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See page 5.

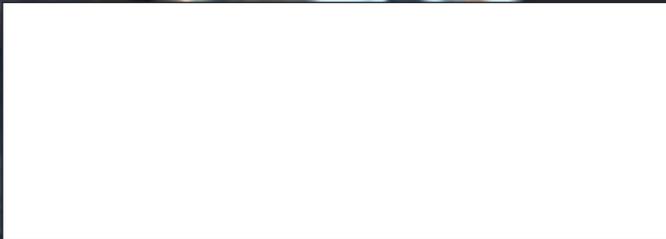


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- Temporary grounds fail to prevent arc incident
- Who's watching the facility's power?

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EBMag is featuring a different guest editor on this page every issue during our 50th anniversary year. You can always reach the editor at acapkun@annexweb.com.

Sid Ridgley is the president of UtilityPULSE, an electricity industry-focused company delivering objective insights and actionable recommendations for improving customer satisfaction, and creating a dynamic organization culture. He can be reached at sidridgley@utilitypulse.com.

Inspire or expire!

In a world constantly being hit with one crisis after another, the challenge for leaders is to ensure their organizations remain relevant to customers, employees and shareholders. Creating value during times of uncertainty requires the hearts and minds of everyone in the organization to be fully focused on achieving results.

It is sad to see organizations with an inordinate number of *going-through-the-motions* employees, but don't blame them; the onus is on the leadership team to create an environment where people willingly give that little extra.

In times of crisis, one must be aware of the potential dangers that lurk in the shadows while being mindful of the opportunities that really do exist. Hunkering down in the bunker promotes retrenchment and, granted, may help an organization survive, but the opportunities to *thrive* may also be missed!

When times are difficult or challenging, managers all too often focus almost exclusively on the immense number of problems that exist. They will focus all of their energy on eradicating the problems, even when it means lobotomizing the organization.

True leaders, on the other hand, recognize there will

always be good times and tough times. During tough times, they concentrate on short-term goals while executing all tasks flawlessly, but never at the expense of keeping their eyes open to opportunities.

In today's economic environment, collaboration, creativity and innovation are the keys to progress. Leaders (and those who follow them) must wield these keys and focus on the things they can do together. Be they employees, customers or suppliers, people will willingly and loyally follow someone when they believe the destination is purposeful and worthy.

Enjoying success today is one thing; ensuring that success is attained again tomorrow, in a changed world, requires a heavy dose of inspiration and a focus on the future.

Relevancy for your company is about combining people, products and services in new ways to create better value propositions—that are both desired and sustainable—to all stakeholders. It is about creating more benefits for sticking with an organization's people, products and services. And this only happens when leaders lead from the front lines, inspiring people to act.

Whereas managers say *Go!*, leaders say *Let's go!* **EB**



Spotlight on energy management

In this edition, Electrical Business turns the spotlight onto energy management, with some feature articles discussing how—when you manage what you measure—you can save!

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Enterprises that rely on interrupted power for business continuity or life safety benefit from sophisticated monitoring and control of their utility power and emergency/backup power. When power management is crucial, a best practice is to use a critical power management system (CPMS).

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14 3M Canada's mission of energy efficiency

With heightened environmental awareness and rising operating costs, successful sustainability practices need to demonstrate a commitment to the environment as well as unnecessary expenses. Innovative energy management practices need to be part of that overall strategy.

20 Can great performers become great managers?

So you promoted a great performer to a manager role, and he is not working out. It's in no one's best interest for a new manager to fail, as it can damage the leadership brand of the organization and deter aspiring managers from wanting a leadership job.

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EBMag checks out Nedco Electrifest X



PHOTO A. CAPKUN

Nedco general manager Gerry Drummond and EBMag associate editor Alyssa Dalton draw a prize winner.

Nedco Ontario (www.nedco.ca) recently hosted its Mardi Gras-themed Electrifest (10th edition), which is among the industry's largest single-day selling

shows. The EBMag team always has a blast at this event: besides the food and entertainment, it's always great meeting with top-notch vendors, friendly Nedco staff and, of course, our valued readers.

Speaking of readers, congratulations to the following who visited our booth and dropped off a business card for chance at some prizes (and a special thanks to the prize donors):

- Zach O. of London, Ont., won a Milwaukee tool belt/pouch. His name was drawn by Nedco's Gerry Drummond.
- Ralph C. of North Bay, Ont., won a Lenox tool tote. His name was drawn by Mayor Hazel "Hurricane" McCallion.
- Ron T. of Barrie, Ont., won a Fluke 62Max+ IR thermometer. His name was drawn by The Dance Company.

U of T hosting NECA's first international student chapter

The National Electrical Contractors Association (NECA, www.necanet.org), based in the States, recently announced it has established its first international student chapter, located at the University of Toronto. Congratulations!

The new student chapter at U of T is sponsored by the Canadian Electrical Contractors Association (CECA, www.ceca.org), which was recognized as NECA's first international chapter several years ago. The new chapter is also CECA's first student chapter.

According to NECA, "Our northern neighbour plans to establish more for the same reason they are becoming so popular on this side of the border: to prepare students for future managerial roles in the electrical contracting industry".

Giroux and Medewar heavily fined for illegal electrical work

A general contractor and a licensed electrical contractor have both been convicted and fined for illegal electrical work done in several Ontario schools in the Ottawa, Kingston and Pembroke areas.

On April 3, 2014, Ontario's Electrical Safety Authority (ESA, www.esasafe.com) says Mario Giroux—owner of Construction G operating in the Ottawa area—pleaded guilty to 13 counts of performing electrical work without an electrical contractor's licence, eight counts of failing to apply for inspection and one count of leaving an unsafe condition. Meantime, on April 24, Nick Medewar of NM Electric was convicted in an Ottawa court of six counts of illegally taking out electrical permits on behalf of an unlicensed contractor working for Construction G.

According to ESA, Construction G hired a worker who performed electrical work on its behalf but did not ensure this worker held the required electrical contractor licence. The worker subsequently arranged to have electrical permits taken out illegally by Medewar—who is a licensed electrical contractor (LEC)—for work at several schools of the Conseil Des Ecoles Catholiques du Centre-Est, and at least one residential site. That worker has been charged with doing electrical work without a licence, and this case is before the courts.

"This is an issue where multiple illegal actions

put public safety—specifically children—at risk," said Normand Breton, ESA's general manager, harm mitigation, who oversees ESA's electrical contractor licensing system. "Through the course of our investigation, we discovered significant electrical hazards at one school that could have seriously injured or killed someone, or caused a fire."

The court imposed a fine of \$58,750 for Giroux's violations and Medewar was fined \$7500. Both fines include a 25% victim fine surcharge, which is credited to a provincial government fund to assist victims of crime.

New Southwire Energy Center "unlike any plant" you've ever toured

By providing a unique environment for customers to discuss product needs—as well as observe the manufacturing process of wire and cable that crews will deploy in the field—Southwire (www.southwire.com) believes the Southwire Energy Center extends the company's reputation for innovation as an energy industry supplier.



"We believe the Southwire Energy Center is unlike any plant our customers have ever toured," boasted Michael Tribble, vice-president, Substation Cables. "We have co-located our sales and product development teams with our manufacturing and logistics operations. This builds stronger collaborative problem-solving in a modern facility that allows customers to be involved in product development and observe the manufacturing process like never before."

Located in Villa Rica, Ga., the centre will aim to develop smart grid components and products for renewable energy projects. However, the new multimillion-dollar facility's primary focus is to expand Southwire's substation cable technology and solutions. In fact, the company says the facility will pioneer a 'substation kit' that will be custom-packed with all of the cable components needed to build or upgrade a substation based on customer specs for individual projects.

The centre will manufacture specialty substation cables along with control cables that include Southwire's Proof Positive Technology to help deter theft.

Watch the video at bit.ly/1k10K2t to learn more.

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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Wow! 3M celebrates 100,000th patent**3M**

3M (www.3m.ca) reached a milestone in May with the issuance of 52 patents, moving the company's total number of patents past the 100,000 mark.

"We celebrate this important milestone and honour all of the scientists whose inventions have contributed to the success of 3M and the products it brings to companies, homes and people," said Fred Palensky, 3M executive vice-president and chief technology officer.

3M says about 3000 patents are issued to the company worldwide each year. Its first patent was granted 90 years ago in 1924. The following year, former 3M chair William McKnight earned 3M's second patent... for a handle for sandpaper.

"Patents are critical to protecting our innovation and significant investments in R&D," said Palensky. 3M invests nearly 6% of sales annually in R&D, including funding for multiple technology platforms that will be introduced to the market in the coming years."

GE offers \$13.5 billion to acquire Alstom businesses

GE (www.ge.com) and Alstom (www.alstom.com) announced that GE has submitted a binding offer to acquire the Thermal, Renewables ("Power") and Grid businesses of Alstom, consisting of \$13.5 billion "enterprise value" and \$3.4 billion of net cash, totalling \$16.9 billion.

"Power & Water is one of our higher growth and margin industrial segments, and is core to the future of GE," said Jeff Immelt, GE chair and CEO. "Alstom's businesses are very complementary in technology, operations and geography to our power and grid businesses. We expect a collaborative and prompt integration that will yield efficiencies in supply chain, service infrastructure, commercial reach and new product development."

The Alstom board has positively received GE's offer and has appointed a committee of independent directors to review the transaction by June 2. Should this review conclude positively, an exclusivity period beginning no later than June 2 will be granted, and the next steps will include Works Councils

consultation, Alstom shareholder approval in a shareholder meeting and customary regulatory approvals.

It is not a done deal, however. While expected to close in 2015, Alstom's board is permitted to consider unsolicited alternative proposals for the acquisition of Alstom, or of the Power and Grid businesses.

"The proposed transaction would allow Alstom to develop its Transport business as a stand-alone company, with a strong balance sheet to capitalize on opportunities in the dynamic rail transport market," said Alstom's chair and CEO Patrick Kron.

Alstom's Power business provides equipment and services for

integrated power plant solutions for a variety of energy sources, including steam, hydro, coal, gas, nuclear steam, wind and other forms of renewable energy. The Grid business offers transmission & distribution solutions to support the build-out of the power grid in emerging economies and replacement of aging electrical infrastructure.



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Anthony Varga, president, Rittal Systems Ltd. accepts an award for being among Canada's Best Workplaces, 2014.

"Trust is the foundation" at Canada's 2014 Best Workplaces

100 companies were recently recognized as the Best Workplaces in Canada for 2014, and making the cut were Hilti (Canada) Corp. and Rittal Systems Ltd. Congratulations!

"Becoming a 'Best Workplace in Canada' was not the goal for our company," explains Rittal (www.rittal.ca). "What we struck out to do was to highly differentiate ourselves in our industry by becoming the best company to work with!"

