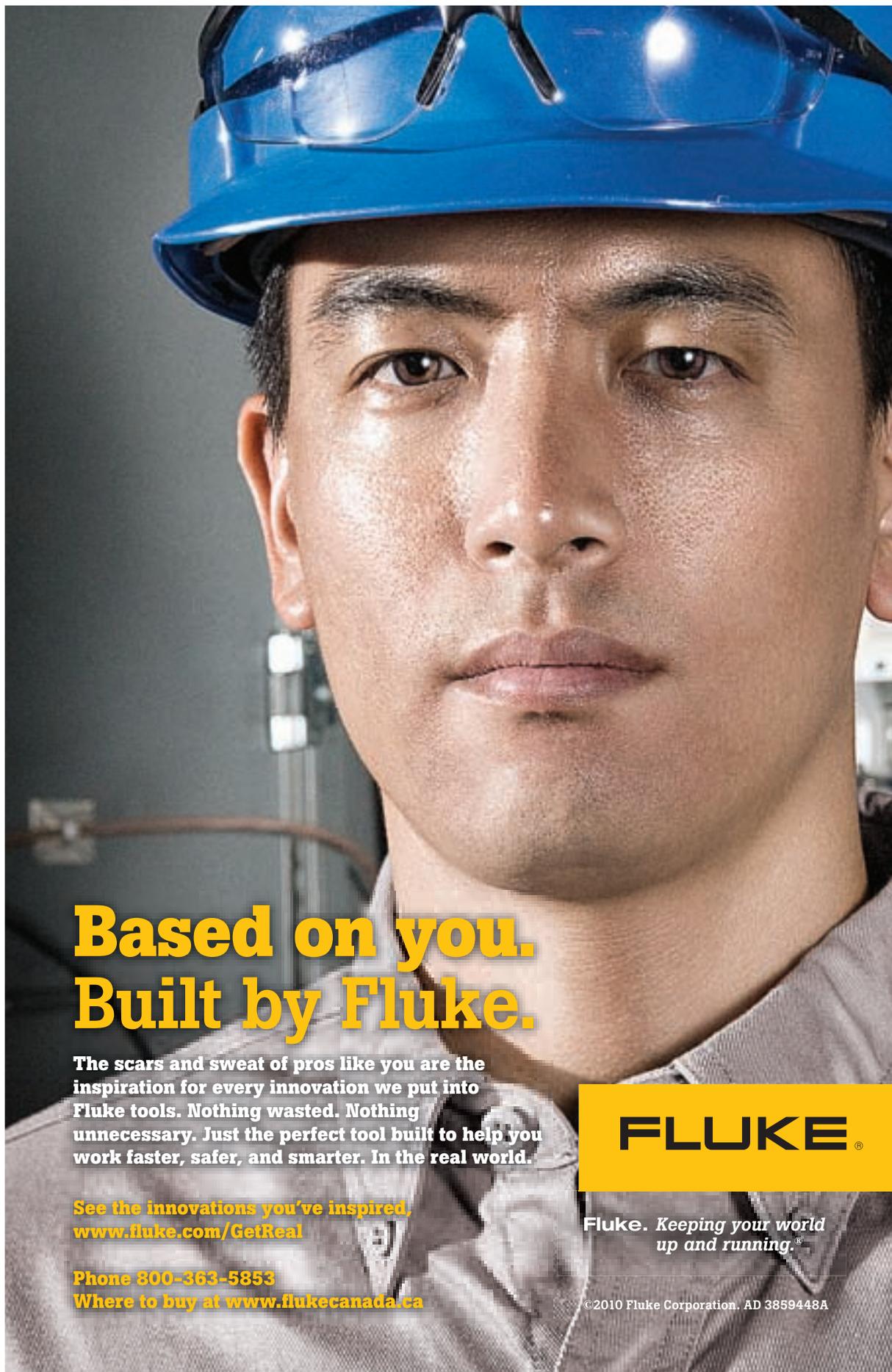
familiar configuration.

- The Wye-connected 2-winding design allows for secondary loading and metering while Zig-Zag designs do not.
- Not all manufacturers provide Zig-Zag grounding options to potential customers, even if that configuration might be the most appropriate.

The Zig-Zag connection's geometry (a) is useful to limit circulation of third harmonics and can be used without a delta-connected winding or the 4- or 5-leg

core design normally used for this purpose in distribution and power transformers. Eliminating the need for a secondary winding can make this option both less expensive and smaller than a comparable two-winding grounding transformer. Furthermore, use of a Zig-Zag transformer provides grounding with a smaller unit than a two-winding Wye-Delta transformer providing the same zero sequence impedance.

Wye-connected grounding transformers, on the other hand, require either a delta-connected secondary or the application of 4- or 5-leg core



**Based on you.
Built by Fluke.**

The scars and sweat of pros like you are the inspiration for every innovation we put into Fluke tools. Nothing wasted. Nothing unnecessary. Just the perfect tool built to help you work faster, safer, and smarter. In the real world.

**See the innovations you've inspired.
www.fluke.com/GetReal**

**Phone 800-363-5853
Where to buy at www.flukecanada.ca**

FLUKE®

Fluke. Keeping your world up and running.®

©2010 Fluke Corporation. AD 3859448A

construction to provide a return flux path for unbalanced loading associated with this primary connection. Since it is often desirable to provide auxiliary power from the grounding transformer secondary winding, this benefit may make it preferable to use a two-winding grounding transformer instead of a Zig-Zag connection. Both transformers can be constructed with auxiliary power capabilities, and this can be either a Wye- or delta-connected load.

A solidly grounded system using a grounding transformer offers many safety improvements over an ungrounded system. However, the ground transformer alone lacks the current limiting ability of a resistive grounding system. For this reason, neutral ground resistors are often used in conjunction with the grounding transformer to limit neutral ground fault current magnitude. Their ohm values should be specified to allow a high enough ground fault current flow to permit reliable operation of the protective relaying equipment, but low enough to limit thermal damage.

Consider this when specifying a grounding transformer

When selecting a grounding transformer for your wind farm, be sure to keep in mind the following parameters:

Primary voltage

This is the system voltage where the grounded winding is to be connected. Don't forget to specify the transformer's basic impulse level (BIL), which measures its ability to withstand lightning surges. In some cases the BIL will be dictated by equipment considerations, such as 150 kilovolt (kV) BIL ratings on 34500-volt wind farms because of the limitation on dead front connectors.

Rated kilo-volt amperes (kVA)

Because the grounding transformer is normally a short time device, its size and cost are less compared to a continuous duty transformer of equal kVA rating. For this reason, grounding transformers are often not sized by kVA, but by their continuous and short time current ratings. Regardless of how you rate it, the grounding transformer must be sized to carry the rated continuous primary phase current without exceeding its temperature limit. This load includes the magnetizing current of the core, the capacitive charging current for the cables, and any auxiliary load if applicable. The higher this value, the larger and more costly the transformer will be. Typical continuous current values can be as low as 5 amps to as high as a few hundred. Be sure to include any auxiliary loading requirements.

Continuous neutral current

The continuous neutral current is defined as three times the phase to current, or in other words, the zero sequence current. This is usually considered to be zero if the system is balanced. However, for the purposes of designing a grounding transformer, it is a value that is expected to flow in the neutral circuit without tripping protective circuits (which would force the current to be zero) or the leakage current to ground that is not a symmetrical function. Again this value is needed to design for the thermal capacity of the grounding transformer.

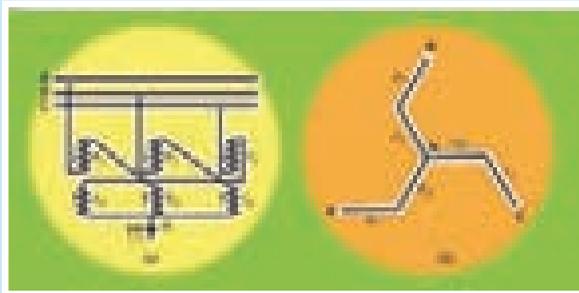
Fault current and duration

This value is needed to calculate the short time heating that results from a fault on the system and should be determined from an engineered system study. Typical values range from a few hundred amps to a few thousand amps, with duration times expressed in seconds and not cycles. For instance, a value of 400 amps for 10 seconds is typical. The fault duration is a critical parameter for the transformer

Figure 1



Figure 2



Simply put, a grounding transformer is used to provide a ground path to either an ungrounded Wye or a delta-connected system.

designer. Where protection schemes use the grounding transformer for tripping functions, a relatively short time duration is specified (5 to 10 seconds). On the other hand, a continuous or extended neutral fault current duration would be required when the grounding transformer is used in a ground fault alarm scheme.

Impedance

The impedance can be expressed as a percentage or as an ohm value per phase. In either case it should be chosen so that the un-faulted phase voltages during a ground fault are within the temporary over-voltage capability of the transformer and associated equipment, such as arresters and terminal connectors. Values, which can vary from as low as 2.5 percent to almost 10 percent, must be provided by the system designer.

Primary winding connection

Be sure to specify the type of primary connection, either Zig-Zag or grounded Wye. Consider the factors discussed above concerning situations for which a particular configuration might be most appropriate, before making the decision.

Secondary connection

Specify the secondary voltage and connection when applicable. Also be sure to

consider the size of auxiliary loading to be connected for either Zn- or Wye-connected primary windings.

If the option is to have a two-winding transformer with no secondary load, determine if the delta winding can be "buried" (that is, not brought out) or if only one bushing is to be brought out for grounding to the tank or testing.

Important grounding transformer features and options

- Advise the supplier whether you need a compartmental padmount transformer with integral tamper-proof compartment or substation design.
- Consider whether the grounding transformer will be located outdoors or indoors. Even outdoor units need special attention when placed near other structures.
- Select the proper fluid type for the particular application. Options include mineral oil, silicone, and Envirotemp FR3 Fluid, a natural ester-based fluid with exceptional fire-resistant properties and favorable environmental attributes.
- Consider connectivity choices and select the best one for the site. Options vary from dead front, live front, and spade terminals. Terminal location can be under a cover or on a sidewall, exposed or enclosed.
- Temperature rise is assumed to be 65°C — adjust design if necessary.
- Consider site elevation or any special environmental concerns.
- Special paint as required.
- Neutral ground resistors — The rated voltage of the NGR should be equal to the grounding transformer's line to ground voltage. The current rating and duration should match the grounding transformer ratings. Remember to set the current rating high enough to be above the cable charging current and grounding transformer magnetizing current. **EB**

Curt Collins is the director of sales for Pacific Crest Transformers, a company that designs and constructs liquid filled distribution transformers. Its customer base covers the Canadian, American and Mexican markets. Visit www.pacificcresttrans.com. This article originally appeared in *Wind Systems Magazine* (Feb 2011).



Visit **EBMag.com**
and click **Calendar** to
see an extensive list of
upcoming events.

