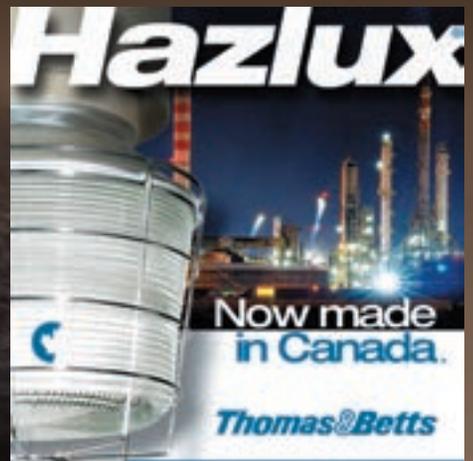


Electrical Business

APRIL 2013



“Help!
I’ve escaped
and I can’t
get back!”

■ **Also in this issue...**

- LED lighting case studies
- Certifying cabling installations
- Ordering the right truck cap

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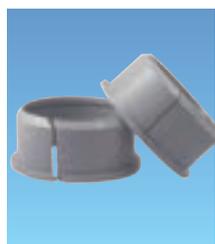
- Approved for support of ceiling fans up to 35 lbs and luminaries up to 50 lbs
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Establishing a healthy Electrical Safety Program is not a sprint, but a marathon.

Selling electrical safety in your organization

Everyone is a salesman. We may not know we're selling when we're doing it, but we all do it... maybe when we're trying to convince our spouse which movie we should go see, or at which restaurant we should eat before the show, but we all do it.

And those sales skills, said Tim Rohrer at the IEEE IAS Electrical Safety Workshop (ESW), are what we need to bring to our organizations to "sell" electrical safety and create an effective electrical safety program (ESP).

Tim believes that by properly educating your audience, "they will come to the inevitable conclusion that [it] is in everyone's best interest to adopt safer electrical work practices". This is, in fact, Tim's definition of sales:

The act of educating one's audience such that they are motivated to take action of a nature that will ultimately benefit themselves or others.

Can you honestly say you have a working ESP when you're constantly looking over your workers' shoulders? No, says Tim. What you have is an "electrical babysitting program". So how do you sell electrical safety?

Sales 101 according to Tim

Know your goal

Establish a final vision for your ESP, then break up the final vision into smaller, attainable goals. Establishing a healthy ESP is not a sprint, but a marathon.

Know your audience

Be they upper or middle management, technicians, contractors, etc., make sure you speak their language. For example, upper management thinks and speaks numbers; middle management speaks production time.

Keep it short and sweet

Don't hammer your audience with facts and figures, unattainable visions, and so forth.

Who benefits?

By speaking their language, you can easily illustrate the benefits they will gain e.g. no unplanned shutdown due to injury, no lawsuits, increased uptime, makes middle management look good, etc.

While at the 2013 ESW, EBMag heard from a variety of delegates who explained why they attend this unique event, and who emphasized its importance to people who are passionate about electrical safety.

Don't take just my word for it. Check out my interviews in the VIDEO "The Most-Efficient Electrical Safety Education... Anywhere!" at EBMag.com (t.co/9aTA8u8juZ). Afterward, I'm convinced you'll be attending the 2014 ESW in San Diego, February 4-7, along with me. **EB**



On the cover and page 24

"Help! I've escaped and I can't get back!"

After 10 years of working flawlessly, radio frequency-sensitive ankle bracelets were no longer preventing these Alzheimer patients from fleeing the old age home.

Contents

14 LED solutions help Cameco Mines increase energy efficiency

With the goal of reducing maintenance, downtime and overall energy use, Cameco Corp.—a global uranium producer—began investigating new lighting solutions for both its McArthur River and Cigar Lake mines.

16 Introduction to The Commissioning Process

Commissioning is a quality assurance process that ensures installed building systems perform interactively and continuously according to owner needs and the design intent. It begins with identifying owner project requirements and ends with ensuring the design intent, finished design and installed systems satisfy these requirements.

22 A more efficient path for certifying cabling installations

The cabling world is rife with varying standards and guidelines, making testing and troubleshooting requirements more complex than ever. Here is a quick overview of what certification means today, and the test tools you need to get the job done.



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26 Ordering the right truck cap or tonneau cover

Before you even place an order, you have to think about how you are going to use your truck and what you really need. Will the truck bed need basic cargo protection, improved security, increased space or even ventilation and light?

27 Pet store doesn't just care about your furry friend

Pet retailer Care-A-Lot Pet Supply has installed over 200 indoor and outdoor LED luminaires and combination of LED lighting and controls solutions to highlight merchandise while reducing energy consumption.

28 Arrow Furniture hits the mark with cost-cutting in-store LED lamps

Arrow Furniture recently selected energy-efficient LED lamps to replace halogen bulbs in its four fine-furniture stores. After all four installations, Arrow will stand to save \$23,000 annually as the result of using 232,000 fewer kilowatt-hours of electricity to illuminate its locations.



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Workers drink windshield washer fluid—employer fined \$175,000!

You're not going to believe this! Brewers Retail Inc.—the Ontario company that owns and operates beer stores in Ontario—was fined \$175,000 for a violation of the Occupational Health and Safety Act after a worker was killed. Here's how it went down:

On April 8, 2012, two workers were washing the exteriors of trucks and trailers at The Beer Store Distribution Centre located at 69 First Gulf Boulevard in Brampton. That afternoon, one of the workers found a liquor bottle filled with blue liquid. The bottle contained methanol windshield washer fluid, though it still had a liquor label on it. The two workers both drank from the bottle, and one took the bottle home and finished it. That worker later died from methanol poisoning.

The employer, Brewers Retail Inc., pleaded guilty to failing to acquaint a worker with a hazard in the handling, storage or use of a liquid chemical agent.

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

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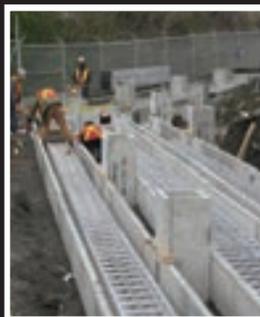
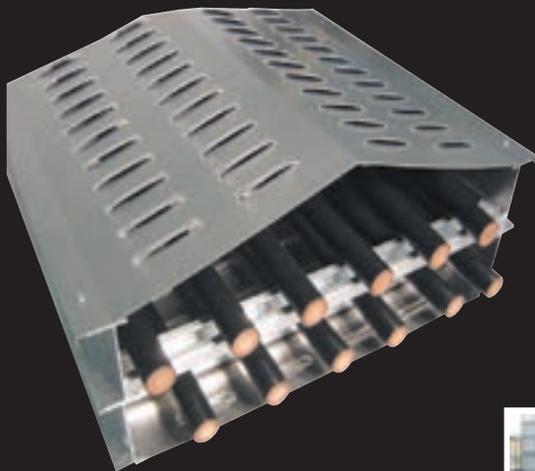
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Reward for oldest pair of Klein side-cutting pliers



Klein Tools (www.kleintools.com) is searching for the world's oldest pair of Klein side-cutting pliers. Customers can see if their pliers are eligible by determining whether their tool is the standard side-cutting type, bears the original Klein trademark and has 'code markings' that will be found inside the handle.

Photos of the pliers and completed form may be mailed or uploaded to Klein's website. For specs/details, visit www.kleintools.com/oldestpliers.

The winning pliers will be selected by Klein Tools' engineering team based on above requirements. The tool owner will receive \$2500 in cash and about \$2500 in new Klein Tools. All photo entries must be uploaded to the Klein Tools website or mailed and postmarked by May 31, 2013, to be eligible for consideration.

"Klein tools are known for their quality and durability," said channel sales manager Thomas Barton. "Our customers are very loyal, and some have tools that have been handed down from one generation to another. So, we thought it would be interesting to see exactly how long our pliers soldier on."

Southwire Canada closing Stouffville plant; relocating its headquarters

Southwire Company (www.southwire.com) has announced its intention to undergo "significant changes this year", including the closing of the its manufacturing plant in Stouffville, Ont., and the relocation of its Canadian headquarters.

"We continue to face challenges in the North American wire and cable market," said Eric Schmidt, president of Southwire Canada. "While we feel the market has

settled, we do not see significant improvements in the near future, leaving us with excess capacity and decreased production efficiency."

Southwire intends to close the Stouffville operations this year and shift product orders to plants in other areas. The move will allow the company to reduce excess capacity, it says, while taking advantage of the proximity of other facilities to raw materials. Southwire purchased the Stouffville facility, which employs about 150 people, from Cable Tech in 2006.

"The closure is not a reflection on our people, their performance or the quality of their work," Schmidt said. "As our business continues to be affected by several factors, this is one of the tough decisions that allow Southwire Canada to remain profitable in an increasingly competitive market."

To further the focus on efficiency, Southwire will consolidate its Canadian business units—including sales, marketing and support staff—under one roof in Mississauga, Ont. in late April.



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PHOTO BY A. DALTON

EBMag checks out VLI's March training event in Mississauga

EBMag recently visited the Venture Lighting Institute's (www.venturelighting.com/Institute) training event in Mississauga, Ont. The one-day workshop (led by Mark Duda, in photo) was held on both March 5 and 6, and offered an introduction to metal halide lamp and ballast fundamentals. Venture Lighting reps were also on hand to speak about new products and technologies available.

Topics highlighted in the workshop included:

- Super Pulse Start Long Life (SPL) Extended Life Lamp series
- Super Pulse Start Ceramic (SPC) ceramic metal halide
- Natural White, Energy Master line & Horizontal Pulse Start
- Lighting retrofits and replacement systems featuring Rio & Jewel
- LeafNut wireless lighting control system & contractor education series

"The Venture Lighting Institute is committed to being the premier educator of pulse start metal halide technology. We utilize our industry leading experience, metal halide systems approach and highly committed staff to educate the lighting community," said the company.

What are the benefits to Literacy and Essential Skills?

The Canadian Apprenticeship Forum (CAF, www.caf-fca.org) announced a new project to investigate the participation rates and ROI for employers who invest in Essential Skills training, and is seeking Working Group members who will provide expertise and guidance on project activities.

According to CAF, the HR challenges in industry include:

- Skills shortages, high turnover and low productivity.
- Essential Skills weaknesses in workers as identified by employers.
- Skepticism and uncertainty about the value of Essential Skills training.
- Lack of substantive data to draw upon.
- Low participation in training in comparison to other countries.

CAF believes this study, which will be based on a survey, will potentially help industry to:

- Understand current rates of participation in Essential Skills training among employers who train journeypersons.
- Build the business case for training in the skilled trades environment.
- Improve policy decision-making on workplace training based on the actual experiences of skilled trades employers across Canada.
- Inform future training strategies that impact industry's ability to sustain itself and remain competitive.

Employers who train journeypersons will be asked to participate in the survey; they can complete the survey via telephone, paper or online. The aim is to gather information from a statistically significant number of employers across trades, and across the country. The sample size will be derived based on the number of employers who train journeypersons and offer Essential Skills training. To learn more about the project, contact the project manager, Emily Arrowsmith at emily_arrowsmith@caf-fca.org or (613) 235-4004 ext. 201.



Photo of Norwegian Gem courtesy Norwegian Cruise Line.

Cruise ships invited to Get Plugged In at the Port of Halifax

Beginning with the 2014 cruise season, the Port of Halifax (www.portofhalifax.ca) says it will be the first port in Atlantic Canada to implement shore power for cruise ships. Shore power enables ships to shut down their engines and connect to the grid to get the power they need while docked.

Transport Canada (www.tc.gc.ca) will contribute up to \$5 million to the project, while the Province of Nova Scotia and the Port of Halifax will each contribute an additional \$2.5 million.