Organizations on this year's list were ranked using the results of an employee survey—the Trust Index, developed by global research firm Great Place to Work Institute. This methodology is used by over 6000 organizations in almost 50 countries each year, making it the most widely adopted workforce satisfaction tool in the world.

"We are excited to once again receive this recognition," said Avi Kahn, president and general manager, Hilti Canada (www.hilti.ca). "Being a great place to work is at the heart of our culture, so when we are appreciated by our team members and an organization like Great Place to Work, we appreciate that."

"Regardless of size, industry or the current economic climate, each of these organizations has discovered that trust is the foundation for quality jobs and performance excellence," say the folks at Great Place to Work Institute.

Alberta wants employers and workers to "Work Right"



Visit bit.ly/RQnhVv to watch the campaign videos.

How many hours do you work before you are owed overtime? Is it ever too hot or too cold to work outside? Alberta's new Work Right campaign (workright.alberta.ca) poses questions like these and invites employers and workers to find out more about workplace rules.

"Our goal through this campaign is to instill a culture of compliance in the workplace, where fairness and safety are the norm," explained Thomas Lukaszuk, minister of jobs, skills, training and labour. "To do this, we are encouraging workers and employers to question what they know about occupational health and safety and employment standards, and we're providing the resources to help them find the answers."

Highlights of the Work Right campaign include:

- Interactive workright.alberta.ca website with questions, answers and links to more information
- Downloadable products
- Media and social media support

Campaign research indicates that while employers and workers both believe they have a good grasp of existing workplace rules, they often don't, says the province.

"This is the first time we have combined Occupational Health & Safety and Employment Standards awareness activities. These two sections of government work with employers and workers every day, so it was a natural fit to promote better understanding of workplace rules and make maximum use of our resources," added Lukaszuk.

Individuals with questions or concerns about workplace rules can call the Occupational Health and Safety Contact Centre at (866) 415-8690 or the Employment Standards Contact Centre at (877) 427-3731.

What do a heliophysicist and our power grid have in common?



Photo 1

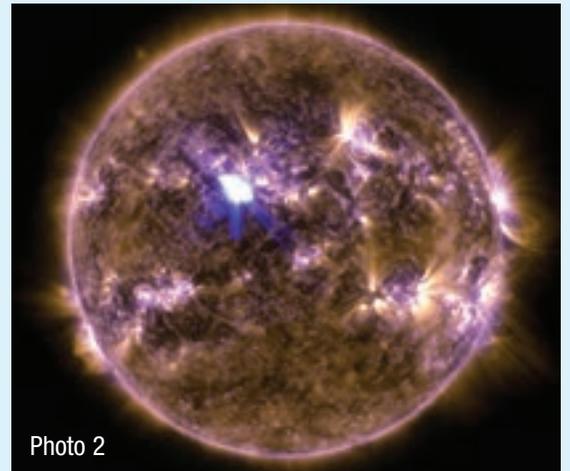


Photo 2

Photo 1 shows Antti Pulkkinen of NASA's Goddard Space Flight Center. Photo 2, courtesy NASA Solar Dynamics Observatory, shows a strong solar flare from April 2013, accompanied by a coronal mass ejection (CME) headed toward Earth.

A NASA scientist is launching a 1- to 2-year pilot project this summer that takes advantage of high-voltage power transmission lines to measure a phenomenon that has caused widespread power outages in the past, and even crashed Hydro-Quebec's transmission system: geomagnetically induced currents, courtesy of a flatulent sun.

GICs typically occur 1 to 3 days after the sun unleashes a coronal mass ejection (CME), explains NASA, which is a "gigantic bubble of charged particles" that can carry up to 10 billion tons of matter. CMEs can accelerate to several million mph as they race across space. Should a CME slam into Earth's magnetosphere, the impact causes electromagnetic fluctuations, resulting in geomagnetic storms on the planet.

These storms increase electric currents that, in turn, drive the fluctuations in Earth's magnetic field near the ground, adds NASA. These surface currents can flow through any large-scale conductive structure, including power-lines, oil & gas pipelines, undersea communications cables, telecom networks and railways.

This is important stuff, because an extreme example of a GIC occurrence was the magnetic storm of March 1989 which, according to NASA, was one of the largest disturbances of the 20th Century. This event precipitated the collapse of Hydro-Quebec's transmission system, causing the loss of electric power to more than six million people.

Enter heliophysicist Antti Pulkkinen of NASA's Goddard Space Flight Center: he and his team are installing scientific substations beneath high-voltage power transmission lines operated by Virginia's Dominion Virginia Power to measure GICs in real time.

"In essence, we're tapping into a very large antenna," Pulkkinen said. "The high-voltage lines are the antennae. During solar storms, violent changes in the electric current occur in near-space, which then are sensed by the transmission lines."

The team is creating three substations, all equipped with commercially available magnetometers capable of measuring the variable magnetic fields associated with GICs. Once inserted inside a protective, watertight housing unit, the team will bury the gear 4 feet into the ground; two directly below Dominion Virginia Power's high-voltage lines and the third 1 to 2 miles away (to provide reference measurements).

In addition to gathering data important to the power industry (especially if it's expanded nationwide, as currently planned), the project will allow heliophysicists to reverse engineer the data to learn more about the conditions in Earth's upper atmosphere that lead to the generation of GICs during severe space weather events, explained Pulkkinen. "Not only will this benefit the utility industry, it also benefits science."

Continued on page 8



Mark Borkowski

Heed the liens that lurk

When borrowing capital for your company, the biggest issue is the lien. When small-business owners consider a loan, their primary concerns are generally what you would expect:

- What is the interest rate?
- How big is the loan?
- What will the monthly payments be?

But another often-overlooked issue lurks in the background: What liens will the lender take, and how will that affect the owner's ability to borrow in the future? Sometimes, the answers to these questions can be devastatingly important.

These liens are also referred to as personal or corporate guarantees. When a lender files a lien, it places the lender in a position to be able to take a borrower's assets in case of default. Sometimes, additional liens are filed by other creditors behind the lender's first lien; these creditors assume subordinate positions and would be able to claim proceeds in liquidation only after the holder of the first lien has been paid off.

Naturally, lenders prefer to be in the first lien position. When a lender does take a second or third lien position, the loan is riskier, and often requires a much higher interest rate.

And that's why paying attention to the lien is critical. When you give up first lien position on some or all of your assets, you really want to make sure you are getting the money you need at the right price, because subsequent loans are likely to be either more expensive or impossible to obtain. Unfortunately, many small-business owners don't pay attention to this.

Our firm recently helped a rapidly growing client that had outgrown its line of credit with a bank. It was growing fast, but wasn't yet profitable enough for the bank to extend more money. Instead, the company chose to take money from an accounts receivable factoring company. We made our client aware of the higher cost associated with factoring but, given the company's relatively high margins and growth prospects, the owner was willing to pay the higher price for faster access to capital.

As part of the process of setting up the factoring relationship, we learned that the company's current lender had placed a blanket lien

When you give up first lien position on some or all of your assets, you really want to make sure you are getting the money you need at the right price, because subsequent loans are likely to be either more expensive or impossible to obtain.

against all assets of the business, including the accounts receivable. We worked with the client to evaluate the option of using some of the proceeds of factoring to pay off the existing bank line. The factoring arrangement still made sense, and our client made arrangements to pay off the existing line of credit at closing, at which time the bank would remove its lien on the receivables to be replaced by a new lien owned by the factoring company.

But as we moved toward closing, we were surprised to learn that the company had entered into a purchase-finance agreement for a small piece of equipment a few months earlier, and the equipment seller had placed a blanket lien on all of our client's assets, including its receivables. Without removing this lien, the transaction could not proceed because the factor, understandably, insisted on being in the first position on the asset against which they were lending.

Much to our surprise, the equipment company would not agree, and the client had to make the difficult decision to pay off the equipment loan with proceeds from the factoring agreement at a much higher rate and on less favourable terms.

Have you ever gotten tripped up by a lien? What was your experience, and how did you handle it? **EB**

Mark Borkowski is president of Toronto-based Mercantile Mergers & Acquisitions Corp. (www.mercantilemergersacquisitions.com), which specializes in the sale of mid-market companies. Acquisition search represents a portion of its activity.

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Eddy and Epitron rule the Canadian roost at AD Spring meeting



North American wholesale marketing group Affiliated Distributors (AD, www.adhq.com) recently held its annual Electrical Division Spring Network Meeting, where two Canadian distributors—Eddy Group and Epitron—received particular attention for their efforts.

The Canadian Electrical Division Business Meeting included the presentation of growth and participation awards for AD Distributors. Epitron Inc. (www.epitroninc.com) was recognized for the Greatest Overall Growth in Remittances, and Eddy Group Ltd. (www.eddygroup.com) for Highest Overall Participation. Congratulations!

AD's Spring Network Meeting included network sessions, Affiliate-led divisional board and committee meetings and a business update. Supplier sponsors at this event included: 3M, Arlington, CRC Industries, Hubbell Lighting, Ideal Industries, Juno Lighting, Milwaukee Tool, Priority Wire & Cable, SATCO Products and Watt Stopper-Legrand.

Eaton kicks off 2014 Power Distribution & Control Assemblies tour



Eaton has launched the Power Distribution & Control Assemblies (PDCA) Solutions Trailer Tour (www.eaton.com/trailertour), showcasing products from Eaton's Electrical Sector and Eaton's Crouse-Hinds business, with stops in over 35 cities in Canada and the States through to November 2014.

"Touring the mobile showroom provides customers and end users an opportunity to learn how our products can make electrical systems more efficient, cost-effective and safe," said Pat Hickey, division marketing manager, PDCA, Eaton.

The 53-ft mobile showroom will display solutions addressing things such as arc flash safety, space-saving equipment and communication systems. Additionally, products for heavy-industrial harsh and hazardous environments will be featured.

The tour targets electrical consultants, specifying engineers, utility companies, corporate and plant engineers, facilities directors, and safety and risk managers. For Canadian tour dates, visit www.eaton.com/trailertour.

Limiting energy availability leads to stunted economic growth—Fraser

Limiting the availability and raising the cost of energy can hurt Canada's overall economy and weaken future growth, finds a new study released by the public policy think-tank, Fraser Institute.

The study, Energy Abundance and Economic Growth (bit.ly/1qSDIWd), examines the long-term relationship between economic growth, energy availability and energy consumption with evidence from Canada and around the world.

"Energy use and economic output grow together over time, and the evidence shows that if you limit energy use, you damage future economic growth prospects," said Ross McKittrick, study co-author, Fraser Institute senior fellow, and economics professor at the University of Guelph.

"It's obvious—energy drives economic growth. Yet policy-makers across Canada continue to treat energy consumption as a bad



thing, and act as though cutting energy use is an end in itself," McKittrick said.