Prairie Power Symposium
April 5-6, Regina, Sask.
Visit tinyurl.com/4uzvfwu

EFC Annual General Meeting
Electro-Federation Canada
April 19, Toronto, Ont.
Visit www.electrofed.com



MCEE
April 20-21, Montreal, Que.
Visit www.mcee.ca



**NAED National Electrical
Leadership Summit**
National Association of Electrical Distributors
April 30-May 3, San Diego, Calif.
Visit tinyurl.com/4vwzsg7

CanSIA Conference and Showcase
Canadian Solar Industries Association
May 3-4, Windsor, Ont.
Visit www.cansia.ca

OEL Electrical Industry Conference
Ontario Electrical League
May 4-7, Guelph, Ont.
Visit www.oel.org



PEARL Annual Conference
*Professional Electrical Apparatus
Recyclers League*
May 14-16, Portland, Ore.
Visit www.pearl1.org

Lightfair
May 15-19, Philadelphia, Pa.
Visit www.lightfair.com



Nedco Electrifest
May 16, Mississauga, Ont.
Visit www.nedco.ca



WindPower 2011
May 22-25, Anaheim, Calif.
Visit www.windpowerexpo.com

**ESC Bright Futures in Canada
Conference: "Innovative Solutions
for a Sustainable Workforce"**
Electricity Sector Council
May 24-26, Toronto, Ont.
Visit tinyurl.com/4t86es7



CanSIA Conference and Showcase
Canadian Solar Industries Association
May 30-31, Vancouver, B.C.
Visit www.cansia.ca



S&D Annual Conference
Supply & Distribution Council
May 31-June 3, Quebec City, Que.
Visit sndcouncil.blogspot.com

IED Annual General Meeting
*Independent Electrical Distributors
(Limited Partnership II)*
June 14-16, Windsor, Ont.
Visit www.ied.ca



CanSIA Summer Solstice
*Canadian Solar
Industries Association*
June 21, Toronto, Ont.
Visit www.cansia.ca

**EFC Federation Cup Annual Charity
Golf Tournament**
Electro-Federation Canada
August 22, Milton, Ont.
Visit www.electrofed.com



**Petroleum and Chemical Industry
Technical Conference**
*IEEE IAS PCIC (Industry
Applications Society, Petroleum
and Chemical Industry Committee)*



September 19-21, Toronto, Ont.
Visit www.ieee-pcic.org

**IBEW 38th International
Convention**
*International Brotherhood
of Electrical Workers*
September 19-23, Vancouver, B.C.
Visit [www.ibew.org/Convention2011/
index.htm](http://www.ibew.org/Convention2011/index.htm)

Spikeshield® Surge Protective Devices

Looking to protect your home
from Electrical Surges?
Hubbell's got you covered
with a wide variety of solutions!



Plug Strips



Surge
Receptacles



Whole House
Protection



Panel
Protector

HUBBELL®
...your best line of defence



ELECTRICAL SYSTEMS

www.hubbellonline.com/wiring

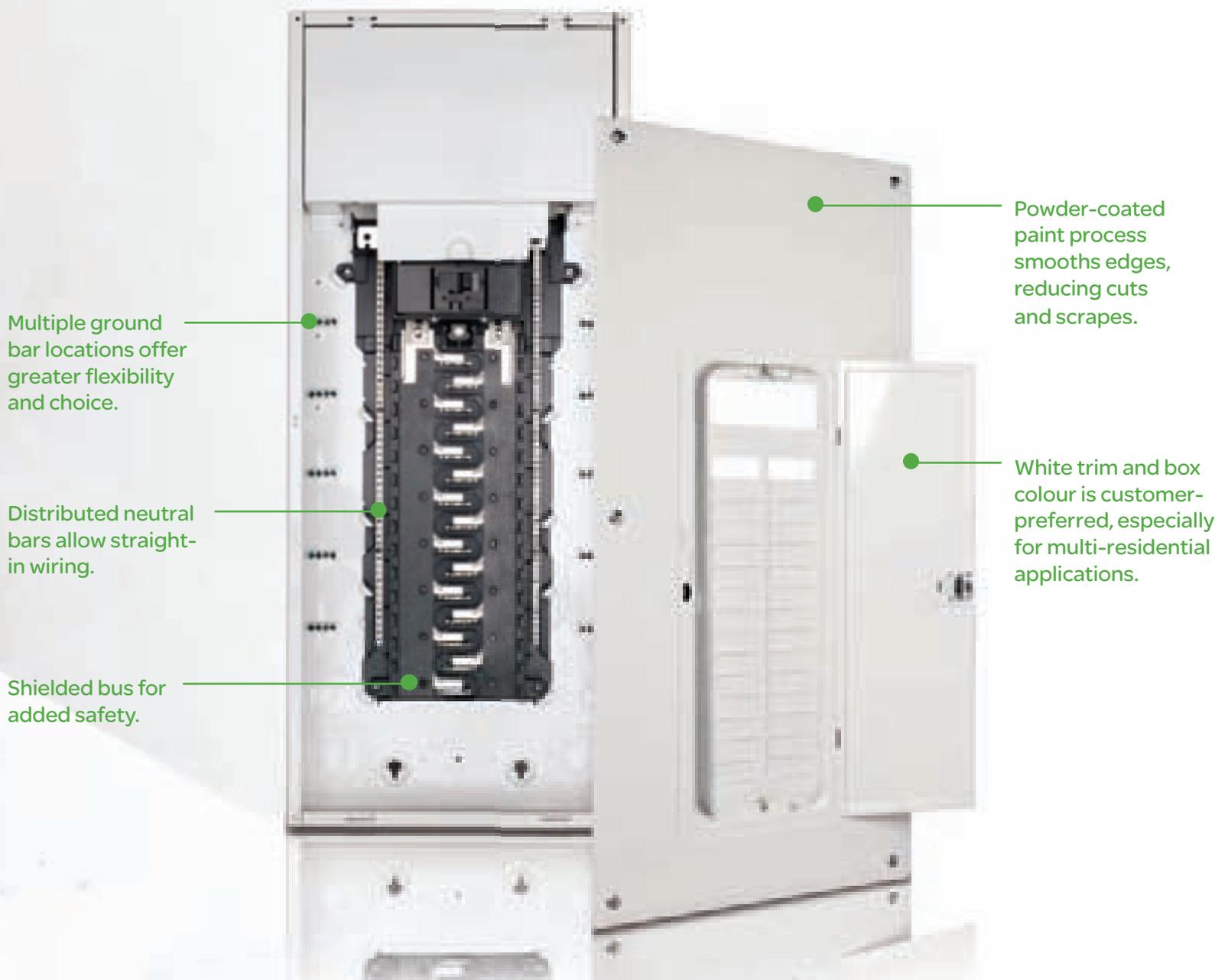
HUBBELL
Hubbell Canada LP



I need a load centre that is easy to install, reliable, and appealing to customers.

We listened

You asked for a full-featured load centre and we delivered. Introducing Homeline by Schneider Electric



Multiple ground bar locations offer greater flexibility and choice.

Distributed neutral bars allow straight-in wiring.

Shielded bus for added safety.

Powder-coated paint process smooths edges, reducing cuts and scrapes.

White trim and box colour is customer-preferred, especially for multi-residential applications.

Load centres designed with you in mind

You've got plenty to do, so Homeline™ is designed for fast, easy installation. Distributed neutral bars positioned for straight-in wiring, multiple ground bar locations, and a self-leveling centre keyhole increase flexibility. Our trim speed screws install three times faster than conventional screws. And Robertson® screws on neutral bars, ground bars, and breakers enable simple, one-tool installation.

Safety and style your customers will appreciate

Safety should never be an afterthought, so Homeline from Schneider Electric™ features a shielded current-carrying bus to protect against accidental live contact. A powder-coated paint process ensures a smooth finish, preventing cuts and scrapes from sharp edges. Homeline is stylish, too, with a white box and trim customers prefer, particularly for multi-residential applications. We've included a standard door on all double-row load centres as well.



Learn more!

Download our **FREE** Homeline brochure and enter to **WIN** one of 100 \$50 Esso® gas cards!

Visit www.SEreply.com Key Code **a865v** or Call **1-800-565-6699**

Schneider
Electric™

Lightfair shines a spotlight... on Philly?

Photo by Bryan Lathrop for PCVB.



Photo by Larry Laszlo for PCVB.

Trade Show & Conference
Tue, May 17–Thu, May 19

Lightfair Daylighting Institute
Sun, May 15–Mon, May 16

Lightfair Institute
Sun, May 15–Mon, May 16

Exhibit Hall dates & hours
Tuesday, May 17 10:00 AM–6:00 PM
Wednesday, May 18 10:00 AM–6:00 PM
Thursday, May 19 9:00 AM–3:00 PM



Photo by Edward Savaria, Jr. for PCVB.

For the first time ever, Philadelphia will host this year's Lightfair International—the self-proclaimed largest annual architectural and commercial lighting trade show and conference in the world—in its newly-expanded Pennsylvania Convention Center. Normally staged alternately in New York and Las Vegas, this year's attendees will be trading in the sights of the flashing billboard lights with the mouthwatering smells of Philly cheesesteak sandwiches and soft pretzels.

New year, new features

To help attendees gain more networking and educational opportunities, Lightfair International will be debuting the Spotlight Lounge at the May 2011 trade show. Staged directly on the trade show floor among the exhibitors, the event organizers feel the Lounge will present a forum for attendees to network and relax, as well as a stage with theatre seating for the *Design With Light* student competition awards, cocktail hour, iPad raffles and more.

Two new pavilions will also be highlighted: The **Building Integration Pavilion**, launched in 2010, features companies displaying solutions and products used to maximize and create energy-efficient buildings; and the **Daylighting Pavilion**, the trade show counterpart to the Daylighting Institute, focuses on architectural daylighting, daylight harvesting, energy efficiency and conservation, solar shading and natural light.

Keynote speaker

Taking centre stage in the Spotlight Lounge is keynote speaker and lighting designer Ingo Maurer, who will present *Addicted to Light—Thank God for Shadows* in an exclusive onsite presentation, followed by an interview conducted by design editor for *T: The New York Times Style Magazine*, Pilar Viladas. During his presentation on Wednesday, May 18 at 3 p.m., Maurer will speak about the critical harmony in the relationship between light and shadow and how their balance or imbalance impacts the design process. He will guide and inform designers to follow their instincts and design without compromise and with joy to achieve fantastic results. **EB**

Fast Philly facts:

- Philadelphia is the second-largest city on the East Coast.
- It was the first capital of the United States from 1790–1800.
- 46 million people live in a 200-mile radius of the city
- The newly-expanded Pennsylvania Convention Center is the largest contiguous exhibit space in the Northeast, and the largest convention center ballroom on the East Coast.
- In 1874, the Philadelphia Zoo became the first zoo to open in the United States.
- The world's first computer, ENIAC, was built at the University of Pennsylvania in 1946.

Information courtesy Philadelphia Convention and Visitors Bureau.

● For the tech-savvy attendee

Stay connected to the show with the new mobile show app and get show and exhibitor info, floor plans, conference program and networking event information all at your fingertips.

● Want more?

Advanced features can provide you with a more personalized experience—get directions, event suggestions based on your interests, take notes, navigate the show floor via interactive maps, bookmark your favourite sessions and set appointments with exhibitors, and request callbacks.

● Visit www.lightfair.com/mobileapp for details.

What you need
to know about

lighting showcase 

wireless lighting controls

Craig DiLouie

Radio-frequency (RF) wireless communication is emerging as a significant lighting control technology. In a typical hardwired lighting control system, control signals are sent using communication wires. In a wireless RF system, control devices communicate through the air using radio waves, eliminating the need for control wiring. The resulting advantages enable advanced lighting control with greater installation flexibility and lower labour installation costs, ideal for hard-to-wire applications non-accessible ceilings, hard ceilings, asbestos abatement issues, and brick and mortar existing buildings.