Once installed, shore power is expected to decrease cruise ship idling by 7%. This percentage is expected to increase over time as more ships equipped for shore power use the facilities. In 2012, the Port of Halifax says it generated about \$1.5 billion in economic impact and over 11,000 port-related jobs, adding that annual cruise activity accounts for about 8% of all tourism traffic in Nova Scotia.

"Empowering the Future Today" - EHRC 2013 Conference & Inaugural Awards Gala



Electrical Business has learned Electricity Human Resources Canada (EHRC, formerly Electricity Sector Council [ESC]) is

conducting its 2013 Conference and Inaugural Awards Gala at the Intercontinental Hotel in Toronto, Ont., November 6-7, 2013.

With the theme "Empowering the Future Today", the conference is expected to attract business leaders and human resource professionals for a two-day event filled with HR strategies for your organization. The aim is to connect, convene and inspire the industry with strategies, research, tools and "cutting-edge best practices". Sessions will address topics such as knowledge

transfer and diversifying your workforce.

New this year is the inaugural Awards Gala on November 6—a celebration that will recognize the achievements of individuals and companies working in the electricity and renewables sectors in Canada in workforce development.

EHRC (www.electricityhr.ca) will also present the preliminary findings of the Renewing Futures labour market study, which promises to provide the labour market intelligence the renewable electricity industry needs to proactively develop its HR strategies. A series of break-out sessions also provides opportunities for delegates to actively engage with their peers and speakers.

Look for registration, speakers, event announcements and sponsorship opportunities via EHRC's Twitter hashtag: #ElectricityHR13.

Alstom enters Canadian wind market through an agreement with NaturEner

Alstom (www.alstom.com) and NaturEner (www.naturener.net) Energy Canada Inc. have entered into an agreement for the supply of up to 414 MW of wind turbines to be installed at NaturEner's Wild Rose Projects in Alberta.

The agreement includes 138 ECO 110 3.0 MW wind turbines and 10 years of maintenance services. This project, amounting to around 420 million Euro, should be booked by Alstom in the fiscal year 2013/14 as soon as Alstom receives the Notice To Proceed. This agreement, says Alstom, marks its "successful entry into the Canadian wind market".

"Alstom Wind is proud to work with NaturEner and the Province of Alberta on this landmark project," said Andy Geissbuehler, head of Alstom's North American Wind business. "The combination of Alstom's proven technology and NaturEner's extensive experience in developing renewable energy projects will enable us to provide an efficient and reliable technology solution that takes full advantage of the strong wind profile of these sites."

The Wild Rose 1 and Wild Rose 2 wind farms will be located on private agricultural land in Cypress County, southeast of the city of Medicine Hat. Scheduled to enter commercial operations at the end of 2014 and end of 2015, Wild Rose 1 and 2 will be the largest wind farm in Canada on a combined basis, says Alstom, with a total installed generation capacity of about 414 MW.

Alstom will assemble the turbine nacelles in its factories located in Amarillo, Texas, and in Bunuel, Spain, and will source other components globally.

Young minds can test drive the trades thanks to YES 2 IT



Students in grades 5 through 10 are getting a unique opportunity to test-drive future careers in skilled trades in communities throughout British Columbia, courtesy of YES 2 IT.

YES 2 IT (Youth Exploring Skills to Industry Training, bit.ly/13ROw5B) is a community-based, interactive program that gives young students in the province a chance to experience skilled trades and make connections with tradespersons in their communities. By introducing them to trades at an early age, it's anticipated that more students will pursue trades training in their senior grades as they work toward graduation.

"Many students simply aren't aware of

the many opportunities in the skilled trades that speak to their interests and potential, and provide a career where you get paid to do what you're passionate about," said Kevin Evans, CEO of B.C.'s Industry Training Authority (www.itabc.ca). "Our YES 2 IT program is a hands-on way for students at a young age to kick the tires and check out a wide variety of trades and career pathways."

Specific programs vary among communities. For example, at an event in Princeton, Grade 7 students worked with a journeyman carpenter to learn about constructing benches, stands and planter soil boxes.

YES 2 IT is sponsored by the Industry Training Authority (ITA) and participating school districts. In 2012-13, ITA is providing \$40,000 to provincial school districts to put toward YES 2 IT projects that increase youth awareness of the trades, and \$150,000 for First Hand programs at Skills Canada BC regional competitions.

The program is supported by the BC Jobs Plan and the BC Skills and Training Plan, which invests \$75 million for new capital and equipment to complement \$500 million in annual investments in skills and trades training programs.

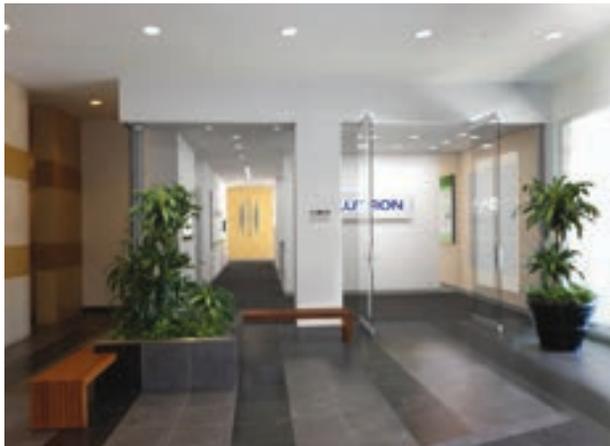


Hendrix relocates to state-of-the-art facility in Amherst

Hendrix Molded Products (www.hendrix-wc.com) has completed its relocation to new facilities in Amherst, N.H. About 7 mi away from their former location in Milford, the new facility more than triples production space, says the company, and allows ample room to grow moving forward.

"This new building is a dream come true for us. We have been evaluating growth options and new locations for years and, when this facility became available, it fit all of our needs," commented Tom Wilson, VP and GM of the Molded Products business unit.

The move into the new 54,000-sf building happened throughout December 2012, with all machines fully operational by mid-January. The Hendrix Molded Products division is one of three business operating units of Hendrix/Marmon Utility LLC, a provider of overhead and underground power distribution products.



Lutron breaks ground on first Experience Centre in Toronto area

Lutron (www.lutron.com) says it has chosen Canada for its first International Experience Centre, to be located in Markham, Ont., just outside of Toronto. The centre will showcase a variety of wireless lighting and shading control solutions for commercial spaces.

"We recognize the importance of Toronto as an international specification location and wanted to add the appropriate resources to best serve our Canadian customers," said Tom Ike, VP of global sales at Lutron. "We look forward to growing our presence here and servicing this important market."

Ground-breaking on the Canadian facility—a commercial experience centre and specification office—began this month. The 2800-sf space (certified as LEED Gold) will celebrate its grand opening this summer. Peter Saccomanno, VP and GM of Lutron Electronics Canada Inc. says the facility will include numerous Lutron control solutions.

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

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There's no question that Ontario's new College of Trades elicits some passionate responses from the trade, either in favour or against. There seems to be no middle ground. Check out one of our latest news items on this subject at tinyurl.com/bug3gf2, then read Letters 1 and 2. Then check out Patrick's Op Ed underneath.

✉ **Ontario College of Trades affects Alberta tradesmen, who do not benefit**



The new Ontario College of Trades organization that will start next month is going to be the worst thing that happens to the Ontario labour system.

I am an Alberta resident for the past 22 years, after moving from the City of Sarnia, Ont. I always renewed my Electrical license with a simple \$60 fee every 3 years to the Ontario Ministry of Colleges and Universities. I obtained my inter-provincial license in Ontario 33 years ago.

I heard about the Ontario College of Trades for the first time last week when I received a letter from them stating I will now have to pay them \$360 per 3 years. In addition, there will be skill improvement criteria and additional, ongoing fees in the future.

I asked the Client Services department of the College whether any of the new Ontario trade regulations apply to me (in Alberta), and the answer was "No". I asked why there is a 500% increase in fees, and they said it was to manage the Ontario trades program.

My current renewal through the Ontario Ministry of Colleges and Universities expires in 2014. I have also been advised by the new College that I must start paying them immediately, even though my C of Q renewal was just completed through the Government of Ontario.

I have a choice: either pay them the ransom demand or lose my inter-provincial electrical license. I was told by the Client Services department at the Ontario College of Trades that I will have no benefit from the Ontario program, no say in the program and ongoing absurd maintenance fees for me to continue to hold my Electrician Trade certification.

It is the most disgusting thing I have seen in my 33 years as a qualified tradesman.

What does this mean to a young Ontarian who may want to become a tradesman? He has choice: start an apprenticeship and become a tradesman in Ontario that has too many new regulations in the new College of Trades and pay ongoing enormous membership fees (in addition to skill improvement course fees), or

he could come to Alberta where the license is issued and good for life with no ongoing fees or hurdles.

—John M., Fort Saskatchewan, Alta.

Meantime, the following letter is a Comment posted online at EBMag.com, which you can also do at any time.

Well, there's balanced, credible journalism for you. You should be sued for printing this. Just about everything in it is a lie.

—Jeff K.

How about some words from the college itself...

✉ **The College of Trades supports tradespeople, the foundation of our economy**

The skilled trades are the backbone of our economy. That's not an exaggeration. These workers literally lay the foundation, build, power and maintain the infrastructure on which our economy runs. At home, at work, and in our daily lives—we rely on them to keep us moving forward.

As our economy changes and we move into the fast-paced, high-tech, 21st Century, skilled trades are more in demand than ever. This is because change and growth mean we need to build, service and adapt our infrastructure. We can't outsource the installation of bridges or the construction of factories—these are the building blocks of our economy.

Ontario's current system just isn't working well enough. We can't afford to fall behind any further.

That is where the Ontario College of Trades comes in. The college is an innovative organization that will help our economy grow. It will do so by ensuring that we have enough skilled trade workers to meet market demand. Currently, the trade sector is fragmented, and no one is taking a hard look at the bigger picture. The college will provide that vision. It will develop industry-driven solutions to ensure the trade sector and our economy are ready for the future.

It will accomplish this through a number of strategies: consulting with industry, tradespeople, the public and other interested stakeholders; establishing a process where independent panels decide whether to keep or adjust journeyperson-to-apprentice ratios based on industry feedback; and acting as a champion for the trades to promote opportunities that will give Ontario a competitive edge.

The college also has a very important role to play in deciding applications on compulsory certification (which types of work will require a licence). This decision is of utmost importance to employees, employers and consumers alike, as it impacts directly on standards of training, safety and consumer protection. It's high time that these decisions be made by the employers, tradespeople and consumers who will have full involvement in the College of Trades.

Through the success of the college, the size of government in this area will be reduced, as these important regulatory decisions will be moved away from the government bureaucracy and placed into the hands of industry.

Finally, promoting the trades as a career of first choice, the college will nurture a new generation of skilled workers—many of whom will be embarking on a second or even third career. We need the skills and experience they bring with them. Some of these individuals may be seeking the challenge and reward of owning their own business; the trades are an excellent sector to pursue that dream.

The college will also enable consumers to look up the credentials and qualifications of individual tradespersons. This will increase confidence in the industry, as anyone hiring a skilled worker for his or her home or business will be able to determine that worker's qualifications with a phone call or a few clicks on the college's website.

In the end, a stronger trade sector means a stronger province. The Ontario College of Trades is an investment in the future: the future of our skilled trade labour force, and of our economy. **EB**

—Patrick Dillon, manager and secretary treasurer of the Provincial Building and Construction Trades Council of Ontario, and member of the Ontario College of Trades' Appointments Council.

✉ **Counterfeit Products Act garners more support!**

The following letter is a Comment posted online at EBMag.com (tinyurl.com/byhlcjbz), which you can also do at any time.



These times are critical in more ways than most imagine. I can honestly say that never in human history—at least the last few centuries—can I recall an assault of such magnitude against our personal security and safety as is being witnessed this past decade. No matter the profession or trade, there is no comparison to be found. It boggles the imagination to find or even contemplate a solution.