For example, policies that increase energy costs or limit its availability (e.g. renewable energy mandates or the required use of biofuels such as ethanol or biodiesel) diminish competitiveness, reduce rates of ROI, and reduce economic growth, says the institute,

adding that conservation mandates and strict appliance standards (e.g. water heaters, refrigerators) often "have no conceivable environmental benefit" but are justified simply because they cut energy use.

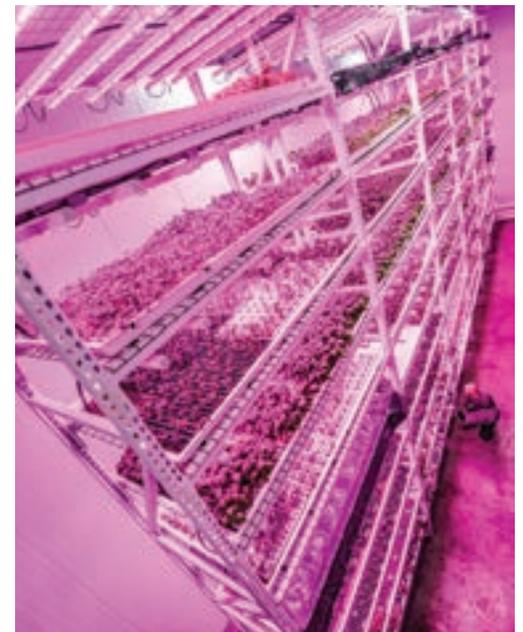
"The Ontario government, for instance, claims that the Green Energy Act, which increases energy costs, thereby making it less abundant, is part of the province's economic growth strategy. The evidence points in the opposite direction—the act will limit future economic growth," McKittrick said.

Using LED 'light recipes' to optimize crop yield and quality

Philips (www.philips.com) has partnered with Chicago, Ill.-based Green Sense Farms (GSF) to develop what it calls one of the largest indoor commercial farms using LED grow lights that are tailored to their specific crops. This farming model aims to allow Green Sense to harvest 20 to 25 times annually by using 'light recipes' optimized for their produce while using 85% less energy.

Philips says population growth, decrease in arable land and crop disasters are driving innovation of farming technologies to allow plants to grow without sunlight in indoor environments close to—or within—cities.

Plants use certain wavelengths of light more efficiently, and respond differently to different sets of wavelengths, explains Philips, adding that LED technology allows it to fine-tune and tailor-make 'light recipes' optimized to the needs of specific crops.



"GSF is using vertical hydroponic technology with Philips LED growing lights, enabling them to do what no other grower can do: provide a consistent amount of high-quality produce year-round," said Udo van Slooten, director of horticultural lighting at Philips.

GSF has invested millions to renovate and equip a million-cubic foot indoor growing area consisting of 14, 25-ft tall growing towers in two climate-controlled grow rooms that use Philips LED solutions tailored to specific crops. This method also eliminates the need for harmful pesticides, fertilizers or preservatives, says Philips, resulting in produce that is organically grown and virtually chemical free.

"By growing our crops vertically [in photo], we are able to pack more plants per acre than we would have in a field farm, which results in more harvests per year," said Robert Colangelo, founding farmer/president of Green Sense Farms.

GSF's vision is to build farms at institutions, such as college campuses, hospital complexes and military bases that can serve large worker populations, reducing the miles their food travels and improving freshness. **EB**

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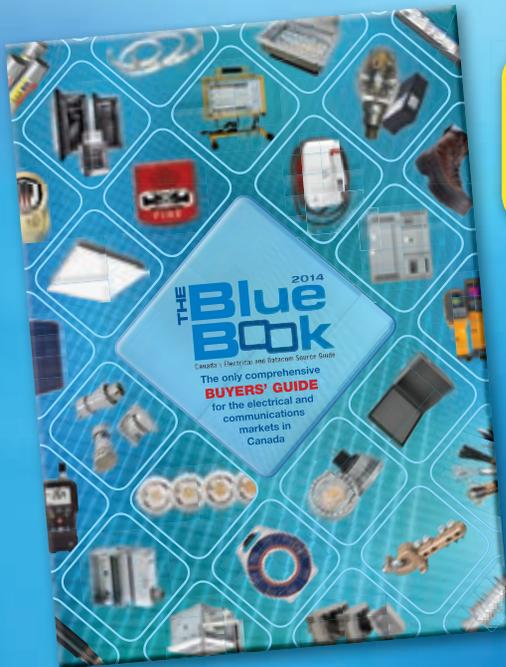
Visit EBMag.com's **Calendar** on the homepage to see an extensive list of upcoming events.

IN CASE YOU MISSED IT...

- PHOTOS** • The EBMag team had a blast at Nedco Ontario's Electrifest—besides the food and entertainment, it's always great meeting with top-notch vendors, friendly Nedco staff and, of course, our valued readers. Visit bit.ly/1htHfP9.
- VIDEO** • Charles A. Cipolla—chair of Electrical Safety Authority (ESA) and chair of Cambridge and North Dumfries Hydro—received Electro-Federation Canada's 2014 Industry Recognition Award. Visit bit.ly/1tGxLVX.
- VIDEO** • With a recent donation of \$230,000, Schneider Electric has donated close to \$2 million in equipment and monetary contributions to Habitat for Humanity Canada since 2004. Visit bit.ly/QAJ3f1.

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August 7-9, Atlanta, Ga.
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IEEE IAS PCIC Annual Conference
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Who's watching the facility's power?

The importance of installing power monitoring and control

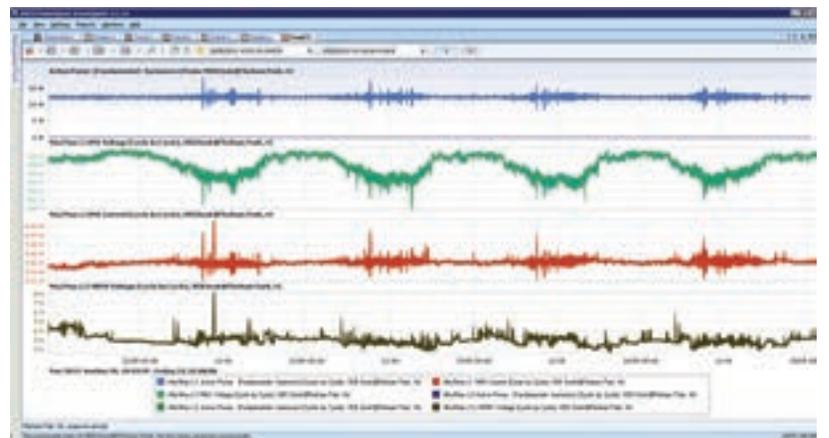
Bhavesh Patel

Enterprises that rely on uninterrupted power for business continuity or life safety—including data centres, financial institutions, telecom companies and healthcare facilities—benefit from sophisticated monitoring and control of their utility power and emergency/backup power. But many businesses and facilities do not yet have that capability.

Implementing optimal monitoring starts with a detailed needs assessment. Asking the right questions will help determine the level of system sophistication. Issues to explore include understanding who's watching the system (onsite or remotely), knowing what happens when an event occurs and whether the facility is well-equipped to respond to that event.

Another critical issue is tolerance for downtime. What is considered acceptable varies widely. Five minutes may be the maximum one enterprise can tolerate while another may find eight hours acceptable. Flexibility and scalability of a monitoring and control system are also crucial because an enterprise can grow, and the business model can change.

At one end of the spectrum are building management systems (BMSs) which have limited capabilities with respect to high-speed monitoring and control because of their narrow bandwidth. When power management is crucial, a best practice is to use a critical power management system (CPMS) to monitor, control and analyze normal and emergency power. CPMSs frequently monitor data from the moment electricity enters the building from the utility main to the furthest switchboard, as well the components of the emergency/backup power system.



Critical power management systems (CPMSs) frequently monitor data from the moment electricity enters the building from the utility main to the furthest switchboard, as well the components of the emergency/backup power system.

Critical power management systems

CPMSs often have some functions and alarms integrated into a building management system. High-end CPMSs feature integrated devices communicating on a dedicated network.

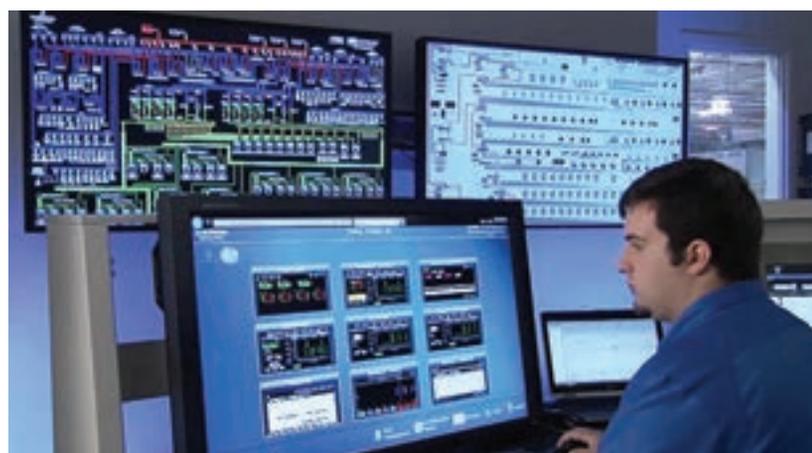
A CPMS often monitors a range of electrical equipment, including emergency gensets, circuit breakers, transfer switches, bus bar, paralleling control switchgear, and other power system equipment. It can also facilitate onsite power system testing, load management and bus



Power quality analytics can be used for pre-function testing to look closely at systems and their responses, and to simulate transients.



A critical power management system (CPMS) often monitors a range of electrical equipment, including emergency gensets, circuit breakers, transfer switches, bus bar, paralleling control switchgear, and other power system equipment.



Power quality analytics can also provide forensics: post-event troubleshooting to help identify where a failure could have occurred.

bar optimization. In addition, it may monitor normal and emergency voltages and frequency; indicate transfer switch position, source availability, normal and emergency voltage and frequency, current, power and power factor; and display transfer switch event logs, time-delay settings, rating and identification.

A sophisticated CPMS has a wide bandwidth and operates at extremely high speed, and has the ability to cache or share large amounts of data from one device to another without disrupting building functions. Most of the data transfer between subsystems of the CPMS happens at speeds and bandwidths that would incapacitate most BMS systems.

Issues to explore include understanding who's watching the system (onsite or remotely), knowing what happens when an event occurs and whether the facility is well-equipped to respond to that event.

A high-end CPMS is typically accomplished through stand-alone proprietary network or through individual vendor agreements for sharing critical information under one umbrella. These stand-alone networks, in turn, feed essential information to a BMS.

