

# Electrical Business

MAY 2011

# REAL SUPPORT

is on page 5.

## Copper forms backbone of *unique campus*

### ■ Also in this issue...

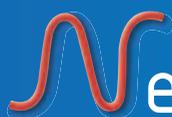
- New work truck chassis
- Common myths about LED lighting
- Green 'fuel' truck alternatives

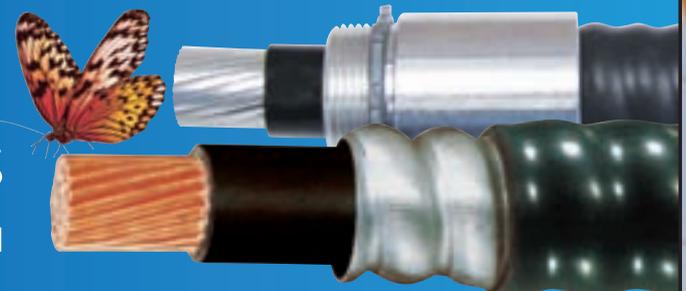
WORK TRUCK  
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## Oh yeah, EB will be there!



Everyone—regardless of where they are located in Canada—has a story to tell. And we're here to help them tell it.

It's been a busy March, and Spring promises to be just as busy, if not busier. Earlier in the month, I travelled to Indianapolis for The Work Truck Show—the premier event for Class 1-8 vocational trucks. (You'll read more about that in "New chassis unveiled at Work Truck Show 2011", where we recap only new trucks unveiled at the event... and there were more than a few! Next month, we'll get into all those accessories that make our trucks true workhorses.)

There's a major push among chassis manufacturers for fuel-efficient/green vehicles. Ford Motors, for example, aims to have half of all its vehicles capable of running on alternative fuel by 2012. These alternative 'fuels' range anywhere from hybrid electric to compressed natural gas (CNG) to biodiesel, and trucks running on these fuels are not toy trucks by any stretch of the imagination. Regardless of the manufacturer, green trucks are being made just as tough, just as capable, as their gasoline-/diesel-only counterparts.

Like all things, you need to do your homework to find out which green truck solution works best for you. But if your company is involved in the green energy market (i.e. solar/wind farms or even commercial/residential alternative energy solutions), just imagine your credibility when your own fleet, too, is green.

I also recently returned from a trip out West: this time to spend time with the Alberta Electrical League (AEL) at its Learning Expo in Red Deer (where, by the way, they don't salt snowy/icy roads...

they just sprinkle little pebbles over everything), and the International Association of Electrical Inspectors (IAEI) Prairie Chapter conference and tradeshow in Saskatoon. Meantime, Alyssa Dalton—EBMag's associate editor and newest team member—attended a similar meeting in Toronto for that IAEI region. And, for the first time, I "tweeted" (yeah, that Twitter thing) live from both events I attended. (Check them out at EBMag.com)

As always, it was fun catching up with friends and meeting new ones, but some might argue these events are too small to attend. Too regional, they might say. What's the payback? Don't your families miss you?

Here at Electrical Business, we don't just play lip-service when we say we are Canada's only truly national (and sometimes international) electrical industry publication. We attend and cover events from one coast to the other because it is our mandate—our duty to you, our Canadian readership. Everyone—regardless of where they are located in Canada—has a story to tell. And we're here to help them tell it.

That's why we say, "EB will be there". Check out our Calendar page at EBMag.com, and you'll see the places we're going. I sincerely hope to meet you (especially if you're the Myth-busters' Kari Byron and you're willing to pose with a rubber duckie for the sake of my three-year old daughter!). **EB**



*Anthony Caputo*

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When it came to lighting the new Durham Consolidated Courthouse both indoors and out, officials set high-performance lighting goals that would help them meet LEED (Leadership in Energy and Environmental Design) requirements within budget.

### 12 Avoiding common myths about LED sources and fixtures

Comparing LED lighting to other light sources using traditional measuring sticks is like comparing apples to toaster ovens, which inevitably leads to common misconceptions. Check out some of the myths of LED lighting, and you'll be able to confidently explore this alternative for your next project.

### 16 Understanding alternate-fuel vehicle technologies

As businesses seek to be more environmentally responsible in all facets of their operations, greening a vehicle fleet is often a natural first step that can have an immediate and positive impact.

### 17 Construction forecast for Ontario: newest member of the "Have-Not Province" club

A survey results of Ontario's ICI construction industry shows almost half of building contractors

expect they'll be busier this year than in 2010; however, competitive pressures and skilled labour concerns remain.

### 22 Looking for the latest choices in lighting efficiency?

While LED technology is quickly becoming the darling of the lighting industry, we cannot be quick to consider more familiar lighting technologies obsolete. High efficiency linear fluorescent systems, for example, also promise longevity and efficiency but at a lower cost.

### 26 New chassis unveiled at Work Truck Show 2011

A major draw at The Work Truck Show 2011 was the large number of product introductions made at the show, especially new chassis. For this installment of Work Truck Show 2011 News and Views, we present some of these noteworthy chassis presentations.

### 30 The low-hanging fruit of energy management

EBMag was invited to participate in an exclusive Editor Day put on by Schneider Electric US. We learned the energy efficiency market is absolutely huge. Are you getting your share?

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### Electrical infrastructure a top priority at renowned computing center

Regardless of its unusual appearance, the Massachusetts Institute of Technology's Ray and Maria Stata Center has an enviable electrical infrastructure that ensures the highest level of power quality, with copper being the focal point in the workings.



**Canada's 50 Best Managed Companies for 2010**

Deloitte has named the winners of Canada's 50 Best Managed Companies for 2010. The program, established in 1993, recognizes excellence in Canadian owned and managed companies. This year's winners span an array of industries, including lighting, electrical and energy suppliers, and have earned the distinction by "demonstrating business excellence through a rigorous and independent process that evaluates their management abilities and practices".

"After two years of shoring up, de-leveraging balance sheets and focusing on cost reduction strategies, Canadian businesses now have growth back on the agenda," said John Hughes, Deloitte partner, Private Company Services, and national leader of Canada's 50 Best Managed Companies Program. "Clearly we're not out of the woods yet, but one of the most impressive aspects of this year's award recipients is the focus of management teams and employees on growth and investment."

Here, then, are the 2010 winners involved in our industry:

**■ B.A. Robinson Co. Ltd. (Winnipeg, Man.)—Platinum Membership**

Celebrating its 75th year of business in Western Canada, B.A. Robinson Co. Ltd. ([www.barobinson.com](http://www.barobinson.com)) is now also an official member of Canada's 50 Best Managed Platinum Club, where membership is restricted to those who have been awarded the title for six consecutive years or more. B.A. Robinson is a distributor of lighting, electrical and plumbing products to the construction industry and retail home improvement market in Western Canada, operating from more than 20 distribution warehouses and showrooms in British Columbia, Alberta, Saskatchewan, Manitoba and Northwest Ontario. The company should also be congratulated on its 75th anniversary this year.

**■ E.B.Horsman & Son (Surrey, B.C.)**

E.B. Horsman & Son ([www.ebhorsman.com](http://www.ebhorsman.com)) has requalified as one of Canada's 50 Best Managed. Established in 1900, E.B. Horsman & Son says it is the only independently owned and operated electrical wholesaler in the Pacific Province. Its primary customers are contractors, OEMs, industrial end users, institutions and systems integrators.

**■ Hatch Ltd. (Mississauga, Ont.)**

Hatch ([www.hatch.ca](http://www.hatch.ca)) supplies engineering, project and construction management services, process and business consulting and operational services to the mining, metallurgical, energy and infrastructure industries. The employee-owned multidiscipline firm has 65 offices around the world and manage programs and projects with an aggregate value of US\$35 billion.

**■ Ideal Supply (Listowel, Ont.)**

Also requalified for 2010 is Ideal Supply ([www.idealSupply.com](http://www.idealSupply.com)), a distributor of electrical supplies, with its Electrical and Industrial divisions aligned with Affiliated Distributors (A-D, ). Ideal Supply has 28 locations throughout central and southwestern Ontario, and is celebrating its 85th anniversary.

**■ Standard Products (St. Laurent, Que.)**

Standard Products Inc. has also requalified. This company supplies lighting solutions to the commercial, industrial and residential markets. Standard continually seeks out advanced lighting technologies that address market concerns. It has a national infrastructure of 16 sales offices and distribution centres, the latter located in Montreal, Toronto, Edmonton and Vancouver.

For more information on Canada's 50 Best Managed Companies, visit [www.canadas50best.com](http://www.canadas50best.com).

# Electrical Business

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**Mersen signs Isted for Manitoba and Northwestern Ontario**

Mersen Canada (formerly Ferraz Shawmut, [www.mersen.com](http://www.mersen.com)) has announced that it has signed Isted Technical Sales (Winnipeg, Man.) as its representative for Manitoba/Northwestern Ontario ([www.istedtechnical.com](http://www.istedtechnical.com)). Ivo Lopes heads a team of technical sales and support personnel in the Winnipeg office.

Isted provides service to architects, engineers, end users, industrial, wholesalers and contractors. Established in 1977, the company has teams serving Saskatoon (northern Saskatchewan), Regina (southern Saskatchewan), and Winnipeg (Manitoba and Northwestern Ontario).

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**Hammond Power Solutions acquiring Italian Euroeletto spa**

Hammond Power Solutions Inc. ([www.hammondpowersolutions.com](http://www.hammondpowersolutions.com)) has signed a definitive agreement with Euroeletto spa (Italy) to acquire its trans-former business.

“After more than two years of looking for the right company in Europe, we are very pleased to acquire Euroeletto,” said Bill Hammond, CEO of Hammond Power Solutions. “This company will not only give HPS a platform for expansion into the European market, but will also give us design and manufacturing capabilities in cast coil technology and the addition of cast coil designs to our already broad dry transformer product offering will help HPS grow even more in North America as well as in other global markets.”

Euroeletto is involved in the design and manufacture of standard and custom dry-type distribution, cast coil and power transformers, and has a reputation in the industry, says Hammond, for product reliability and quality. Euroeletto has annual sales revenues of about \$15,000,000.

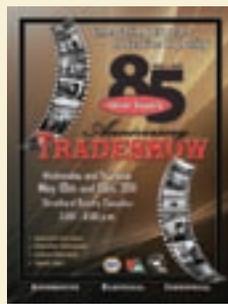
**Schneider Electric Canada creates Energy Business**

Schneider Electric Canada ([www.schneider-electric.ca](http://www.schneider-electric.ca)) has created a new Energy Business to offer products and solutions it describes as “specifically tailored” for the electrical utilities, oil & gas, mining minerals and metals segments, and many other large electro-intensive operations.

“The Energy Business will support our customers’ quest for a smarter grid,” said Eric Deschenes, vice-president, Energy Business, Schneider Electric Canada.

Key products and solutions of the Energy Business include:

- Schneider Electric and Areva D medium-voltage power distribution and energy consulting services;
- Areva D protection relays and grid/substation automation. This includes the MiCOM portfolio (Px10, Px20, Px30 and Px40 relay platforms, C264 Bay Computer/RTU, A3xx Gateways, etc.) and the PACiS IEC 61850 technology and delivery model;
- Prefabricated electrical build-ings (PEBs, E-houses).



**Ideal Supply celebrates 85 years; upcoming tradeshow undergoes change**

Ideal Supply ([www.idealsupply.com](http://www.idealsupply.com)) is celebrating its 85th anniversary this year. Ideal Supply’s 2011 tradeshow, scheduled for May 18-19, is undergoing some changes from the past number of years. This year’s event will take place at the new Stratford Rotary Complex. “This location is a much more modern facility which specializes in hosting larger venues and promises to offer Ideal’s customers a more pleasant atmosphere,” says Ideal.

This year’s theme, “Celebrating 85 years of Service & Quality”, is just another reminder of the company’s anniversary celebration. As in the past, show hours are between 3:00 pm and 9:00 pm both days, and all of Ideal’s key suppliers represented in over 150 booths. For more information or to obtain tickets please contact your local branch or account manager.