—Jim A.



| Dave Smith

Emergency response: methods of release

Part one

Both CSA Z462 and NFPA 70E require workers to be trained in emergency procedures. Part of this requirement is that workers or employees “exposed to electrical hazards shall be trained in methods of release of victims from contact with exposed energized electrical conductors or circuit parts”.

Even though the regular and continued use of voltage-rated rubber gloves and leather covers is mandated in both standards, there will still be instances where mistakes are made, hazards not identified, procedures not followed, practices not practised, etc. In these instances, an electrical rescue may have to be effected.

In addition, both standards include the following as a requirement of a Qualified Worker: “The decision-making process necessary to determine the degree and extent of the hazard and the PPE and job planning necessary to perform the job safely”.

It is therefore inherent that a rescuer meet this requirement to conduct an electrical rescue. The plethora of look-alike electrical equipment in industry makes electrical rescue by a non-electrical worker a highly dangerous task.

The effect of electrical current on our body and various organs is well known. Three causes of immediate death can be current flow: through the head, affecting the breathing centre of the brain which controls the diaphragm muscle; across the chest causing the diaphragm to contract, leading to asphyxiation, or; through the chest, causing the heart to go into ventricular fibrillation or cardiac arrest.

There must be a number of factors in place to receive an electrical shock. The first must be contact with a source of electrical energy, which can only be caused by a breakdown or bypassing of the insulation system in an energized piece of

A common mistake people continually make is thinking that a good, swift bodycheck is an effective way to release someone from a circuit.

equipment or part of a system; the second must be contact with another source of energy or ground; then enough current to affect the person.

When you witness a person in contact with an electrical circuit, you may not even be aware there’s a problem. One of my clients had a welder standing beside a steel table with an electrical outlet on it that had come into contact with the table. As the welder stood beside the table, he put his hand on it and went into muscular paralysis; the others with him did not realize it until someone noticed he was in physical stress. At that point, they discovered the table was energized.

Most times, though, it will be evident that a person is receiving an electrical shock. When the current is high enough, there will be such a violent muscular reaction that the body is propelled away from the contact because of the reaction of large muscle groups. Other times, though, a person will be hung up on a system. As current flows through muscle fibre, the fibres will contract. When someone’s hand is on an object, current flow will cause the hand to contract, making it difficult or impossible for the person to release their hands from the energized object. This natural phenomenon of the hand is the source of the old advice: Always brush with the back of your hand.

Knowing precisely what to do in an electrical accident is important for both the rescuer and the victim. A common mistake people continually make is thinking that a good, swift bodycheck is

an effective way to release someone from a circuit. Depending on a tremendous variety of factors, it may not work.

When Lou Abel was a young roughneck, his co-worker was rolling up a power cable and made the mistake of leaving it plugged in under wet and muddy conditions. “He suddenly went completely rigid, and a high-pitch squeal came out of him!” Lou recalls.

Lou grabbed his co-worker’s shoulder to release him, but was immediately thrown flat on his back. With the energy drained from him, Lou could not even lift himself off the ground and, as his co-worker continued the high-pitched squeal, Lou clearly remembers wishing he would die soon so the screaming would stop. Before that occurred, however, another worker had the presence of mind to unplug the cable the fellow had been rolling up.

It is perfectly clear after the fact that de-energizing is the correct response but, during the stress of an accident, you cannot imagine what an untrained response would be.

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

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) to help support your own safety initiatives.

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Ideal Industries (www.idealindustries.ca) has appointed **Vicki Slomka** to the position of senior vice-president of global human resources. “Vicki holds one of the most vital positions within the Ideal organization,” said **Jim James**, CEO, president and vice-chair of the company. Slomka will lead the company’s worldwide human resources organization across all Ideal business units and its 1200 employees. Her responsibilities include overseeing the development and execution of HR policies, programs and services, as well as global employee relations, compensation, recruitment and retention, and succession planning. In addition, she will lead in the development of long-range HR strategies and goals.



Stephane Mayer

Chess Controls (www.chesscontrols.com) has named **Stephane Mayer** regional sales manager for Timmins and Sudbury Mines in Ontario. Mayer, a College Boreal graduate in Greater Sudbury, Ont., joined Chess Controls more than six years ago as technical and application support representative. “His strong knowledge of the products represented by Chess Controls Inc. and his exceptional customer service attitude will greatly assist us in serving our clients in the Sudbury and Timmins area,” said the company.

Ascent Group Inc. (www.ascent.ca)—the parent company of Ascent Solutions, Ascent Renewables, Ascent Energy Services and St. Thomas Energy—has announced two senior management changes. **Ron Osborne** has been appointed the new chief executive officer for the Ascent Group of companies, bringing with him more than 20 years of energy sector experience in both regulated and non-regulated environments. He is a professional member of the Institute of Industrial Engineers and the Institute of Corporate Directors. **Laurie Skinner** has been named to the position of president and chief operating officer of Ascent Solutions. Skinner previously served as the director of field services and was most recently acting as interim president. He is a graduate of the “Queen’s Executive” program at Queen’s University in Kingston, Ont. He started in the electrical industry in 1977, and has been a journeyman since 1981.



Mike Gentile

Mike Gentile, vice president and general manager of **Philips Lighting Canada** (www.lighting.philips.ca), announced the formation of a single customer facing sales organization representing the entire Philips Lighting portfolio previously marketed by Canlyte, Day-Brite, Ledalite, Lumec, Philips Lamps and Ballasts, and Bodine. According to Gentile, “this powerful Philips Lighting sales organization will provide customers with a more simplified and seamless service while offering the most extensive breadth

of lighting products available from a single manufacturer”. The new organization will be led by **Pierre Legare**, director of Professional Sales, Philips Lighting Canada, will head the new organization, and his regional territory management team will include: **Don Gifford**, British Columbia; **Norm Henze**, Midwest (Alberta, Manitoba, Saskatchewan); **Pierre Vincent**, Ontario; and **Paul Cote**, Quebec and Atlantic. This management team will be responsible for all activities of direct sales forces and independent agent network.

To assist Vincent in his role as territory manager, Central, his team will include the following appointments: **Steve Stanton**, distributor and contractor sales manager; **Angelo Miceli**, specification sales manager; **Rick Hill**, agent sales manager; and **Paul Adams**, inside sales manager.

To assist Cote in his role as territory manager, East, his team will consist of: **Jean-Claude Lesperance**, distributor and contractor sales manager; **Robert Murphy**, specification sales manager; **Robert Cloutier**, agent sales manager; and **Luis Hernandez**, inside sales manager.

Furthermore, a team of category sales specialists and technical/applications support specialists under the leadership of **Chad Mitchell**, located in various offices across the country to support the sales organization with more in depth technical skills when required—Category sales managers:

- **Gary Schaefer**, Outdoor Urban, Municipal, Roadway & Landscape
- **Wayne Campbell**, Outdoor Commercial
- **Mark Dietrich**, Color Kinetics & Controls
- **Mei-Ling Fong**, Indoor Point Source
- **Dave Courneyea**, Indoor General Area
- **Tim Waterfield**, HID, Fluorescent & CFL
- **Malcolm Lobo**, LED, Halogen & Incandescent

Lighting layout and application specialists:

- **Marc-Antoine Vachon**
- **Linda Zimbalatti**

Technical support specialists:

- **Jamie Busch**, Outdoor Commercial
- **Jean-Marc Poulin**, Color Kinetics & Controls
- **Pascal Istasse**, Indoor Point Source
- **Doug Wilson**, Indoor General Area



Mark Andrews

Jewell Instruments has added **Mark Andrews** to its **Triplett Test Equipment and Tools** product group (www.triplett.com) as regional manager, West. In this position, Andrews will be focused on growing Triplett sales in Western Canada and the United States by working with Triplett’s independent manufacturer’s representatives, retailers, distributors and end users. “Mark’s unique mix of experience with industrial distribution and retail will bring immediate value to Triplett and his collaborative approach to working with reps and customers will be a great asset as we work to grow our business,” said **John Payne**, director of business development, Triplett Product Group.

Jeff Hoffman has been named president of **Staco Energy Products Co.** (www.stacoenergy.com) effective immediately. Hoffman’s background includes various positions in sales, marketing and executive management at companies such as United Technologies, Emerson Electric, Berkshire Hathaway and, most recently, with Illinois Tool Works (ITW). Staco manufactures voltage control, VAR compensation, uninterruptible power supplies (UPSs) and engineered power quality solutions. “Jeff is an excellent addition to the Staco team,” said **Blainey Hess**, executive vice-president of parent company **Components Corporation of America**. “His experience driving growth and profitability will help Staco to reach their aggressive sales goals as well as sales channel development.”



Larry Schmidt



Jay Goodman

LumenOptix (www.lumenoptix.com) has appointed **Larry Schmidt** to the position of president and CEO, while company founder **Jay Goodman** heads up the New Business Development division. In his most previous role as sales and marketing director for LumenOptix, Schmidt oversaw the company’s marketing, branding, public relations, corporate communications, and advertising activities while helping to build a network

of over 50 specifying agents and regional managers. “I couldn’t think of a more qualified individual to hand the reigns off to than Larry,” said Goodman. “His deep industry experience and relationships along with his incredible sense of integrity make him the perfect choice to lead LumenOptix to its next phase of growth.” For his part, Goodman said he is looking forward to relinquishing day-to-day operational responsibilities in order to head up LumenOptix’s New Business Development function and serve as an agent of change working to speed the digital lighting revolution on behalf of the entire industry. He will continue to be a shareholder and remain on the company’s board.



Beverly Richards

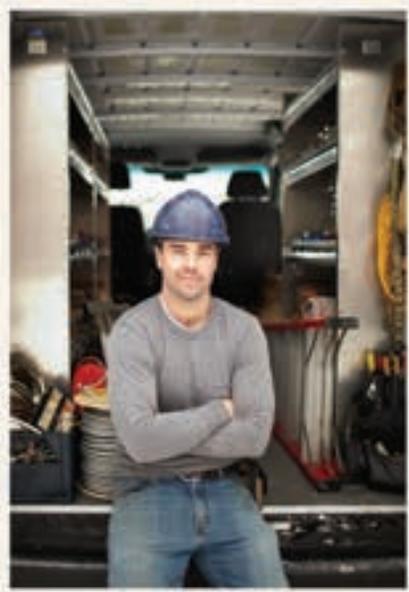
Knipex Tools LP (www.knipex-tools.com) has hired **Beverly Richards** as marketing manager of its North American sales operations. Her previous work experience includes five years at Klein Tools, where she held the position of retail channel marketing manager. “Beverly will be a great addition to our team and will help us expand our marketing and product support materials,” said **Alan Sipe**, president and general manager, Knipex. “The team at Knipex Tools is excited to welcome Beverly, and we look forward to seeing continued growth within our North American sales and marketing operations.



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“With all of its features and overall flexibility, the Sprinter fits the demands of our business perfectly.”

on job sites, other contractors see it and ask me all sorts of questions. I’m convinced that they want to trade their van with mine, but I won’t. I love my Sprinter.”

This is my business. This is my Sprinter.



For more stories like Pierre-Luc Babin's, visit MYSPRINTER.CA.



Mercedes-Benz



IN CASE YOU MISSED IT...

PHOTOS • EBMag attends the Super Bowl of electrical safety: IEEE Electrical Safety Workshop. Visit bit.ly/10KpXUT.

PHOTOS • Check out the latest Class 3-8 vocational vehicle and related equipment offerings at Work Truck Show 2013. Visit bit.ly/10KqnKS.

VIDEO • See why *this event* is the most-efficient electrical safety education... anywhere! Visit bit.ly/13xfKiA.

VIDEO • Ford shows off all-new Transit chassis cab and cutaway models. Visit bit.ly/10KrDOL.