Wireless RF lighting control first became popularized in residential applications, with typical applications including home theatres, kitchens and other common areas, master bedrooms, and exterior and security lighting. Subsequently in recent years, it has emerged as a viable alternative to hardwired controls in commercial building applications.

Benefits

The first is flexibility. Wireless control devices can be placed where they are needed without limitation imposed by wiring, including areas that are difficult to wire. More flexibility is provided in unique applications. Electrical planning may be shortened. After installation, devices can be moved and the system expanded with relative ease.

The second is savings, especially for labour and material costs, which may result in net installation savings after the typically higher product cost is figured. Wireless control eliminates the need for dedicated control wiring and associated switch legs, traveler wires and other raw materials. The system installs more quickly, producing labour savings. With no damage to walls or ceilings, and minimal disruption to business operations, wireless control lends itself well to existing building applications which demand the benefits of advanced lighting control.

As a result, RF wireless lighting controls are growing in popularity both as a more flexible alternative to hardwired systems in new construction, and as an economical way to retrofit existing spaces with minimal cost and disruption. These solutions are also particularly suitable for commercial building applications where the cost of running control wires runs too high, such as outdoor lighting, parking garages, warehouses and retrofits.



lighting showcase

Applications

Wireless RF control devices for commercial applications include occupancy sensors, photosensors, low-voltage relay switches, line-voltage controls, plug controls, hotel card switches, shade controls, HVAC and valve controllers, and door/window sensors. Despite similarities between products, various manufacturers may take significantly different approaches.

In the simplest wireless RF system, a sensor, such as an occupancy sensor, communicates to a controller that controls the load, such as a wall switch with an embedded RF receiver, using radio waves instead of wiring. The level of communication is peer-to-peer—two devices communicating within range. To extend the range, a repeater is required.

Wireless control devices may be powered by

batteries or through energy harvested from the operating environment. High-quality batteries offer a rated life of 10 years. Self-powered devices are available using EnOcean's wireless RF technology. For example, the simple motion of pressing a light switch harvests a sufficient amount of energy to send a control signal to a receiver. Sensors are powered by ambient light or via temperature differences. Hotel key card systems are powered by the motion of the placement of the card into the device.

Mesh Networking

More sophisticated control needs, involving a greater complexity of loads and integration of multiple control strategies, will involve larger systems such as mesh networks. In a mesh network, control signals are passed along, or routed among, all the wireless devices that make up the system, or network nodes, providing multiple, redundant pathways for signals to get to their intended receiver(s). As such, repeaters are not necessary. In a typical system, each device is connected via at least two pathways. If two-way communication is enabled, devices can acknowledge receipt and request retransmission of data, enhancing reliability.

Communication of a robust control signal is therefore enabled via the most efficient path between devices that have no direct path to each other or are out of range. This approach makes it possible for devices with relatively low transmitting power to communicate reliably over long distances. Mesh networks are “self healing,” meaning if one of the devices is not functioning, the signal simply routes through another functioning device. This type of configuration is easily scalable. Note that configuring a mesh network is more difficult than a non-mesh network, and that the selected solution should include a method for locating and identifying devices for installation, operations and maintenance.

Protocols

For wireless RF control devices to be interoperable within a given control system, they must be compatible with the same protocol. Today, there are four main types of RF communication protocols: ZigBee, Z-Wave, EnOcean and proprietary.

ZigBee is an open-source protocol (IEEE 802.15.4) that is supported by the ZigBee Alliance of manufacturers. Vendors offering products based on the 2.4 GHz ZigBee platform include Sensor Switch, Crestron and Control4. ZigBee enables complex control functions, and mesh and star networking configurations.

ONE COMPANY DISTINCT BRANDS MANY CHOICES...



HUBBELL
Hubbell Canada LP

1.800.465.7051
www.hubbellonline.com/lighting



LOW VOLTAGE MOUNTING BRACKET FOR NEW CONSTRUCTION

Our non-metallic, low voltage mounting brackets are the time and money-saving solution to fast, secure mounting of Class 2 wiring.

For new construction, LVMB1 and LVMB2 mounting brackets allow installers to install datacom wiring without an electrical box.

- For use with 1/2" or 5/8" drywall
- Permits the use of 3/4" EMT
- Non-conductive, smooth plastic prevents cable damage



LVMB1



LVMB2



Arlington 800/233-4717 • www.aifittings.com

© 1999-2006 Arlington Industries, Inc.

© REV/2011 Arlington Industries, Inc.

ANYBODY™ SHIPS AS AN LB but...

It's any body you want it to be!

Arlington's aluminum or plastic AnyBODY™ ships as an LB, but converts to a T, LL, LR or C by switching the covers and threaded flanges to create the style you need.

Easy and convenient, it saves you the hassle, space, cost of stocking five different conduit bodies.

Competitively priced with LBs – **NO EXTRA COST for the normally more expensive T** - UL/CSA Listed.

Plastic 1/2" to 4"

Includes three flanges w/ glue-in pipe joint.

Aluminum 1/2" to 4"

Includes threaded flanges for three openings. 1/2" to 2" are combination EMT/rigid – threaded for rigid, but they also have a set-screw for use with EMT.

METAL & PLASTIC!



Any BODY™



Arlington

800/233-4717 • www.aifittings.com

© Arlington Industries, Inc.

CSA LISTED BOX EXTENDERS for SET BACK ELECTRICAL BOXES



BE1

© 2001-2010 Arlington Industries, Inc.

Our CSA/UL Listed Box Extenders extend set back electrical boxes up to 1-1/2".

Made of heavy-duty, non-conductive plastic, they level and support wiring devices, and protect wires against damage and stripping.

BE1R for round or octagonal boxes, the single (BE1), two-gang (BE2) for all standard devices, switches and GFCIs – **and now three- and four-gang box extenders for multiple gang boxes!**



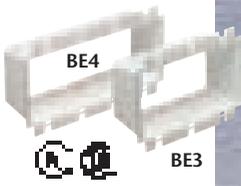
BE1



BE2



BE1R



BE4

BE3



Arlington 800/233-4717 • www.aifittings.com

Try them all for the safe, easy way to meet CEC 12-3018 (1) for flush boxes!

© 2001 Arlington Industries, Inc.

NEAT COVER UP BOX COVER for UNUSED FAN/FIXTURE BOXES

Our non-metallic CP3540 Box Cover is the neatest way to cover unused fan/fixture boxes – pan boxes too! – and poorly cut drywall.

The bracket has 'A' and 'B' openings for use on flat or uneven ceilings. Attach the bracket to the box with #8 or #10 screws, backing them out just far enough to slip the bracket on.

fits Pan Boxes too!

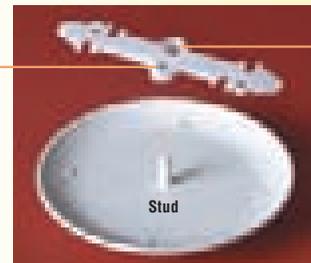


CP3540 Box Cover

- No visible screws on the ceiling plate
- Fits 3.5" or 4" round or octagonal boxes
- Non-metallic
- Textured, paintable

'B' for uneven or textured ceilings
Thread stud into opening until tight

Versatile Bracket Design



Stud

'A' for flat ceilings
Push stud into opening to seat cover



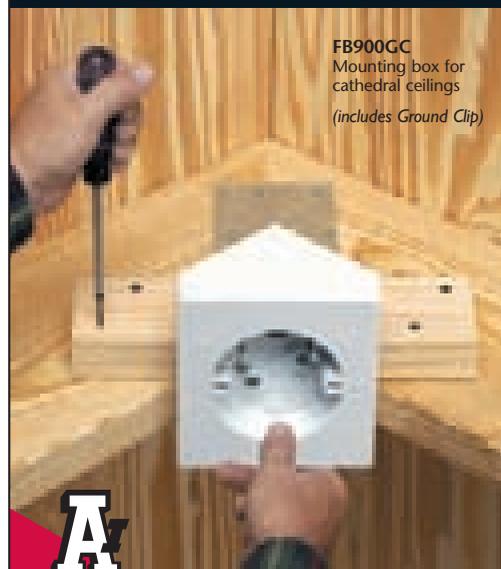
Arlington 800/233-4717 • www.aifittings.com

© 2002 Arlington Industries, Inc. REV 0107

Patented. Other patents pending

FAN & FIXTURE MOUNTING BOX

FOR CATHEDRAL CEILINGS in NEW CONSTRUCTION



FB900GC Mounting box for cathedral ceilings (includes Ground Clip)

Get a safe, secure fan/fixture installation on cathedral ceilings with Arlington's FB900GC Mounting Box.

It installs quickly and easily next to a rafter, for easy centering. Taller sides on the FB900GC box allow it to fit cathedral ceiling angles greater than 80°.

- No loose parts – self-contained
- Large, 8" square mounting surface handles large fan canopies
- 1.45 cubic inch box for new construction
- CSA Load Ratings 50 lb fan or fixture (UL rating: 70 lb fan, 200 lb fixture)



Arlington

800/233-4717 • www.aifittings.com

Patented/Other patents pending

©2005 Arlington Industries, Inc.



FB900GC



THIS PROBLEM SOLVED!

lighting showcase

Z-Wave was developed by Zensys, a home controls manufacturer, and is shared with partnering companies through the Z-Wave Alliance, making this protocol a de facto open standard. Vendors offering products on the 900 MHz Z-Wave platform include Leviton, Cooper Wiring Devices and Intermatic.

EnOcean technology was developed by EnOcean and is shared with partnering companies through the EnOcean Alliance, making this protocol another de facto open standard. Manufacturers offering self-powered products based on the 315 MHz EnOcean platform include Leviton, Ledalite Architectural Products, Illumra and Zumtobel.

Some manufacturers develop proprietary protocols unique to their products operating as part of an engineered system. Manufacturers include Vantage Controls (900 MHz), WattStopper (900 MHz) and Lutron Electronics (400 MHz).

Range

Wireless RF control devices in a network communicate with a radio range of 30 to 100 ft, more or less depending on whether the signal must travel through open space or obstacles such as dense walls. Range can be extended by adding devices, either repeaters or additional control devices, in a network. Passing the signal through obstructions can impact range; the range given by a manufacturer as “open air” distance is not the same as what will occur in a structure.

And it's not just physical obstructions, such as the wall itself, but the type of material in the obstruction—steel, wood, brick, cement, etc.—that affects range. Installation in metal enclosures, such as a metal junction box with a stainless steel faceplate will similarly affect range. Finally, range may be dependent on what protocol is used—the EnOcean Alliance, for example, claims a range of 50 to 150 ft (through walls and ceilings). A device, such as a RF signal strength meter (“sniffer”), should be used to check locations for these devices prior to installation.

Figure 1

Wireless lighting control in an office application. Image courtesy Leviton.