# NEED REAL SUPPORT ?

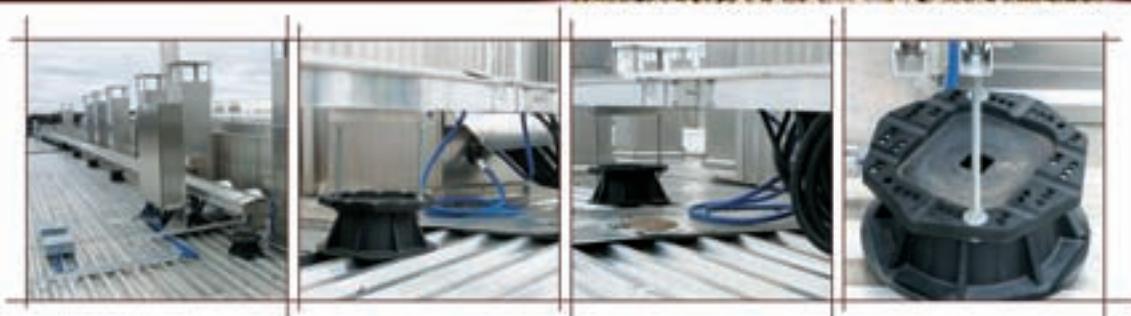
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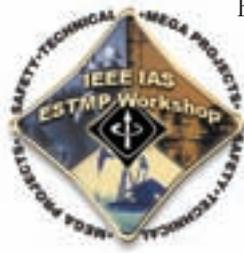
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**Thomas & Betts**

**Call for presentations for 2012 IEEE IAS Electrical Safety, Technical and Mega Projects Workshop**

The IEEE Industry Applications Society is accepting proposals for presentation at the ESTMP (Electrical Safety, Technical and Mega Projects) Workshop being held March 19-21, 2012, in Edmonton, Alta. The workshop provides a forum for exchanging and advancing industry knowledge in the areas of electrical safety, engineering design, system reliability and the implementation and execution of mega projects.



(To learn more, check out the AC Direct video for the 2010 event here: [tinyurl.com/353qm9f](http://tinyurl.com/353qm9f))

The workshop's focus is to share innovative concepts, successes as well as lessons learned in the areas of: 1) advancing state of the art knowledge and best practices, 2) stimulating innovation in creating the next generation of technology and 3) design and implementation of Mega Projects.

To learn more about the Call For Papers tutorials, panel discussions, sponsorship and exhibiting, please visit [www.ieee.org/estmp](http://www.ieee.org/estmp).



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**ElectriXwest Agencies represent Hayata in Western Canada**

Band-N-Go Inc. ([www.bandngo.com](http://www.bandngo.com)) has appointed ElectriXwest Agencies Ltd. ([electrixwest.com](http://electrixwest.com)) to represent Hayata stainless steel products in Western Canada. These products include: stainless steel cable ties, markers and banding; buckles and seals; fastening tools and accessories.

“ElectriXwest Agencies Ltd. represents quality manufacturers that sell their products through electrical distributors,” said Band-N-Go. “The ElectriXwest sales force is professional, highly trained, and has solid relationships in the electrical industry in Alberta.”

**New GE Grid IQ Innovation Centre to develop smart grid products**

Through a partnership with the Ontario government, GE Canada is establishing the GE Grid IQ Innovation Centre in Markham, creating 146 jobs in the area. According to the province, the new centre will develop and manufacture smart grid products and services to help Ontario's power grid:

- detect outages and automatically re-route power to downed areas;
- manage the shutdown of downed powerlines to increase safety and reduce fire hazards; and
- keep critical organizations running if there is a power disruption.

“Today's announcement is an excellent example of how business and government can partner to develop innovative technologies that address Ontario's needs while having applicability to sustainable energy demands globally,” said Elyse Allan, president and CEO, GE Canada.

Within the next four years, GE says it expects to spend \$18.5 million in R&D-related activities, developing its products and services. Ontario is providing \$7.9 million toward the project, and GE is investing \$40 million. The centre will also include a smart grid demonstration centre and lab facility, which will be used to showcase products and services.

**CAF report concludes apprenticeships are worth it!**

“Apprenticeship completers fare better” is the conclusion of a new report by the Canadian Apprenticeship Forum (CAF, [www.caf-fca.org](http://www.caf-fca.org)), which analyzed secondary statistical data on outcomes of apprentices, those who did not complete an apprenticeship, college graduates, and those who did not pursue any post-secondary training.

“The good news for apprentices and others considering apprenticeship training as a post-secondary option is ‘It’s worth it,’” concluded the report entitled “Assessing Apprenticeship Outcomes: Building a Case for Pursuing and Completing an Apprenticeship”.

The data suggests that individuals who complete apprenticeship training have better employment outcomes, both immediately after completion and several years post-completion; better earning potential; and higher levels of job satisfaction and job security.

“Certified completers earn the highest annual wages, both among full- and part-time workers. While certified completers earn a median wage of \$27 an hour, discontinuers show a median of \$20 an hour.”

Additionally, certified completers report a higher incidence of working in a field related to their training.

Visit [tinyurl.com/4xp8ust](http://tinyurl.com/4xp8ust) for the full report.

**ISO 50001 Energy Management Standard targeted for publication 3Q 2011**

The International Organization for Standardization (ISO, [www.iso.org](http://www.iso.org)) has announced a third-quarter 2011 target date for publishing its ISO 50001 International Standard for energy management, which it claims will help organizations improve their energy performance, increase energy efficiency and reduce climate change impacts.

“ISO 50001 will establish a framework for industrial plants, commercial facilities or entire organizations to manage energy,” says ISO. “Targeting broad applicability across national economic sectors, it is estimated that the standard could influence up to 60% of the world’s energy use.”

“ISO 50001 will contribute to enhanced energy efficiency and prudent energy use. An extremely high level of consensus drove our committee’s fast progress toward publication—proof that the world needs and wants this standard,” said Edwin Pinero, chair of ISO/PC

242, the committee behind the standard.

The document, said to be highly compatible with ISO 9001 (quality management) and ISO 14001 (environmental management), will highlight:

- A framework for integrating energy efficiency into management practices;
- Making better use of existing energy-consuming assets;
- Benchmarking, measuring, documenting, and reporting energy intensity improvements and their projected impact on reductions in greenhouse gas (GHG) emissions;
- Transparency and communication on the management of energy resources;
- Energy management best practices and good energy management behaviours;
- Evaluating and prioritizing the implementation of new energy-efficient technologies;
- A framework for promoting energy efficiency throughout the supply chain;
- Energy management improvements in the context of GHG emission reduction projects.



Feizhen Lu, Sungrow Canada’s CEO, and Brad Duguid, Ontario’s minister of energy (along with several other VIPs) prepare to cut the ribbon and officially open Sungrow’s new North American headquarters.

**Sungrow Canada establishes North American HQ in Vaughan, Ontario**

Sungrow Canada Inc. ([www.sungrow.ca](http://www.sungrow.ca)) established its North American headquarters in Vaughan—part of the company’s \$10-million investment in Ontario. EBMag was there as company and government dignitaries participated in the grand opening ceremony.

“We are proud to select Ontario for the headquarters for our North American operations,” said Ms. Feizhen Lu, president and CEO, Sungrow Canada Inc. “Ontario’s Feed-In Tariff program has opened up new markets for us and we look forward to expanding our business and reaching new customers with made-in-Ontario solar inverters.”

During her address, Lu mentioned the company had initially looked at establishing its North American HQ in the United States, but was ultimately attracted to, and settled on, Ontario because of its aggressive green energy policy.

The new facility will manufacture solar inverters, as well as conduct R&D and provide technical support. Sungrow Canada Inc. is a joint venture between Sungrow Power Supply Co. Ltd. and HiFi Solar Energy Ltd. **EB**

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**Reg Clark**, vice-president industrial products for **Thomas & Betts Canada** ([www.tnb-canada.com](http://www.tnb-canada.com)), announced several organizational changes involving **Craig Douglas**, **Rob Ruys** and **Len Skoreyko**. Douglas, the regional sales manager for Western Canada, started with the company in 1975 as a sales rep in Winnipeg, Man. This year he embarked upon his “well-deserved retirement” after 35 years of service to the company. “We wish to thank him for his contribution, loyalty and, above all, his



Craig Douglas



Len Skoreyko

dedication to the company during these 35 years,” said Clark. In light of Douglas’ departure, Thomas & Betts restructured the Western sales organization as follows (effective April 15, 2011): **Rob Ruys**, currently sales manager for the Midwest, will become regional sales manager for British Columbia and the Midwest (Manitoba and Saskatchewan). Ruys will be based in T&B’s Vancouver sales office. **Len Skoreyko**, currently sales manager for Alberta, will become regional sales manager responsible for the Alberta sales region. “The creation of this new sales region reflects our commitment to bring a regional focus to the increased activity in this region,” said Clark. Skoreyko will continue to be based in at the Edmonton sales office.



Jim Johnson Jr.

**James (Jim) L. Johnson Jr.** has been appointed president of **Osram Sylvania Ltd./ Ltée** ([www.sylvania.com](http://www.sylvania.com)), replacing **Abbas Khan**. He will have overall responsibility for the Canadian company’s sales, operations and support functions, including the Trade, Retail and Automotive Lighting sales channels and the Sylvania Lighting Services division. Johnson joined GTE Sylvania, the predecessor of Osram Sylvania, in 1985 and has held positions of increasing responsibility at multiple locations and businesses.



William Daoud

**Schneider Electric** ([www.schneider-electric.ca](http://www.schneider-electric.ca)) has announced the appointment of two new business development managers for the **Buildings Business in Canada**. Montreal-based **William Daoud** will manage the Quebec and the Atlantic provinces. Daoud has “extensive experience” in controls and automation and is a professional engineer in the Province of Quebec. Meantime, **Matthew Ward** will manage Western Canada. Based in Calgary, Schneider describes Ward as bringing “a broad spectrum of experience in security solutions, including both access control and video management”. In other company news, **Olivier Cousseau**



Matthew Ward



Olivier Cousseau

has been appointed to the position of director, industry marketing. Supported by a team of application experts, Cousseau will manage industry offer and segment marketing strategy.



Dave Granger



Glen Melanson



Geoff Cormier

**Dave Granger** is the newest member to **Standard Products’** ([www.standardpro.com](http://www.standardpro.com)) Ontario sales team. His background—which includes stints as a licensed electrician, working for electrical distributors and an OEM—should prove valuable, says the company. He is responsible for Southwestern Ontario and can be contacted at (519) 860-2727. Standard also welcomed **Glen Melanson** to the Maritimes sales team. He has 25 years of experience in the electrical distribution sector, and is responsible for New Brunswick and Prince Edward Island. He can be contacted at (506) 380-5145. Finally, the company added **Geoff Cormier** to its Alberta sales team. He possesses five years of sales experience in the construction industry and is a lighting specialist. Geoff is responsible for business development in the Southern Alberta region, and can be contacted at (403) 831-9181.



Michael Gentile

**Michael Gentile**, formerly the general manager for **Philips Canlyte**, now has an expanded role within Philips’ Canadian Lighting business as he assumes the role of general manager, **Philips Lighting Canada**. In this role, Gentile remains responsible for the Canlyte organization, but also assumes the role of general manager for the Lighting Systems, Controls, and Lamps organization previously led by **Ted Simpson**. In addition, he will also be responsible for the Commercial activities for Lumec, Day-Brite and Ledalite in Canada. To show continued long-term commitment to the Canada Lighting market, says Philips, the two Philips Lighting organizations in Canada (Professional Luminaires and Lighting Systems, Controls & Lamps) now report to one Canadian leader. In other company news, **Larry White**, western regional lighting specifier, begins his retirement after 26 years of “dedicated service” to the company. In light of White’s departure, **Norman Henze, LC**, will assume the role of western regional lighting specifier based out of Edmonton, Alta. Henze currently sits on the executives committee for the Edmonton Chapter of **IES**. Finally, Philips Lighting Canada welcomes **Ryan Sonnenberg** to the team as account manager for Northern Alberta. Prior to working at Philips, Sonnenberg served as a project manager for an Edmonton contractor.

