

Electrical Business

THE AUTHORITATIVE VOICE OF CANADA'S ELECTRICAL INDUSTRY



There's an invitation for you on page 5.



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Rotary hammer features integrated dust reduction technology.



Page 5

Schneider donates \$78,000-worth of equipment to Conestoga College.



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T8 lamps are TCLP-compliant and promise reduced lamp-end blackening.



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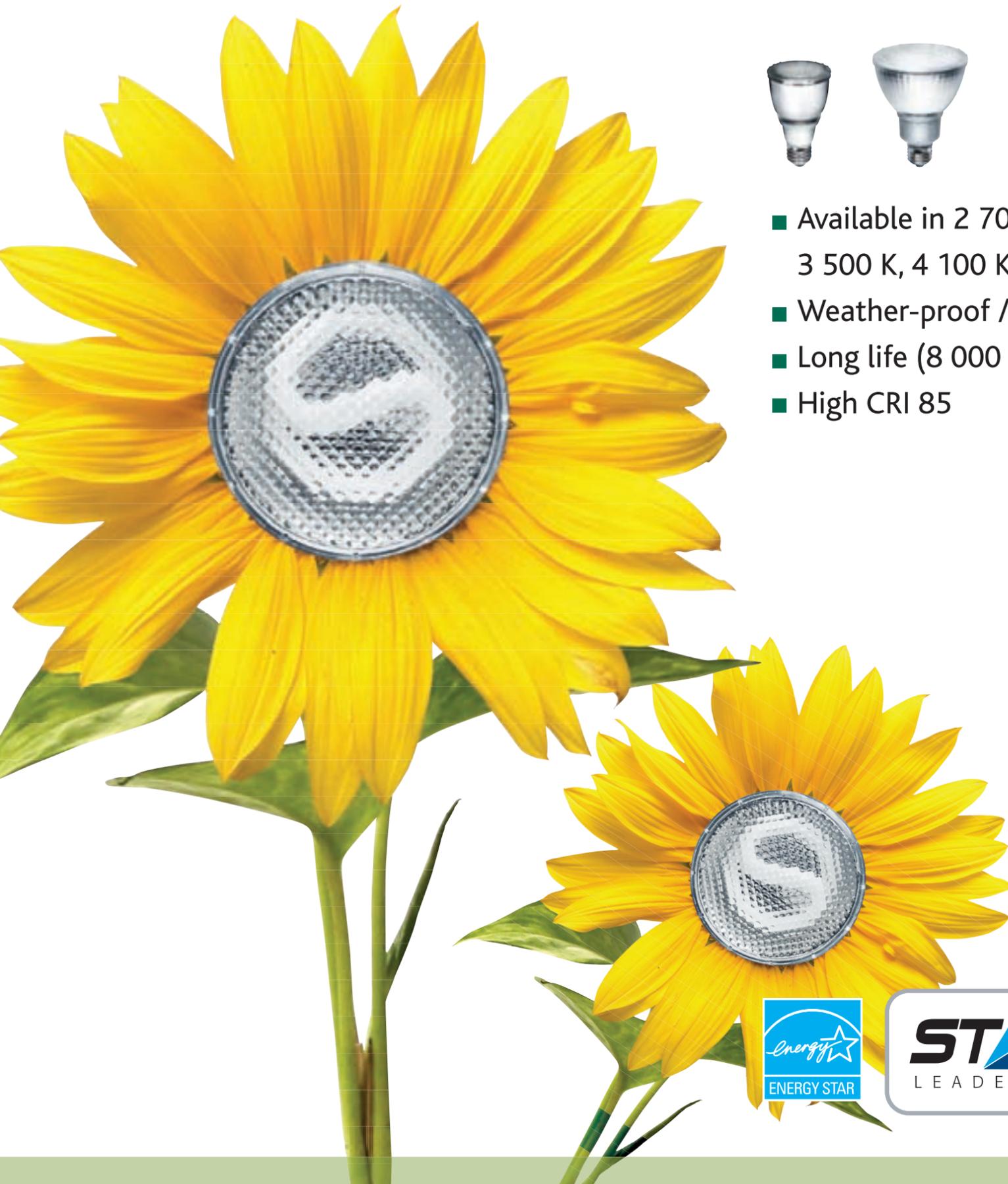


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▼ From the editor

Whither the next generation?

Canada's population continues to age, says StatsCan, but according to new preliminary estimates, it is (thankfully) still one of the youngest of the 30 developed countries that are members of the Organization for Economic Cooperation and Development (OECD). As of July 1 last year, Canadians' median age was estimated at 39 years. In 2002, it was 37.6 years.

Our nation's proportion of seniors ranks in 22nd place—still far behind Japan, where one in five citizens is 65 or older. Between July 1, 2007, and July 1 this year, nearly 300,000 people will turn 65 in Canada, the highest annual level on record. This number should increase for another 20 years, when people born during the peak of the Baby Boom generation reach retirement age. At that time, more than half a million will turn 65 each year.