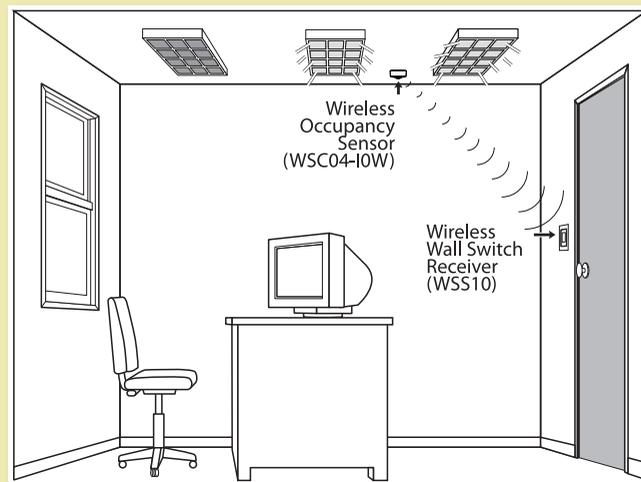
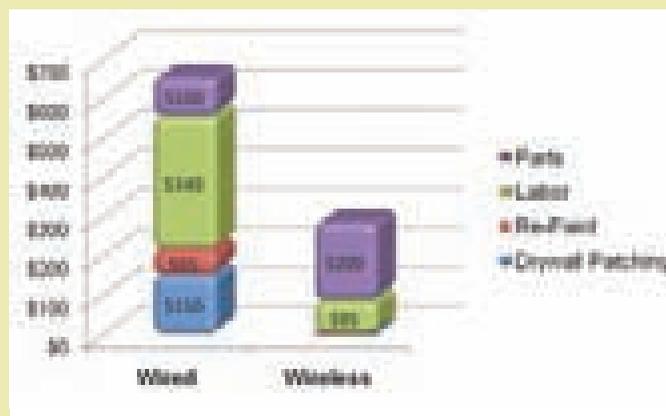


Figure 2

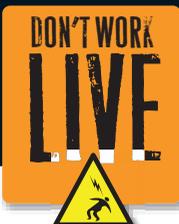
Wireless lighting controls may provide labour and material cost savings, particularly in applications such as difficult-to-wire new construction applications and existing buildings. Image courtesy Leviton.



WHAT SHOULD HAVE BEEN A ROUTINE JOB TURNED YOUR WORLD UPSIDE DOWN!



Workers, supervisors and facility - business owners should follow safety requirements defined by the Ontario Electrical Safety Code and the Occupational Health & Safety Act. Written safety procedures are required where anyone is working on electrical equipment.



Visit www.esasafe.com for electrical safety information.



YOU CAN DO IT - YOU SHOULD DO IT - DON'T WORK LIVE!

Startup

Control devices in a wireless lighting control system work together in much of the same way they would in a wired system. What is different is the way the devices interact and the level of intelligence required. In a hardwired system, the devices intended to work together can be simply wired. In a wireless system, the devices must be programmed or mapped to each other so they know which control signals they should be responsive to, and how they should respond. Additional intelligence is not new; it has been deployed in networked lighting systems for some time.

Along with the flexibility of wireless lighting controls comes some added complexity. Important questions to ask include how the devices are set up and commissioned, and by whom. It is recommended that programming be performed prior to physical installation, as the operating range is reduced during programming. It is further recommended that the wired receiver device be installed first and then the wireless device programmed within 10 feet to ensure mapping.

Integration

While wireless RF control systems may be standalone, wireless devices may also supplement, expand or otherwise interface with an existing control system.

The wireless RF solution may be required to integrate with the hardwired lighting control system as well as other building monitoring and control systems such as BACnet, LONworks, Modbus, DALI and TCP/IP (Internet). Additionally, it may also be required to operate with other wireless control devices. Selected devices should not interfere with each other, be FCC certified, and be secure from intrusion. EnOcean modules, for example, contain a unique 32-bit ID number to prevent overlap with other wireless controls. Additionally, some wireless controls also use 128-bit Advanced Encryption Standard (AES) security for communications. **EB**

A regular contributor to Electrical Business, Craig DiLouie, LC, is principal of ZING Communications Inc. and education director for the Lighting Controls Association (www.lightingcontrolsassociation.org). Visit him online at www.zinginc.com.

Standard Products unveils revamped, updated and improved website



After seven months of work, Standard Products has unveiled a “revamped, updated, and improved” website, in order to make it the go-to resource for its customers, it says. In addition to adding a glossary of lighting terms, updating information and adding to the Product Information section and Literature section, Standard now keeps a blog, which it says will be a medium used to publicize new products, industry-specific news, and company news. A LEED (Leadership in Energy & Environmental Design) calculator has also been added to the website to help customers determine whether a lamp and its application will contribute to a building’s LEED certification.
STANDARD PRODUCTS
www.standardpro.com

Beacon Products unveils enhanced Vinoy



Beacon Products, a division of Hubbell Lighting, has released its newly-enhanced Vinoy, the pole-mounted luminaires which it says suit a broad

range of demanding commercial streetscape, outdoor area and landscape lighting applications. All Vinoy models provide diffused lighting from “classic-design pole- and building-mounted fixtures.” Lens options include clear, frosted or white acrylic; clear, frosted or white glass; and clear or textured polycarbonate. Lamp options comprise low-watt compact fluorescent, low-watt MH or HPS, incandescent or “customer’s request.” All fixtures are UL, ETL or CSA listed for enduring wet-location use in all climates.
BEACON PRODUCTS
www.beaconproducts.com

Traxon Shield AC XB wall washing and grazing LED system

Traxon Technologies says its Shield AC XB LED lighting system is best suited for wall washing and grazing applications where fixtures are located far from the control area, or where the structural construction is complicated and extensive cabling or mounting is limited. Powered by line voltage, the Shield AC XB system can run up to 300 metres away from the



nearest power source, eliminating the need for separate driver units, and is suited for large-scale architectural installations, such as bridges and high-rise buildings. Based on the standard daisy-chain topology and using one cable for power and data, the Shield AC XB system simplifies wiring and helps save installation time and costs, says Traxon. The field-installable connectors provide wiring flexibility, allowing installers to optimize cable length and fixture positions.
TRAXON TECHNOLOGIES
www.traxontechnologies.com

Jesco Lighting introduces new recessed LED downlighting



Jesco Lighting has introduced new LED recessed downlights, which it describes as “high-output, highly energy conserving, and long life.” The full line is housed in compact, cylindrical, fixture heads that are “easy to handle, install and maintain,” and are available in 3-, 3.5-, 4-, and 6-inch apertures. The lights come in “pure white” with colour renditions of 3000K and 4000K, and are said to suit a broad range of upscale commercial, institutional and residential installations.
JESCO LIGHTING
www.jescolighting.com

Nexus Lighting Array MR16 HO LED replacement lamp

Nexus Lighting Inc. launched its new Array MR16-HO (high output), an LED lamp that’s a direct replacement for MR16 halogen down and track lighting applications. The MR16-HO operates at



12vAC and uses 6.5W to deliver over 325 lumens and a CBCP (centre beam candle power) of 2693. It is designed to last 50,000 hours and offers a colour rendering over 83 CRI in both 2700K and 3000K temperatures. The lamp is available in 18° spot, 22° narrow flood and 100° flood optics, and can be operated in open or enclosed fixtures.
NEXXUS LIGHTING
www.nexuslighting.com

HessAmerica expands Novara 450 OV line to include LEDs

Novara 450 OV outdoor area lights has been expanded to now include LED light sources. The oval luminaire uses a patented CLU-Tech LED module developed by Hess, which it describes as providing illumination suitable for long, narrow applications such as pathways and streets typically found on corporate campuses, universities, parks, and hospitality venues. The luminaire emits zero upright and can be used for LEED lighting zones LZ2 through LZ4, it adds. Two light outputs are available: 39W or 50W.
HESSAMERICA
www.hessamerica.com

electricity
SECTOR COUNCIL
Building bright futures

BRIGHT FUTURES IN CANADA CONFERENCE
Innovative Solutions for a Sustainable Workforce

InterContinental Toronto Centre Hotel
 May 24-26, 2011, Toronto, Ontario

- The national event dedicated to the workforce of the electricity and renewable energy industry
- Hear from knowledgeable speakers on practical and innovative solutions to overcome workforce challenges
- Network with key industry decision makers and peers

Join industry employers, labour organizations, educators, and government representatives for the electricity and renewable energy HR event of the year.

REGISTER NOW
 EARLY BIRD REGISTRATION DEADLINE IS MAY 2
 For more information visit
www.brightfutures.ca/en/conference/en

www.brightfutures.ca

Funded in part by the Government of Canada's Sector Council Program **Canada**

GUIDELINES



on the application of dimming to high-intensity discharge lamps

NEMA Lighting Systems Division

HID lamps are designed to keep the lamp electrodes and discharge tube wall operating within a specific temperature range in order to maintain the proper vapour phase concentrations of discharge tube additives for good lamp performance. Because dimmed operation of HID lamps causes the discharge vessel to operate below ideal thermal conditions, users may experience degradation of efficacy and life if the starting and operating recommendations below are not followed. For this reason, control or occupancy detection systems capable of instant off-on operation are not desirable for HID lamps.

The effect of dimming on HID lamp life is dependent on how long lamps are operated in the dimmed mode, the type of dimming system, and how deeply lamps are dimmed. Lamp and ballast systems should meet the requirements of the appropriate American National Standards Institute (ANSI) specifications for both starting and operating lamps at full/rated power. Magnetic ballast dimming systems may not be capable of maintaining recommended ANSI specifications in the dimmed mode. Failure to meet the required sustaining voltage may cause premature lamp dropout and shortened life.

In general, satisfactory, efficient operation of HID lamps that does not harm lamp life or introduce the risk of accelerated lumen depreciation can best be achieved by operating the lamp in accordance with the recommended dimming levels in this paper.

The information below represents some practical guidelines for considering an energy-saving HID dimming system. Ideal applications of these energy-saving systems include parking garages, warehouses, shipping docks, street lights, supermarkets, ball fields, factories, and security lighting. They are also used in conjunction with daylight lighting systems to conserve energy. Concerns such as colour shift and lamp performance have been expressed regarding the use of HID lamps on dimming systems. Since these are application dependent, tradeoffs in colour and performance should be weighed in the overall benefits calculation of energy reduction.

Common types of lamp dimming systems

There are two basic categories of lamp dimming systems in common use:

1. **Step-level (including bi-level) power reduction**, typically associated with magnetic ballasts.
2. **Continuous or variable dimming**, typically associated with electronic ballasts.

Not all systems will provide the same performance with all HID lamps, and not all systems are optimized for all HID lamps. Consequently, lamp and ballast manufacturers should be contacted to confirm that lamp/ballast combinations are compatible.

Step-Level

Step-level systems generally operate by increasing the capacitive impedance of a magnetic ballast to reduce the lamp current and therefore the lamp wattage. These systems are often used in conjunction with occupancy detection systems. In a typical application, infrared or ultrasonic occupancy sensors are utilized to detect motion in the controlled area. During the period in which motion is detected by the sensors, the lamps operate at full power. With the absence of local activity over a certain period of time, a switching mechanism in the system reduces the lamp power to a predetermined wattage.

Step-level systems should not drop below the reduced lamp wattage specification when using an ANSI reference lamp at the lowest recommended ANSI input voltage for a particular magnetic ballast type. See the sections specific to high-pressure sodium and metal halide for more detail.