Extremely high rates of speed are required to generate such power quality details as wave form capture or transient harmonic displays. That said, some power monitoring details do not require lightning speeds, and can be accomplished at the BMS level.

Though a BMS doesn't have the scope of capabilities of a sophisticated CPMS, a BMS can play a role in protecting the emergency power system. For instance, a CPMS may send automatic alerts on system operation via pager, e-mail or selected system alarms to the BMS.

Power quality analytics

Power quality analytics are the leading edge of CPMS technology, though still generally less widely used than other CPMS capabilities. According to a recent survey conducted on behalf of ASCO Power Technologies of facility executives, not quite one quarter of respondents indicated their businesses had a single system that monitors, controls and provides reporting and power quality analytics for the emergency/backup power system.

This analysis can serve many goals. For example, it can be used for pre-function testing to look closely at systems and their responses, and to simulate transients. It can also be used for trending and predicting growth, which can help, for example, in determining how to plan for adding servers or, perhaps, variable frequency drives to control energy costs.

Power quality analytics can also provide forensics: post-event troubleshooting to help identify where a failure could have occurred, asking such questions as why did the facility lose a particular breaker that tripped the PDU (power distribution unit) and caused a chain of events that caused a switchover to the UPS (uninterruptible power supply)? Was the cause a short or floating ground, or an electrical spike? There are many different events, the analysis of which would benefit from a recording scale fast enough to identify exactly what started the event within a very small time frame (often milliseconds).

And when problems with power do happen, there can be a quick cascade of events. Forensics generated by a high-end CPMS can give fast and accurate time marks to track down where things went wrong. (Forensic capabilities generally are not employed across the board but rather should be used judiciously in key locations.) For example, event analysis and disturbance reporting via a CPMS can provide data on specific equipment that failed, an identification that might enable management to alert the manufacturer that a piece of equipment is not operating within its warranty.

Two other major features of CPMS are functional testing and continuous commissioning, which is the testing and retesting to ensure everything is operating as designed and constructed, which can be mighty helpful, even when facilities are not required to perform monthly or other periodic emergency power testing.

And, though power reliability is the primary function, CPMSs can contribute to energy savings by transferring loads, optimizing utility peak demand loads. With their multitude of capabilities and breadth of information they make available, CPMSs offer high visibility into power movements within a facility, enabling management to prevent many problems from occurring. 

Bhavesh S. Patel is director of marketing and customer support at ASCO Power Technologies (www.emersonnetworkpower.com/asco), a business of Emerson Network Power.

How to get your energy management projects approved

Hooman Fazlollahi

When energy managers of industrial or manufacturing organizations think of energy management systems, the first thing that crosses their mind is the need for extended and costly metering... and they're right. The more granular the energy consumption data throughout the process, the more effective the energy management (EM) system will be in identifying the most energy savings opportunities. Therefore, energy managers look at extending metering infrastructure as an essential prerequisite to an energy management system.

However, when energy managers attempt to define and initiate projects for upgrading and extending the infrastructure, their efforts can fall short of being approved by management. The reason is mainly the lack of available data or persuasive arguments justifying the cost for such projects. After all, without a proper EM system, how can they have enough data to back their ROI claims?

This is why energy managers find themselves in a frustrating deadlock, which makes it difficult for them to make any progress toward implementing an EM system in their organizations.

In many cases, the alternative is to resort to creating in-house automation-based monitoring tools to improve visibility, but most of these tools are limited in scope and usability. The all-important analysis, trending and reporting functions are either very limited or non-existent.

Can this loop be broken? Is it possible to skip on the costly metering projects and implement an EM system that will get good results despite the lack of metering?

Make the most of what you already have

Even with minimal metering, there are potentially great gains to be made by implementing an energy management system. A higher level of awareness combined with proper trending and analytical tools has its advantages:

Advantage 1: Easier to identify the low-hanging fruit

Could monitoring just the main meters in, say, a production facility, produce positive results? Yes, it could, when the objectives are kept simple. In the typical facility, there are a lot of cases of ongoing energy waste that may very well be known to everyone. However, many of these cases are overlooked due to lack of awareness of their magnitude and cost. This lack of awareness, or even ignorance, is in part the result of not having the proper monitoring tools available.

Here are a couple of examples of how some low-hanging fruit cases can be identified by simple monitoring and trending:

Process tweaks: There are many energy-saving procedures and protocols that can be implemented to make a process more efficient. But without a proper monitoring and trending tool, it would not be possible to assess the results of such actions in real-time. Being able to detect even small energy fluctuations as a result of a procedural change allows the energy manager to identify the effectiveness of that action right away, and ensure sustained continuation of the new procedures. This can amount to significant savings.

Hardware problems: A given operation has an expected consumption and pattern. These patterns can be monitored to ensure they are within the expected range. Any deviations provide energy managers the ability to detect problems that can be due to a procedural flaw, faulty equipment, leaky air pump or other abnormal conditions. It may be difficult to pinpoint the problem quickly due to limited metering, but at least the problem is detected and actions can be taken.

In an industrial environment, such actions may amount to hundreds of thousands, even millions, of dollars in savings each year. It would be very difficult for anyone's management to dismiss such numbers. In this case, the energy manager can enjoy a much more favourable position when proposing metering (or related) projects.

Advantage 2: Corporate responsibility culture-building can start right away

One of the biggest challenges energy managers face is building a culture of corporate and environmental responsibility within an organization. To achieve this, much effort must be spent on advertising and marketing energy efficiency values within the organization. However, these marketing efforts would not be effective without quantifiable success stories backing them up. Taking successful actions on the low-hanging fruit can provide the momentum needed to rally the organization behind energy managers and their vision.

Advantage 3: Easy access to energy information and reports

An enterprise EM system will hold all energy data of the organization's various operations in one central place. This makes it much easier for energy managers to access and analyze the data. They can quickly look at trends, costing and environmental reports (e.g. GHG and carbon), effortlessly. This makes it much easier to perform the necessary analysis required to pursue their initiatives.

Revive the energy management project by simplifying the scope

When metering is not an essential component for getting some positive preliminary results, then postponing it to a later phase is a viable option. When the energy management project is broken up across several phases, it would lower the initial costs of the project and allow it to move forward rather than have it idle indefinitely. As success stories mount and management gets on board, energy managers will have the leverage they need to back their claims, as well as to justify more-ambitious projects.

Conclusion

Based on my interactions with many energy managers, this article aims to offer alternative avenues and find viable solutions to the energy management deadlock.

The concept of real-time EM systems as an essential component of sustainable improvement and optimization is still new in the industrial and manufacturing sectors. The capabilities and benefits of such systems remain ambiguous and complex in the minds of many. Therefore, proposing such projects to any management team is challenging (let alone getting the required capital allocated to move the project forward).

For this reason, it may be advisable for energy managers to reduce the scope of such projects in terms of required capital and resources. The best way to do this is to start simple and use the EM system with existing hardware and focus only on the low-hanging fruit and culture-building. When managed properly, a lot of potential success can be expected. These success stories can be harvested, not only to raise more capital for energy-related projects, but to build and promote a thriving energy efficiency culture within the organization. **EB**

Hooman Fazlollahi is director of development with EnergyMethods.com. This article was originally published at Energy-Manager.ca.



Achieving successful sustainability programs through energy management

3M Canada's mission of energy efficiency

Andrew Hejnar

Sustainability programs in Canada's corporate environment are increasingly extending into industrial and commercial business activities. With heightened environmental awareness and rising operating costs, successful sustainability practices need to demonstrate a commitment to the environment as well as unnecessary expenses. Innovative energy management practices need to be part of that overall strategy.

For its part, 3M has been setting five-year corporate sustainability goals since 1970 that focus on reducing volatile air emissions, waste and greenhouse gas emissions, and improving energy efficiency.

Energy efficiency is really the gateway to achieving our sustainability goals. Improved energy efficiency always leads to emission reductions in other areas. I'm proud to say the 85 energy improvement projects on the go at 3M since 2011 have achieved reductions in electricity demand, energy

intensity, electricity energy and natural gas consumption, to name a few.

While these commitments and results might appear difficult to achieve or require major new initiatives, I can tell you that our progress came through numerous *small but significant* steps that were well-implemented and managed.

In my experience, successful energy management comes from focusing on three areas:

- Technology
- People
- Measurement

By starting with small changes in a facility's existing technology infrastructure, promoting behavioural changes among employees and benchmarking from the very beginning to track progress, reducing electrical energy usage can become a reality for almost all companies.

Best practices learned

Here are some of best practices I've learned as Energy Manager at 3M:

It doesn't have to be complex

Lighting retrofits are a simple, yet highly effective way to decrease the electricity usage in a building. Through the implementation of LED lights, occupancy sensors, energy-efficient light bulbs and natural lighting systems, large electricity cost savings can be achieved through decreased energy consumption.

In our case, lighting retrofits were implemented at our facilities in Ontario (London, Perth, Mississauga and Brockville) to save electricity, resulting in a 30% increase in efficiency in the lighting systems. To be specific, converting to LED lighting systems resulted in savings of more than 240,000 kWh of electricity and annual cost savings of more than \$29,000.

Equally, the installation of 300 occupancy sensors at our London facility is saving