Regionally, Canada's population is older east of Ontario, where all provinces had a median age over 40, and where the proportions of seniors are among the highest in the country. In the West and the North, the population is generally younger. Newfoundland and Labrador had the highest median age (42 years) and the lowest proportion

of youth (15.1%) in the country, as of July 1. Saskatchewan still had the highest proportion of seniors (14.9%), but the Eastern provinces are gradually closing the gap.

Because of its strong fertility, the population of Nunavut is very young; in fact, its age structure is similar to many developing countries. While seniors accounted for only 3.1% of its population, children aged 14 and under represented one-third (33.2%). Alberta had the lowest median age among the provinces (35.4 years), as well as the lowest proportion of seniors (10.4%). At 18.7%, its proportion of children aged 14 and under is the third-highest among the provinces, behind Manitoba and Saskatchewan.

The provinces and territories are aging at different speeds. The population's median age is increasing faster in the East than in the rest of the country. Newfoundland and Labrador, in fact, is getting older faster than any other jurisdiction of the country. Over the last five years, its median age grew by 3.2 years, more than twice the country's increase of 1.4 years.

Alberta's population is aging at the slowest pace. Over the last five years,

its median age rose by only 0.5 years. The province's aging process was slowed notably by strong inflows of young migrants from other regions in Canada. Between 2002 and 2007, Alberta had a net inflow of 153,900 from other provinces—43% of its total growth. The median age of Alberta's interprovincial immigrants was 26.4 years.

These numbers are very telling, especially in Eastern Canada. Already saddled with the burden of losing skilled workers to other parts of Canada, they don't have as much new blood coming into the workforce as their neighbours to the west. So while we all may complain about a lack of skilled labour in our own backyards, our Eastern provinces may have the most legitimate claim to that conclusion. Perhaps the answer is more government involvement for keeping skills at home, or increased immigration or, maybe, incentives for people to have more children. Whatever the answer or answers, we need to take action today to ensure we have a skilled workforce tomorrow. And for some of us, that action has to happen sooner than later. 

Anthony Capkun

Electrical Business

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A new office lighting field study conducted by the National Research Council of Canada's Institute for Research in Construction (NRC-IRC) demonstrates that sophisticated lighting control strategies can be combined successfully to generate persistent, large energy savings in open-plan offices (hence, a greener planet) while improving occupant satisfaction with their jobs and workspace.

FEATURE

16 Keeping the lights on when power glitches, then switches

This case study looks at how Calgary's ARX Engineering was commissioned to design a retrofit power supply transfer scheme that would improve reliability, meet current utility requirements, provide enhanced protection features and provide feedback to building operators.

19 Power Tools

Don't let this power go to your head, as Electrical Business provides a look at the latest in hammers and drills/drivers on the market.

20 Pathfinding via solar-powered LEDs

Solar-powered area lighting is a gateway for the electrical business community to offer a substantial new product to parks, parking facilities and college campuses for areas located far from the electric grid.



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REGIONAL FOCUS

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Schneider donates equipment to Conestoga

Schneider Electric recently donated \$78,000-worth of automation equipment (including M340 PLCs, Lexium drives and Magelis HMIs) to the Conestoga College Institute of Technology and Advanced Learning (ITAL). The systems will be used in one of Conestoga's PLC labs for students in the corporate training, diploma, applied degree training and continuing education programs.

"Industry partnerships are vital to us, because they allow our students to learn leading-edge

technology that will respond to employer needs", said John Tibbits, president of ITAL. "This, in turn, enhances our reputation as a leading-edge educational institution."

The donation was the result of collaboration between Shaun MacGarvie, industrial sales manager with Graybar Canada (a member of ITAL's Program Advisory Committee) and Peter D'Aurora, business development manager, Schneider Electric. Seeing an excellent fit between Conestoga College ITAL's automation curriculum development needs and Schneider automation equipment, McGarvie worked with D'Aurora to develop the Schneider Electric donation package.

This donation will also benefit Schneider Electric and Graybar Canada. "Strengthening Conestoga College ITAL's curriculum will help ensure that graduates have the skills required by electrical equipment manufacturers and distributors", says Gavin de Mello, director of human resources, Schneider Electric Canada.

Philips SSL unveils corporate HQ

Philips Solid-State Lighting Solutions (SSL)—the entity formed by Philips' acquisition of Color Kinetics—has completed the finishing touches and officially unveiled its new 50,000-sf corporate headquarters in Burlington, Mass., which merges the principles of green design with LED lighting technology throughout the facility.

The HQ incorporates many features designed to showcase both existing and forward-looking applications of LED lighting, in addition to amenities for product design and development. These include: a showroom that's lit entirely by LED sources and designed to mimic various market applications; conference rooms and common spaces that incorporate both colour and white LED lighting systems; 'portal' passageways lined by 24,350 individually controlled LED nodes; workshop, optics lab and machine shop for product design and testing; and colourful LED lighting throughout workstation areas. The central lighting system incorporates wall switch occupancy sensors.

Investment in non-residential building construction

StatsCan says investment in non-residential building construction marked its fourth consecutive year of uninterrupted growth, fuelled mostly by sustained commercial investment in Central Canada and Alberta (due mainly to the construction of major office buildings underway in Alberta, Quebec and Ontario). Non-residential investment hit \$10.4 billion in the third quarter 2007, up 4.9% from the second quarter.