Continuous or variable

Line voltage continuous dimming systems work by changing the primary voltage to the ballast with a variable voltage transformer or by electronically modifying input voltage and current waveforms (also known as 'phase control'). Continuous dimming can also be achieved by employing electronic low or high frequency switching circuits or by combinations of electronic and mechanical devices (so-called 'hybrid systems') to modify the lamp power. These systems can reduce lamp wattage continuously. Questions on line voltage lamp dimming should be directed to individual lamp or controller manufacturers.

High-pressure sodium

There are several common high-pressure sodium (HPS) lamp technologies, including standard, non-cycling, TCLP-compliant, and internal ignitor types. Additionally, there are some quartz MH and ceramic MH lamps that offer enhanced colour characteristics (CRI, CCT) for specific applications that are designed for retrofit operation on HPS ballast systems. All HPS and HPS retrofit lamps meet the same recommendations for starting and dimming operation.

Most HPS lamps are approved for dimming in any orientation, but operation on magnetic or electronic ballasts may make a difference. The lamp manufacturer should be consulted to determine performance expectations for specific applications and control systems.

It is recommended that HPS lamps be started and operated in the full power mode, i.e., at rated wattage, for a minimum of 15 minutes before dimming. This is necessary to clean the arc tube of deposits from starting that would raise arc voltage and promote internal reactions within the alumina tube. If an interruption to the ballast input voltage should occur, the lamp may extinguish and require several minutes to re-ignite. The timing circuit should be reset for 15 minutes only after the lamp has restarted. If the input voltage activates the timer, then 20 minutes is recommended before dimming is resumed.

For a continuous type dimming system, the reduced wattage recommendation for HPS lamps must be achieved with a ballast meeting the recommended ANSI specifications for starting and operating a reference lamp. Step-level systems should not drop below this minimum wattage specification when using a reference lamp at the lowest recommended ANSI input voltage for a particular magnetic ballast type. Line voltage dimming systems may not be capable of maintaining the minimum ANSI open circuit voltage in the dimmed mode. Failure to provide sufficient sustaining voltage may cause premature lamp dropout and short life.

Users should be aware that for some HPS lamps, and particularly for retrofit quartz and ceramic MH lamps designed to operate on HPS ballasts, there may be changes in lamp colour temperature, colour rendering, and luminous efficacy

Figure 1 CCT Shift for QMH Lamp

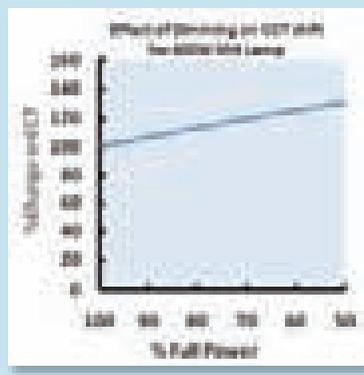
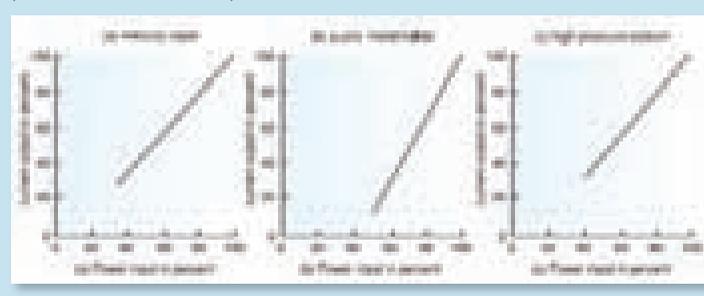


Figure 2

Lumen output versus power output for HID lamps: (a) mercury vapour; (b) quartz metal halide; and (c) high-pressure sodium. (Source: IESNA Handbook)



lighting showcase

with dimming. As a general guideline, when dimmed below the wattage value in Table 1 for sustained periods, there is an increased likelihood of poor lumen maintenance and shorter lamp life.

Additionally, HPS lamps, aged approximately 15,000 hours, are susceptible to dropout when rapidly dimmed. This could be misconstrued by the user as a failed lamp, when in fact if allowed to cool, the lamp will re-light and operate at rated wattage for its rated life in an undimmed mode. To reduce the potential for dropout due to rapid dimming, it is recommended that dimming rates be slowed to approximately 1.5 minutes from full light to maximum dimmed condition, while maintaining sufficient sustaining voltage.

Metal halide

There are several common types of metal halide (MH) lamps, including pulse start ceramic MH (CMH), pulse start quartz MH (QMH), and probe start quartz MH. There are also some specialty lamps such as those with internal ignitors or starting aids that are designed to operate on probe start and pulse start ballasts.

It is recommended that metal halide lamps be started and operated at full power, i.e., at rated wattage, for a minimum of 15 minutes before dimming. If an interruption to the ballast input voltage should occur, the lamp may extinguish and require several minutes to re-ignite. The timing circuit should be reset for 15 minutes only after the lamp has restarted. If the input voltage activates the timer, then at least 20 minutes is recommended before dimming is resumed. This recommendation includes lamp types that are started with the assistance of internal starting aids, e.g., a starting probe, as well as those that require external high voltage ignitors.

Lamp manufacturers restrict the operating positions of lamps with starting probes to the base-up position when they are used on dimming systems. This restriction originates from consideration of the operating temperature of the bimetal switch that is used with the starting probe. Failure of the bimetal switch to operate at its design temperature in the dimmed mode may cause premature lamp failure. Consult the lamp manufacturer before operating probe start lamps

in other than vertical base up positions.

Quartz and ceramic pulse start MH lamps are commonly available that require external ignitors for starting and do not utilize probes and switches. These lamps may be dimmed in any position that the lamp manufacturer recommends for a particular wattage. NEMA recommendations are listed in Table 2.

Users should be aware that quite often, there is a



MEET THE NEW ADDITIONS TO OUR CORD REEL FAMILY... HEAVY DUTY & NEMA 4X REELS

Heavy duty construction, at a reasonable price

HEAVY-DUTY CORD REELS (LE9000 SERIES)

-  Durable, all-steel construction
-  Available in different cord lengths and gauges, with a variety of cord ends and accessories



LE9000 SERIES

NEMA 4X WEATHERPROOF CORD REELS

-  Great for outdoor areas, wet locations and hospitals
-  Available in heavy-duty (LE9500 series) and industrial-duty (LE6500 series) versions
-  LE6500 series industry-duty NEMA 4X reels are the first of their kind



LE9500 SERIES LE6500 SERIES

DOWNLOAD OR REQUEST YOUR COPY OF OUR HD AND NEMA 4X REELS MINI-CATALOGUE:

WWW.LINDEQUIPMENT.NET/HDREELS

www.lindequipment.net | 877.475.LIND | info@lindequipment.net

Safety-Performance-Durability

Techspan IEC309 Pin & Sleeve connectors



3 sizes
of non-metallic back boxes
now in stock

- Watertight - IP67 (indoor/outdoor) 20-100amp
- Splashproof - IP44 (indoor) 20&30amp
- Quick and easy installation
- Rugged construction
- Single & 3 phase voltage ratings - 6 colour codes determines size
- 3, 4 & 5 wire connections, 4 amperage ranges available, -25°C to 90°C OTR

Use this link to for a complete listing of available items
www.techspan.ca



SCAME



Stainless Steel Banding

We'll put YOU in the market!

Have you always wanted to get into the stainless steel banding market but couldn't find a reliable supplier? Look no further.



- Techspan has an expansive new line of stainless steel banding and cable ties to meet any application. • Coated and uncoated. • Colours. • 316 or 201 grade stainless steel.

Now you can secure that local sign business. Or maybe snag that marine or oil field contract.

Contact Techspan today for more information or go to

www.techspan.ca



"Don't Get Caught Short On Your Connection"

Use Penn-Union "Penn-Crimp®" Compression Lugs with longer length barrels for added assurance

Choose from a variety of styles including Telecom and Flared lugs for DLO and Flex cables



- Suitable cable types include Concentric, Compressed & Compact stranding, flexible cable, Welding & DLO cable, Class H, G, M and Metric cable.
- Generous entrance chamfer provides easy cable insertion
- CSA & UL approved for Power, Grounding /Bonding & Direct burial
- **CSA & UL Approved with most Major Competitors crimp tools**
- Approved up to 35KV application
- 5 styles to choose from including Flared & Telecom styles
- Copper conductor range from 8 awg. To 2000 MCM
- Aluminum conductor range from 8 awg. To 1000 MCM

Use this link to get your copy of our Wire and Cable-Lug selection chart

www.techspan.ca



PENN-UNION

Delivery Troubles On Cable Ties?

We stock oddballs and all colours for shipment today!

Standard Cable Ties

- Miniature
- Intermediate
- Standard
- Heavy duty
- Extra Heavy duty
- Natural
- UV Stabilized
- Metal Tooth



Specialty Cable Ties

- Colored Ties
- Mounting Ties
- Low Profile
- Releasable
- ID Ties
- Push Mount
- Chrome Plated Ties
- Stainless Steel Ties and Banding

Accessories

- Mounting Pads
- Assortment Packs
- Clamps & Clips
- Installation Tools
- Spiral Wrap



Visit us at www.techspan.ca



Mil-Spec

1-800-363-1588 • www.techspan.ca

Email: sales@techspan.ca





lighting showcase

voltage activates the timer, then 20 minutes is recommended before dimming is resumed.

Questions regarding the dimming of specialty mercury vapour systems should be directed to the manufacturer.

Conclusion

With the increasing emphasis on energy efficiency,

attention is being focused on the application of control systems that include dimming functions for high-intensity discharge (HID) lighting systems for both indoor and outdoor lighting. Complicating matters is that the lamps, ballasts, and control systems may be designed by different companies and may have compatibility issues. The exact performance of any HID dimming system or of the lamp on that system is dependent upon the specific dimming methodology employed with specific ballasts and lamps.

These guidelines are meant to impart general information and considerations in the design and

application of such systems. Contact the manufacturers of the lamps, ballasts, and dimming systems for specific recommendations.

It is further recommended that the user, lighting designer, or specifier evaluate any new proposed combination of components as a system in a field test to ensure that the combined performance of the system is acceptable.

Additionally, policy makers who reference or cite these guidelines should carefully analyze the three sub-sections: high-pressure sodium, metal halide and mercury vapour. A thorough reading of each section will reveal that HID systems respond differently to dimming, between and among the HID family types, and that recommendations for one family cannot be assumed to apply to others. **EB**

Note 1

The reduced wattage recommendation for HID lamps must be achieved with a ballast meeting the recommended ANSI specifications for starting and operating a reference lamp at rated lamp power. Magnetically and electronically ballasted dimming systems should not drop below these wattage specifications when using a reference lamp at the lowest recommended ANSI ballast input voltage. Dimming systems may not be capable of maintaining sufficient sustaining voltage in the dimmed mode. This may cause premature lamp dropout and short life. Older lamps may be prone to dropout during dimming. Consequently, a slower rate of dimming is recommended. Magnetic lag and regulated lag ballast dimming is not recommended.