**Sylvain Lanoue**, vice-president of **Power Survey International** ([www.powersurvey.com](http://www.powersurvey.com)) announced the appointment of **Jerry Grootveld** to the position of regional sales manager. In his new position based out of Vancouver, B.C., Grootveld is responsible for sales in Western Canada and the Western States. **EB**



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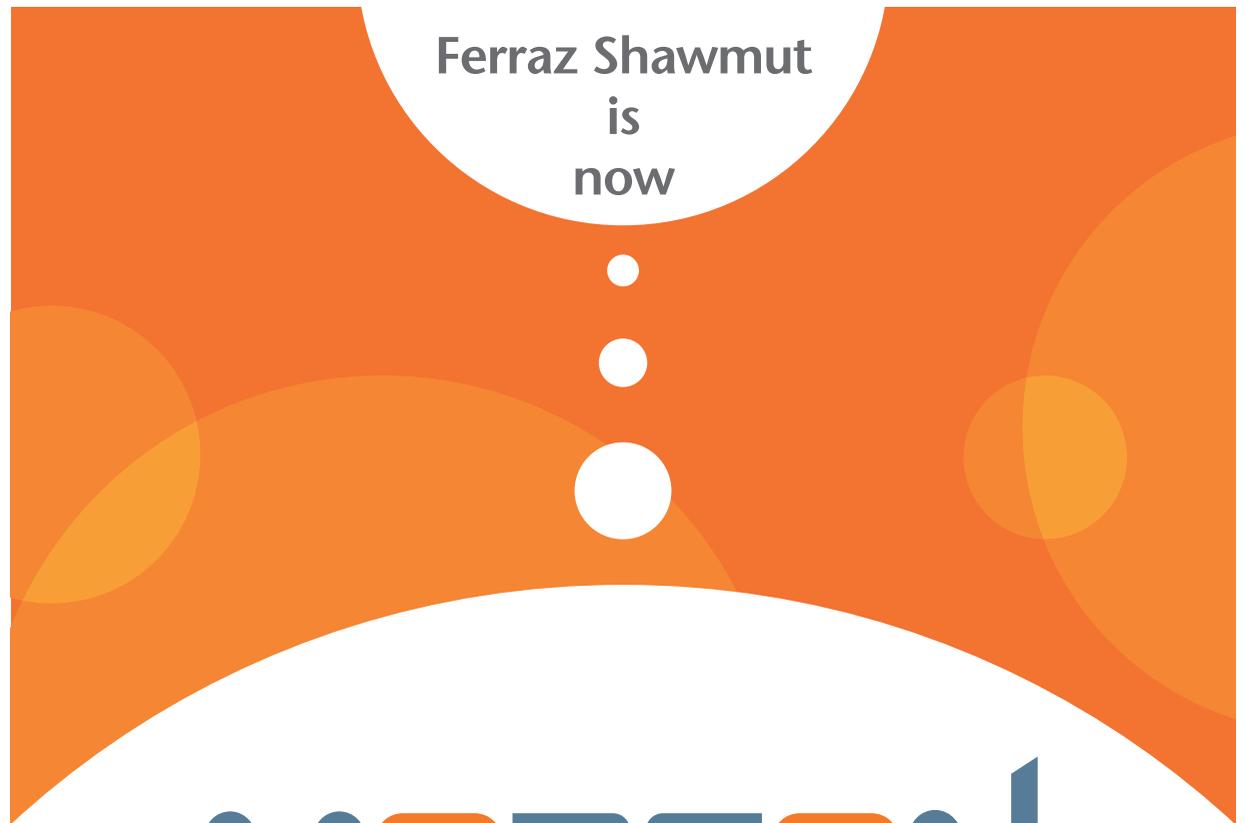
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# Lighting scheme

helps new Ontario courthouse meet energy-efficiency requirements

The Superior and Ontario Courts justice services—which operated in eight separate buildings—was looking to increase efficiency, prompting officials to implement a project to integrate the operations into one modern building: the Durham Consolidated Courthouse in Oshawa, Ont. When it came to lighting this facility, both indoors and out, officials set high-performance lighting goals that would help them meet LEED (Leadership in Energy and Environmental Design) requirements within budget.

Arguably, the new courthouse is among the most technologically advanced courthouses in the province.

“We were particularly interested in meeting LEED Gold certification requirements for the Durham Consolidated Courthouse, and the result of our efforts is a building that is the most energy-efficient new Ontario government building,” said Michael Shiu, Stantec Consulting, who was the lighting designer and electrical engineer on the project. “Cooper Lighting worked with us

from the beginning to solve design issues and offered us wide-ranging indoor and outdoor lighting fixture solutions, even helping to customize products to suit our needs.”

The building design team’s intention was to save as much energy as possible in the new 446,000-sf building while creating the correct lighting environment with the appropriate lighting fixtures to provide maximum efficiency. Because the integrated courthouse structure is a complex, multi-faceted building, there was a range of lighting needs in both interior and exterior locations where multiple products from one supplier met the designers’ requirements.

Located in downtown Oshawa, this new facility is the first of its kind to achieve LEED Gold certification. It houses 33 courtrooms, three motions rooms, two conference/settlement rooms and related legal and court services.

The courthouse employs compact fluorescent downlights in public areas, meeting rooms and offices, and special confinement/correctional lighting fixtures in secure areas and holding cells. Architectural

suspended fixtures are located in the atrium.

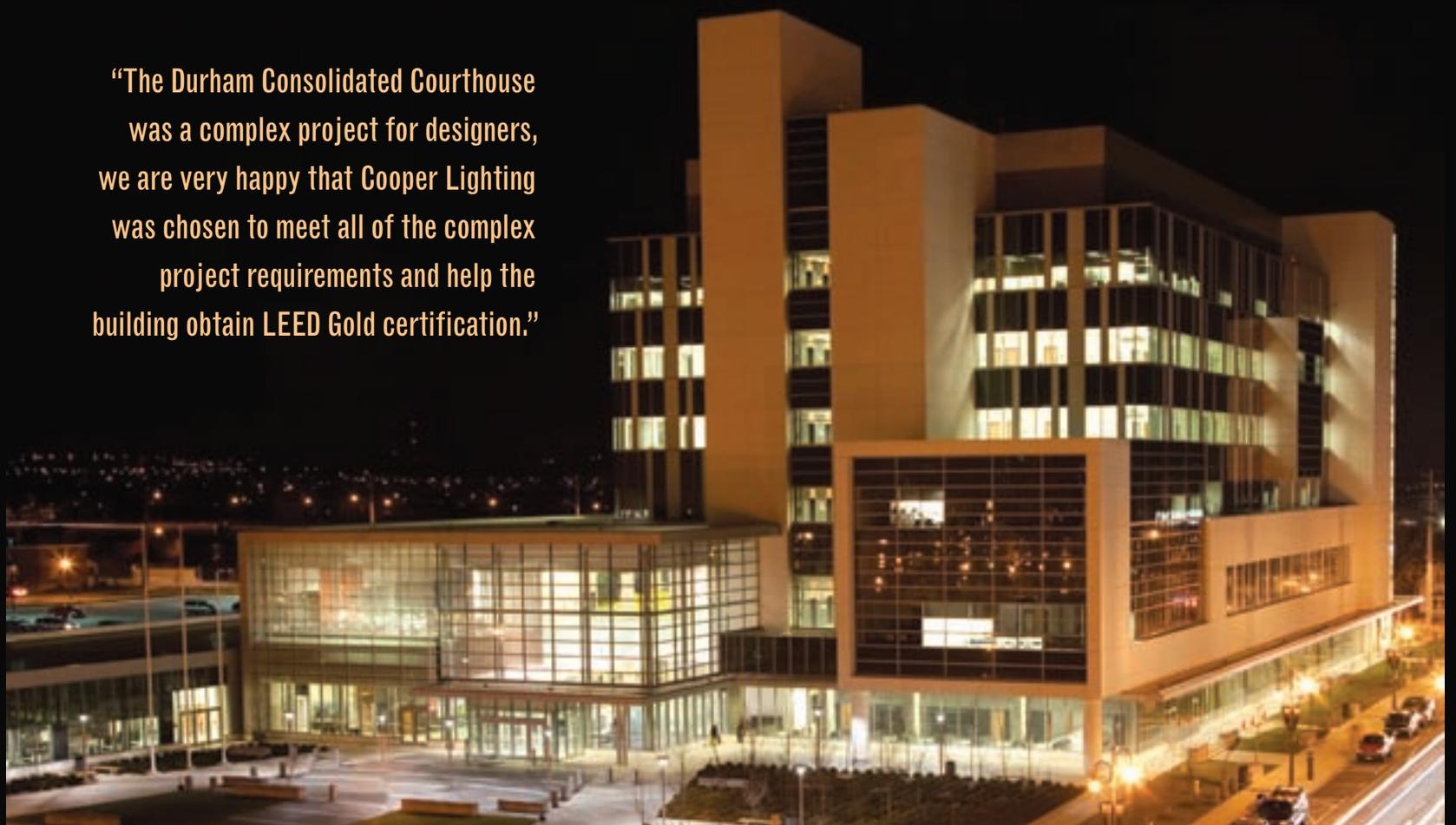
In the boardrooms and library, designers chose fluorescent luminaires that feature an open-baffle design providing high vertical footcandles. Throughout the project, designers used fluorescent luminaires in the main corridor and courtroom, while the courtroom walls are illuminated with a perimeter lighting system.

For exterior lighting, the design team chose luminaires that provide ‘spill light’ control for illuminating the parking lot.

“The Durham Consolidated Courthouse was a complex project for designers,” said Mark Eubanks, president at Cooper Lighting. “We are very happy that Cooper Lighting was chosen to meet all of the complex project requirements and help the building obtain LEED Gold certification.” **EB**

*For more information about on Durham Consolidated Courthouse projects, and the lighting products used, visit [www.cooperlighting.com](http://www.cooperlighting.com). For additional information on the LEED certification program, visit [www.usgbc.org](http://www.usgbc.org).*

“The Durham Consolidated Courthouse was a complex project for designers, we are very happy that Cooper Lighting was chosen to meet all of the complex project requirements and help the building obtain LEED Gold certification.”





Dave Smith |

mind your safety **EB**

## Entering outdoor substations

### Part one

If you've never entered an outdoor substation before, the equipment may be completely foreign to you. A substation, though, is merely one of a series of connection nodes between a generating station and an end user.

Where you are in North America determines which grid you walk into, all of which are interconnected. The reliability of the North American utility grid is the responsibility of NERC (North American Electric Reliability Corp.), which manages eight grids or regional entities (Google NERC maps to see them all).

The benefit of this system is redundant supply within each grid; should one generator go down, the rest will share the load to keep the lights on. It also means that when a fault occurs in your substation, every generating station in your grid wants to feed energy to the fault (limited only by the impedance of the system). This means that problems with one utility can be transmitted to neighbouring utilities—even an entire grid, as happened to NPCC in 2003.

If you are a small non-residential facility, you are likely fed from one small substation with one set of high-voltage primary lines feeding one transformer in the station, and another set of secondary lines feeding your facility—either at a reduced high voltage or at a low voltage. Your facility will depend completely on this one power source, called a radial system.

Upstream in the electrical system will be a more complex substation that will have one set of lines coming in and multiple sets of lines going out, and it is part of the interconnected grid system. These multiple lines can both feed other substations and entire communities, or major users who want to be fed from the interconnected system for redundancy.

The input/output voltages of this substation will be higher than in the radial system. Further up the system will be more complicated substations with multiple lines going in and out with higher voltage levels on both primary and secondary (these are the 230kV to 800kV boys).

Then you're back at the transformer yard outside the generating station where the transformers are stepping up the generator output voltages to match to the regional transmission grid.

Regardless of the substation you are entering, there are some common sense and historically validated safe work practices you should follow. As you approach a substation, its appearance can indicate the quality of the maintenance. For instance, the crushed gravel that is in every substation is there to limit step potential during a fault event. Weeds growing up through the gravel, or blackberry bushes coming through the fence, means someone is not doing—or does not know to do—their job. During your approach, visually check for broken insulators, storm damage, snow, ice, puddles, vandalism, whether Danger signs are in place, and that the

gate is locked.

In a world of high-value copper, look and see whether the copper grounding is still in place. There should be ground wires and ground jumpers from the fence into the ground along the fence and, particularly, attached to the gates. I was in a 60 kV substation in Toronto where every lick of copper had been stolen since the previous inspection (such an incredibly dangerous thing to do). Someone sent me horrible pictures of two guys roasted in a Texas substation as they were trying to remove copper and, inadvertently, became part of the electrical system.

As you approach the gate, and everything seems in place, take the back of your arm and slowly hold it close to the fence. If the hair on your arm starts to rise, there's a problem. If the hair does not raise, take the back of your hand and quickly and lightly touch the fence. Do you feel any tingles? (However, it is unlikely you will feel the tingle of low voltage if you're wearing insulated boots on dry ground.) A tic tester could be effective for determining whether there is induction on the fence but, due to general induction, it may give you a false positive. Regardless, if you have felt no tingle on the back of your hand, then you can likely unlock the gate and go in. Lock the gate behind you; you do not want to be responsible for someone entering after you without permission.