Continued on page 18

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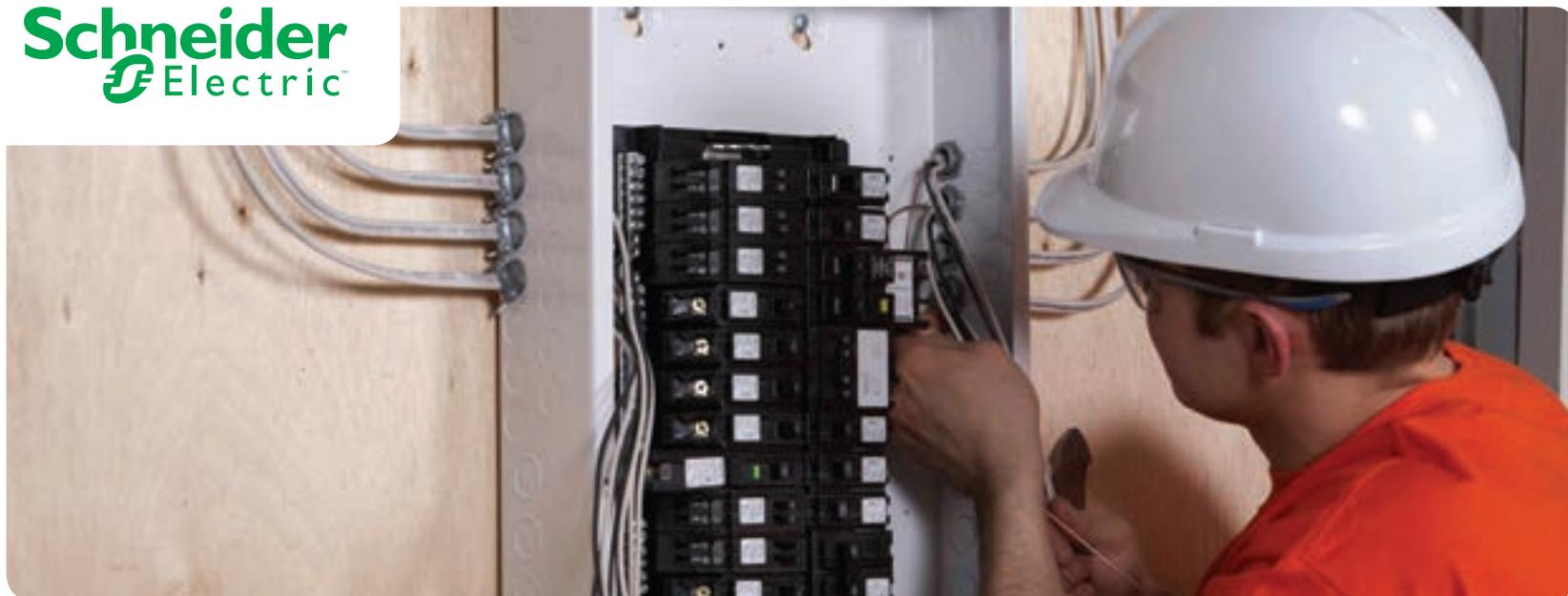
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120,000 kWh annually, and the addition of 800 energy-efficient light bulbs at the plants amounts to an electrical savings of more than 600,000 hours of energy each year. Lastly, we utilized natural light in our headquarters building in London and removed 750 light bulbs. This simple decision saves 56,250 kWh of electricity per year.

Staff is key

Motivating employees to commit to behavioural changes can also have a positive impact on energy consumption. By consistently highlighting the importance of energy consumption to staff and fostering team efforts to reduce consumption, sustainability practices can be effectively achieved.

For instance, we implemented a reward system for employee suggestions that result in projects that effectively reduce energy consumption. This program serves to engage staff in the process, which helps to cultivate new habits. It also leverages their intimate knowledge of day-to-day practices to which management might not be privy. Simple suggestions like shutting down machines when they are not in use or reducing the capacity of certain machines to save energy can result from this type of program and serve as significant energy-saving initiatives over the long term.

Management commitment is essential

Building a successful energy management program involves many elements, with senior management commitment being one of the most important. Usually, sustainability is an ongoing part of any company's Corporate Social Responsibility (CSR) program, so the challenge is getting energy management included as part of that program.

How is that done? The most effective way is to build a business case that not only links energy management activities to any existing CSR programs, but also outlines the potential for financial savings resulting from decreased energy costs. To do this, it's imperative to set a benchmark through measurement by calculating key statistics, such as current electricity usage, and setting improved energy performance goals. In this way you can demonstrate the potential for reduced operating costs, which will help you get the commitment from management you need for a successful program.

To illustrate, the various tactics employed at our Brockville plant save more than 1 million kWh each year, amounting to more than \$350,000 in annual savings. At our London plant, more than 2.5 million kWh are saved each year, with a total electrical cost savings of \$300,000. These are the types of numbers that make a business case compelling for senior management, year after year.

Energy management with ISO 50001

ISO 50001 is a voluntary, international standard framework that supports organizations in all industry sectors manage energy more efficiently. Once implemented, the framework serves to integrate energy efficiency into management processes based on a continuous improvement cycle, and encompasses the three areas I consider key for successful energy management: technology, people and measurement.

The framework is a set of requirements for organizations to:

- develop a policy for more efficient use of energy
- fix targets and objectives to meet the policy
- use data to better understand and make decisions about energy use
- measure the results
- review how well the policy works
- continually improve energy management

3M has experienced great success adopting this standard: our London and Brockville plants are both certified ISO 50001, and our goal is to have all of our facilities certified by the end of 2016 (see Sidebar "3M Canada Brockville plant achieves ISO 50001 accreditation").

Partnership and incentives are important

Initiating an energy management system can seem daunting, and we are proud of—and grateful for—the partnerships we've developed with energy experts across Canada. For instance, we work with Enbridge Gas Distribution, Union Gas, London Hydro and Hydro One Networks by means of equipment incentives, expert advice and support for studies, training, meters and energy management software—all of which contributed to the achievement of ISO 50001 certifications at the Brockville and London plants.

Provincial governments are also supportive, as they offer tax incentives to commercial and industrial establishments that adhere to specific energy management practices. These incentives are intended to support the Government of Canada's goal of successfully generating 90% of its electricity from zero-emitting sources by 2020.

Lastly, Natural Resources Canada has an ecoEnergy Efficiency for Industry program that has a mandate to enhance joint collaboration on the development of clean energy science and technologies to reduce greenhouse gases and combat climate change. Through this program, 3M has received funding to support energy management efforts at our Brockville plant.

The Energy Services Association of Canada has estimated that most commercial and institutional facilities can typically achieve savings between 15% to 35% on their energy consumption through the implementation of energy conservation and sustainability practices. By focusing on technology, people and measurement, establishing a framework and a plan, and remembering that progress comes through numerous small but significant steps, energy conservation can be achieved, and we can all contribute to global sustainability. **EB**

Andrew Hejnar is 3M Canada Co.'s energy manager. With more than 10 years of experience in the field, his focus is on energy performance improvements and GHG reduction at the company's seven manufacturing facilities, as well as office buildings. Hejnar holds a Masters degree in Energy Management, has a degree in Electrical Engineering and has completed industry certificates, including the Advanced Certificate in Facilities Management and Certified Energy Manager, and Certified Energy Auditor. He has also achieved Certified Carbon Reduction Manager accreditation.

3M CANADA BROCKVILLE PLANT ACHIEVES ISO 50001 ACCREDITATION

3M Canada says it has recently received ISO 50001 accreditation of its Brockville, Ont., tape manufacturing facility, as well achieving Platinum—the highest level—of the Superior Energy Performance (SEP) program for its energy efficiency accomplishments.

"3M's Brockville plant has demonstrated an energy performance improvement of more than 15% over the past three years. "Improving energy efficiency is one of the fastest, greenest and most cost-effective ways to reduce greenhouse gases, save energy and increase energy security," said Gordon Brown, MP for Leeds-Grenville, on behalf of Joe Oliver, Canada's minister of natural resources.

At the Brockville manufacturing site, 3M produces masking tape that is distributed for global consumption. 3M Canada says it is the first in the country to earn this distinction, and only the second in the world.

The plant's energy management system (EMS) has met the requirements of ISO 50001, a voluntary international standard promoting energy management in businesses. Implementation of the standard aids organizations in reducing energy use through sharing industry best practices, measurement and reporting disciplines, and promoting energy efficiency throughout supply chain operations.

The SEP designation indicates additional energy management and performance verification requirements have been met, either at the highest level of Platinum, the next level of Gold, and the lowest level of Silver. **EB**

— Published October 19, 2012, at Energy-Manager.ca

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Simplify design

When developing its new motor protection and power switching assortment, ABB took its customers' design processes into consideration. The goal was to simplify the process without compromising reliability or safety. The result: Fewer products with more features.

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Secure uptime

Voltage fluctuations occur even in the most stable networks. Long cabling or a temporary high power outtake, exceeding that which a generator is dimensioned for, are two examples of how voltage fluctuations come about.

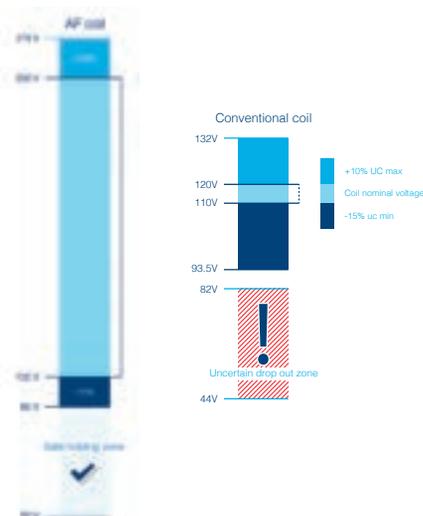
With conventional contactor technology these fluctuations could lead to chattering contacts, phase-losses or welding contacts. A motor running uncontrolled can result in costly stoppage or even pose a risk for persons' safety.

With ABB's new contactor and motor protection range the risk of contact welding is practically eliminated. Reduced servicing work and secured uptime saves many millions of dollars for our customers. How does AF do it?

The coil interface of the AF contactor ensures that there is always enough energy to keep its contacts closed. Its distinct pull-in and drop-out values ensures that the contacts are either opened or closed, which eliminates the chattering or "humming" related to conventional contactor technology.

Energy consumption

The AF contactor is designed to use only the exact amount of power needed to keep the contacts securely closed – no less, no more. This has resulted in an 80% reduction in the coil's energy consumption. This sometimes allows for smaller panels and more compact transformers without turning to forced cooling.



Built-in surge suppression

Another benefit of the AF technology is that it absorbs surges. Surges could with conventional technology potentially harm surrounding equipment and the amplitude can reach several kilovolts. Thanks to the AF technology the surges never reaches the control circuit completely eliminating the need of a surge suppressor.



Christian Guidi
Control product Specialist
Tel.: 514-420-3111 ext 3229
christian.g.guidi@ca.abb.com



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Until the AF range was installed, voltage sags were affecting Cargotec's MacGregor deck cranes. Conventional contactors welded shut, leading to several stoppages a week. No longer. Known for superior quality and an ability to operate in the most hostile environments, MacGregor deck cranes enjoy a global reputation for reliability. A small but vital component, the AF contactor helps maintain this reputation. To keep things moving, you need Control.

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Can great performers become great managers?

Fiorella Callocchia

WE PROMOTED A GREAT PERFORMER TO A NEW MANAGER'S ROLE, AND THEY ARE NOT WORKING OUT. WHAT CAN WE DO?

This is a common scenario in organizations. So why does it continue to happen, and what can companies and HR professionals do to better select and support new managers?

First, let's remember that transitioning from an individual contributor's role to a manager's role is neither easy nor simple. Sometimes people 'glorify' managerial roles, which prevents them from seeing the challenges, as well.

The manager's role is all about getting results through people; this means knowing what makes people tick, what motivates them to perform and how to build a high-performance team.

New managers need to be informed and trained but, even more important, is the process of identification, assessment and selection of new managers. It is in no one's best interest for a new manager to fail. It can damage the leadership brand of the organization and deter aspiring managers from wanting a leadership job.