References

- D. Smith and H. Zhu, "Properties of High Intensity Discharge Lamps Operating on Reduced Power Lighting Systems", Journal of the IES, Vol. 22, No. 2: pp. 27-39, 1992.
- "Dimming of Philips Metal Halide Lamps", Philips Lighting Technical Bulletin, June 1992.
- "High Intensity Discharge Lamp Dimming", General Electric Technical Bulletin, August 2010.
- IESNA Handbook, 9th Edition, pp. 6-54 and 6-55, 2000.
- NEMA LSD 25-2008 "Best Practices for Metal Halide Lighting Systems, Plus Questions and Answers about Lamp Ruptures in Metal Halide Lighting Systems".
- R. G. Gibson, "Dimming of Metal Halide Lamps", Journal of the IES, Vol. 23, No. 2: pp. 19-23, 1993.

This Lighting Systems Division white paper, LSD 14-2010, was prepared by the Lamp Section of the National Electrical Manufacturers Association (www.NEMA.org).

The requirements or guidelines presented in this document are considered technically sound at the time they are approved for publication. They are not a substitute for a product seller's or user's own judgment with respect to the particular product discussed, and NEMA does not undertake to guarantee the performance of any individual manufacturer's products by virtue of this document or guide. Thus, NEMA expressly disclaims any responsibility for damages arising from the use, application, or reliance by others on the information contained in these white papers, standards, or guidelines.

BALLASTS ARE OUR BUSINESS.



ULTRASAVE offers a wide range of ballasts for electronic and magnetic fluorescent, as well as HID applications.

Contact us today to find out more about our latest additions.

ULTRASAVE

www.ultrasave.ca

ULTRASAVE LIGHTING LTD. | T 905.940.0888 | F 905.940.0338 | Toll-Free Number 1 866.733.9217
RESIDENTIAL COMMERCIAL RETAIL INSTITUTIONAL



T8 ELECTRONIC BALLASTS

Energy efficient ballasts available in high, normal and low ballast factor. Meet most Canadian Hydro rebate program requirements.



T5/T5HO ELECTRONIC BALLASTS

Programmed rapid start ignition with lamp EOL protection circuit and 90°C case temperature rating. T5HO series also available with auto-reset thermal protection.



CFL ELECTRONIC BALLASTS

Operate 1 or 2 CFL 13/18/26/32/42W lamps, of various types.



ELECTRONIC HID BALLASTS

Complete range of 120-277 and 347V models, side/bottom mount versions.



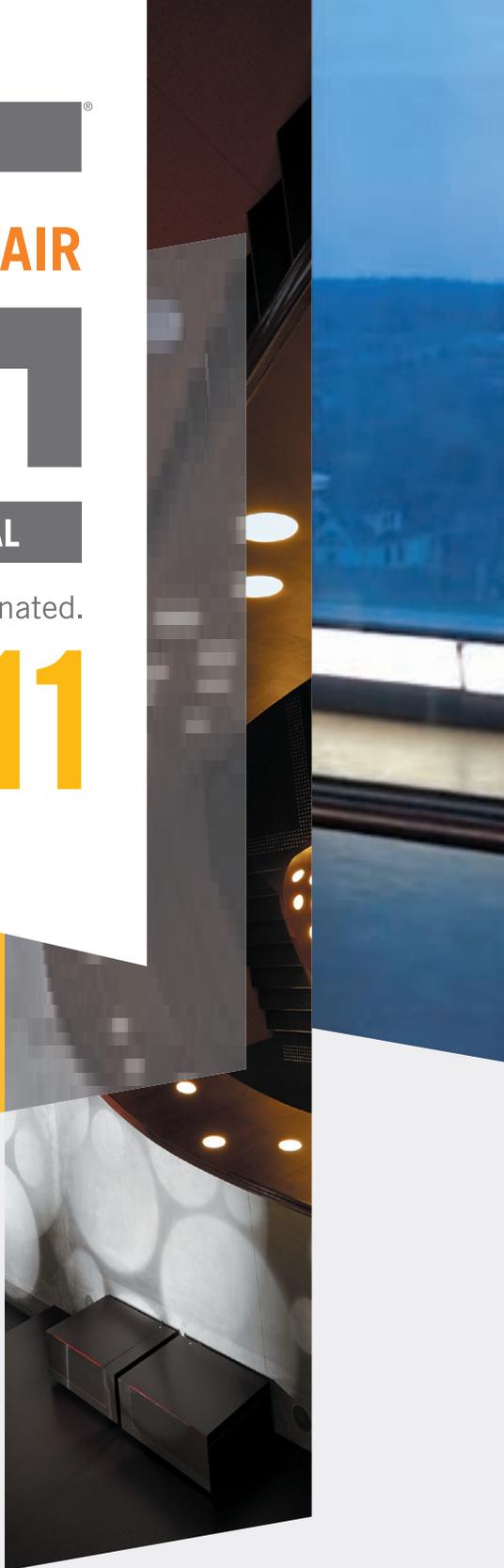
LIGHTFAIR



INTERNATIONAL

The future. Illuminated.

2011



CONNECT TO INNOVATION. ONLY AT LIGHTFAIR® INTERNATIONAL

The World's Largest Annual Architectural &
Commercial Lighting Trade Show & Conference

LIGHTFAIR Daylighting Institute®
LIGHTFAIR Institute®

May 15 – May 16, 2011

Trade Show & Conference

May 17 – May 19, 2011

NEW 2011 LOCATION!

Pennsylvania Convention Center
Philadelphia, PA
USA

www.lightfair.com



In collaboration with
The Illuminating
Engineering Society

IALD

In collaboration with
The International
Association of
Lighting Designers

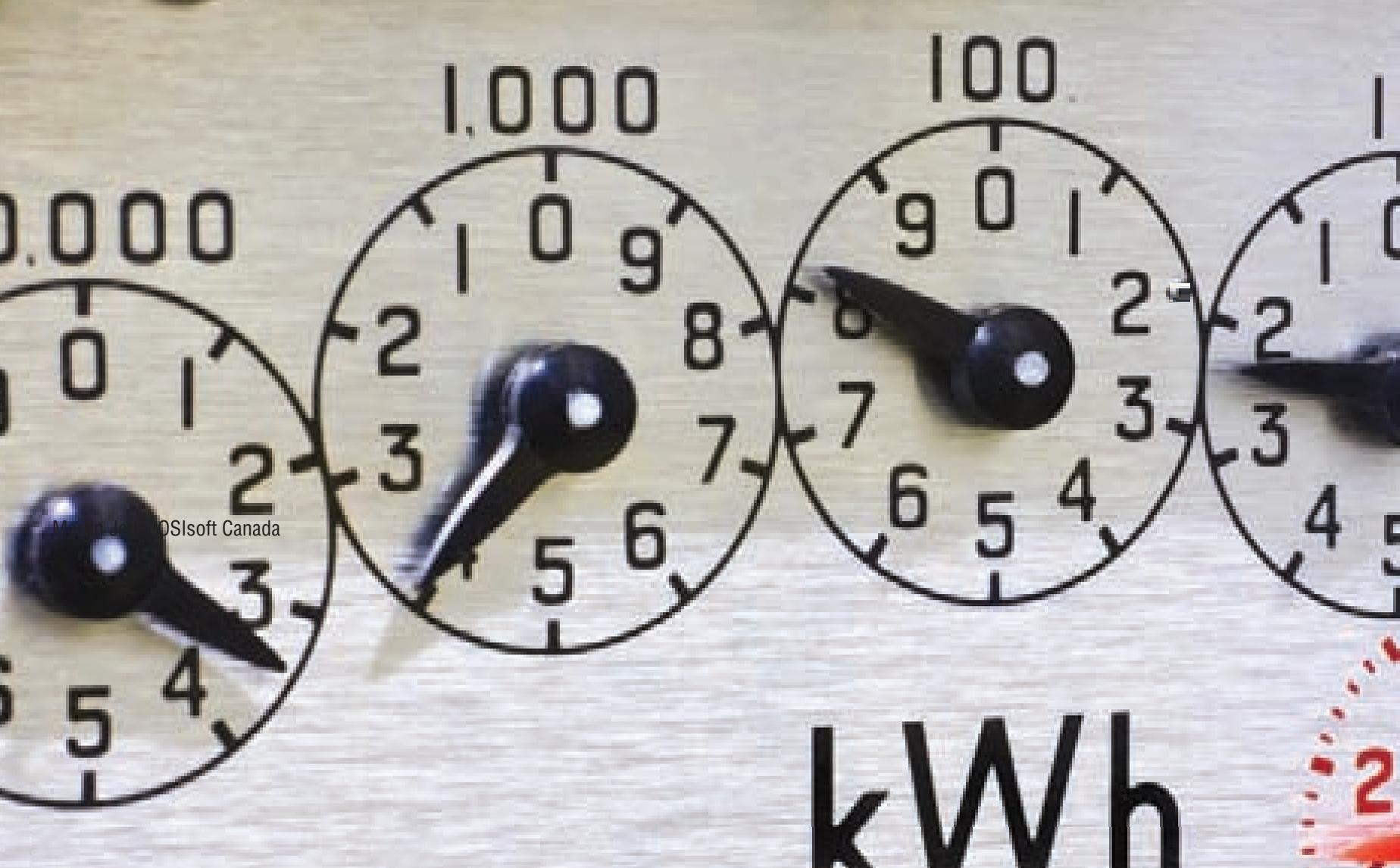


AMC
Produced &
Managed by
AMC, Inc.

PHOTO CREDITS
(LEFT TO RIGHT) ZA – KOENJI LIGHTING DESIGN: Hiroyasu Shoji, IALD; Yumiko Tanaka, Associate IALD; LightDesign Inc | ARCHITECTS: Toyo Ito & Associates PHOTOGRAPHY: © Toshio Kaneko STEPHEN M. ROSS SCHOOL OF BUSINESS AT THE UNIVERSITY OF MICHIGAN LIGHTING DESIGN: Keith J. Yancey, IALD, AIA, LC, P.E.; Carlene M. Geraci; Nathanael C. Doak; Jennifer Pieszak, IALD; Lam Partners Inc | ARCHITECTS: Kohn Pederson Fox Associates PC PHOTOGRAPHY: © Barbara Karant / Karant+Associates, Inc; © JJR LLC / Ken Cobb; © Lam Partners Inc; © Michael Moran

connect with us!





Martin Jetté / OSIsoft Canada

Smart grids for **energy distribution**

How having access to data in real time can create new opportunities

Martin Jetté

A large proportion of the North America energy distribution network is more than 50 years old. Such a situation is not common in this remarkable era of rapidly evolving technologies. It is not surprising then that, under such circumstances, the network is known for inadequacies such as meter readings done every 30 days or more and the poor quality of manually collected data.

Nonetheless, change is coming. The implementation of smart grids has slowly begun in places all over the world, and significant investment will soon be a common theme. Gladly, according to many indexes, the economic situation is increasingly favourable to the carrying out of large-scale projects.

In an era that favours sustainable development, the smart grid gains approval by including a variety of renewable energy sources and by recruiting governments and all members of the population to participate. When the existing electrical network represents the greatest industrial machine ever created and implemented

by man, then the smart grid will be, without question, the biggest sustainable development project in North America in the next decade. To illustrate, it could cost more than one billion dollars for the initial implementation of such a system across a network as large as Quebec's.

Such an investment will yield substantial improvements. One of those being the ability to get data readings on production, transmission, distribution and consumption within minutes—perhaps even seconds—thus generate enormous benefits for consumers and electricity distributors, big and small. In fact, thanks to an automatic data collection and processing system integrated into the network, we can analyze energy data from the moment it is generated to its delivery to the power outlet at a consumer's home.