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

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

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# LED lighting:

# getting it right

## Avoiding common myths about LED sources and fixtures

- Myth 1:** LEDs last forever
- Myth 2:** LEDs are not bright enough
- Myth 3:** White-light LED sources produce over 160 lumens per watt
- Myth 4:** 3-watt LEDs are brighter than 1-watt LEDs
- Myth 5:** LEDs generate no heat
- Myth 6:** LED systems cost too much
- Myth 7:** LED light quality is poor

### Myth 1: LEDs last forever

Like all light sources, LED sources slowly fade over time. This light output degradation, or *lumen depreciation*, is determined by testing LED sources over a period of 6000 hours or more. Factors that can cause lumen depreciation include drive current and heat generated within the device itself.

*Lumen maintenance* describes how long a lighting fixture retains a certain percentage of its initial light output. White light sources used for general illumination are commonly considered to be at the end of their useful life when their light output falls below 70% of initial output. For white and coloured accent and non-task lighting, the lumen maintenance threshold is often considered to be 50%.

Well-designed LED lighting fixtures can retain 70% of their initial output for 50,000 hours or more, depending on operating conditions and other factors. At 24 hours per day of continuous use, such fixtures can deliver useful light for six years or longer—many times longer than incandescent sources, and up to twice as long as long-life fluorescent sources.

### Myth 2: LEDs are not bright enough

When you compare the raw lumen output of conventional lamps with the lumen output of many LED lighting fixtures, it often seems that LED fixtures deliver less light than the conventional alternatives. Such comparisons, however, are inaccurate and misleading, as they fail to account for the significant amount of wasted light in conventional lighting solutions.

Simply put, *lumen output* is a poor measure of the suitability of a lighting fixture for a given task. A better measure is *delivered light*—that is, how much light a fixture delivers to a surface or area, as measured in lux (lx) or footcandles (fc). You can make accurate comparisons between conventional and LED lighting fixtures on the basis of delivered light, as it measures how much of a light source's raw lumen output reaches a surface or area you want to illuminate.

To determine how much of a conventional lamp's raw lumen output reaches a task area, you must discount any light lost in the fixture housing (often over 30%), as well as any light lost as a result of lensing, shading and filtering. Since incandescent and fluorescent lamps emit light in all directions, you must further discount any light emitted in a direction away from the target area.

LED lighting fixtures are integrated systems in which the light sources (LEDs), the fixture housing and the primary optics are inseparable. Lumen measurements of LED lighting fixtures, therefore, are performed on the entire system, and already account for light lost to the fixture housing and lensing. Furthermore, since LEDs are inherently directional, they emit almost all of their light output in the desired direction, rather than dispersing it in all directions. And since LEDs natively produce intensely saturated coloured light, they require no gels or filters, which can block a significant percentage of a fixture's light output (over 90% for certain shades of deep blue).

When comparing lighting fixtures on the basis of delivered light, LED fixtures often perform as well as (significantly better, in some cases) conventional fixtures while consuming far less energy.

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**Myth 3: White-light LED sources produce over 160 lumens per watt**

Many manufacturers test their LED chips on lab benches at room temperature with short pulses that produce a high efficacy that cannot be achieved in practical use. While these results are not incorrect, they do not reflect the typical expected output of LED sources integrated into lighting fixtures. Although percentages vary, it is not uncommon to see efficacy losses of up to 40%.

Reputable LED fixture manufacturers do not base lumen measurements on the test results of their LED source suppliers. Instead, they use independent, third-party testing labs to measure and validate the output of their lighting fixtures according to test conditions spelled out in the LM-79 standard, published in 2008 by the Illuminating Engineering Society (IES).

Some highly efficient white-light LED lighting fixtures can achieve efficacy of over 40 lumens per watt (lm/W), sufficient to earn Energy Star and other energy-efficiency ratings. For example, linear LED cove lights from a one manufacturer achieve efficacies of 43.9 to 53.1 lm/W in normal operating conditions.

**Myth 4: 3-watt LEDs are brighter than 1-watt LEDs**

Because of incandescent light bulbs, you're probably used to looking at wattage to determine the light output of a light source: a 100-watt lamp puts out more light than a 60-watt lamp.

The fact is that incandescent lamps have a very low efficacy compared with CFLs, high-output fluorescent lamps and LED light sources. All general-service incandescent lamps use the same filament material heated to the same temperature; the only way to increase their light output is to increase the wattage. This is one of the main reasons why incandescent lamps are so wasteful.

LED sources are much more efficient at converting watts to lumens. Different materials can be used within the LED sources themselves, each of which has its own *light extraction efficacy*. For these and other reasons, two different LED sources can consume the same number of watts

but differ widely in lumen output.

Because watts cannot be used as an index of light output, evaluating the 'brightness' of LED sources for a given situation requires you to think differently about lighting. A standard 60-watt incandescent lamp emits a total of about 800 lumens, but the light is emitted equally in all directions. When you're reading at your office desk, your book does not receive all 800 lumens from your desktop lamp, nor do you need it to.

As described in Myth 2, the crucial measurement is delivered light. According to IES, serious reading requires an average of 50 fc or 500 lx on the page. Many linear LED under-cabinet fixtures and other task lights can deliver this level of light while consuming far less than 60 watts. For example, one undercabinet LED light delivers 50 fc in typical desktop situations while consuming only about 6 watts per foot.

**Myth 5: LEDs generate no heat**

Because they produce no infrared energy, the beam of light from an LED source is cool. However, waste heat is produced within the LED itself during the conversion of electricity into light. This waste heat must be properly removed from the lighting system to maximize fixture performance and to avoid damage to the LEDs. In well-designed LED lighting fixtures, heat removal is accomplished through carefully designed and engineered heat sinks that draw heat away from the LEDs and dissipate it into the air surrounding the fixture housing.

**Myth 6: LED systems cost too much**

Initial fixture costs may be higher for some LED lighting solutions than for comparable incandescent and fluorescent lighting solutions. But initial fixture cost does not account for the total cost of owning, operating and maintaining a lighting system. Because of their long useful life, LED lighting fixtures avoid the maintenance and materials costs which multiple relampings of incandescent fixtures require over tens of thousands of hours of operation.

And because LEDs consume far less energy, annual power costs can be reduced by up to 80%. The total cost of LED lighting systems, therefore,

can be significantly lower than conventional systems. In fact, payback on LED lighting solutions can often be realized in less than three years.

**Myth 7: LED light quality is poor**

Two important measurements of white light quality are *correlated colour temperature* (CCT) and *colour rendering index* (CRI).

CCT describes whether white light appears warm (reddish), neutral or cool (bluish). The standard definitions of CCT allow a range of variation in colour that can be readily discerned by viewers—even when the CCT value is the same. Ensuring colour consistency, therefore, is a major concern of LED manufacturers. Leading LED lighting manufacturers use various LED selection schemes (*binning*) to ensure colour consistency from fixture to fixture.

On a scale of 0 (worst) to 100 (best), CRI measures the ability of a light source to reproduce the colours of objects faithfully in reference to an ideal light source—the sun, for example, or an incandescent lamp. Most office, retail, educational, medical and residential spaces require a minimum CRI of 70 to 90. Many white-light LED lighting fixtures available today achieve CRIs of 80 or better, comparable to many CFL lamps, quartz metal halide lamps, and some cool white fluorescent fixtures—sufficient for the vast majority of applications.

Because of well-known shortcomings of the standard CRI test for LED lighting, some LED lighting fixtures with low CRI scores produce visually pleasing light that renders colours appropriately. Colour Quality Scale (CQS), a colour-rendering standard that better accounts for the unique properties of LED light sources, is currently under development. Until CQS or a similar alternative is in place, you should observe LED sources with low CRI scores in person to evaluate how well they render colour.

Armed with this knowledge, you can work with your lighting supplier to confidently explore LED lighting alternatives for your next project. **EB**

*Courtesy Philips Solid-State Lighting Solutions 2010.*

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# Power quality on campus

## Electrical infrastructure a top priority at renowned computing center



A computer-intensive educational facility requires the utmost in reliable, stable and clean electrical power, or what's known as high power quality. An excellent example of power quality on campus is the electrical infrastructure at the Ray and Maria Stata Center on the campus of the Massachusetts Institute of Technology (MIT).

The Ray and Maria Stata Center for Computer, Information and Intelligence Sciences is built on the site of Massachusetts Institute of Technology's (MIT's) legendary Building 20, a 'temporary' timber-framed building constructed during World War II that served as a breeding ground for many of the great ideas that were born at MIT. Designed by architect Frank O. Gehry, the Stata Center is meant to carry on Building 20's innovative and serendipitous spirit, and to foster interaction and collaboration across many disciplines.

The building is home to the Computer Science and Artificial Intelligence Laboratory (CSAIL), the Laboratory for Information and Decision Systems (LIDS) and the Department of Linguistics and Philosophy. Its striking design—featuring tilting towers, many-angled walls and whimsical shapes—challenges much of the conventional wisdom of laboratory and campus building.

Computers and networks are woven into the fabric of university life. Today, they are



essential to the educational experience—whether training students for satisfying work in an increasingly digital world or connecting them to vast storehouses of knowledge pertaining to their specialized fields of study.

Networks are everywhere on campus, including dormitories, computer labs, media centres, libraries and research labs. Many business schools today have installed realistic securities 'trading floors' complete with ticker boards, where students can learn how to

execute real-time transactions in global markets based on up-to-the-minute financial data.

The 720,000-sf 'Stata' is arguably one of the most eye-catching structures to be found on any American college campus. Regardless of its unusual appearance, the Stata has an enviable electrical infrastructure that ensures the highest level of power quality, with copper being the focal point in the workings.

The installation includes a 500-kcmil bare copper ring ground and multiple 'triangulated' copper-clad electrodes to ensure less than 5 ohms resistance to ground. A well-designed copper-based grounding system is essential for any electrical wiring project, especially one this complex. It helps stabilize an electrical wiring system, and provide a path to the earth for transient conditions such as over voltages and lightning.

Several copper-wound, K-rated transformers help to accommodate harmonic currents and improve energy efficiency. Moreover, full-sized grounding conductors in all circuits ensure low ground resistance to the points-of-use.

The dedication and separation of 'sensitive' branch circuits from branch circuits serving non-sensitive equipment helps to shield sensitive equipment from electrical noise. The number of outlets on sensitive branch circuits is limited to six or less to reduce the magnitude of harmonic currents; isolated grounds (IGs) in all sensitive circuits provide additional protection against RF (radio frequency) noise and other voltage irregularities.

Finally, the electrical infrastructure includes the installation of transient voltage surge suppression (TVSS) equipment at substations and at points of use. Layered protection of this type assures maximum protection from voltage surges. TVSS requires low-resistance ground path to work properly.

The Stata's electrical infrastructure not only benefits from a robust wiring and grounding system now, but also provides sufficient size and flexibility to accommodate the future needs of the institute. **EB**

*Case study courtesy the Copper Development Association. For more information about the electrical infrastructure of the Stata Center and the optimization of power quality at educational institutions, visit the power quality applications section of [www.copper.org](http://www.copper.org).*



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## Understanding alternate-fuel vehicle technologies

As businesses seek to be more environmentally responsible in all facets of their operations, greening a vehicle fleet is often a natural first step that can have an immediate and positive impact. (There may also be government tax credit incentives for fleets to convert to alternative fuels.)

### Types of fuels and their advantages/considerations

#### Flex fuel

A flexible-fuel vehicle (FFV) is an alternative-fuel vehicle with an internal combustion engine designed to run on more than one fuel, usually gasoline blended with ethanol (E85), and both fuels are stored in the same tank. Flex-fuel engines are capable of burning any proportion of the resulting blend as fuel injection and spark timing are adjusted automatically according to the actual blend detected by electronic sensors. E85 is the most common flex fuel.

- **Advantages:** Ethanol/E85 is clean-burning and substantially reduces CO and CO<sub>2</sub> emissions. Compared to gasoline, it is a higher octane, provides more horsepower and burns cooler. Corn and other cellulosic plants are readily available

- **Considerations:** E85 produces less energy, so 1.56 gal of E85 takes you as far as 1 gal of gasoline. Due to the increased volume required and the fact that alcohol is corrosive, fuel system components must be upgraded.