What can organizations do to be proactive and help a manager succeed in the role? Here are seven best practices and strategies:



- 1 Develop a competency model for the manager's role that clearly outlines the core skills, knowledge and behaviours required for success.
- 2 When considering internal candidates, ensure that a 'management' role is, in fact, one of their career aspirations. Soliciting candidates who do not have a management role in their sights will make them feel they have no choice but to take the job—especially if they want to earn more money. This can prove to be disastrous if the situation does not work out. Plus, it may create legal risks for the company.
- 3 Provide a balanced view of the manager's role. There are positive aspects to every job, as well as tradeoffs. Managers who are promoted within the same team will be managing former peers and, maybe, friends. They will need coaching as to how to deal with the new work relationship and establish boundaries.
- 4 Ensure the process is sound and respected. Conduct an in-depth interview of all internal candidates. Don't assume because they know the organization that this critical step can be skipped. Assess them with the same level of rigour as external candidates, and complete skills assessments that can later be used for professional development plans.
- 5 Work with the manager to develop a 100-day plan. Set dates within the first three months to discuss progress, performance, milestones and challenges. Dealing with any issues early on will increase the likelihood of success.
- 6 Arrange for coaching and necessary training. New managers need to understand how to give feedback, address performance challenges, understand legal responsibilities and conduct performance reviews, to name a few. Consider assigning a mentor who can share lessons learned and navigate new managers through their first few months.
- 7 Consider lunch & learn sessions for the staff to discuss what it takes to be a manager within the organization... to enhance the role's brand, and encourage individuals to develop their skills.

Management roles offer exciting career and professional challenges while expanding one's skills related to people. Let's help people succeed by providing them with the appropriate training, tools and support. This way, everyone wins! **EB**

Fiorella Callocchia, CHRP, is specialist lead, human capital with Deloitte. This article submitted by the Human Resources Professionals Association (www.hrpa.ca).

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Temporary protective grounds fail to prevent arc flash incident

Steve Leblanc

This article—which is based on the paper “Are you safe with your temporary protective grounds?” delivered at the IEEE Electrical Safety Workshop 2014—explores an arc flash incident that occurred at a pellet plant facility located in Port-Cartier, Que., while workers were replacing a 2000A, 600V main moulded-case circuit breaker (MCCB) with a newer one.

Among the investigation’s revelations was the temporary protective ground wasn’t sufficient to withstand the short circuit current when the power accidentally returned to the work area. One worker suffered first-degree burns to his face and hand. That incident led to a modification in our procedures, which was communicated to other electrical workers.

(A special thanks to everyone involved in the investigation, for their cooperation and collaboration, and to ArcelorMittal Mining Canada for allowing me to share this experience.)

The work plan that fateful day

The main breaker being replaced at the incident site (Figure 1) was one of three main MCCBs with thermal-magnetic trip units that had caused problems (repeated hot spot, false trips) over the past two years. One of those same breakers had been changed the year before with an insulated-case breaker (Figure 2); the second was going to be changed during that outage, and the third due in October 2013.

On October 24, 2012, a job briefing was carried out by the supervisor with the contractor regarding the sequence of work. That morning, because we were in outage, four jobs were being done simultaneously on the same feeder line. Two jobs were planned on the 600V, one job on the 4160V in the electrical room 5A, and one other on the main 4160V feeding the other places (Figure 3A and 3B). I will refer to the work teams as A, B, C and D as in Figures 3A and 3B.

The sequence was planned as follows: Teams C and D were first going to lockout-tagout (LOTO) then test for the absence of voltage. After the green light from Teams C and D, Team B would do the same work, followed by Team A after getting the green light from Team B. We call this Cascade LOTO.

That morning, Teams C and D started LOTO but, before checking for the absence of voltage, every team received an instruction from the control room operators to temporarily reenergize the circuits due to a production problem. The teams reenergized the circuits as instructed. About 30 minutes later, the teams got the OK to do LOTO by the control room operators.

The unexpected call from the control room destabilized the teams, as they had a tight



FIGURE 1
Old moulded-case circuit breaker.



FIGURE 2
New insulated-case circuit breaker.



FIGURE 3A
Simplified equipment schematic.

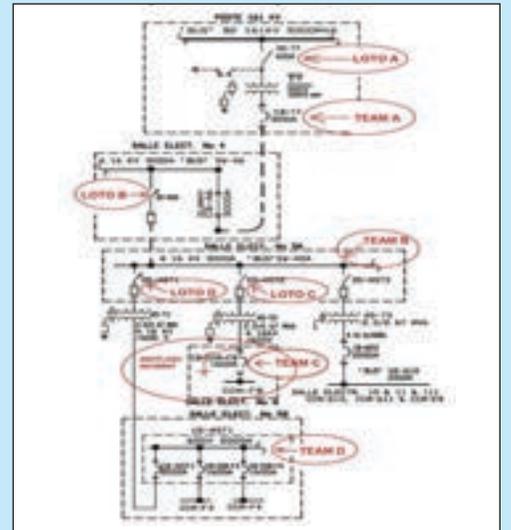


FIGURE 3B
LOTO and working teams' positions. Also part of the plant single-line diagram.



FIGURE 4
Position of worker and place of arc flash. Front view.



FIGURE 5
Rear view of cell.



FIGURE 6
Condition of temporary protective ground cable after blast (rear cell view).

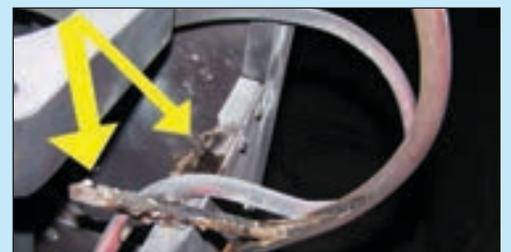


FIGURE 7
Temporary protective ground cable breaks (rear cell view).

schedule for performing their tasks; when they received the OK to LOTO, every team performed LOTO simultaneously. Team C performed its voltage-absence test without knowing Team A had already cut the power; consequently, the test didn't show any voltage. After confirming the absence of voltage, temporary protective grounds were installed.

With everything secured and the work security assessment checklist done, the contractors started their work. The old circuit breaker was removed. Meantime, Team B finished its work, so they removed their LOTO and put their disconnect switch back to the ON position. While the contractor was taking measurements to fit the new circuit breaker, Team A finished its work and reenergized their part of the circuit.

For reasons I will not discuss here, a mechanical problem at the isolation point LOTO B let the power through to the contractor workspace. With the power back at Team C's work point, the temporary protective ground failed, and an arc flash incident occurred (see Figures 4, 5, 6 and 7).

The contractor was sent to the plant medical clinic, then transferred to the city hospital. First-degree burns were diagnosed on his hand and face. All work on that cell was stopped for the day, and the pellet plant's electrical workers were assembled to discuss the incident.

What happened?

Immediately after the incident, a formal investigation was held with the Health & Safety Department, the technical department, and the contractor's supervisor, who immediately flew in from Montreal (about 400 miles away). A root cause analysis (Tap Root Method) was done, and one of the causes identified was the temporary protective ground cable's capacity.

The temporary protective grounds used were size 2/0 AWG, and the fault current was 28kA; the temporary protective grounds acted as a fuse (Figures 6 and 7), causing the injury. Following the identification of that cause, a study was sought from an engineering firm to confirm that theory. The study confirmed those grounds greatly contributed to the blast.

This horrific incident reminded us to stay alert to mechanical problems; to have

only one person coordinate everyone's movements and give the all-clear when doing Cascade LOTO; to stick to initial work planning; to always communicate the intensity of the available default short circuit current to the workers; to conform to ASTM F855 "Standard specification for temporary protective grounds to be used on de-energized electric power lines and equipment".

So make sure you always have the information you need to protect yourself or other workers, and that your temporary protective grounds can actually carry the available short circuit current. **EB**

Steve Leblanc has been with ArcelorMittal (formerly Quebec Cartier Mining) for 21 years, occupying positions ranging from

electrical technician to electrical safety reference. He also has 20 years of experience as a volunteer firefighter, and is a member of a search and rescue team (e.g. confined space, heights and medical first responder). This experience led him to develop the emergency plan for the pellet plant, and raised his sensitivity to electrical safety. He is now implementing an electrical safety program for the pellet plant.

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On July 1st 2011, Pioneer Power Solutions Inc. (NASDAQ symbol "PPSI") acquired Bemag Transformers and merged them into its Pioneer Transformer group. Pioneer is able to offer a uniquely broad array of dry and liquid filled Distribution and Power Transformers.

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The Pioneer dry type transformer is appropriate for industrial and commercial high voltage applications (up to 10Mva and 35KvBil).



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- Custom bus-bar coordination with circuit breaker

Splicing and cleaving optical fibers

We can splice fibers with fusion or via mechanical methods. Fusion is the accepted way, as it is reliable, fast and cheap. Once you own the fusion splicer, the only cost is for a protective sleeve for the fiber. The fusion splicers I used many years ago (and don't ask how many years!) cost over \$40,000 and required calibration way more frequently than new models.

Splicers similar to the one shown (Photos 1a and 1b), with a cleaver, case, tools, etc., cost \$5000 to \$10,000. They consistently execute great splices, provided you treat them properly.

There are two basic types of splicer for single fibers:

1. Core Alignment, which gives the lowest loss of generally 0.01 dB to 0.02 dB This is generally the only acceptable method for telco and cable TV installations.
2. Cladding Alignment, which is less accurate (with losses of perhaps 0.03 dB to 0.05 dB). This method is usually acceptable for short distances, such as FTTH (fiber-to-the-home) installations.

There was, at one point, a large price gap between the two types, but this has narrowed to the point where there is very little cost difference between the two, and I see more of a trend to #1 Core Alignment for everything.

Stop complaining and do it right

I am continually amazed when I watch technicians fusion splicing and complaining about the junk gear their bosses gave them. They redo the splices several times in some cases and, in the end, do not have splices of the quality that the equipment and they themselves are capable of achieving.

The solution is simply a matter of taking a few minutes at the start of the day to clean the equipment. The equipment is delicate, so treat it with care. This short investment in time will pay off big time throughout the day. Also, it might put a smile on your supervisor's face as a result of your increased production.

When you want consistently good splices, keep the following tips in mind:

- Keep the splicer in the case when not in use. Airborne dirt is your enemy.