Let us take the example of Hydro-Quebec, which has a network that includes more than 3.7 million meters throughout the province. Suppose there are 10 variables to read for each meter. That makes a total of 37 million variables that must be read at short intervals. This

extraordinary amount of information, when collected instantaneously, would allow for a close monitoring of operations, and for adjustments to be made when necessary. By 2015, it is estimated that the data storage requirements will reach 35 petabytes per year in North America. This very same data could even be used for many other value-added applications.

Among other possibilities, demand could be linked to actual production by determining the source of the power being used (i.e. a hydroelectric dam or wind farm). The distributor would then be able to help clients who—for political or environmental reasons—would prefer to use renewable energy sources. Let us also point out that automated data collection and processing systems have been used successfully in (mainly) industrial sectors for many years.

Among the advantages for electricity distributors is easier billing, which can be more precise and, when necessary, more frequent. Users can even consult their consumption online in almost real time.



Furthermore, we must not overlook the benefits of being able to detect power outages as they happen. For many distributors, waiting for clients to raise the alarm is still the easiest way to determine whether there has been a power outage. With a smart grid, this method would evolve: the detailed information provided by the automatic data collection and processing system allows distributors to accurately and quickly locate a power outage.

It should also be noted that, with a smart grid, it would be easier to prevent and detect energy theft or losses, thanks to the tracking of power being generated and transmitted. Yet another added advantage is the more flexible management of consumption during peak hours and the diversification of energy sources that smart grids already afford.

Components and other advantages of the smart grid

Let us begin with a quick overview of what this digital and interconnected network—or smart grid—actually comprises. It consists of five basic components, the most central of which is an intelligent infrastructure that acts as the spinal cord of the system, essentially permitting the system to process, validate, report and archive meter data.

The second component is smart meters, which allow us to measure, transmit and automatically store this data, and to establish two-way communication between the distributor and the consumer. It is thus possible to send instructions to the meter

and, by the same stroke, to the consumer. This functionality would permit certain customers participating in a special project to regulate use from a distance, such as remotely controlling the activation of appliances or heating systems to regulate use during periods of high energy demand and, ultimately, pay a lower price for the electricity. Another example would be the use of this functionality to facilitate and expedite the necessary transfer operations when a consumer moves.

The replacement of traditional meters with smart meters has begun, most notably in Quebec, where hundreds of thousands of smart meters have already been installed. Although readings on these new meters are still being taken by an employee who must go house-to-house, it is foreseeable in the very near future that readings will be taken from a distance, thereby enabling these employees to be assigned to other more strategic and productive tasks.

The third component, called ‘smart generation’, allows the smart grid to easily assimilate significant quantities of renewable energy—solar, wind, geothermal—generated by commercial or residential sources. The Ontario Power Authority (OPA) provides a compelling example of the opportunities that this proposes, with a program that pays individuals or small companies producing solar power a higher rate than the actual cost of electricity (between \$0.4-0.8 per kW), guaranteed by OPA for a period of 20 years.

By its very nature, renewable energy is intermittent, and can only account for a small percentage of distribution networks, making it generally more expensive to generate and integrate into existing networks. As a result, we must rely on other sources of energy to compensate for reduced production caused by weak winds or cloud cover over solar panels. A smart grid can assist in managing and planning for these very situations, thanks to its ability to provide real-time data. For example, industrial sites that produce large quantities of thermal or electric power can become an integral part of the global distribution network by forming an industrial micro grid. In providing energy on demand, these sites could contribute to help reduce the impact of intermittency of renewable energy sources.

The fourth basic component of the smart grid is the ‘smart consumer’. With such easy access to their own consumption data, consumers can play an active role in ensuring an efficient and well-managed grid, especially during peak periods when the grid is put under intense pressure. For example, on the morning of January 16, 2009, as the temperature dipped to -31.8°C in Quebec, Hydro-Quebec reached a record load of 37.3 GW of energy. The previous record was 36.2 GW, recorded back in January 2004.

During these periods of very high demand, users of the smart grid can more easily regulate their energy consumption, and thus create more benefits for everyone. Currently, numerous electricity distributors use the media to encourage the population to reduce their consumption during peak periods. However, the smart grid has two-way communication, which is a much more efficient way to get users actively involved in optimizing their consumption. This opens up great potential for significantly changing consumer behaviour.

The fifth and last component comprises smart devices, such as equipment that can be controlled remotely via two-way IP communications, as well as smart timers, thermostats and energy storage systems. An increasing number of new technologies are slowly being added to this list.

In the same vein, the day will soon come when energy can be stored in the network, only to be used when demand is greater or to compensate for alternate energies that are, by nature, sometimes intermittent. Energy could be stored in the form of compressed air, in banks of batteries or in flywheels.

New business opportunities

An interesting example comes from an American company, Ice Energy, and its revolutionary energy storage system for commercial buildings. At night, when demand for electricity is at its lowest, the system produces ice. During the day, these units then deliver power to the air-conditioning system. That is, the A/C for the building is powered by ice produced during the night. The cycle of ice production automatically begins once more at the predetermined time.

This process provides relief to the overworked system during peak periods, when demand for A/C is highest and the cost of electricity high. In the southern United States, the use of A/C can account for up to 30 percent of demand in peak periods. Ice Energy monitors the units for its clients; they also allow clients—and electricity distributors—to start the units up remotely, according to demand.

Energy distribution in the future

A smart grid enables greater collaboration between consumers and providers, opening the door to more efficient management of energy resources, significant savings, better preservation of the environment and operating a more reliable network. This represents huge progress over the current situation, in which we can adequately control the production of energy, but are unable to control or even accurately predict consumption.

With an increase in the number of energy-generation methods and a more sensible use of electricity in general, we can avert or, at the very least, delay the building of new dams and the activation of new power plants, as well as avoid the economic, ecological and political issues that inevitably come with such projects.

Based on the principles of sustainable development—which are crucial in the evaluation of any new project nowadays—the advent of the smart grid is near. The advantages it can deliver in terms of greater efficiency and cost savings will undoubtedly create new business opportunities. For example, the rise of micro-networks will permit industrial companies to sell back-up energy to help distributors manage demand during local peak periods. This could lead to more attractive rates for industrial clients, based on their participation in the micro-network.

The smart grid’s ability to collect a vast quantity of strategic data within a few seconds, gathering information from its generation to its consumption, opens vast new horizons for the energy sector. **E3**

Martin Jetté is the general manager, OSIsoft Canada, www.osisoft.com.

ESPS launches web-based Electrical Safety Training System

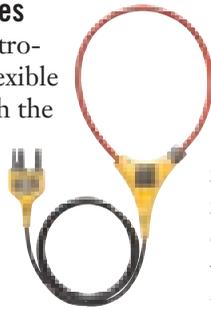


ESPS (Electrical Safety Program Solutions Inc.) launched a web-based Electrical Safety Training System (ESTS) for the electrical worker based on the CSA Z462 Workplace electrical safety standard for electric arc flash and shock qualification training. The training system allows electrical workers to identify and quantify the arc flash and shock hazards and help to establish preventive and protective control measures that can be used to mitigate arc flash and shock risk exposure. The training system features interactive and adult learning methods with full narration using scenarios in a unique 3-D Virtual Electrical Workplace classroom. **ESPS ELECTRICAL SAFETY TRAINING SYSTEM**
www.arcflash-training.ca

Fluke i2500-18 and i2500-10 iFlex current probes

Fluke Corp. has introduced new iFlex flexible current probes with the aim of making current measurement easier and more precise. The probes expand the measurement range of select Fluke meters to 2500AAC; the large coil allows users to reach around large or awkward-shaped conductors up to 6-in. in diameter, while the 0.3-in. profile allows the coil to reach between tightly-packed cables. A 6-ft cord makes it easier to see readings at a distance from the conductor. The probes connect directly to the meter, displaying current measurements without error-prone scaling factors. In addition to AC current measurement, they also work with frequency, inrush, and min/max/avg functions. The iFlex current probes are available in 10-in. and 18-in. sizes.

FLUKE ELECTRONICS CANADA
www.flukecanada.ca



Lind Equipment XP1630 hazardous location floodlight

Lind Equipment has introduced the XP1630, a new hazardous location floodlight to its line of explosion proof lights, which it describes as a 150W PAR38 incandescent floodlight that outperforms the competition while offering a value alternative for explosion proof floodlights. The floodlight is constructed from "thick aluminum and built to be water-tight, making it suitable for use in wet locations and providing protection to the light during pressure-washer cleaning".

It comes standard with 25, 50 or 100° of 16/3 SOW cord and a non-explosion proof plug.

LIND EQUIPMENT
www.lindequipment.net



Higher weight ratings for Arlington's FBRS4200R adjustable bracket fan/fixture box



Arlington Industries' FBRS4200R heavy-duty, plated steel box with adjustable bracket now has higher weight ratings for fans and fixtures installed in retrofit (existing) construction. The box is rated for a 150-lb fixture or a 70-lb fan when installed on joists spaced 16" on-center; and 70 lbs for either a fixture or fan on joists spaced 24" on-center, says Arlington. The 20.0 cubic inch box installs between rafters with 16" to 24" on-center spacing, and bracket ends bite into the wood rafter or joist to hold the fan or fixture in place. The product is UL/CSA Listed.

ARLINGTON INDUSTRIES
www.aifittings.com

Mersen launches new HelioProtection fuse line

Mersen (formerly Ferraz Shawmut) has launched the industry's first UL 2579 listed range of photovoltaic fuses — the HelioProtection fuse line, which includes the HP6M, HP10M, and HP6J. The new line features minimum breaking capacity capabilities of 1.35 times the

fuse-rated current value allows for safe circuit interruption under typical low-fault current conditions produced by PV arrays. The enhanced fuse construction of the HelioProtection series makes it ideal for continuous temperature and current cycling withstand adding to system longevity, says Mersen.

MERSEN
www.mersen.com

Irwin Universal Handsaw



Irwin claims its new Universal Handsaw cuts three times faster than traditional tooth handsaws—"the most significant innovation of the Universal Handsaw lies in a novel and proprietary ergonomic positioning of the handle in relation to the cutting edge. 45° and 90° angle-markers are built right into the blade. It is available at The Home Depot, Home Hardware, Rona and industrial supply locations in a 15" and a 20" blade.

IRWIN
www.irwin.com

Air King offers Energy Star-qualified ventilation products



Air King now offers a complete line of high-quality Energy Star qualified ventilation products, including exhaust fans and range hoods. Its line of exhaust fans includes the ECO-exhaust fan series, the Deluxe Quiet and Quiet series, the High-Performance exhaust fan series and fire-rated exhaust fan series. Air King's line of range hoods includes the undercabinet range hood Series, the wall-mounted chimney range hood series, the Advantage Professional canopy series, and Powered Insert series.

AIR KING
www.airkinglimited.com

CSA Switch Rated WELDING RECEPTACLES

A combination plug, receptacle and disconnect switch in one device

- Simplifies connect & disconnect of welders
- Meets requirements for local disconnect
- Ensures power flow from arc flash

FREE Samples Available

Meltric

Ontario Marcel Houle 1.800.461.4076	Quebec Michel Trepanier 1.877.307.5525	East Coast Rod Blake 1.800.565.8771
--	---	--

Manufacturers Representatives for Meltric Corporation

CHESS ELECTRIC

FLUKE

The NEW 28II digital multimeter sets the standard for rugged.