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

MCEE
(Mécánex, Climatex, Expoelectriq, Éclairage)
April 17-18, Montreal, Que.
Visit www.mcee.ca



OEN Spring Networking at Woodbine RaceTrack
Ontario Energy Network
May 3, Toronto, Ont.
Visit www.ontarioenergynetwork.org

EFC AGM: Business Program & Industry Recognition Award Presentation
Electro-Federation Canada
April 23, Mississauga, Ont.
Visit www.electrofed.com/newsroom/events



OEL Electrical Industry Conference
Ontario Electrical League
May 8-11, Chatham, Ont.
Visit www.oel.org



BICSI Canadian Region Meetings
April 23, Calgary, Alta.
Visit www.bicsi.org

Forum on Hydropower
Canadian Hydropower Association
May 13-15, Ottawa, Ont.
Visit www.canadahydro.ca

RETScreen Training Institute
April 23, Toronto, Ont. - 101:
Introduction to Clean Energy Project Analysis
Visit www.retscreen.net/ang/training_institute.php

Partners in Training: "Shutdowns & Turnarounds"
A presentation of Electrical Business Magazine
May 14, Saskatoon, Sask.
Visit www.partnersintraining.ca



Lightfair
April 23-25, Philadelphia, Pa.
Visit www.lightfair.com



RETScreen Training Institute
May 14, Toronto, Ont. - 201:
Energy Efficiency

Project Analysis
Visit www.retscreen.net/ang/training_institute.php

Electric Power Conference & Exhibition
May 14-16, Rosemont, Ill.
Visit www.electricpowerexpo.com

16th Annual PEARL Electrical Safety, Reliability & Sustainability Conference & Exhibition
Professional Electrical Apparatus Recyclers League
May 18-20, New Orleans, La.
Visit www.pearl1.org/annual_conference.htm

Electrical Council Ontario Region Golf
Electro-Federation Canada
May 23, Nobleton, Ont.
Visit www.electrofed.com



ECAA Annual General Meeting
Electrical Contractors Association of Alberta
May 24-26, Waterton Lakes

National Park, Alta.
Visit www.ecaa.ab.ca

EFC Electrical Council Annual Conference
Electro-Federation Canada
May 28-31, Scottsdale, Az.
Visit www.electrofed.com/ec



BICSI Canadian Region Meeting
May 30, Moncton, N.B.
Visit www.bicsi.org

CanSIA Solar Ontario 2013
Canadian Solar Industries Association
May 29-30, Niagara Falls, Ont.
Visit www.cansia.ca

Electric Utility Fleet Managers Conference
June 2-5, Williamsburg, Va.
Visit www.eufmc.com

Skills Canada National Competition
June 5-8, Vancouver, B.C.
Visit www.skillscanada.com



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Partners in Training 2013

- **May 14**, Saskatoon, Sask. "Shutdowns & Turnarounds"
 - **June 18**, Dartmouth, N.S. "Maintenance & Reliability"
 - **September 24**, Sudbury, Ont. "Shutdowns & Turnarounds"
 - **October 17**, Mississauga, Ont. "Maintenance & Reliability"
- DETAILS coming soon!
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LED solutions help Cameco Mines increase energy efficiency

With the goal of reducing maintenance, downtime and overall energy use, Cameco Corp.—a global uranium producer—began investigating new lighting solutions for both its McArthur River and Cigar Lake mines.

Working with its lighting partner—and after testing and reviewing the options—Cameco settled on Cooper Lighting’s Lumark Wal-Pak LED Series. It was then able to achieve its aforementioned goals by replacing more than 973 HID (high-intensity discharge) wallpacks with LED solutions to reduce energy consumption for its lighting systems by almost 86%.

“Replacing traditional metal halide lighting with our energy-efficient LED options is one of the most practical upgrades a company can make to save energy and reduce its overall environmental footprint,” said Cooper Lighting president Mark Eubanks.

With almost 1000 LED luminaire upgrades, the company was able to achieve an estimated 86% reduction in electricity consumption for its lighting systems between two jobsites. **EB**

This article is based on a case study published by Cooper Lighting. Visit www.cooperlighting.com.



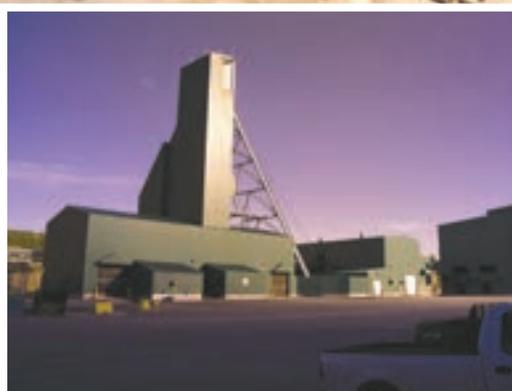
PHOTOS COURTESY COOPER LIGHTING.

With almost 1000 LED luminaire upgrades, Cameco was able to achieve an estimated 86% reduction in electricity consumption for its lighting systems between two jobsites.



PHOTOS COURTESY COMECCO.

Located in northern Saskatchewan, Cameco says Cigar Lake is the world’s largest undeveloped uranium deposit.



Located in northern Saskatchewan, Cameco says the McArthur River Mine has an annual uranium production capacity of 18.7 million lb U3O8 (triuranium octoxide).

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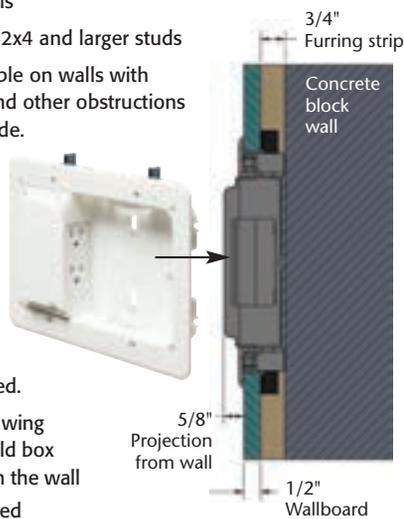
Our TVL508GC TV Box™ is ideal for flat screen TV installations on 1/2" or 5/8" drywall with wall cavity depths greater than 3/4". Applications include:

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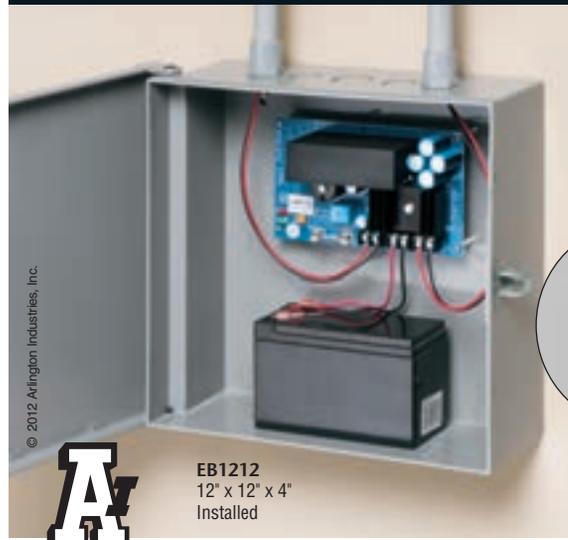
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NEW!

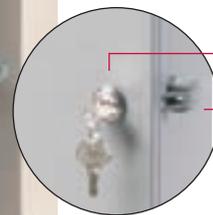
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They're 'lockable' too! There's a **Knockout** on the front for an optional cam lock (sold separately) and a **Latch** that accommodates a padlock.



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7" x 8" x 3.5"

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EB1212
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3-1/2"	NM2080
4"	NM2090

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FOR SIDING

FIXTURE BOXES

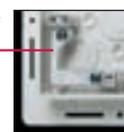
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INTRODUCTION TO

The Commissioning Process

Craig DiLouie

In an ideal world, clients state clear project requirements. The design team unites around a concept. The design documents clearly express the design intent. The contractor installs and starts the system without errors. And users benefit from quality lighting and control.

In reality, any number of things can go wrong. The client may have unclear expectations. There may be conflicts within the design team. The design documents may not clearly express intent. The contractor may make mistakes. And users may complain.

Commissioning was invented so that even as things go wrong during the complex construction process, the end result satisfies the design intent and owner requirements.

Commissioning is a quality assurance process that ensures installed building systems perform interactively and continuously according to owner needs and the design intent. It begins with identifying owner project requirements and ends with ensuring the design intent, finished design and installed systems satisfy these requirements.

Benefits of commissioning

- reduced owner energy and operating costs;
- enhanced property value and marketability;
- greater accountability for work quality by project team participants;
- reduced risk exposure across the design team;
- verification the building and its systems will perform as intended; and
- greater user acceptance and satisfaction.



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Economic benefits

The Lawrence Berkeley National Laboratory calls commissioning “arguably the single-most cost-effective strategy for reducing energy, costs, and greenhouse gas emissions in buildings today.” A study of building projects conducted by the research organization, published in 2009, found building commissioning generated:

- median 13% energy savings in new construction, resulting in cost savings of \$0.18/sf and a typical payback of 4.2 years; and
- median 16% energy savings in existing buildings, resulting in cost savings of \$0.29/sf and a typical payback of 1.1 years.

As an isolated measure, addressing lighting deficiencies via commissioning was found to generate a 1.4-year payback.

The commissioning process

In the lighting industry, the term “commissioning” is often applied to lighting control system activation, or factory startup, in which a manufacturer representative calibrates installed controls as a service. It may also be used to describe functional testing.

Commissioning applies to the entire building and its energy-using systems, including lighting and controls. System activation and functional testing are steps within a larger process of ensuring all installed systems satisfy the design intent and owner requirements.

Additionally, commissioning is sometimes confused with measurement and verification (M&V). Commissioning answers the question, “Does the building and its systems perform according to what the owner wanted and the designer intended?” M&V is a process of measuring and verifying system results, answering the question, “Did we get the results we thought we were going to get?”

ASHRAE Guideline 0-2005, The Commissioning Process, defines a process for commissioning whole buildings. In 2012, ASHRAE proposed a new standard, 202, which will identify the minimum acceptable commissioning process for buildings and systems.

In 2011, the Illuminating Engineering Society (IES) developed Design Guide 29, The Commissioning Process Applied to Lighting and Control Systems, which serves as a lighting-specific guide to The Commissioning Process described in Guideline 0.



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MANAGED
COMPANIES**

The commissioning process spans the construction process, with specific steps assigned to each of the major phases of a typical construction project. The commissioning process is highly detailed but includes these major steps:

- Owner Project Requirements (OPR) (pre-design phase);
- Basis of Design (BOD) (design phase);
- performance testing (construction phase); and
- end-user training and systems manual at turnover

(construction phase).

A post-occupancy review also may be conducted (occupancy and operations phase).

The commissioning process is implemented by the commissioning team, which is led by the commissioning authority. This individual may be an independent consultant or member of the design team. Third-party commissioning, with the commissioning authority reporting directly to the owner, is recommended. LEED (Leadership in Energy and Environmental Design) 2009 requires third-party

commissioning for projects 50,000 sf and larger; the commissioning authority must have commissioning experience on at least two building projects. Some utility incentive programs also require third-party commissioning.

The commissioning team includes the commissioning authority, owner, members of the design team such as the lighting designer, and other professionals, as needed. The makeup of the commissioning Team may change as the project proceeds through its phases.

The commissioning team develops all procedures, roles and responsibilities, schedules, budget, formats, etc. for implementing the commissioning process. This project-specific roadmap forms the commissioning plan.

Owner Project Requirements

The first step in the commissioning Process is to identify the Owner project Requirements (OPR). These requirements are developed as a formal pre-design commissioning document—typically by the owner, consultant or commissioning team—providing clear expression of owner requirements and expectations. (The requirements, however, may be vague until the design phase). This document provides a common reference point for the entire design and construction process.