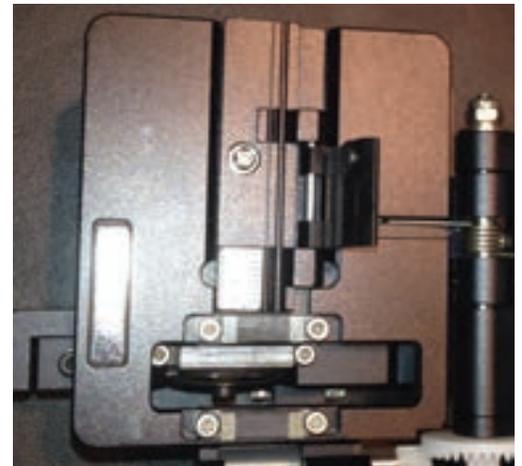


PHOTO 1A

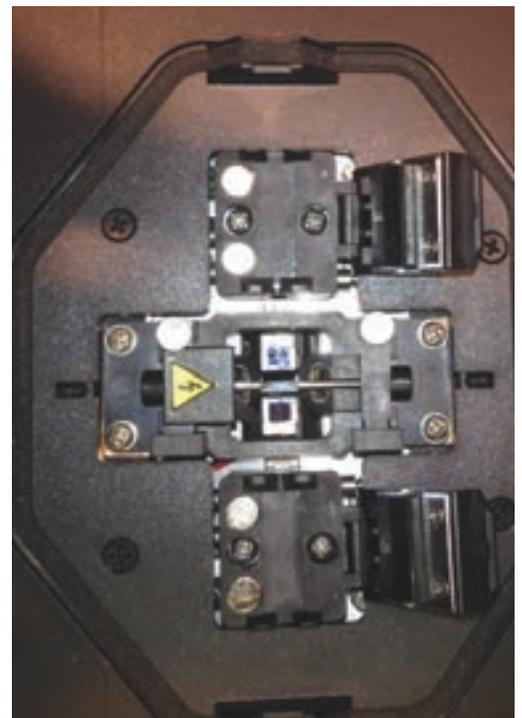


PHOTO 1B



PHOTO 2

- Don't expect good splices under adverse conditions (e.g. dirt, damp, wind). You may have to create conditions of heat, cleanliness and light to expect good splices.
- Keep the dome and heater covers closed unless you are splicing or heating. It has a gasket, and is almost air tight.
- Clean your splicer before you start splicing, even if you cleaned it the day before. It might look clean, but it is not a beauty contest... clean it before you start splicing. If you are splicing in a dirty environment, you will have to clean it several times throughout the day (Photos 1a and 1b).
- Use an air bulb and fine brush for cleaning.
- Do not use spray cans, as the propellants might damage something and dirty the mirrors below the electrodes and in the dome.
- When splicing gel-filled cable, ensure it is really clean so you don't gum up the splicer.
- Clean any gummed-up grooves with a piece of sharp wood. Never use metal. A toothpick works well for this.
- Charge the battery when you finish. The splicer shown will do over 200 splices and heats on a single charge.
- Have a stable and secure place for your splicer when splicing. Should it drop to the floor, it is probably garbage.
- Keep your shrink splice sleeves in a sealed container (e.g. zip-lock bag).
- If you drop the shrink splice sleeve on the floor (Photo 2), leave it there. It is probably dirty.
- Never clean the fiber with alcohol after you have cleaved it or you might cause reflections.
- Have the splicer serviced (calibrated) when necessary. You will know when it is not working properly.
- Clean the cleaver before you start with a fine brush and alcohol, especially when splicing gel-filled cable. Clean the

grooves with a piece of wood, such as a toothpick. The metal is soft and will scratch if you use metal to clean them.

- Close the cleaver between cleaves to keep out airborne dirt.
- If you are getting bad cleaves, you probably need to advance the cleaver wheel to the next

setting. You will probably get 400 to 700 cleaves on each setting, depending on the cleaver.

- And, finally, if you drop the cleaver on the floor, its value will be drastically diminished.
- Manage your fiber ends and empty the scrap container at the end of the day. **EB**

*William Graham is a master fiber optic instructor who operates Mississauga Training Consultants (www.fiberopticttraining.com) and has been providing training programs for 19 years. He is also a director of the Fiber Optic Association (www.thefoa.org) and has certified over 4000 installers in Canada alone.
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Pam Erickson



Ed Crawford

NSi Industries LLC (www.nsiindustries.com) has a new executive vice-president of marketing and business development, **Pamela Erickson**, who joins NSi after several years as VP of marketing for the US Electrical Division at Affiliated Distributors (www.adhq.com). At NSi, Erickson has responsibility for marketing and product management, as well as several strategic accounts. Meanwhile, **Ed Crawford** has accepted the position of president US electrical & international

development at **AD**. Crawford comes to AD from Philips Lighting North America, where he held the position of senior vice-president and general manager of Professional Lighting, and was formerly president and CEO Philips Light Sources and Electronics North America.

Travis Merrill has joined **Flir Systems Inc.** (www.flir.com) in the newly created position of senior vice-president and chief marketing officer. Reporting to president and CEO **Andy Teich**, Merrill most recently served as vice-president of marketing for Samsung Electronics America, where he led the Galaxy Tab marketing initiatives from 2011 to 2014. "With the recent introduction of the Flir One iPhone thermal camera accessory and the low-cost Lepton thermal micro-camera core, we expect Flir's customer base and market breadth to expand rapidly into markets where effective brand-building and world-class marketing will create significant value," said Teich.



Charles A. Cipolla

Charles A. Cipolla—chair of Electrical Safety Authority (ESA) and Cambridge and North Dumfries Hydro—received Electro-Federation Canada's (EFC's) 2014 **Industry Recognition Award** (www.electrofed.com). "I've been very fortunate in my career to have worked in a wonderful industry," said Cipolla. "It's miraculous what we can do with electricity, and shame on us for not telling that story and making people more aware... We all feel that we're just doing a job, but we're doing much more than a job; we're improving our society and our way of life." Watch our video at bit.ly/1tGxLVX. Employed in many senior positions at Rockwell Automation Canada, he has been actively engaged in the Canadian electrical market for his entire career. He served as EFC chair (2001-2002), member of the executive committee and also served as treasurer and chair of the Electrical & Electronic Manufacturers Association Committee.



Tim Horsman (left) accepts ceremonial gavel from outgoing chair Kevin Mallory (right).

EFC also announced its 2014/2015 executive committee of the board of directors, recognizing six industry executives who will "provide leadership and represent the EFC membership". **Tim Horsman** of **EB Horsman & Son** is the 2014 chair, replacing **Hubbell Canada's Kevin Mallory**, who stays on as past-chair. **Nathalie Pilon** of **Thomas & Betts Canada** is vice-chair, **Francois Anquetil** of **Sonepar Canada** is treasurer. Joining the Executive Committee is **Joris Myny** of **Siemens Canada** as secretary. **Elaine Gerrie-Valentini** of **Gerrie Electric Wholesale Ltd.** stays on as a senator.

Effective May 1, 2014, a series of organizational changes came into play at **Wesco Canada** (www.wesco.ca). **Sherry Adams** is responsible for all HR functions, while **Leo Akim** will direct Wesco's Lean program. **Dale Berstad**, former president of Brews Supply, is now vice-president and general manager. **Allan Boch**, director of operations, is now overseeing Wesco's Atlantic branches in addition to Ontario. **David Brady** was named director, supply chain, and is responsible for leading Wesco's regional centres of excellence, and national

purchasing and pricing activities. **Dan Drazilov**, who was appointed regional vice-president, Canada, will have expanded responsibilities for supplier relations and marketing, while retaining business development and the TVC business. **Mark Semchuk** was promoted to director of operations for the Brews, Trydor and LaPrairie businesses. He will have responsibility for developing a national utility business in Canada.



Rob Goldsmith

Rob Goldsmith has been appointed to the position of sales manager, Commercial and Industrial, Canada, for **Eaton's Cooper Power Systems Division** (bit.ly/Rx7VEF), Electrical Sector-Americas. Located in Burlington, Ont., he will lead the Commercial and Industrial segment sales team, including manufacturer reps and channel partners, to expand Cooper Power Systems' commercial and industrial footprint in Canada. Recently, Goldsmith served as marketing manager, OEM Segment, Canada, Electrical Sector-Americas. He joined Eaton in 1981, and has since held various roles of increasing responsibility in sales and marketing. He holds a diploma in electrical technology from Ryerson Polytechnical Institute (now Ryerson University).

Liteline Corp. (www.liteline.com) has appointed of **Jarrod Stewart** to regional sales manager for Ontario, and hired **A.M. Agencies** (www.amagency.com) as its sales agent in Alberta. Stewart joined the company two years ago as a sales rep for the Greater Toronto Area. "I am very pleased to be given this opportunity, and am excited about what lies ahead as Liteline continues to launch new and innovative products," he said. Headed by **Doug Prusky**, A.M. Agencies has been in the business for more than 25 years, says Liteline, and has offices in Calgary and Edmonton.



Mike Bauer

Fulham Co. Inc. (www.fulham.com) has appointed **Mike Bauer** as its new vice-president of Global Sales. Bauer comes to Fulham from Cree, where he served as global VP of lighting sales. "In addition to his great customer relationships, Mike brings to Fulham a deep knowledge of the latest trends and technologies of all lighting types, but especially LED lighting," said **Bob Howard-Anderson**, Fulham's CEO. Bauer's experience spans 26 years in the lighting industry, with positions at Nexxus, Lighting Decisions Group, and General Electric.

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Retrofit fluorescent cabinet signs with GE LineFit Light LEDs



Designed to be a replacement for upgrading fluorescent cabinet and box sign lighting, the GE LineFit Light LED lighting system boasts 58%-76% energy savings compared with T12HO fluorescents. It is available in 11 sizes and three colour temperatures, and offers a range of double-sided signage sizes and styles. Using existing fluorescent sockets (R17d) for a four-step installation, the LEDs promise to be up-and-running in just minutes per fixture, reducing installation labour time and costs. Specialized rotating end caps ensure proper alignment and ultimate light output directed toward the sign face, says the company.

GE
www.gelighting.com

USAI Lighting introduces BeveLED mini fixture



USAI Lighting has added the BeveLED mini to its family of

downlight, adjustable and wall wash fixtures. Delivering more than 1000 lumens at 20W, the fixture claims to deliver a perfect 10° beam equal to any MR-16 or metal halide source with medium (25°-35°) and wide (50°) beams for more uniform ambient light. As well, the company promises fixture-to-fixture colour consistency, and that each product is rigorously tested for dimming compatibility with architectural control systems. Different reflector and lens options also are offered.

USAI LIGHTING
www.usailighting.com

Tivoli TivoTape XS light tape offers indoor, outdoor versions



Tivoli says it has expanded its TivoTape series with a new high output, premium colour, flexible and field trimmable LED solution for cove, under-counter/cabinet accents for both indoor and outdoor applications. The XS (extreme spacing) series—available in indoor and outdoor versions—is a flexible, low voltage light tape with 36 SMD LEDs that deliver up to 264 or 237 lumens per foot, respectively.

With continuous run lengths of up to 22-ft. per run, the product is manufactured to specified lengths with factory attached end preps pre-cut for ease of interconnections and installation.