#### Biodiesel

Biodiesel refers to a vegetable oil- or animal fat-based diesel fuel. Blends of biodiesel and conventional hydrocarbon-based diesel are products most commonly distributed for use in the retail diesel fuel marketplace. A system known as the 'B' factor is used to state the amount of biodiesel in any fuel mix (i.e. 20% biodiesel is referred to as B20).

- **Advantages:** Biodiesel burns cleaner than petrodiesel, with reduced emissions.

- **Considerations:** Biodiesel may be more expensive than petrodiesel, and in low temperatures may require a special additive or fuel tank heater to flow properly.

#### CNG (compressed natural gas)

CNG is a fossil fuel substitute for gasoline or diesel. It is safer than other fuels in the event of a spill (natural gas is lighter than air, and disperses quickly when released). CNG is made by compressing natural gas, which is mainly composed of methane. It is stored and distributed in hard containers at a pressure of 2900 to 3600 psi. CNG is used in traditional gasoline internal combustion engines that have been modified to operate on CNG.

- **Advantages:** CNG is an extremely clean-burning fuel and significantly reduces CO, CO<sub>2</sub> and NOX compared to its gasoline counterpart. CNG has an octane rating of 130 and has the potential to optimize the engine's thermodynamic efficiency by utilizing a higher compression ratio.

- **Considerations:** CNG has slightly less energy than gasoline per unit volume and requires a larger fuel tank/container. Refuelling time and infrastructure are also considerations.

#### LPG (liquefied petroleum gas)

LPG is a flammable mixture of hydrocarbon gases, most commonly propane and butane. A powerful odorant is added so that leaks can be detected easily. Propane is non-toxic and cannot get into the water table were there a leak in the storage container.

- **Advantages:** Power, acceleration, payload and cruise speed are comparable to those of an equivalent vehicle fuelled with gasoline. Propane has a high octane rating of 104, in

between CNG at 130 and unleaded gasoline at 87. Because it burns completely, there is less carbon buildup. Spark plugs, exhaust system and oil changes are needed less frequently.

- **Considerations:** Because of the low vapour pressure of propane, starting can be an issue in extremely cold conditions.

#### Hybrid

A plug-in hybrid electric vehicle (PHEV, also known as a plug-in hybrid), is a hybrid vehicle with rechargeable batteries that can be restored to full charge by connecting a plug to an external electric power source. A PHEV shares the characteristics of both a conventional hybrid electric vehicle, having an electric motor and internal combustion engine, and an

all-electric vehicle, also having a plug to connect to the electric grid.

- **Advantages:** Hybrids offer a greater range than electric-only vehicles and reduced tailpipe emissions. When a charging station is unavailable, the gasoline engine can provide power.

- **Considerations:** The vehicle essentially has two powertrains; with that comes increased vehicle weight, and reduced payload and towing capability.

#### BEV (battery electric vehicle)

A BEV uses chemical energy stored in rechargeable battery packs. As with other electric vehicles, BEVs use electric motors and motor controllers instead of an internal combustion engine for propulsion. The concept utilizes onboard batteries for propulsion and recharges the batteries using the electric grid.

- **Advantages:** Vehicles that run solely on electric power require no warm-up, run almost silently, and have excellent performance. EVs can be recharged at night when generating plants are underutilized, and produce zero tailpipe emissions. Even when emissions from the generating plants are factored in, electric vehicles emit less than 10% of the pollution of an internal combustion vehicle.

- **Considerations:** Pure EVs still have limited range: typically no more than 100-120 miles. Depending on the charge voltage, most vehicles have to sit overnight for a full charge. **EB**

Information courtesy Ford Motor Company ([www.ford.com](http://www.ford.com)).



# Construction forecast for Ontario: newest member of the “Have-Not Province” club

## OCS releases annual survey results

According to an annual survey of Ontario’s industrial, commercial and institutional (ICI) construction industry, almost half of building contractors in the province expect they’ll be busier this year than in 2010.

Commissioned by the Ontario Construction Secretariat (OCS) and conducted by Ipsos Reid, the annual survey of ICI building contractors reveals that 44% anticipate more work this year, and 34% expect to increase their number of employees.

“There’s good news this year, but it is tempered with some underlying caution,” notes Sean Strickland, CEO of the secretariat. While 55% of survey respondents express optimism about the economy, this number is soft in that it is largely made up of those who say the economy is only ‘somewhat good’ rather than ‘very good’.

“Like most Canadians, Ontario’s contractors are optimistic about the future, but are concerned about how much business expansion will actually occur in the coming year,” says Strickland.

Firms in the Greater Toronto Area are the most positive about their prospects. Those in Southwestern Ontario (particularly firms in the Windsor-Sarnia region, hit by the slowdown in the auto and petrochemical industries) are the most negative.

Firms located in the GTA and Central Ontario are the most likely to anticipate workforce increases this year, which is consistent with their forecast for an improved level of business. Given a tougher year expected by contractors in Southwestern Ontario, it is not surprising that firms in that region are less likely to anticipate expanding payrolls in 2011.

According to the survey, the commercial sector is expected



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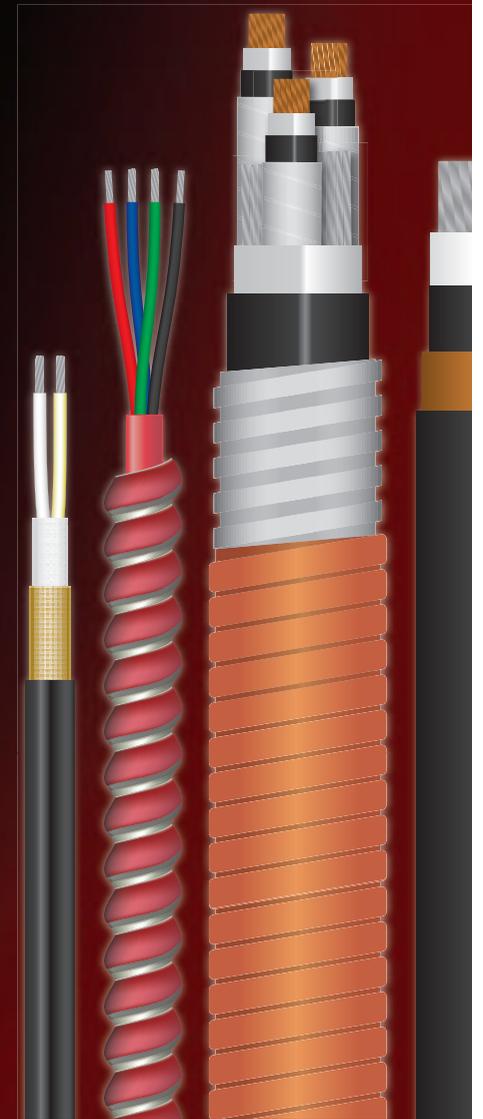
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to lead in increased construction activity this year followed by the industrial sector. The percentage of contractors expecting to conduct more work in the institutional sector is down from 2010, consistent with the perception that the budget constraints of government will slow institutional projects.

Building contractors identified three factors that limit their growth:

**Skilled Labour:** The availability of skilled labour and staff is seen as the key barrier to

business expansion. Furthermore, only 18% of the survey respondents expect the availability of skilled construction workers to increase in 2011. This points to the need for further awareness of career opportunities in the skilled trades, says OCS, and improved employment opportunities for apprentices with construction employers.

**Economic Issues:** While 2010 was a better year for contractors, it appears that the effects of the recession are still lingering in their minds. Case in point, survey respondents are only cautiously optimistic about Ontario's economic prospects and the ability of the private sector to be a growth leader. Employers are still concerned about access to financing, cash flow and the availability of new projects.

**The Competitive Nature of the Industry:** Almost half (46%) of all firms expect the level of competition from other firms to increase in 2011. The industry is highly fragmented, with the vast majority of firms (86%) employing fewer than 50 individuals. 67% of firms work on projects valued at less than \$500,000.

Still, some 44% of contractors expect they'll be conducting more work, and 34% think they'll be adding jobs, this year. These figures are not dramatically different than 2010, but are up significantly from 2009.

Contractors expect some inflation this year, with the majority citing transportation (in line with steadily increasing gasoline prices) and construction materials as the items most likely to increase in cost. Given these pressures, it is not surprising that 43% of contractors expect to raise their prices in 2011 (up from 39% in 2010 and 21% in 2009).

According to the Ontario Construction Secretariat, the province's industrial, commercial and institutional building construction industry continues to face skills shortages—a situation that is likely to worsen with the aging workforce, making increased awareness and investment in apprenticeship training an important economic priority for the province.

“This points to the need for increased investment in apprenticeship training to further awareness of career opportunities in the skilled construction trades

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as well as to improve employment opportunities for apprentices, yet the survey indicates that the opposite may be taking place,” says Strickland.

The number of firms employing apprentices has declined to 43% from 47% a year ago (and 57% in 2009). Unionized contractors are considerably more likely to hire registered apprentices, with 68% of union respondents indicating that they employ apprentices compared to 32% of non-union contractors. The survey also reveals that unionized contractors are more likely to employ significantly more apprentices than their non-union counterparts.

And among those firms that employ apprentices, only about one-quarter (23%) indicate that their investment in apprenticeship training is increasing, while most (71%) indicate that it is ‘staying the same’.

“Typically during periods of decreased economic activity, apprenticeship investment declines due to fewer construction projects. In times of decreased construction activity it is harder to find jobs for apprentices. We hope that with increased economic activity we will see additional investment in apprenticeship,” Strickland notes.

The Construction Sector Council (CSC) has estimated that the Ontario construction industry will need to replace 23% of its workforce or 73,000 workers by 2019 because of the aging of this population.

Among contractors that employ apprentices, there is disagreement over whether the skill levels of apprentices are better today than five years ago: 40% saying Yes, 40% saying No.

However, there is agreement on some of the areas that need to be addressed to attract and train the skilled workers of the future:

- 65% say youth are not aware of construction career opportunities.
- 93% say more needs to be done to expose youth to the technical skills required by the construction industry.
- 82% say new training requirements will be needed because of new environmental standards, such as LEED.
- 77% indicate that the academic level of new apprentices needs to be improved.

Established in 1993, the Ontario Construction

Secretariat (OCS, [www.iciconstruction.com](http://www.iciconstruction.com)) facilitates relationships and dialogue among trade unions and contractors in the industrial, commercial and institutional (ICI) construction industry. Its mission is to improve the competitive position of the industry through knowledge, research and discussing issues of common concern.

The survey of 1000 ICI contractors in Ontario was conducted between November 21 and December 16, 2010. The margin of error is +/- 3.1% (95% confidence interval). **EB**



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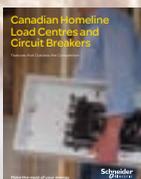
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Robarts Library at the University of Toronto employs fluorescent lighting throughout the building to achieve long-life and energy-efficient lighting in a unique and appealing design.

High efficiency fluorescent systems provide remarkable energy savings in warehouses and other applications. Lighting controls such as occupancy sensors, bi-level systems and load curtailment are ideal in this type of setting to further reduce energy consumption.

far more energy efficient than their predecessors, and are equipped with technology to help maximize energy savings and/or lamp life. Ballasts can be selected with either Instant Start (IS) technology, designed to maximize energy savings and for infrequent switching, or Programmed Rapid Start, designed to maximize the life of the system and for use on controls (i.e. occupancy sensors).

Controls can help to further reduce the energy consumption of fluorescent systems. Bi-level systems tied to an occupancy sensor can be implemented to reduce the light level of a space when an area is not in use. Continuous dimming is another option, which employs a photosensor to monitor an area's light level, and dims the controlled system when enough natural light is present. Load curtailment controls can also be used with load-shed systems to reduce demand for more power, thereby yielding incentives from electric utilities to users who implement these systems.

The right high efficiency fluorescent system, paired with appropriate controls, can substantially reduce energy consumption and provide a high performance, highly efficient, long-lasting system.

#### The ceiling ahead

Many in the lighting industry recognize that LEDs and solid-state lighting is the future of lighting. LEDs offer a new range of possibilities to illuminate almost any type of space, and have the potential for even greater energy savings and flexibility in their controllability and sensing. However, LED technology still has a way to go in the area of general illumination before it can truly be considered a cost-effective option. And while the cost of solid-state lighting is projected to decrease substantially in the future, fluorescent systems offer many of the same benefits as LED systems at an affordable cost, today.