The Owner Project Requirements can be quite detailed, covering owner requirements for spaces and the lighting system, and including information about tasks, surfaces, special applications, architectural constraints, light levels, colour, visual comfort, aesthetics, energy efficiency, maintenance, technology, applicable codes and standards, LEED certification, performance, and many other issues.

For example, the Owner Project Requirements might state the following about daylight harvesting:

“Daylight harvesting is a control strategy offering good energy savings potential. The general lighting will be automatically controlled in response to daylight levels with minimal distraction to users. All daylighted zones should have automatic daylight harvesting control.”

Basis of Design

The Owner Project Requirements form the foundation of the Basis of Design (BOD), or design intent, which translates owner requirements into a clear design direction. This formal document, typically created by the design team and evolving throughout the design

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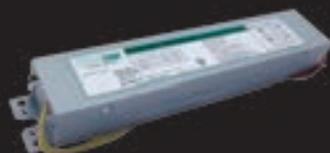
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process, includes descriptions of systems such as lighting and controls, covering issues such as energy efficiency targets, desired technologies, preferred manufacturers, flexibility, maintenance requirements and level of training users will need to operate the controls.

The lighting controls part of the Basis of Design is sometimes called the lighting controls narrative. This written document provides a clear, detailed and current description of the control system, its functionality, and its sequence of operations, or what actions it performs as outputs (e.g. turn off the lights) in response to various inputs (e.g. occupancy). At a minimum, it includes two sections. The first references the Owner Project Requirements related to lighting control and what strategies will be implemented to satisfy these requirements. The second describes the control system and sequence of operations for each space or general space type. Additionally, the author may include other helpful information such as performance testing and acceptance criteria, control zoning and references to related documents such as wiring diagrams.

For example, the lighting controls narrative within the Basis of Design for an office building might state the following about daylight harvesting:

“All luminaires within one window height of perimeter windows in open and private offices will be separately controlled from other general lighting in the space provided sufficient daylight will be available to these zones. The luminaires within these zones will be controlled using automatic dimming daylight harvesting controls. Luminaire-mounted photosensors, sensitive to reflected light, will be employed. Dimming will be initiated when the total level of daylight and electric light reaches 150% of the maintained design light level provided by the electric lighting only.”

Design phase

During the design phase of the project, general concepts and strategies will become more and more detailed. The commissioning authority may review some or all design documents to ensure the current Owner Project Requirements are being satisfied. Any equipment substitutions should be approved by the lighting designer. All changes to the design and their impacts should be clearly indicated in the Basis of Design.

Performance testing

Performance testing (also called acceptance testing or field commissioning) is conducted during the construction phase, typically by the installing contractor, to ensure what goes into the building produces desired outcomes. The designer should detail all checklists, performance tests, conditions for testing, and criteria for acceptance for use by the contractor in the specifications, along with any required equipment and instrumentation.

Additionally, the designer should clearly identify any performance testing required prior to installation, such as manufacturer testing (functionality, UL, etc.) and mockups and sample construction.

This phase of commissioning may include six specific activities:

- equipment verification to confirm approved equipment arrives in good order at the jobsite;
- installation verification to confirm equipment is installed according to approved drawings and plans;
- system activation, also called factory startup, in which controls are programmed, calibrated and adjusted to match specifications and site conditions;
- functional testing to confirm installed equipment operates according to the design intent and achieves stated acceptance criteria;
- assign deficiencies to a punch list for resolution by the contractor, and;
- owner notification and acceptance of all test reports.

Equipment verification

(The author can provide a sample form that can be used for equipment verification. As control equipment arrives at the jobsite, a random sampling of each type of control can be opened to confirm it complies with the specifications and/or approved submittals. The form is provided for educational purposes only, and does not supersede actual project commissioning requirements or manufacturer instructions.)

Functional testing pre-checklist

Below is a series of steps that should be taken prior to functional testing:

- The building must be made ready—enclosed, with all windows and exterior doors installed and closed, and with all furniture and ceiling tiles installed.
- All lighting and controls should be completely installed and operational prior to testing, with permanent electric power supplied to all light fixtures.
- Dimmable fluorescent fixtures should be operated at full output overnight, or about 12 hours, unless the lamps are “pre-seasoned” at the factory.
- All equipment needed for commissioning, such as ladders or lift equipment, should be on-site and ready for use.
- Obtain a copy of the project drawings and specifications prior to visiting the site.
- Ask the control manufacturer or its representative to review any test procedures prior to execution to ensure it will not damage any equipment or affect product warranties.

Functional testing checklists

The Lighting Controls Association has developed a number of resources that can aid in installation verification and functional testing of lighting controls systems, including checklists. These checklists are described in Parts 2, 3 and 4 of the Lighting Controls Association’s Education Express course, EE110: Commissioning and Lighting Controls: They are also available as part of IES-DG-29-11, where they supplement checklists for lighting systems.

Field calibration

While the manufacturer’s representative should calibrate and adjust controls to match the specifications and site conditions, additional adjustments may be required during performance testing to ensure

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the installed system achieves the design intent. A photosensor in a room with light-painted walls and furnishings, for example, will respond differently than a sensor in an adjacent room with dark-painted walls and furnishings. Even such a small difference in application conditions can make a big difference in controls system performance and energy savings for the owner. Subsequent adjustments may involve relocating equipment and fine-tuning the settings of sensors, such as occupancy sensors and photosensors.

In older systems, sensors are calibrated by hand. In newer systems, sensors may be calibrated using software. Some new occupancy sensors and photosensors are self-commissioning or can be calibrated on the ground without a ladder.

Cases in point

In a particular classroom and laboratory building, the daylight harvesting system could be ineffective because exposed lamps from these direct/indirect

luminaires are in the sensor's view. Performance testing would likely identify and correct this deficiency, aligning reality with the design intent.

Or in another facility, we could see an HVAC duct shade a photosensor, rendering the daylight harvesting control strategy ineffective. Performance testing would likely identify and correct this deficiency.

Systems manual

The commissioning process requires the commissioning team or other responsible entity to submit a Systems Manual to the owner for formal acceptance as part of project turnover. The Systems Manual is a composite document that provides detailed information about operations and maintenance of a building's systems, including its lighting and control system, for the owner to use during the occupancy and operations phase of the project. In addition to performance benchmarks, warranties and manufacturer and distributor information for each control device, the Systems Manual should also include final programming, schedules, calibration settings.

User training

Upon the turnover of the building and its systems to its owner at the end of the construction phase, facility personnel should also receive training on the proper operation and maintenance of the lighting and control system. This is critical because if users do not understand the controls, they may complain and attempt to override or bypass them.

Post-occupancy

Consider planning for the commissioning authority to return to the project within 10 months after acceptance of the control system for additional testing. Maintenance personnel should inspect all lighting controls for proper operation at least once per year, particularly if reflectances or lighting requirements in the space have changed.

Commissioning and LEED

Basic commissioning activities are a prerequisite for LEED 2009, New Construction and Major Renovations, certification. Energy & Atmosphere Prerequisite 1: Fundamental



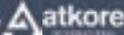
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Commissioning of the Building Energy Systems requires commissioning of lighting, HVAC and related controls. Specifically, the Commissioning Authority must:

- create and implement a Commissioning Plan;
- incorporate commissioning in the construction documents;
- review Owner Project Requirements and Basis of Design;
- verify installation and performance of building energy systems; and
- complete a summary report.

Advanced commissioning activities are rewarded with 2 points in LEED 2009 under Energy & Atmosphere Credit 3: Enhanced Commissioning. This credit requires:

- review design and contractor submittals for building energy systems;
- produce a systems manual for facility operators;
- provision training for facility operators and occupants on proper use of system controls;
- conduct post-occupancy evaluation within 10 months after substantial completion and produce a plan to resolve any outstanding problems.

Commissioning and energy codes

Functional testing is required in energy codes based on the 2010 version of the ANSI/ASHRAE/IES 90.1 energy standard. Specifically, all specified lighting controls and associated software must be calibrated, adjusted, programmed and assured to operate in accordance with construction documents and manufacturer installation instructions. Specific requirements are identified for occupancy sensors, programmable schedule controls and photosensors.

For example, at a minimum, the party conducting the testing must confirm that the placement, sensitivity and time-out settings for any installed occupancy sensors provide acceptable performance—e.g. the lights must turn Off only after the space is vacated, and must turn On only when the space is occupied. Time switches and programmable schedule controls must be programmed to turn the lights Off. And

photocontrol systems must reduce light levels produced by the electric lighting based on the amount of usable daylight in the space as specified.

ANSI/ASHRAE/IES 90.1-2010 also requires that certain documents be turned over to the owner within 90 days of system acceptance, including, for example, as-built drawings of the lighting and control system, operating and maintenance manuals for all lighting equipment, recommended relamping program, schedule for inspecting and

recalibrating lighting controls, and a complete narrative of how each lighting control system is supposed to operate, including its recommended settings. **EB**

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

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A more efficient path for certifying cabling installations

Adrian Young



Before a cabling vendor issues a warranty, he's going to want to see certified results, but that's not always as easy as it sounds. The cabling world is rife with varying standards and guidelines, making testing and troubleshooting requirements more complex than ever.

Anyone involved in the certification picture needs to understand that not all processes and tools are the same for each job. Here is a quick overview of what certification means today, and the test tools you need to get the job done.

What is certification?

In simple terms, certification involves comparing the transmission performance of an installed cabling system to a defined standard to demonstrate the quality of the components and workmanship.

Cabling links therefore must return a PASS result. If not, it is up to the technician to diagnose any failing links and retest until the link meets the transmission performance requirements.

Typically, certification testing is executed as an automated test or an AUTOTEST based on pre-determined test parameters, such as frequency range and other PASS/FAIL criteria for each test.

A copper cabling test will provide measurements such as NEXT (Near End CrossTalk 'Xtalk'), ACR-F and Return Loss, and most field testers will report a simple PASS/FAIL. When it shows a PASS, simply save the result and move on. When the field tester reports a FAIL, then you will need to have some knowledge about these test parameters and what causes them to fail.

Often, test limits are specified by the cabling vendor offering the warranty. It goes without saying that some test limits are easier to pass than others and can often be used as a quick escape route for troublesome installations. In other words, simply saying that a cabling system is "to be tested to Cat 5e" is not good enough.

Link definitions and test limit selection

Cabling standards define two link definitions: Channel and Permanent Link. The Channel test is an end-to-end test that includes user and equipment cords. With the Channel test, however, the limits are more relaxed, and the use of long patch cords can artificially improve the test results.

Cabling standards provide a second link definition called Permanent Link, which covers the connectors at each end and whatever lay in between. It's important, therefore, to specify a Permanent Link test.

It is often a daunting task for the inexperienced to decide which limits to select. To simplify the decision, test limits can be split into two categories: generic cabling standards and application standards.

It's common practice to test to a generic cabling standard such as Cat 5e Permanent Link for a newly installed copper cabling system. Testing to Cat 5e will ensure that a range of applications will work. Most of the time, the test limit will be defined by the vendor offering the warranty, so it is important that vendors make that limit clear to the technician. Otherwise, the technician runs the risk of the cabling warranty being rejected and having to re-test the entire installation.

To find out whether an existing cabling system will support 100Base-TX or 1000Base-T, you can use the application limit in the tester or a qualification tester.

Fiber certification also falls into the same two categories. However, testing to a generic cabling standard such as ANSI/TIA-568-C will not guarantee 10GBase-SR compliance. The designer of the fiber plant will need to decide whether 10GBase-SR is a requirement, then design the cabling plant to meet those requirements. Poor fiber plant design is not easily rectified once you reach the testing stage. More often than not, a redesign of the pathways is required.