TIVOLI
www.tivolilighting.com

The clear 40W equivalent LED bulb from Philips

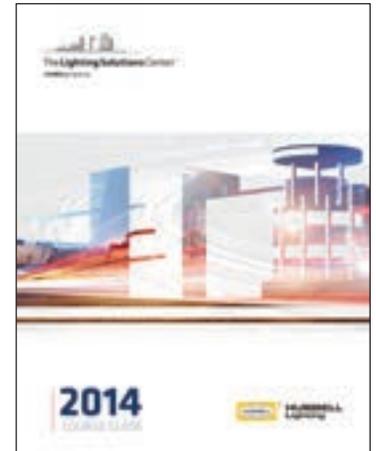
Royal Philips says it has given



the traditional incandescent light bulb “the biggest shake-up” in over 100 years. The new Philips clear 40W equivalent LED bulb claims to bring back the shape and instant bright, warm light of a traditional light bulb with the world’s “first innovative lens delivering light in all directions”. With its A60 shape, the clear LED bulb allows users to “hold onto the light they love, with all the benefits of modern LED,” says Philips.

PHILIPS
www.philips.com

Hubbell announces 2014 lighting education schedule



Hubbell Lighting has released the 2014 lighting education course schedule at its Lighting Solutions Center (LSC). The 25,000-sf facility is engineered to present a total solutions approach to current lighting challenges and to evolve to meet future lighting challenges head on, added Bailey. Located at its LEED (Leadership in Energy and Environmental Design) Silver corporate office in Greenville, S.C., the LSC features a five-topic lab with multimedia presentations, training rooms and an amphitheater to showcase products specific to the subjects discussed. The courses are available to newbies and professionals in architecture, illuminating engineering, lighting design, electrical contracting and distribution fields, with several from this year’s schedule qualifying for various continuing education units.

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www.lightingsolutionscenter.com

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- 1300 Lumens

Beghelli www.beghellicanada.com

Leviton launches Universal Z-Wave dimming switch



Leviton says the updated Vizia RF+ VRMX1 universal dimming switch is “designed for the future” and is suitable for a range of lighting applications including local and remote dimming control for incandescent, dimmable LED and CFL, halogen, magnetic low voltage and electronic low voltage. Users

can choose between 49 fade rates and various pre-sets for powering on and minimum brightness. The switch also showcases a horizontal LED locator and brightness indicator bar. Two snap-in colour change kit options are included.

LEVITON
www.leviton.com

Organize and protect cable with improved Arlington CED130 device



Arlington Industries says it has improved the CED130 cable entry device with slotted cover to provide an aesthetically pleasing installation, while organizing and protecting low voltage cable against abrasion. Mounting holes allow for the attachment of a decorator-style wall plate to the low voltage side of an electrical box, and give extra support to the installation, says the company, adding that it also helps organize low voltage cable in a neat bundle.

ARLINGTON INDUSTRIES
www.aifittings.com

Refreshed Capital Safety website boasts smarter search capabilities



Capital Safety has launched a new website designed to be “more user-friendly and provide customers around the world with the insights and information they need with just a few clicks”. A year in the making, the improved CapitalSafety.com boasts smarter search capabilities, faster downloads and a mobile-optimized design for users on the go. On the homepage, visitors will find videos, news and events, featured products and popular downloads. The new navigation labels at the top of the page direct visitors to four primary sections: products, product support, training and safety resources.

CAPITAL SAFETY
www.capitalsafety.com

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Fluke Connect: the “largest system of connected test tools in the world”



Unveiled to select media—including EBMag—last month in Chicago, the new Fluke Connect system allows technicians to wirelessly transmit measurement data from their test tools to their smartphones for secure storage on the cloud and team access in the field. It promises to help you eliminate “time wasters”, like having to write everything down. More than 20 Fluke tools connect wirelessly with the app, including digital multimeters, infrared cameras, insulation testers, and process meters. Technicians can AutoRecord measurements and IR images to Fluke Cloud storage from wherever they’re working, without writing anything down. Watch the video at bit.ly/1gEa8EO.
FLUKE
www.fluke.com

CCOHS Ontario health & safety awareness e-course

Ontario workers can now take an e-course to help understand their rights and responsibilities under the province’s new health and safety training regulation. Under the new Occupational Health and Safety Awareness and Training regulation of the Occupational Health and Safety Act (OHSA)—which comes into force on July 1, 2014—all Ontario employers must ensure their workers complete a basic health and safety awareness training program. This one-hour course will provide participants with an understanding of their health and safety rights and responsibilities in the

province and the duties of the employer, supervisor and worker. The course also identifies common workplace hazards, such as repetitive movements; slips, trips and falls; working near vehicles; using or working near machinery; and workplace violence. Participants can print a certificate of completion upon finishing the e-course.
CCOHS
www.ccohs.ca

Triplett CobraCam Pro camera boasts 4X digital zoom



Triplett has released its CombraCam Pro—an inspection camera featuring magnetic detachable display, four LEDs and 4X digital zoom. With the included Micro SD card, users can save snapshots and live video directly to device which can be reviewed on the device—no computer required. As well, the inspection camera features a 3.5-in. full colour display, 180° image rotation, rubberized grip, and 8mm camera wand.
TRIPLETT
www.triplett.com

EHRC unveils National Occupational Standard for electrical trainers

Electricity Human Resources Canada (EHRC) has outlined a new National Occupational Standard (NOS) for industry trainers that provide practical guidance for businesses, educators and job seekers within the electricity industry. According to the EHRC, the standard will help unify the Canadian electrical and renewable energy sector by identifying the skills, knowledge and attitudes required for industry trainers employed by electrical organizations and utilities across the country. In addition to the standard, an Essential Skill Profile (ESP) has been developed for the industry trainer role, which describes how workers in an occupation use essential skills, such as reading, document use, writing, and working with others.
ELECTRICITY HUMAN RESOURCES CANADA
www.electricityhr.ca

Prevent stripped screws with new Dewalt Impact Ready FlexTorq bits



Dewalt introduced a new line of Impact Ready FlexTorq screwdriving bits accompanied by a 10X Magnetic Screw Lock system. The FlexTorq design allows bits to flex up to 15 degrees and features oversized wings to provide a better fit between the fastener and the bit tip, which aims to prevent stripped screws. The 10X Magnetic Screw Lock system minimizes drops and reduces wobbling by employing a magnet to lock the fastener in place on the bit tip. The 10X system will include a new rapid load holder (compatible with all 1-in. bits) and a collar that fits onto 2-in., 3.5-in., and 6-in. FlexTorq power bits.
DEWALT
www.dewalt.com

King Innovation’s DryConn KSC connectors and King Krimper



King Innovation has introduced the DryConn KSC (King shrink crimp) waterproof wire connectors for use in low voltage lighting applications. With a high-flow heat shrink, splices remain waterproof and UV protected, says the company. Users can choose between four available sizes, ranging from #18 to #8. Meanwhile, King Innovation has released the King Krimper, a non-retracting ratchet style crimp tool designed to be used with the DryConn KSC connectors. With pre-defined compression and colour-coded tool indents, the King Krimper is both effective and easy to use, it says.
KING INNOVATION
www.kinginnovation.com

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Outdoor station fence enclosures

An often-misinterpreted section of the code involves the installation of station grounding and grounding fence enclosures, mainly due to a lack of understanding of what we are doing, and why. Are we grounding or are we bonding? Why are we burying all this copper and covering it in crushed rock?

We are actually doing three things:

1. We're grounding the electrical equipment to ensure we are on an equipotential plane with all of the equipment installed in and around the station, which also helps to operate protective devices in the event of a station fault.
2. We are ensuring the grid will sufficiently handle any faults imposed upon the cables (without damage) by sizing them in accordance with Table 51.
3. We are maintaining tolerable limits for touch and step potentials by controlling the conductivity of the medium on which we are standing (Table 52).

In my experience, station grounding has been engineered to meet (and often exceed) code requirements. So where do most of the errors occur in the installation of station grounding? I see problems when one CEC Rule is

followed, but not another. I have been to a number of sites, and the defect has been the same on two or three issues.

1. How far past a fence or gate must the crushed rock extend?

Most installers read CEC 36-304(5) where it states 1 metre, and that's where they stop. But the code states "... at least 1m beyond the station grounding electrode area on all sides". Understand that this depends on how far inside the perimeter ground electrode area the fence is installed. 36-312 states the fence must be installed a minimum of 1m inside this perimeter, so the crushed rock (when required) should extend a minimum of 2 metres from the fence at 150-mm depth.

2. Gate swing and its relationship to the ground grid

CEC 36-312 states the station fence shall be located at least 1m inside the perimeter of the station ground electrode area. When a gate is 3-metres long and can be opened outward, then the station ground electrode area needs to be extended outward to encompass the full swing of the gate, and the ground covering shall extend 1 metre beyond the new electrode area. This ensures we do not enter an area that

is not a part of the tested safety zone while opening or closing the gate.

3. The boundary fence

The boundary fence is easily missed; as we do our calculations regarding the safe installation of equipment in and around the station, we may forget that—should there be an incident and we have a ground potential rise in the area—we may also have a ground potential rise in relation to any metallic boundary fence in proximity to the station fence. When the values of available touch voltage in or near a boundary fence exceed the values of Table 52, then the boundary fence must be bonded to the station fence every 12m by a minimum no. 2/0 AWG copper conductor as per 36-312 (2).

Engineered drawings are required in our jurisdiction for all high-voltage installations but, as inspectors, we sometimes need refreshers on what we are seeing and *what we need to see*. **EB**

David Pilon has been an electrical inspector with SaskPower since 2000, and is currently the vice-chair of the Canadian Certified Electrical Inspector (CCEI) committee of the International Association of Electrical Inspectors (IAEI), Canadian Section. David can be reached at dpilon@saskpower.com.

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

Tackle The Code Conundrum... if you dare!

Answers to this month's questions in July'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

Where non-metallic sheathed cable is exposed, switch, outlet, and tap devices of insulating material shall be permitted to be used without boxes.

- a) True b) False

Question 2

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

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

Question 3

Capacitors associated with diagnostic imaging equipment are not required to have automatic means for discharging and grounding the plates if all current carrying parts are at least 2.0 m from the floor and are inaccessible to unauthorized persons.

- a) True b) False

Answers: EBMag May 2014

Q-1: The metal assembly of a raised floor in a computer room must be bonded with a conductor [] copper to form an effective equipotential plan.

- d) #6 AWG. Ref. Rule 10-406(6).

Q-2: What size of ground wire is required to bond a metal fence around an outdoor substation?

- b) 2/0 AWG. Ref. Rule 36-312(2).

Q-3: Where receptacles of type 14-50R are installed on recreational vehicle lots, the CEC requires them to be protected by GFCI of Class A type.

- b) False. Ref. Rule 72-110(4).



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