Fluorescent systems are one of the most viable and cost-effective solutions for general illumination currently available on the market. Fluorescent technology will continue to evolve, with more energy-saving options becoming available and manufacturers pushing the boundaries of long life. For where we are in today's lighting market, high efficiency fluorescent lamps and ballasts are an incredibly sound investment, offering just the right combination of cost and energy savings, maintenance cost reduction, colour characteristics and replaceability. **EB**

*Paula D. Ziegenbein is an application marketing manager with Osram Sylvania. Visit [www.sylvania.com](http://www.sylvania.com).*

# Looking for the latest choices in lighting efficiency?

## The solution might be more familiar than you think

Paula D. Ziegenbein, LC, LEED AP

LED technology is quickly becoming the darling of the lighting industry, and LEDs are widely known for their long life and energy efficiency. With the rapid evolution and growth of the solid-state lighting market, many 'traditional' light sources are receiving less consideration.

But, we cannot be so quick to consider these more familiar lighting technologies relics. In the case of high efficiency linear fluorescent systems, for example, the same—or better—longevity and efficiency that you would expect from an LED source can be achieved, but at a lower cost.

#### Rebirth of the linear fluorescent

Fluorescent systems may be a tried-and-true lighting solution, but they are far from obsolete. Fluorescent technology has gone through many iterations since fluorescent systems made their commercial debut in the 1940s, and improvements are continuously being made.

The first fluorescent systems introduced were T12 lamps paired with magnetic ballasts. While these were highly efficient for their time, the introduction of the T8 lamp in the 1980s by Osram Sylvania offered an even more efficient option. Electronic ballasts also improved system efficiency, as did the introduction of the T5 lamp in 1995. Fluorescent technology continued to improve and expand with the introduction of

high efficiency T8/SS and T5/SS systems, and dimming features have recently been added to lamps and ballasts as well.

#### What today's fluorescent systems offer

Today's high efficiency fluorescent systems offer a more-than-viable lighting solution for general illumination. With systems featuring up to 100+ lumens per watt efficacy, high performance, quality colour consistency, excellent colour rendering and up to 55,000-hour life ratings, fluorescent technology may be one of the best cost/value propositions in the market.

Considering the average fluorescent system has been installed for over 15 years, many existing T8 installations are reaching the end of their life cycle, and are likely due for a lamp and ballast retrofit. Upgrading these systems to today's high efficiency fluorescent systems could result in over 40% energy cost savings.

#### A closer look at energy savings

Today's choices for fluorescent lamps offer incredible energy savings compared to earlier systems. By simply changing a T8 lamp in an existing installation to a high efficiency, energy saving version can instantly save 7% to 20% of energy.

Combining these high performance lamps with high efficiency ballasts can deliver even more impressive results. Today's electronic ballasts are

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# GARD-N-POST™

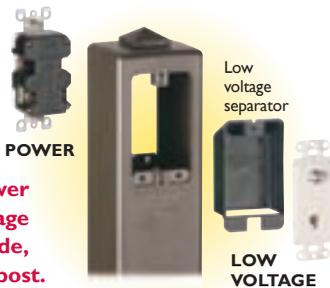
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Arlington's **Gard-N-Post™** Enclosures and Supports offer the attractive, safe, and easy way to install a light fixture and/or one or two devices outdoors!

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Patented. Other patents pending.



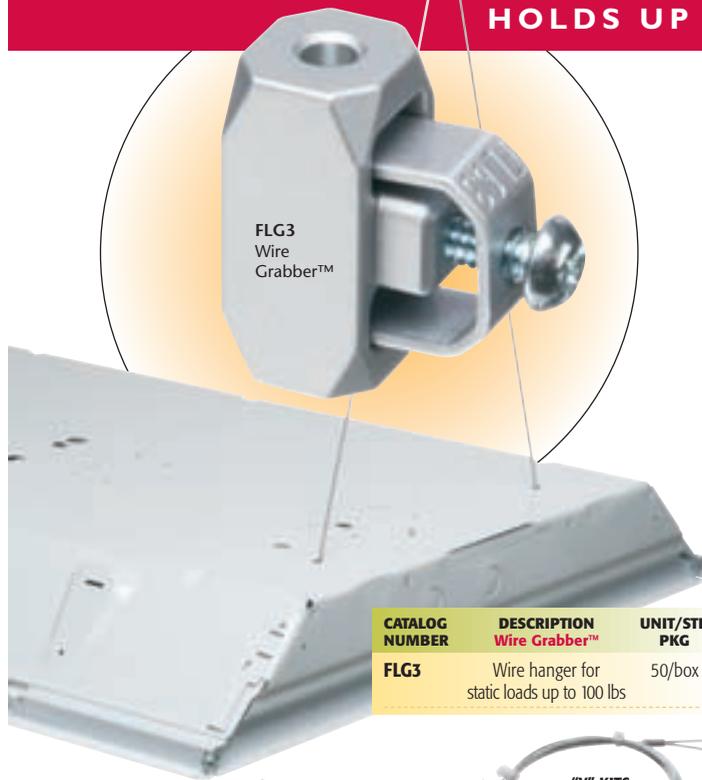
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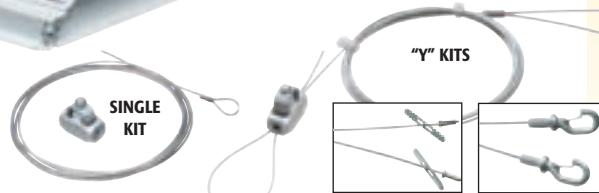
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**SINGLE w LOOP ON END**

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DWB0812	10'
DWB0815	15'
DWB0820	20'
DWB0830	30'

**"Y" w TOGGLES**

CATALOG NUMBER	WIRE LENGTH
DWYT0805	5'
DWYT0810	10'
DWY2T0810*	10'
DWYT0815	15'
DWYT0820	20'
DWYT0830	30'

**"Y" w HOOKS**

CATALOG NUMBER	WIRE LENGTH
DWYH0805	5'
DWYH0810	10'
DWY2H0810*	10'
DWYH0815	15'
DWYH0820	20'
DWYH0830	30'

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# Developing a value-added engineering mentality

Business valuers generally agree that a construction company generating most of its sales from the competitive bid market has no goodwill value, as it is worth the value of its net assets plus work on-hand. The less the business relies on competitive bidding, the higher the goodwill value.

Contractors that strive to generate business by means other than competitive bidding tend to be more successful and have a higher resale value. A variety of niche construction markets are not based primarily on price but, to be successful at them, the contractor needs to focus on sales and marketing. (The easiest jobs to sell are those based solely on price; these are also the hardest jobs for making money.)

Some elements that will enhance the long-term value of your business include:

1. Get yourself on Invitation Only bid lists, where you compete against a small number of high-quality contractors.
2. Perform design-build work.
3. Partner with contractors

- who generate work outside the competitive bid process.
4. Perform work that has a perceived value beyond price.
  5. Generate repeat business.
  6. Focus on customers who are looking for value and want to develop relationships.
  7. Develop a Value-Added Engineering mentality.

When I work with contractors, I go to great lengths to instill the above principles into their way of thinking. However, when they insist on staying in the competitive bid market, they must develop and master these traits:

1. Be incredibly efficient at what you do.
2. Never do anything that is not part of the contract without getting paid well for it.
3. No Mr. Nice Guy.
4. Don't bother building relationships.

Contracting businesses are quite strange. We bid jobs as low as possible to win them, then work like crazy to try and make as big a profit as possible. We keep

lowering our prices so that we get the job, then complain like crazy about how difficult it is to make a buck.

Why do we do everything in our power to bring prices down? Surely by lowering prices we make a good profit target almost unattainable.

The normal laws of supply and demand do not work in construction. I have yet to hear of anyone saying, "Let's not bother with the sheet metal; it's too expensive". Once the decision to build has been made, it's strictly a decision of allocating the contracts/subcontracts. The work is going to be done; the question too often becomes one of who offers the lowest price.

I encourage contractors to avoid the bid/spec market as much as possible, and try to wean them off of it.

I get them to identify other areas of work that are more profitable and less competitive. This is often an area in which they are already doing work for their A-list customers. Then we develop a strategy for getting more of that type of work.

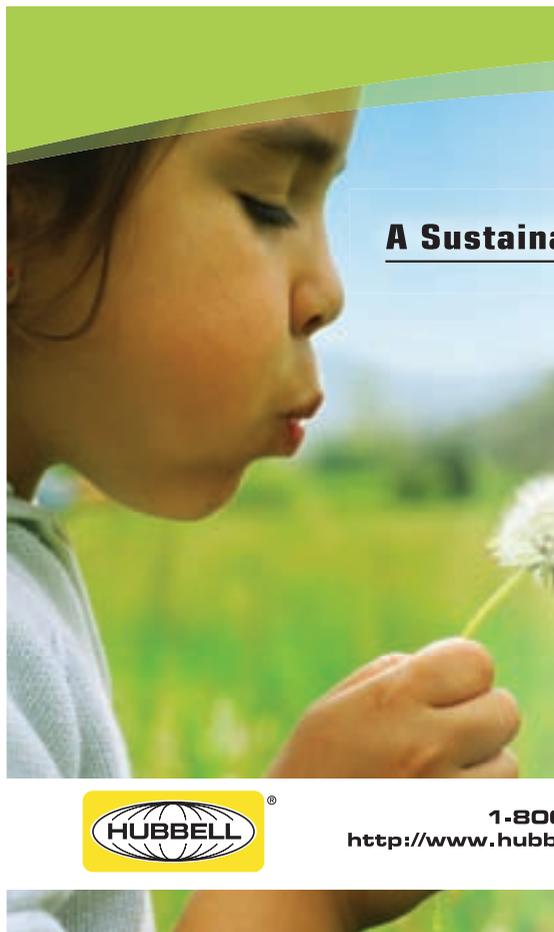
I encourage contractors to avoid the bid/spec market as much as possible, and try to wean them off of it.

Some points to ponder:

- Do you really understand your business model?
- Do you honestly know what is important to your A-list customers?
- Do you have the processes and people in place to deliver?
- Do you know how to focus on value-added work?
- Do you have a strategy for increasing your number of A-list customers?
- Do you have a strategy for retaining your existing A-list customers? **EB**



Ron Coleman, a member of the Institute of Certified Management Consultants of British Columbia, just published his latest book, "Building Your Legacy: Lessons for Success from the Contracting Community", which teaches you how to make more money while having more fun. A noted speaker, he has completed many interfirm financial comparisons of groups of construction companies in Canada and the United States. Ron's numerous published education programs include a 36-hour business management course specifically designed for the Electrical Contractors Association of British Columbia (ECABC). Visit [www.ronaldcoleman.ca](http://www.ronaldcoleman.ca).





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# New chassis unveiled at Work Truck Show 2011

Anthony Capkun

The Work Truck Show 2011 attracted 10,020 delegates—a 24% increase over 2010 and a 10% improvement over the previous record of 9084 set in 2007. With an unprecedented 560 exhibitors occupying 16% more floor space than in 2010, the Work Truck Show 2011 was the largest in the event's 12-year history.

Produced annually by NTEA (National Truck Equipment Association), the Work Truck Show showcases over 500,000 sf of Class 1-8 vocational trucks and equipment. The event also features more than 40 educational and technical training programs. Work truck professionals, including fleet managers, equipment buyers, maintenance personnel, manufacturers, distributors and dealers—not to mention Electrical Business!—attend.

A major draw for event attendees was the large number of product introductions made at the show, especially new chassis introductions: seven OEMs used the show as a platform for significant product announcements. For this installment of Work Truck Show 2011 News and Views, we present some of these noteworthy chassis presentations. Next month we'll be looking at accessories for your work truck.



(Remember, when you see the Video Icon, it means there's an associated video at [EBMag.com](http://EBMag.com).)



## ● NEW SPRINTER CREW VAN

Daimler Vans USA launched its fifth Sprinter model: the Crew Van ([www.mercedes-benz.ca](http://www.mercedes-benz.ca)). Complete with many Mercedes-Benz safety and convenience features, the Sprinter Crew Van seats five, with all the remaining room set up for cargo.

Featuring a three-place second row seat, the Sprinter Crew Van can carry an entire work crew to the jobsite and back, plus all their tools and materials. Like other Sprinter models, says Daimler, the fuel-efficient Crew Van is powered by a 3.0L V6 diesel that gets 30% better fuel economy than a comparable gasoline engine.