Troubleshooting tools for copper and fiber links

Any field tester you choose for copper should offer built-in diagnostics. Otherwise, you are going to be left guessing whether you have termination or cable issues. When you have a NEXT issue, having the ability to look down the cable to see where the Xtalk is occurring will result in fewer delays.

These diagnostic tools often have the words Time Domain in them, such as HDTDX (High-Definition Time Domain Xtalk), which allow the technician to determine whether there is a termination issue at the panel or he is working with a batch of bad cable.

An OTDR (Optical Time Domain Reflectometer) is required to locate faults in fiber installations. Historically, these devices were only used by experts, but new-generation OTDRs are much more user

friendly, drawing a map of the link that identifies the components and their performance. By selecting a test limit, the OTDR can automatically display the location of the troublesome connection on the map.

In addition, there are affordable distance-to-fault testers that simply give a numeric value in metres or feet to where a fault may possibly be located. A VFL (Visual Fault Locator) is also a critical tool for locating bends and breaks in the fiber patch panel.

All certification devices allow results to be stored to the tester and made available for download to a PC.

As a critical part of a network technician's day-to-day job, certification requires a solid working knowledge of standards and general technical know-how. While standards and variations may have increased in complexity, the good news is today's test tools are helping make the process easier, more accurate and more efficient for all concerned. **EB**

Adrian Young is a senior technical support engineer at the Fluke Networks Technical Assistance Centre. He can be reached at adrian.young@flukenetworks.com.

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Electrical malfunction puts Alzheimer patients in danger

Patrick J. Lynch, P.Eng.



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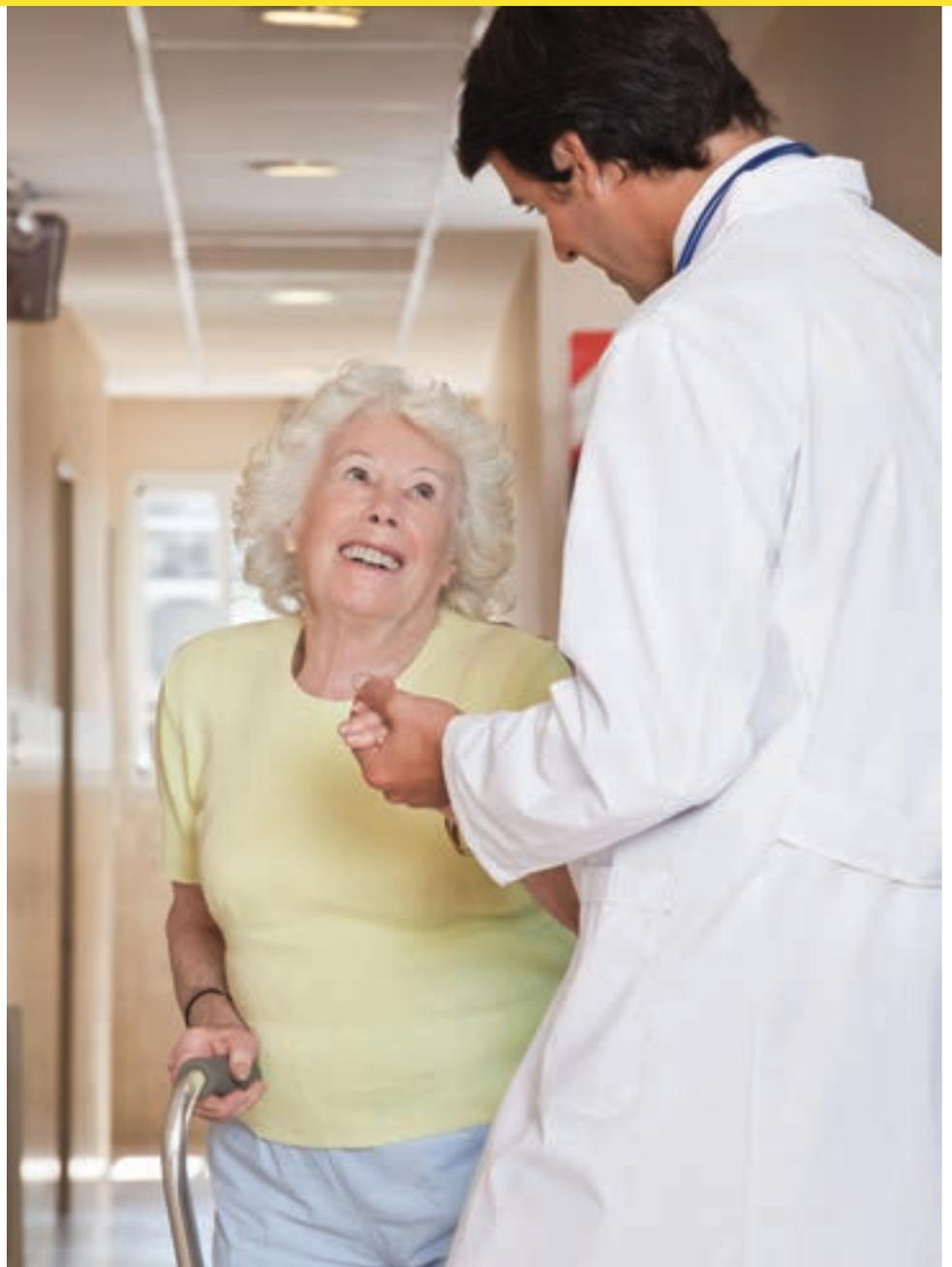
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Suddenly, over the intercom system, an all-station code alarm was sent out. The patients were escaping! Extra security personnel were needed, stat! The patients were eventually found, aimlessly wandering through rush-hour traffic on a nearby highway.

How could this happen?

The escaping patients were from an old age home. Many of them were suffering from Alzheimer disease. For their own personal safety, these patients wore radio frequency-sensitive ankle bracelets. When they approach the facility’s exterior doors, the door sensors are supposed to detect them and automatically lock the doors to prevent the patients from leaving, thereby keeping them safe.

This system had worked flawlessly for the last 10 years, but something had gone horribly wrong.

Every door in this facility would no longer automatically lock with an approaching Alzheimer patient. Extra security personnel had to be posted continuously 24 hours at each

door to keep all of these patients safely inside. This was a system-wide problem within the facility, and they needed help stat!

The investigation commences

The electronic door system lock manufacturer was immediately called to investigate. He concluded his system worked perfectly back at the shop but, for some strange reason, would no longer properly function when installed at this site. He was stumped as to why this was happening. What had changed?

Had new cell site towers been installed nearby, or had a ham radio operator moved into the area and started to broadcast, thereby interfering with the ankle bracelet system? Or was it a more local phenomenon within this actual facility?

Our company was asked to come in to perform an electrical forensic investigation. As we pulled into the parking lot, our RF test equipment sprang to life and immediately began to pick-up low-band (below 500 kHz) frequency noise. When we entered

the facility, these RF noise levels increased by at least 100 times.

Based on the results so far, this would tend to rule out externally generated RF noise scenarios. But what could be causing the noise within the facility?

This is a very old facility. Security transmitting radio frequencies and other RF transmitter sources were checked and all found to be operating within normal guidelines.

When electronically scanning the building, we noticed the noise levels would significantly increase in the basement area where the power cables run partially exposed. What is connected to this power system that is generating this noise?

We connected our equipment directly onto these power cables to capture this power frequency DNA. The DNA results displayed a typical telltale frequency spread pattern for a variable frequency drive (VFD) system. The facility director was then asked whether any new electrical equipment or upgrades had been installed at this site.

Getting to the bottom

The facility director mentioned a new air circulation system had been recently added in a new remote building, but he could not see how this would affect all his electronic locking doors in the main facility.

He reluctantly took us to this building and opened the room that contained this new air circulation system. We connected our equipment and immediately found the same DNA frequency trace—only about 50 times greater in magnitude. This air circulation equipment was using a VFD.

We asked if he could arrange to momentarily turn off this VFD and re-check the door locking systems. He agreed and, success! Everything now worked perfectly.

The power cables throughout this facility were evidently acting like a radiating antenna for the VFD frequencies.

The only problem now is, with the drive turned off, the patients will not be getting any air circulation, so the system had to be turned back on. Of course, the door locking system malfunctioned again, and a regiment of security door guards will again be required.

The air circulation drive manufacturer was then advised his system was interfering with the proper operation of the electrical systems within this facility. He must either immediately remove it or modify it.

Protecting our wanderers

After many weeks of unsuccessful

attempts, both the drive manufacturer and the door locking system group eventually both had to modify their designs and shift operating frequencies to allow both systems to coexist and properly function within the facility.

An initial, thorough third-party electrical engineering environmental interference review of the electrical operating systems at this facility prior to the introduction of any new electrical equipment would have most likely prevented this situation. Thankfully, none of the 'grey hairs' were hurt in their 'walking with the cars'

experience. Whatever their age, and whatever their mental capacity, we have to keep our people safe.

We, too, may some day become wanderers. **EB**

Patrick J. Lynch, P.Eng., has been the president of Power Line Systems Engineering Inc. since 1986. He graduated Electrical Engineering from the University of Waterloo in 1975, and has successfully directed Power Line's completion of over 1100 complex electrical engineering site disturbance investigations around the globe. Visit www.powerlinesystems.ca.

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Ordering the right truck cap or tonneau cover

One of the decisions a truck owner must make is whether to outfit his vehicle with a truck cap or tonneau cover (flat lid). But how is that decision made?

The first step is to get to know your local truck accessory retailer who can recommend the features you might need based on how you use your truck. For example, will you use your vehicle for

work purposes and hauling around equipment, or will you be using your truck primarily for outdoor excursions, such as camping or hunting?

One thing to keep in mind is that, whatever the decision—tonneau cover or truck cap—nearly all are made-to-order and must be professionally installed, so it is a good idea to allow a minimum of two weeks to order.

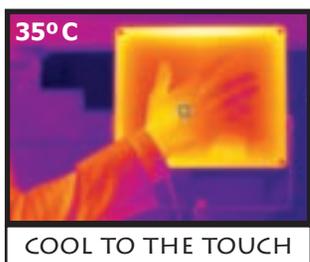


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“Truck caps are not an off-the-shelf item... they are truly a custom product,” says Bryan Baker, director of marketing, A.R.E., a manufacturer of fiberglass truck cap and tonneau covers. “The better model caps and covers are typically made to the customer’s individual specifications and to match the vehicle bed and colour. In addition, a number of options are available, so that means they are not a ‘one-size-fits-all’ product.”

Before you even place an order, you have to think about how you are going to use your truck and what you really need. Think about how you will need the cap or cover to function. Will the truck bed need basic cargo protection, improved security, increased space or even ventilation and light?

In addition to exterior paint code matching, you can customize the interior as well with windows, interior liners, screens, doors, racks, lighting or clothing rods.

Do you want to keep it utilitarian, and use the bed just for hauling your gear? You might want a basic truck cap or a flat tonneau cover with the minimum of features, such as security locks.

If you use your truck for a camper, a cargo liner can soften the floor to help you get a better night’s sleep. Adding a fabric headliner to the inside of the cap will also eliminate the problem of condensation. It is crucial to include windows with screens for ventilation if you use the truck bed to haul your hunting dog or use it as a camper.

Another important consideration is security: when you have thousands of dollars invested in work equipment or outdoor gear, you will want to make sure it’s safe. Various cap manufacturers offer different locks. The best are automotive-quality and utilize the same lock cylinder style as vehicle manufacturer. Some caps also come with remote keyless entry systems.

There’s a lot to think about when selecting between a tonneau cover or truck cap, as well as what features to include, so do your homework and work with reputable truck accessory retailers. 

This article is based on a piece written by A.R.E. Visit www.4are.com to learn more.

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Fluorescent highbays were installed throughout the sales floor to enhance the lighting for two different shelving types.