The New 28II DMM will work in the toughest environments. It can troubleshoot most electrical problems and has an IP67 waterproof, dustproof rating and built to withstand a 3 m drop.



Based on you. Built by Fluke.

800-363-5853
www.flukecanada.ca/dmm

WANTED

Molded Case Circuit Breakers. New & Used, All Brands. Motor Control & MCC. Buckets in A&B, S.D. & W.H. & C.H.

Please call, email or fax Ralph Falvo with your list.

FALVO ELECTRICAL SUPPLY LTD.

5838-87A St., Edmonton, Alberta
1-800-661-8892
780-466-8078 Fax 780-468-1181
email: rjf@falvo.com

CELEBRATING 15 YEARS OF QUALITY SERVICE

BRITECH

HEATING CABLES & EQUIPMENT

WE HAVE THE HEATING CABLE YOU NEED

"Construction Site Tough"

120 TO 600 VOLT. SHIPPED FROM STOCK
THE BEST PRICED CABLES IN CANADA

Call today and start making money!
www.britech.ca 877-335-7756 info@britech.ca

Backlit display because blackouts kept you in the dark

Remote display because sometimes the meter needs to be up there and you need to be down here

Based on you. Built by Fluke.

FLUKE

Phone 800-363-5853
www.flukecanada.ca/dmm

Fluke. Keeping your world up and running.

©2010 Fluke Corporation.



SEE OUR FULL LINE OF LEDs!

EIKO

CERTIFIED GREEN

www.eiko.com

Don't miss out
on your next issue of
Electrical Business

Sign up for your FREE SUBSCRIPTION
It's fast, it's easy and it's free!

Here's how:

For fastest service visit
www.ebmag.com
and click the subscribe button



www.ebmag.com

FLUKE

New Fluke 1555/1550 Insulation Resistance Testers

Digital Insulation testing up to 10kV!

Test high voltage equipment including switchgear, motors, generators and cables. Conduct the entire range of test voltages specified in IEEE 43-2000 with a best in class, 3 year warranty and CAT IV 600 V safety rating. Measurement storage and PC interface make it fit right in your maintenance program.



Based on you. Built by Fluke.

800-363-5853 www.flukecanada.ca

THE BENCHMARK IN ELECTRICAL SAFETY INFORMATION

Services:

- Electrical Industry Consulting
- Training Development
- Electrical Safety Assessments
- Benchmarking
- Feasibility Studies

Contact

Kris Paszkowiak, P.ENG.

Phone: (905) 599-2702

eMail: kris.paszkowiak@gmail.com

CodeSafety
associates

training assessments consulting

ADVERTISER INDEX

ADVERTISER	PAGE
ABB	14
Arlington Industries	25
Brady Canada	10
Britech Corp.	37
Chess Controls	36
CSA	38
Eaton	9
EIKO Canada Ltd	37
Electrical Safety Authority	26
Electricity Sector Council	27
Falvo Electrical Supply Ltd.	37
FLIR Canada	6
Fluke Electronics Canada	17, 37
Hammond Manufacturing	12
Hammond Power Solutions	11
Hubbell Lighting	24
Hubbell Wiring	19

ADVERTISER	PAGE
IED Limited Partnership	40
IPEX Inc	30
Lightfair	33
Lind Equipment	29
Mersen Inc	15
Nexans	1
Northern Cables	7
Schneider Electric	20, 21
Southwire Canada	39
Standard Products	2, 37
Surge Pure	13
Techspan Industries	31
Thomas & Betts	1, 5, 11
Ultrasave	32
United Wire	4
Venture Lighting	8

Extreme Temperature Ballasts



STANDARD's extreme temperature ballasts are designed specifically for applications where the ballast is subjected to ultra high and low ambient temperatures, as low as -30°C and as high as 90°C. These ballasts are perfect in hot factory environments, and highbay fixture applications as well as cold outdoor covered parking lots, freezers, and industrial unheated structures. Their program start technology allows for frequent on and off switching making them ideal for use with motion or occupancy sensors. These ballasts also feature an auto-restrike capability after relamping. These extreme temperature ballasts are available for T8 (2 lamp 32 W), T8HO (2 lamp 86 W) and T5HO lamps (2 and 4 lamp 54 W), in universal voltage (120-277 V) and 347 V.

STANDARD
LEADERS IN LIGHTING

Standard Products
www.standardpro.com

Visit www.EBMag.com and click the icon for our digital edition!





High-voltage power cables

Canadian Electrical Code (CEC) Rule 36-104(1) requires shielding for permanently installed power cables with thermoset insulation operating at circuit voltages above 2000V phase-to-phase. The Rule also sets out a few exceptions as defined in subrules (2) (3) and (4) but basically all cables rated above 5kV will have an insulation shield.

The purpose of the grounded insulation shield is to spread the electrical stresses in insulation over the entire cable and eliminate any electrical stress concentrations that can lead to premature cable failure. Power cables have two levels of shielding. The first level is the semiconducting polymeric conductor shield, which presents a flat and even electrical surface between conductor and the insulation. The second level is the insulation shield, again consisting of a semi-conducting polymeric material and a metallic component.

Under certain conditions, a standing voltage will be induced in the metallic component of the insulation shield. The voltage reached is a function of length, operating current and

cable spacing. If one of the cable terminations is grounded, the shield is subjected to a standing voltage of zero at the grounded end and maximum induced voltage at the point furthest from this grounded connection.

Given the right conditions, standing voltage can reach a level where serious electrical shock becomes a major concern, which is why some electrical safety authorities limit the voltage allowed between 10-20 volts and never more than 50 volts. For safety reasons Rule 36-308 2(e) (i) requires cable shield to be connected to the station ground electrode by a copper conductor of not less than No. 4 AWG.

The practice of bonding both ends of the cable shield, at the supply and at the load end, ensures that there is no standing voltage at the cable ends. This eliminates any electrical shock hazard but will still allow circulating currents to flow in the shield, as there will be a loop through the earth between the two points of connection to ground. One must consider the reduction in current carrying capacity for larger power cables if the shield is grounded at both ends.

For example, if we need to supply a 1000kVA transformer, 44kV primary, using three single copper conductors, directly buried we need to decide on the cable insulation rating. The selection of the cable insulation level depends on whether the system is grounded, and on the electrical fault clearing time. The 100-percent insulation thickness is recommended for grounded systems and where the system protection will clear any ground fault within a minute. The 133-percent insulation level is specified for systems without a grounded neutral or where the fault clearing time may exceed a minute but not an hour. The 44kV distribution systems are reactance grounded at the supply station and therefore, a 100-percent rated cable is normally used.

This single ground connection is preferred where practical. The shield is connected to ground from the stress cone at one end only and the other end is isolated. A standing voltage may build up on the shield at the ungrounded end but no current can flow in the shield because of the single ground point. This is usually the best choice for grounding the cable shield on short runs. If there is any doubt or if the high voltage power conductor shield needs to be grounded at more than one point, it is always a good practice to contact the cable manufacturer. **EB**

Kris Paszkowiak is principal of CodeSafety Associates, a consulting firm serving the needs of the electrical industry. He holds a Master Electrician licence and has served numerous organizations over the years, including the Canadian Advisory Council on Electrical Safety, Committee on CE Code Part I and UL Electrical Council. E-mail CodeSafety Associates at kris.paszkowiak@codesafety.ca.



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

Tackle The Code Conundrum... if you dare

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

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

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

Question 1

Does the OESC permit a bare neutral in a consumer service, if this conductor is made of copper and run in a raceway?

- a) Yes
- b) No

Question 2

What is the maximum mounting height to the overcurrent device handle of a panelboard in a dwelling unit?

- a) 1.5 m
- b) 1.6 m
- c) 1.7 m
- d) 1.8 m

Question 3

What size of ground wire is required to bond a metal fence around an outdoor substation?

- a) #6 AWG
- b) #2/0 AWG
- c) #3/0 AWG
- d) #4/0 AWG

Answers to Code Conundrum EBMag March 2011

Q-1: All the luminaires located in an unfinished basement shall be controlled by a wall switch located at the head of the stairs.

b) False. Subrule 30-506(2).

Q-2: A single disconnecting means shall be provided either integral with, or adjacent to, the distribution equipment:

c) Within each building when fed from another building. Rule 14-418.

Q-3: Which of the following CSA receptacle configurations is required for an electric range having a calculated demand of 50A or less in a dwelling unit?

c) 14-50R. Subrule 26-744(4).



Standards & So Much More

Standards | Application Tools | Education & Training

Z462-08 Workplace Electrical Safety Standard

This first all-Canadian comprehensive standard intended to address safe work procedures and protection of workers around energized and potentially-energized electrical equipment compliments CSA Z460 Control of Hazardous Energy – Lockout, and C22.1-09 Canadian Electrical Code Part I.

VISIT WWW.CSABO3



Maxis Pulling Rope designed for high strength and low stretch

Maxis Pull-It 10K requires no bolting to the floor

NoLube® SIMpull RW90™ and T90 cables enable easier, safer pulling

Maxis Triggers dual remote footswitches ensures a safe pull

Factory installed SIMpull Heads™ eliminates time consuming prep work

Colored conductors eliminate phase taping, multiple pull on single reel



A WHOLE NEW WAY TO PULL WIRE.

For faster, cleaner, safer installations, make it SIMpull Solutions.SM

When it comes to pulling RW90 and T90, there's the hard way—and then there's the SIMpull[®] way. With SIMpull Solutions from Southwire, installing building wire is faster, cleaner, safer and more cost-effective. SIMpull Solutions features everything you need to maximize your time and your resources: pre-installed pulling grips, colour-coded and paralleled cables on stacked reels for multiple pulls, lightweight reel jacks and cable pullers that fit into tight spaces. Best of all, there's no need to lube, greatly reducing prep time and cleanup. To learn more about doing things the SIMpull Solutions way, contact your Southwire representative or visit www.southwire.com/canadasimpullolutions.



www.southwire.com

Stouffville - 1-800-668-0303



Southwire and SIMpull Solutions are trademark and registered trademarks of Southwire Company.

EXCLUSIVE TO IED REWARDS CUSTOMERS



LIGHT IT UP
& WIN!



YOU COULD **WIN** THE ULTIMATE
HOCKEY ROAD TRIP

MARCH 15, 2011 THROUGH JUNE 15, 2011

IT'S EASY. JUST LOG IN AND PLAY!

All registered players will automatically receive 10 pucks every week during the promotion. Accumulate them, or use them as they arrive. Test your slap shot skills and try scoring on the goalie.

GET MORE CHANCES TO SCORE.

Purchase a minimum of \$50 of product from 3 different IED Rewards suppliers and receive an additional 5 pucks, increasing your chances to win.

WIN AN ORIGINAL 6 ROAD TRIP.

The top 6 players on the Leader Board will win the hockey trip of a lifetime - an Original 6 Road Trip! Includes 3 NHL games, hotels, flights, and much more... An exclusive IED experience.



*For more details about the Original 6 Road Trip and for full Terms and Conditions visit <http://roadtriprules.iedrewards.ca>



www.iedrewards.ca