All Sprinters are equipped with independent strut suspension with coil springs in front and four-wheel disc brakes, as well as a solid axle with leaf-springs at the rear. A five-speed automatic transmission is standard, and several choices of springs, shock absorbers and stabilizer bars provide just the right suspension for each version of the Sprinter van.

With 188 horsepower and 325 lb.-ft. of



torque (from 1400 to 2400 rpm), the Sprinter's four-valve-per-cylinder BlueTEC diesel features centrally located piezo-electric injectors, CDI direct injection, a variable-nozzle turbocharger and exhaust gas recirculation. Building on this foundation of engine design, the Sprinter engine incorporates several modular after-treatment units in the exhaust stream, including an oxidizing catalytic converter, a maintenance-free particulate filter, and an NO<sub>x</sub> storage converter.

Making the BlueTEC diesel engine as clean as a modern gasoline engine, an AdBlue system injects a urea solution into the exhaust, which releases ammonia (NH<sub>3</sub>), reducing nitrogen oxides to harmless nitrogen and water in the downstream SCR catalytic converter.

SCR (selective catalytic reduction) is a process

that creates an effective method of diesel exhaust gas after-treatment; AdBlue is carried in its own tank and metered into the exhaust in minute quantities, so small that the tank only needs to be refilled during routine scheduled maintenance.

Every Sprinter comes with Adaptive ESP stability and rollover control, ABS anti-lock brakes, Brake Assist and traction control. The driver and front passenger seats are equipped with standard multi-stage front air bags, and side curtain and torso air bags are available options. Other options include Bi-Xenon headlights, a tire pressure monitoring system and a Parktronic parking aid.

The Mercedes-Benz Sprinter made its European debut in 1995, and a new-generation Sprinter was launched globally in 2006. Since 2001, the Sprinter has been sold in the U.S. by Freightliner. Then Mercedes-Benz USA began offering the Sprinter line through select Mercedes-Benz dealers in 2010. Both MBUSA and Freightliner are divisions of Daimler AG.

● **RAM TRUCK CARGO VAN**

Ram Trucks ([www.ramtruck.ca](http://www.ramtruck.ca)) unveiled the new 2012 Ram Cargo Van (Ram C/V) at The Work Truck Show 2011. The Ram C/V features solid sliding door and rear quarter window and backlight privacy panels in place of clear glass windows. However, buyers have the option of equipping their Ram C/V with several combinations of solid and glass panels, including a choice of solid or glass backlight.

“We see growth in the Class 1 light commercial vehicle market,” said Fred Diaz, president and CEO of Ram Truck Brand and lead executive for U.S. Sales, Chrysler Group LLC. “With its class-leading capability and a lower total cost of ownership, the highly versatile Ram Cargo Van is a great vehicle choice for small businesses and commercial fleets.”

The Ram Cargo Van also receives a structural aluminum rear load floor. Two flooring options will be available, including one with a flat, uninterrupted, high-capacity surface. A second optional floor provides through-the-floor access to three exclusive storage bins and load floor tie-downs.

With more than 25 years of minivan engineering behind it, and as the inventor of the first minivan-based cargo van, the Ram Truck brand says it understands the versatility needs for both small and large businesses. The Ram C/V provides a Class 1 1800-lb cargo payload and towing capability up to 3600 lb. A 20-gal fuel tank and 25 mpg highway also deliver good fuel range.

A commercial-tuned ride and heavy-duty load-levelling suspension promise maximum hauling capability. A heavy-duty radiator and transmission oil cooler help meet heavier powertrain demands. Ram C/V is also engineered with hydraulic power-assist rack-and-pinion steering, front anti-sway bar and rear twist-beam axle with coil springs. Ram C/V has a maximum Gross Combined Weight Rating (GCWR) of 8750 lb.

The vehicle boasts standard electronic stability control (ESC), commercial load-tuned tire-pressure monitoring (TPM) and four-wheel anti-lock disc brake system (ABS).

At the heart of the 2012 Ram C/V is a new, 3.6L Pentastar V-6 engine mated to a six-speed automatic transaxle. The Pentastar V-6 delivers 283 hp and 260 lb-ft of torque.

The Ram C/V also features a new driver-selectable fuel economizer mode. In addition, a rear spoiler and reduced brake caliper and rear bearing drag all contribute to Ram C/V's aerodynamics and fuel economy.

Here's some good news: the 2012 Ram Cargo Van will be built in Canada in Windsor, Ont., and will go on sale Q3 2011.



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**● FORD MOTOR CO. GREEN OFFERING**

Ford Motor Co. (www.ford.ca) says its ever-growing portfolio of fuel-efficient products extends to its commercial customers, including those interested in alternative-fuel vehicles. The company says that, by 2012, half of all its vehicles will be capable of running on alternative fuel.

“No other manufacturer offers the range of vehicles and alternative-fuel solutions combined with comprehensive support,” said Len Deluca, director, Ford Commercial Truck. “We’re bringing our commercial customers the solutions they need in this ever-competitive environment.”

With the wide variety of requirements for commercial vehicles—such as application, payload and driving cycle—Ford says it has developed an expansive suite of vehicles and alternative-fuel choices.

For example, a battery electric vehicle (BEV) might be appropriate for customers with multiple short trips over the course of a day totalling less than 100 miles. CNG, LPG and flex-fuel vehicles have a range of about 300 miles before needing to be refueled. Biodiesel and hybrid vehicles stretch the range even further, up to 500 miles.

**● WESTERN STAR 4700**

Western Star Truck Sales Inc. (www.westernstartrucks.com) introduced its all-new Class 8 vocational truck: the 4700.

“The Western Star 4700 broadens our product line-up to meet the growing needs of value-minded vocational customers who still demand the attributes found in a traditional Western Star truck,” said Mike Jackson, general manager of Western Star. “Hand-built with unmatched attention to detail, the 4700 features the same durability, ruggedness and reliability our customers expect from Western Star.”

The Western Star 4700 is available with a range of powertrain options, including the Detroit Diesel DD13 engine and the Cummins ISC and ISL engines. A range of transmissions are also available, including the latest Eaton Ultrashift PLUS transmission, and Alison 3000 and 4000-series transmissions.

The truck’s body-builder interface connectors and transmission control unit is located in-cab, providing greater protection against harsh or corrosive environments, which helps prevent the possibility of wiring shorts and downtime.

Also included is a bolt-in pass-through plate in the cab floor that eliminates drilling, and a dedicated Body Builder Wiring Raceway. An accessible routing path through the cab floor, the raceway provides plenty room for body builders to route wiring more efficiently. The truck also features point-to-point wiring, and an add-on multiplex option is available.

The 4700 boasts a new, 1/2-in. 3.2 million RBM single-channel frame rail option that reduces weight and maximizes payload in a single frame. Plus, the single-channel rail is custom-punched to eliminate unnecessary holes that can reduce frame strength.

In addition to the frame, the 4700 features multiple mid-chassis packaging solutions to help body builders achieve the clean back-of-cab they need for optimal body installation.

The routing and clipping of air and electrical lines down the chassis are suspended away from the frame rails to reduce the chance that the lines will rub against the rail, creating issues that can result in downtime.

The Western Star 4700 will be available to order Q3 2011, with targeted delivery in early 2012.



**● HINO CLASS 4-5 COEs WITH FIRST DIESEL-ELECTRIC HYBRID OFFERING**

In an enormously elaborate ceremony, Hino Trucks (www.hino.com) unveiled today a “revolutionary addition to its product lineup”, offering four models of the newly designed Class 4 and Class 5 cab over engine (COE) trucks. Specifically, Hino will offer the 155 diesel model and the first ever U.S. Class 4 diesel-electric hybrid model, the 155h. The 155 and 155h models will carry a 14,500 lb GVW rating. In the Class 5 market, Hino will offer the 195 diesel model and the first ever U.S. Class 5 diesel-electric hybrid model, the 195h. The 195 and 195h models will carry a 19,500 lb. GVW rating.

“With the introduction of this new truck, Hino Trucks is making the diesel-electric hybrid a viable option in the U.S. commercial truck industry for the first time,” said Sumio Fukaya, president and CEO of Hino Trucks.

All models are powered by the Hino J05E Series engine. The 5L engine is rated at 210 hp and 440 lb-ft of torque. Utilizing Aisin’s A465, 6-speed automatic transmission, the Hino hybrid is the first to be packaged with an automatic transmission.

Both models feature an ergonomic wide cab with a North American standard 33-in. frame rail width, a 56,900 psi frame, and a standard centre-mounted rear fuel tank. The cab’s styling emphasizes aerodynamics and visibility with an angled windshield, narrow pillars and rounded-radius curves. Inside, the new cab uses its increased width to provide room for drivers up to 6 ft, 6 in-tall, seating for three and a versatile mobile workspace with a variety of organizational storage options. A crew cab version will also be available.

The Hino 155h and 195h diesel-electric hybrid COEs represent a “giant leap for alternative fuel commercial vehicles in North America”, says Hino. The company says it developed the world’s first hybrid bus in 1991, and has been continuously evolving its hybrid technology ever since. The new truck is in fact Hino’s sixth generation of hybrid technology.

Bob McDowell Sr., vice-president of sales & customer support for Hino Trucks added, “With diesel pricing continuing to raise concerns, the new COE trucks provide a durable and dependable solution for today’s business owners. Our COE trucks feature low operating costs, competi-

tive price points, and an engine design that promises improvement in fuel economy over straight diesel with the same running performance.” **EB**



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# The low-hanging fruit of energy management

Anthony Capkun

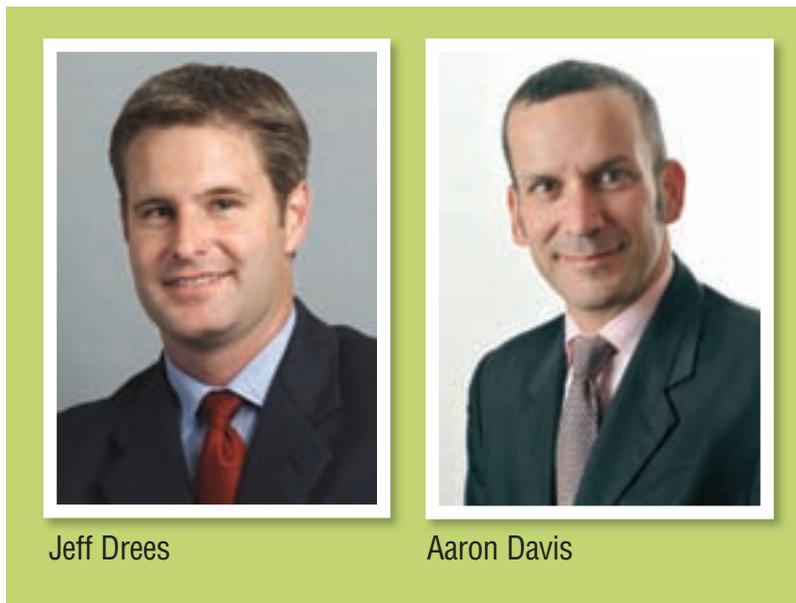
Last fall, Electrical Business magazine was invited to participate in an exclusive Editor Day event put on by Schneider Electric US. The company gathered some of its top execs to explain the multinational's global repositioning, and the way it will go to market under EcoStruxure. Some of the folks included: Jeff Drees, U.S. president; Barry Coflan, senior VP, Offer Development, Buildings Business; Jim Sandelin, senior VP, Buildings Business; Rob McKernan, president, Americas Region, IT Business; and Tony Gentile, vice-president, Installation Systems and Control, Power Business.

(To check out video highlights from a special "Energy Management Panel" that included Schneider execs along with some prominent end users, visit [EBMag.com](http://EBMag.com)'s Videos page.)

What was interesting about this event is that a company as old and as global as Schneider deems it necessary to reposition itself and the way it goes to market in the 21st Century; because, in the 21st Century, electricity and the electrical trade are not just about connecting wires to things; no, it's about finding ways of interconnecting things and infusing them with intelligence with the goal of consuming energy in as miserly a fashion as possible.

As Houston Neal wrote in our May 2010 edition, "In the next 10 to 20 years, 'electrical contractor' will no longer be a suitable job title for electricians. They will transition into 'energy contractors' to support the fast-growing green construction market".

Schneider, and companies like it, says its business is "no longer power" but, said Drees, "to become the global specialist in energy management". He added, "Current building practices give no regard to the guy paying the bill".



Jeff Drees

Aaron Davis

Canada's energy efficiency market could be worth up to \$70 billion by 2030.