Outside, LED luminaires help keep light within property lines to eliminate light spill and light pollution in the neighbouring residential area.



The lighting plan had to achieve optimum lighting and minimal glare for the aquarium displays.



Recessed lighting fixtures integrated with ceiling and wall controls were installed in the offices and hallways.

Pet retailer Care-A-Lot Pet Supply installed over 200 indoor and outdoor LED luminaires, poles and digital controls in its new 20,000-sf facility in Virginia Beach, Va. A combination of LED lighting and controls solutions were made to work together to highlight merchandise while reducing energy consumption.

Working with PM&E Design Group and Resource Lighting, Care-A-Lot selected a variety of lighting solutions to solve unique challenges, which included lighting a space and merchandise effectively with 30-ft high ceilings, as well as achieving optimum lighting and minimal glare for the aquarium displays.

Outside, Care-A-Lot needed a solution to provide quality lighting in its large parking lot while minimizing light pollution to the neighbouring residential community.

For this site, I-Beam fluorescent highbays from Lithonia Lighting were installed throughout the sales floor to enhance the lighting for two different shelving types.

RT5 volumetric recessed lighting fixtures from Lithonia integrated with ceiling and wall controls from Sensor Switch were installed in the veterinary exam rooms, kennel rooms, washrooms, offices, break rooms, hallways and restrooms.

For aesthetics and energy savings, Care-A-Lot installed Gotham EVO LED downlights, as well as recessed DoM series LED luminaires from Lithonia to minimize glare on aquarium tanks.

On the exterior, Lithonia ALX LED luminaires help keep light within property lines to eliminate light spill and light pollution in the neighbouring residential area. Winona Lighting Winscape Hensley LED ingrades and Winscape Benton LED

wall-mounted cylinders illuminate the columns and entryway to the store.

It is estimated the store will save \$5000 annually in energy costs as compared to typical HID (high-intensity discharge) and fluorescent lamp sources. **EB**

This article is based on a case study published by Acuity Brands (www.acuitybrands.com).

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Arrow Furniture

hits the mark with cost-cutting in-store LED lamps



New LED retail lighting consumes just 17 watts of electricity compared to the 90 watts used by the old halogen bulbs.



As part of its solution, Mercor applies rebate incentive programs from all power utility service providers across Canada.



Arrow Furniture stands to save \$23,000 annually as the result of using 232,000 fewer kilowatt-hours of electricity to illuminate its locations.

With four fine-furniture stores in Toronto, Ont., and more than 40 years of experience, family-owned Arrow Furniture shops the world over to bring customers the best traditional and contemporary furnishings.

To ensure that dining room sets, area rugs, office decor and accents for every room in the house are beautifully but economically lit, the retailer selected energy-efficient LED lamps to replace halogen bulbs in its stores. After all four installations are finished early this year, Arrow will stand to save \$23,000 annually as the result of using 232,000 fewer kilowatt-hours of electricity to illuminate its locations.

“We looked at different types of energy-saving lighting including LED options for about three years,” says Israel Adud, operations manager for Arrow Furniture. “Many products were offered to us by many vendors, but none of the bulbs were sufficient to light the merchandise on the floor.”

Toronto-based distributor Mercor Lighting introduced Adud to new LED retail lighting that consumes just 17 watts of electricity compared to the 90 watts used by the old halogen bulbs. More importantly, the lamps’ light output, colour consistency and uniformity met Adud’s exacting standards for in-store illumination.

“When sampling product at the store level, the crisp, white light emphasized the true colour of merchandise better than competing lamps our customer had previously evaluated,” explains Eric Tordjman of Mercor Lighting.

With assistance from Mercor, Arrow has already retrofitted 345 LED PAR38 lamps at one of its Greater Toronto Area (GTA) stores. Installations at a second same-size location—as well as two larger stores

housing 550 fixtures each—are to be completed by Spring 2013.

“Mercor came to us with a great solution,” says Adud. “The overall response has been very positive. The new LED lighting gave our store a fresh look that we’re excited to continue with at our other locations.”

Arrow Furniture’s smaller stores will each reduce their annual electricity use by 44,746 kWh thanks to the new lighting—a nearly \$4500 savings based on 12 hours of operation a day and \$0.10 kWh rate. The company’s larger stores, meantime, will save about 71,000 kWh and \$7100 each after retrofitting all in-store lamps.

Totalling its four GTA locations, Arrow Furniture’s switch to energy-efficient LED lighting will soon yield a \$23,000 annual cost benefit.

Mercor Lighting also helped qualify Arrow to receive a \$20 return from the Canadian Lighting Rebate Office for every LED lamp installed. As part of its solution, Mercor applies rebate incentive programs from all power utility service providers across Canada.

“Including combined utility savings and rebates, the cost of our complete lighting update will be recouped in about two years,” notes Adud. “To provide our customers with a brighter shopping experience while spending less is a win-win proposition, certainly.” **EB**

This article is based on a case study published by GE Lighting. Visit www.gelighting.com.

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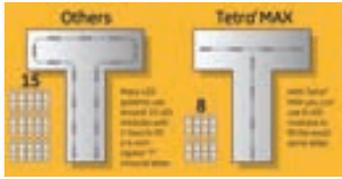
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Electrical Safety Authority

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GE LED Tetra channel letter lighting - miniMax, Max and PowerMax

The new GE LED Tetra channel letter lighting systems claim to provide businesses with bright, dependable lighting through its miniMax (small letters), Max (medium) and PowerMax (large) options. The system features pre-drilled holes and industrial-grade mounting tape to assist with flexible cuts between modules. With Tetra products, users can typically use one string of LED modules where two strings were needed before, says GE, noting that while slightly less bright, the uniformity of GE's LED systems maintain illumination across letter faces with fewer modules and can result in lower costs.

GE

www.gelighting.com

Acuity Brands expands Lithonia's OLWCM ceiling light family

Acuity Brands expanded Lithonia's OLWCM ceiling-mount luminaires family—which are suitable for outdoor lighting applications such as parking areas, garages, carports, etc.—to offer two styles and three lumen packages. OLWCM 36 luminaires are designed with a tight, type 5 light distribution, ideal for lighting smaller areas at higher footcandle levels. The OLWCM 46 and 57 luminaires provide a wide light distribution for illuminating larger areas. The OLWCM ceiling lights employ LEDs that maintain 70% of light at an expected 50,000 hours of service, says Acuity. All OLWCM ceiling light luminaires are designed for mounting heights between 8 ft and 15 ft, for flush or pendant mounting for customizable mounting heights. The fixtures are crafted with cast-aluminum and corrosion-resistant bronze or white housing.

LITHONIA LIGHTING
www.lithonia.com

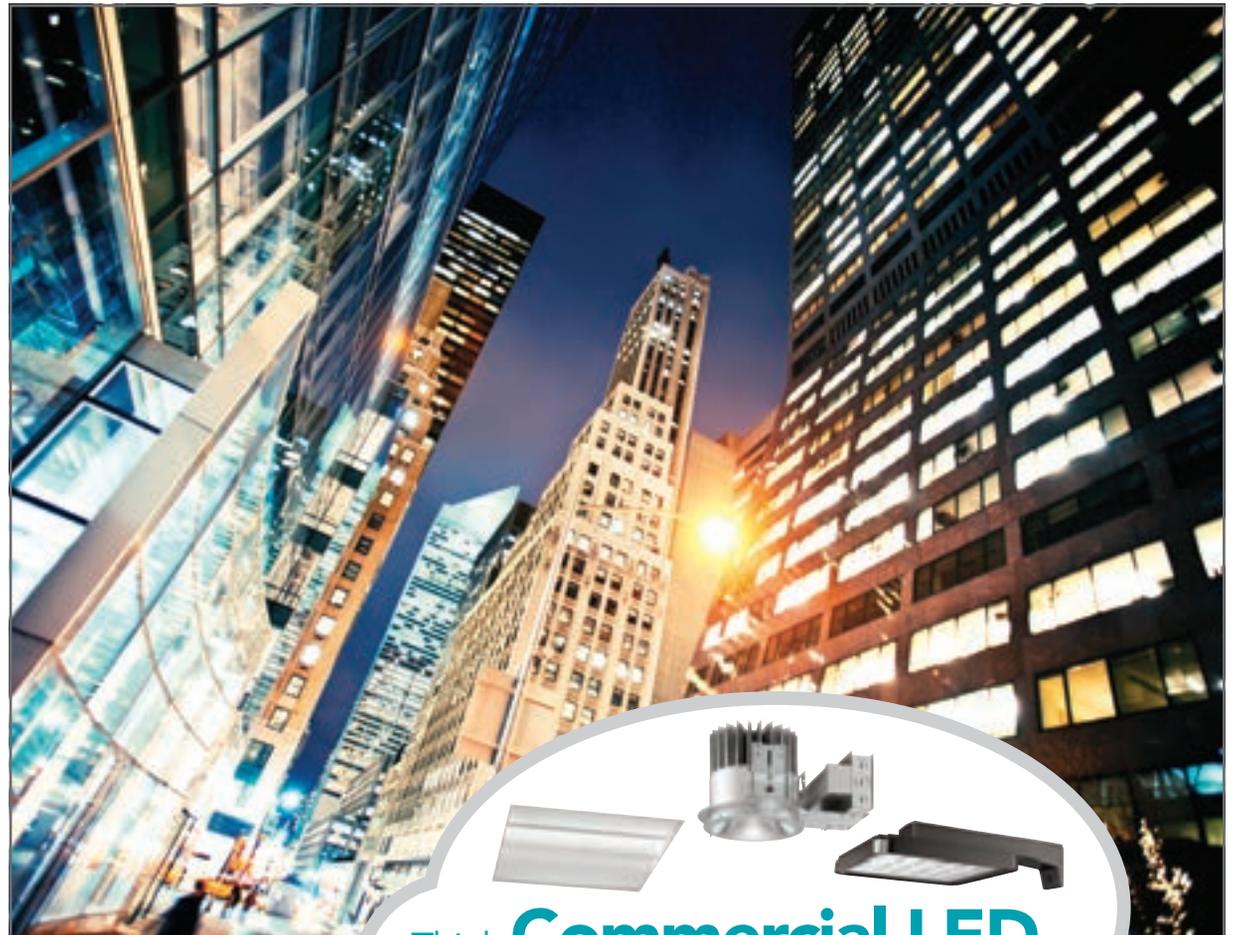
McGraw-Edison introduces Galleon LED luminaire

The McGraw-Edison Galleon LED luminaire has been added

to Cooper Lighting's line of outdoor lighting products, offering users a choice of 12 optical distributions, nine lumen packages, and comes standard with various specification grade design features. The Light Squares are also field-adjustable to reorient the distribution in 90°-increments.

With efficiencies up to 95%, it provides 30-75% energy savings when compared to typical HID (high-intensity discharge) luminaires, says Cooper, and is suited for new construction and retrofit projects.

COOPER LIGHTING
www.cooperlighting.com



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EB lighting products

Lumenpulse LED luminaires to feature Lutron EcoSystem solution

Lumenpulse's entire indoor and outdoor LED product lines will soon be embedded with Lutron Electronics' EcoSystem technology. EcoSystem is a lighting control system comprised of digitally addressable dimming ballasts and LED drivers, controls, and environmental sensors, which boasts energy savings from 40% to 70%. Under the new agreement, the EcoSystem solution can, for the first time, be applied to both indoor and outdoor lighting.