Studies by ACEEE (American Council for an Energy-Efficient Economy) and others quoted by Drees indicate the U.S. alone could *cost-effectively* reduce energy consumption by 25% to 30%. ACEEE further estimates that \$300 billion was invested in energy-efficiency technologies and infrastructure in the United States in 2004 (60% in buildings, 25% in industry and 11% in transportation). Based on right set of policies, market forces and financing, that market could be worth up to \$700 billion market by 2030.

That's just the U.S. If you take the standard 10% Canadian quotient from that American figure, it means Canada's energy efficiency market could be worth up to \$70 billion by 2030. If you managed to snag just a small fraction of that amount, just think of how pretty you'd be sitting.

Some pretty impressive words of both caution and action came from Aaron Davis, Schneider global chief marketing officer. There are essentially two mindsets when it comes to the extent of mankind's impact on the environment and climate change: those who believe we impact our environment greatly, and those who do not. Davis argued we should simply "err on the side of caution"; essentially, saving energy and reducing CO<sub>2</sub> emissions are the right things to do—regardless of your position on global warming.

And the quickest fixes—the low-hanging fruit, if you will—is to instill energy efficiency into our buildings and processes, and at the point of use. This is something we can do right away that will have an immediate impact as longer-term projects—like making generation and transmission more efficient—come online decades from now.

Being more energy efficient is something that should be done because it makes sense, Davis argued. You shouldn't have to wait for it to be legislated by government. "Why wait for a policy change? Can you imagine having a one-child policy like China?"

No, it's best to tackle this movement head on. And when I say "movement", I (like Schneider) don't mean the 'Green' or 'tree-hugger' movement, or what have you. Drees said it best: "Green has never sold a project. There has to be financial value".

Similarly, you must make the financial value apparent to your existing and would-be clients as you discuss ways in which you can help them manage their energy consumption to make them efficient—first and foremost. According to Drees, there's a real shortage of energy management professionals in the market. Why not become one? If that also helps clear the air we breathe, then all the better. **EB**

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### Standard Products welcomes revamped website

After seven months of work, Standard Products has unveiled a “revamped, updated, and improved” website, in order to make it the go-to resource for its customers,



it says. In addition to adding a glossary of lighting terms, updating information and adding to the Product Information section and Literature section, Standard now keeps a blog, which it says will be a medium used to publicize new products, industry-specific news, and company news.

**STANDARD PRODUCTS**  
www.standardpro.com

### Beacon Products Vinoy early 20th Century street and area lighting

Vinoy is designed in early 20th Century street and area lighting designs in modern, vandal-resistant, energy-conserving outdoor pole- or building-mounted fixtures. Beacon Products, a division of Hubbell Lighting, says Vinoy illuminates building entryways and properties of all kinds, be they commercial, institutional, municipal or residential. Vinoy is constructed of heavy-gauge, partially recycled cast aluminum with stainless-steel hardware. Units have an easy re-lamp removable top; high-power-factor ballasts; porcelain-glazed sockets; and galvanized anchor bolts or direct-burial in-ground bases. Lamp options include CFL, low-watt MH or HPS, incandescent and more. All fixtures are UL, ETL or CSA listed for wet-location use in all climates.

**BEACON PRODUCTS**  
www.beaconproducts.com

### Osram Sylvania Ultra Professional Series LED lamps

Osram Sylvania has introduced its latest series of LED lamps—the Sylvania Ultra Professional Series—which it describes as an ideal solution for retail, hospitality, museum and high-end residential settings. The series offers a Colour Rendering Index (CRI) of 95 together with an R9 colour rating that is greater than 50. The LEDs are hot-binned at 85°C, within a three-step McAdams ellipse measurement of colour difference. Four lamp types are currently available: PAR20, PAR30 and PAR30LN, and PAR38.



**OSRAM SYLVANIA**  
www.sylvania.com

### Tamper-proof Electric Panel Seal

Industries Ltd. launched its new tamper-proof device, the Electric Panel Seal (EPS), which is installed by licensed electrical contractors to their customer’s panels once they have completed work. David Zovic, founder and president, explains the purpose of the EPS as a “security feature because it clearly identifies that the work



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performed is done by a qualified electrical contractor. If the seal is broken the warranty is void”. YFJ insists the EPS will be offered exclusively to licensed electrical contractors. “This small and powerful device will provide assurance for the homeowner that the electrical work is performed to the highest standards and codes,” says Frank Cozzolino of Solutions Electrical & Maintenance Ltd. (Check out the video at EBMag.com)  
**EPS (ELECTRIC PANEL SEAL)**  
www.electricalpanels.com

### Helmer’s single-dwelling residential electrical service panel calculator

Douglas Helmer has created a free online form that calculates the proper conductor sizes, meter



base, etc., for a Canadian single-dwelling residential service panel. Helmer started this project over two years ago, and now it works across all internet browsers. (If you use it, take a moment to leave a comment to let Doug know what you think of it.)  
**DOUGLAS HELMER**

www.douglashelmer.com/panel

### Ideal introduces industrial-grade 490 Series multimeters

[Ideal 490 Series Multimeters] Ideal Industries has introduced the new 490 Series Multimeter, which it describes as having problem-solving technology and a hardened all-weather housing for harsh environments. The series offers True RMS readings for “error-free” testing, auto AC/DC voltage (1000V) and current mode with frequency indication, auto selection for resistance/continuity/diode/capacitance, plus data acquisition and logging of up to 20,000 records when used in unattended monitoring of signals over time. High Frequency Rejection (HFR) mode provides accurate voltage/frequency readings on non-sinusoidal wave forms, such as adjustable speed motor drives.  
**IDEAL INDUSTRIES**  
www.idealindustries.ca

### Carlo Gavazzi launches CTD Series

Carlo Gavazzi has unveiled the CTD Series, a new range of solid-core current transformers which, it claims, provides both innovation and functionality. Carlo Gavazzi also describes the series as “easily installed” and “providing optimum safety and flexibility”. The series is connectable with all types of wiring terminals and can be installed on DIN-rail or directly to the back panel. It also supports primary currents up to 2000AAC, secondary currents of 1A or 5AAC,



and features solid- and split-core types in 12 frame sizes and sealable terminal block covers.

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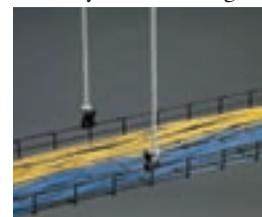
### Building Your Legacy: Lessons for Success from the Contracting Community

EBMag is pleased to announce that Ron Coleman—our “It’s Your Business” columnist—has published a new book entitled “Building Your Legacy: Lessons for Success from the Contracting Community”. “When I work with contractors, I want them to see beyond the money. I want them to see the business as a process for making money and creating a good lifestyle,” says Coleman. “With this focus, it is easier to build a contracting business that will be both your legacy and a legacy for your family.” The book is available at special quantity discounts to use for sales promotions, employee premiums or educational purposes. Ron is a professional accountant, certified management consultant and professional speaker with some 30 years of experience on four continents, and having analyzed more than 2000 sets of financial statements for contractors.

**RON COLEMAN**  
www.ronaldcoleman.ca

### Cooper B-Line introduces Flextray cable management system to Canada

Cooper B-Line has introduced its CSA-approved Flextray cable management system and range of corresponding accessory products in Canada which, it says, will provide contractors with “significant labour and time savings over competitive cable support systems by combining field-adaptable flexibility with several time-saving accessories that facilitate a virtually tool-less installation”. The system is available in different sizes and can “serve as a practical option for everything from a small cable drop to a large trunk of cables”.



**COOPER B-LINE**  
www.cooperbline.com

### Siemens Energy launches SWT-2.3-113 gearless wind turbine

[Siemens Energy SWT-2.3-113 wind turbine] Siemens Energy launched a direct-drive gearless wind turbine for low to moderate wind speeds. The core feature of the new SWT-2.3-113, says Siemens, is a drive concept with a compact permanent magnet generator, which is characterized by its simple design, requiring no excitation power, slip rings or excitation control systems. This results in high efficiency even at low loads, boasts the company. With a capacity of 2.3MW and a rotor diameter of 113 m, the turbine is fitted with the new Siemens B55 Quantum Blades, which aim to boost efficiency and optimize performance.

**SIEMENS ENERGY SECTOR**  
www.siemens.com/energy

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## ENT Support for Concrete Slab Construction



Perfect for use in high-rise, post-tensioned buildings, the new ENT Support Unit (ESU) raises the tubing or conduit up off the

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## EPR Kit Adapters make Duct repairs quick and easy!

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# Essential safety requirements for motor control circuits

The Canadian Electrical Code (CEC) contains two very essential safety requirements for motor control circuits: grounding; and why it's so significant that control circuits be prohibited for use as motor disconnecting means.

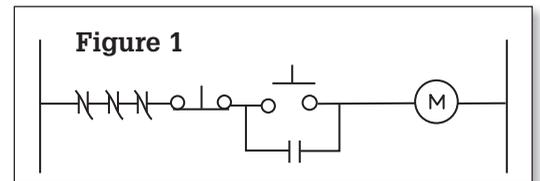
As a basic requirement, Rule 28-500 Control required specifies that every motor must be provided with a motor starter or controller for starting and stopping the motor. Sub-rule 1 also provides a list of exceptions to the rule, namely:

- A single-phase, 125-volt, cord-connected motor up to 1/3 horsepower;
- A motor controlled by a general use disconnect switch;
- A single-phase portable 125-volt motor, up to 1/3 horsepower controlled by a horsepower rated switch; or
- Several motors controlled by a single motor controller.

First addressing the motor control circuit grounding issue, Rule 28-506 Grounded control circuit requires that when a motor control circuit is supplied from a grounded electrical source, the grounded side of the motor control circuit must be arranged so that an accidental ground in the control wiring will not start the motor or prevent it from stopping.

Seems like a common sense requirement, but how is this accomplished? This simply means that the grounded side of the motor control circuit must be on the side of the motor starter coil opposite from the motor control contacts. Consider figure 1. Which is the grounded side of the circuit? What do you think might occur if the other side of the control circuit happened to be the grounded side? (Figure 1)

Here, the rule requires that the right hand side of the control circuit must be the grounded side. Should the grounding of the circuit accidentally be reversed, a short-circuit in the control wiring between the motor



starter coil and the motor control contactor would energize the starter coil, causing the motor to start up on its own.

Alternatively, a short-circuit between the stop pushbutton and the motor control contactor would not cause the motor to start. Note that once started, the motor cannot be stopped by means of the motor control circuit, since the stop pushbutton would then be out of the control circuit and thereby prevented from stopping the motor.

Addressing our second point, Rule 28-602(4) specifies that a motor disconnecting means must not be electrically operated, either automatically or by remote control. This means that before working on the motor or the motor-driven machinery, we must always disconnect and lock-off the electrical power supply to the motor. Disabling the motor control circuit by using a lock off switch is not a permissible or safe means of disconnecting the motor. A lock-off stop device in the control circuit will prevent the motor from starting. However, a short-circuit in the control wiring could cause the motor to start unexpectedly and create an unsafe condition. For this reason, de-energizing the motor control circuit is not permitted as the motor disconnection means. **EB**

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



Questions and answers compiled by the Electrical Safety Authority | VISIT [WWW.ESASAFE.COM](http://WWW.ESASAFE.COM)

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Answers to this month's questions in June/July's Electrical Business.

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

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

**Question 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.

a) #10 AWG    c) #6 AWG  
 b) #8 AWG    d) None of the above

**Question 2**  
 Does the Canadian Electrical Code (CEC) allow two supply services of the same characteristics to enter a building when only one will be used for supplying a fire pump?

a) Yes  
 b) No

**Question 3**  
 When a 2 conductor NMS cable is used for a switch loop, does the CEC require you to tape the white wire with black tape at the switch (when the connections are made so that the actual black wire is the return conductor from the switch to the outlet)?

a) Yes  
 b) No

**Answers to Code Conundrum EBMag April 2011**

**Q-1:** Does the CEC permit a bare neutral in a consumer service if this conductor is made of copper and run in a raceway?  
 a) Yes. Subrule 6-308.

**Q-2:** What is the maximum mounting height to the overcurrent device handle of a panelboard in a dwelling unit?  
 c) 1.7 m. Subrule 26-402(2).

**Q-3:** What size of ground wire is required to bond a metal fence around an outdoor substation?  
 b) #2/0 AWG. Subrule 36-312(2).

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