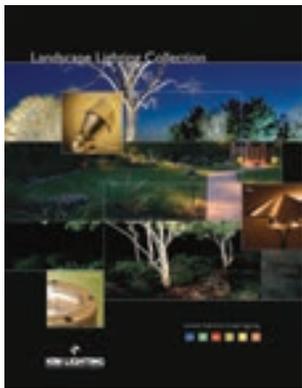
LUMENPULSE

www.lumenpulse.com

LUTRON

www.lutron.com

LED versions available for Kim Lighting landscape collection



Kim Lighting is now offering LED versions for its series of landscape lighting products,

boasting durable, multi-voltage, high performance solutions that minimize energy consumption. LED lamp versions in 12V, 120V or multi-voltage 120-277V, and in 3000K, 4000K or 5000K colour temperatures are now available for the following Kim Lighting landscape products: Bell Stem; Bell Wall; Micro-Flood; Minivault; Ravenna Lowlighter; Ravenna Highlighter; Scarab; Step Light Rectangle; Step Light Round; and Traditional.

KIM LIGHTING

www.kimlighting.com

New Appleton Green LED luminaire claims to uncover hidden flaws in steel



Appleton has introduced what it says is the lighting industry's first ordinary location green LED floodlight/high-bay luminaire designed specifically for surface inspection of steel. The new Area-master Green LED luminaire claims to allow otherwise invisible flaws to be seen by technicians

inspecting steel arriving from mills, such as hairline cracks or blistering that may be undetectable under normal white cool light. The Area-master Green LED accepts voltage from 120-277VAC, 50-60Hz and boasts system efficiencies of 80%.

APPLETON

www.appletonelec.com

Switch Lighting offers liquid-cooled LED A-lamps



Switch Lighting is now offering its liquid-cooled LED A-lamps that can be used in any fixture, any orientation indoors and out, it claims. In addition to its 40W, 60W, 75W, and 100W-equivalent lamps, Switch has designed the Switch3-Way, a 25W, 50W, 75W-equivalent LED incandescent replacement A-Lamp for use in three way fixtures. According to the company, the Switch100 is the first true 100W-equivalent A-lamp with a 1600 lumen output and radial flux equal to incandescents on the market. The lamp offers a colour temperature of 4000K.

SWITCH LIGHTING

www.switchlightingco.com

Orr Lighting debuts S9051 LED downlights



Orr Lighting's new S9051 LED downlight series is now Energy Star qualified for commercial and residential use. The series is available with a 4-in. aperture in 15W and 21W optics in two distinct models for new (S9051N) and retrofit (S9051E) construction. The S9051N model features a galvanized steel housing with adjustable mounting brackets, five knockouts in junction box, and a dimmable driver. The S9051E model offers a quick-install and well balanced lamp module that is easily accessed, says Orr Lighting, as well as dimming capabilities. The series is also cETLus listed.

ORR LIGHTING

www.orrlighting.com

Halco Lighting 10W ProLED A19 lamps



Halco Lighting Technologies has released its 10W ProLED A19 lamps, which it describes as the ideal replacement for incandescent A19s in the residential and commercial markets. According to Halco, the dimmable lamps provide up to 13 times the life and are 83% more efficient than standard incandescent A19 lamps. With dimmability to 5%, the lamps produce 830 lumens and are available in 3000K with 82 CRI.

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ESPS releases NFPA 70E Electrical Safety eLearning software version



The team at Calgary, Alta.-based ESPS (Electrical Safety Program Solutions) Inc. released the NFPA 70E software version of its Electrical Safety eLearning, and is looking “forward to this success flowing south of the border”. The Electrical Safety Training System (ESTS) is a multimedia-based, interactive experience consisting of several modules with multiple lessons, knowledge checks and final assessment. The ESTS uses 3-D virtual electrical workplace scenarios and a digital electrical classroom as a learning aid. The ESTS is available for both electrical workers (4 hours of instructional content) and non-electrical workers (45 minutes of content).

ESPS
www.esps.ca

Extech releases EX845 MeterLink diagnostic app for Android



Extech has developed the EX845 MeterLink app for Android mobile devices, allowing electrical contractors and plant maintenance professionals who use Extech’s EX845 clamp meter to remotely view and display readings from the meter on an Android phone or tablet up to 10m or 30ft away. The app displays values for the following functions: AC/DC voltage, AC/DC current, capacitance, resistance, frequency, diode test, and temperature (both from a Type-K thermistor probe and from the meter’s built-in non-contact, laser infrared thermometer). Function indicators highlight which measurement mode is selected on the meter. Additionally, Data Hold and Min/Max functions are also remotely displayed. The MeterLink app also features a log of recent readings for quick reference, basic trending and more context. It can be downloaded now at the Google Play Store app.

EXTECH INSTRUMENTS
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Wheatland Tube launches Wheatland Electric Catalogue iPad app

Wheatland Tube—a division of JMC Steel Group—launched its newest app for the iPad (iOS 6 platform): the Wheatland Electric Catalogue, which provides product information

for Wheatland’s electrical sales teams, distribution partners and end-user electrical contractors. The app allows users to view and share the catalogue; access educational videos about Wheatland products; look up product specs; read code-compliance information, and more. To download the



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VENTURE LIGHTING

Get organized with Electrician's Tote and other bags from Lenox

Lenox has unveiled a new line of toolbags for tradesmen to store and organize their hand and power tool accessories. Lenox says tradesmen have told them "they want a bag with more room, that's strong enough to hold multiple tools and can stand up to vigorous use", which is why these bags were engineered with reinforced rivets and water-resistant bottoms. Tested to hold 2x its



weight limit, each bag is designed with a variety of pockets that provide multiple ways to arrange and store tools. The Electrician's Tote has eight interior and 12 external pockets, five open storage areas and 16 elastic loops. It includes a tape measuring clip, key clip, tape holder loop and small parts bin. A clip-on handle allows the tote to be hung anywhere. The Bucket Tool Organizer has 22 exterior and 12 internal pockets; it includes a hammer loop, tape-holder loop and side clips. The

Contractor's Tool Bag has a large open mouth and 14 interior pockets. It includes hammer loop and small parts bin.

LENOX
www.lenoxtools.com

Milwaukee unveils contact temp meter 2270-20

Milwaukee Electric Tool has introduced the 2270-20 contact temp meter, featuring a dual thermocouple input and delta T calculation to help users better identify and address temperature issues in heating and cooling systems, it says. The contact temp meter measures from 1372C to -200C (2,500F to -325F), and using the data collected, the meter will also calculate the Delta T of the two temperatures. A timer function also allows users to track minimum, maximum and average temperatures for up to a 24-hour period. The meter boasts a simplified keypad and interface, and a high-contrast white on black display to make reading the display easier from far away and in all lighting conditions. Additionally, a magnet and strap allows the meter to hang during use for hands free measurement.



MILWAUKEE ELECTRIC TOOL

www.milwaukeetool.com

Megger 5kV and 10kV insulation resistance testers



Megger, a manufacturer and supplier of test equipment and measuring instruments for electrical power applications, is now offering three insulation resistance testers (IRTs) rated at 5kV and 10kV. Designed for use by electrical contractors, wind farm and solar generation operators as well as power generation, testing service and industrial manufacturing companies, the 5kV MIT515 and MIT525 and 10kV MIT1025 boast compact, light-weight operation and rapid charge capabilities. The MIT515, MIT525 and MIT1025 are rated for use at an 3000m altitude, and a rotary switch dial selects the test voltage, test mode, memory and other functions. All units feature a lithium-ion battery and can test continuously for up to six hours.

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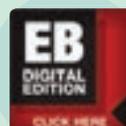
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Another look at Appendix B

In an earlier article (“Canadian Electrical Code, Appendix B”, EBMag February 2013, p. 26), I suggested checking for an Appendix B interpretation when applying any of the Canadian Electrical Code (CEC) rules for the first time. Appendix B is there to help us better understand the intent of the rules and provide important supporting information. Here are a few more examples:

Rules 4-004(1)(d) and 4-004(2)(d) provide allowable ampacities for underground wiring. Conductor configuration Diagrams B4-1 to B4-4 for underground conductor installations are located in Appendix B, with the allowable ampacity Tables D8A to D15B associated with these diagrams for copper and aluminum underground conductors in Appendix D. The ampacity tables are based on 90C-rated conductors.

However, new Rule 4-006 requires that when equipment is marked with maximum connection temperatures, the conductor ampacities must be based on the applicable columns in Tables 1 to 4. To convert the 90C conductor ampacities, Appendix B explains that underground ampacities for conductor temperatures of 75C to 60C may be obtained by multiplying the 90C temperature ampacities by the derating factor 0.886 (for 75C) or 0.756 (for 60C). These conversion factors help us meet the requirements of Rule 4-006.

Rule 2-320 requires that adequate ventilation be provided to prevent overheating of heat-producing electrical equipment.

Appendix B helps us by specifying that about 3.5m³/min to 4.3m³/min is normally provided for each kilowatt of loss for ventilating 40C rise equipment.

Rule 10-500 defines effective grounding as a ground fault path of sufficiently low impedance so as to facilitate operation of overcurrent devices (fuses and circuit breakers). Appendix B explains that an effective ground fault path will have impedance sufficiently low enough to permit at least 5x rated current to flow during a ground fault. This definition explains various rules that call for effective grounding.

Rule 10-814(1) specifies that bonding conductor sizes must not be smaller than specified in Table 16. Appendix B makes two important exceptions to the rule:

1. When correctly sized raceways (conduit or tubing) and metallic cable sheaths are permitted for use as bonding conductors, they are considered to be adequate for the purpose.
2. Bonding conductors in cable assemblies are sized in accordance with the applicable Part II standards. While bonding conductor sizes may differ from Table 16, they are considered adequate for the purpose.

Rules 18-050 and 18-066 provide requirements for selecting equipment when employing the Zone system of classifying locations for flammable and explosive gases and

vapours. To assist us in identifying hazardous location equipment, Appendix B supports the rules with detailed specifications for the hazardous gas groups.

Rule 32-202 specifies permissible wiring methods for fire pumps, metal raceways, cables with metal armour or sheaths and non-metallic conduit and tubing in minimum 50-mm concrete. Appendix B takes the requirements for fire pump wiring a step further with this recommendation:

Consideration should be given to the location, routing and design of wiring to minimize hazards that might cause failure due to explosions, floods, fires, icing, vandalism and other adverse conditions that might impair the function of a fire pump.

This extra step is taken to help ensure that power will be available when fire pumps are called upon to perform in an emergency.

With the examples given in these two articles, I hope I have convinced you of the value of Appendix B. **EB**

Les Stoch is president of L. Stoch & Associates, specialists in quality management/engineering services. He is a member of PEO, OEL and IAEL, and develops and delivers electrical code and technical workshops for Dalhousie University. He also developed the Master Electrician training program and exam (Ontario) for the Electrical Contractor Registration Agency. Visit L. Stoch & Associates online at www.lstoch.ca.

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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

Direct-current systems that are to be grounded shall have the grounding connections made at one or more supply stations but not at individual services or elsewhere on interior wiring.

- a) True b) False

Question 2

Flexible cords used in Class II, Division I shall have a separate bonding conductor not contained with the other conductors of the circuit.

- a) True b) False

Question 3

When it is necessary to climb an outdoor floodlighting pole to replace lamps, permanent climbing steps shall be provided and the lowest permanent step shall be not less than [] above locations accessible to unauthorized persons.

- a) 1.2m b) 2.5m
c) 3.0m d) 3.7m

Answers: EBMag March 2013

Q-1: For hotels, the minimum ampacity for service or feeder conductors shall be based on a basic load of [] w/m² of the area of the building plus other lighting loads for special areas and heating and air conditioning loads.

b) 20. Ref. Rule 8-208(1).

Q-2: The radius of the curve on the inner edge of bends made on mineral-insulated cable shall be not less than [] times the external diameter of the sheath and shall be made so as not to damage the outer sheath.

d) 6. Ref. Rule 12-712(1).

Q-3: Electrical metallic tubing shall have an inside diameter of not less than [] tubing.

b) 16 Trade size. Ref. Rule 12-1406.



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