Investment in the commercial component led the way with a 5.2% increase to \$6.2 billion. In the institutional component, investment rose 5.3% to \$2.7 billion, while investment in the industrial component increased 3.1% to \$1.5 billion.

Overall, eight provinces and two territories recorded increases, but the biggest gains, in dollars, occurred in Ontario and Quebec. In both provinces, investment rose in all three components, reaching new record highs. Among the factors sparking the non-residential sector are a strong labour market, high profits recorded by Canadian corporations, healthy retail and wholesale sectors, declining vacancy rates in large urban centres and Western Canada's dynamic economy.

Of the 34 census metropolitan areas (CMAs), 23 showed gains in the third quarter, with Toronto, Calgary and Montreal showing the largest increases (in dollars)—the last two setting a new quarterly high.

Commercial: robust gains in office building

Investment in commercial building construction hit another record high, in the wake of robust activity in office building sites in Alberta, Quebec and Ontario. Overall, seven provinces showed gains in commercial

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Who am I?

Thomas & Betts invites you to be a part of the year-long celebration we're hosting throughout 2008 to mark the **50th birthday** of a very special product brand.

To kick off the festivities, participants who correctly identify the product brand will be entered in a weekly prize drawing throughout the month of February.

You could win a GARMIN™ StreetPilot® C340 GPS system.

Log in to www.tnb-canada.com/en/50 and submit your response today!

Thomas & Betts



Canada wins Silver in Japan

Thanks to René Jetté of the Centre de formation professionnelle Pierre-Dupuy for sending us great news from the WorldSkills Competition in Shizuoka, Japan, in November. He writes: "Following our last participation in the World Skills Competition... with Skills/Compétences Canada, we got a silver medal in Electrical Installation Trade #18."

Congratulations to Silver Medal winner Maxime Blais-Lapointe of Quebec City, Que. The photos show Maxime at work during the competition, and again with his trainer Mario Houde of the Centre de formation professionnelle EMOICQ (École des métiers et occupations de l'Industrie de la construction de Québec) on his left, and René to his right.

investment in the third quarter. Alberta (+7.8% to \$1.6 billion), Ontario (+4.2% to \$2.2 billion) and Quebec (+5.9% to \$909 million) experienced the largest investment growth (in dollars), and each set a record high.

On the other hand, Nova Scotia experienced a second consecutive decline, which was the largest among the provinces. This decrease was the result of commercial construction projects started in mid-2005 and early 2006 and now mostly completed.

Among the 34 CMAs, 21 registered quarterly growth. The strongest gain (in dollars) was in Calgary, where investment rose 15.3% to \$928 million. It was followed by Toronto, with a 6% increase to \$1.2 billion.

Several economic factors were consistent with a fertile environment for the commercial sector. These included the vigorous retail and wholesale sectors and declining vacancy rates for office buildings in major Canadian urban centres. These



declining rates have provided added incentive for office building construction and the construction of shopping malls and warehouses.

Institutional: new record thanks to gains in educational building

Investment in institutional building construction increased for the third-straight quarter. This robust gain was largely the result of strong spending on the construction of educational facilities in seven provinces.

Provincially, the biggest third-quarter increase (in dollars) occurred in Quebec, where investment rose 16.4% to \$491 million, the third-straight quarterly gain. This increase was the result of projects in educational and healthcare building construction. In Ontario, which recorded growth for a second consecutive quarter, institutional investment increased 5.8% to \$1 billion.

In contrast, British Columbia posted the biggest decline (in dollars). This decrease was the result of institutional construction projects started in mid-2005 and early 2006 and now mostly completed. In total, 24 of the 34 CMAs posted gains. Toronto led the way in terms of growth (in dollars), its second consecutive quarterly gain. In contrast, Ottawa recorded the most significant decline.

Industrial: back-to-back quarterly increases

Investment in industrial building construction increased for the second-straight quarter. Strong investment gains in primary industrial buildings in nine provinces, particularly Ontario and Quebec, more than offset declines in the other industrial categories.

At the provincial level, the largest contribution to the quarterly increase (in dollars) occurred in Ontario, the result of gains in all industrial construction buildings. This reflected a higher number of major projects for manufacturing plants and utilities buildings that began in 2007. Alberta posted the largest decline (in dollars), as investment in all industrial building categories dropped after high spending in previous quarters. This decline was the result of several industrial projects that started in 2006 and are now mostly completed.

In the third quarter, manufacturers continued to face increased production costs, stronger global competition and the appreciation of the Canadian dollar. On the other hand, the industrial capacity utilization rate among Canadian industries increased slightly in the second quarter of 2007.

Of the 34 CMAs, 21 posted increases. Toronto and Montreal posted the highest third-quarter increases, the result of further major industrial construction projects that started at the beginning of 2007. After posting a record high in the second quarter, Calgary registered the most significant decline in dollars, in the wake of a drop in all industrial construction building categories. **EB**

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PHOTO CONTEST

Electrical Business, in association with the Electrical Heritage Society of British Columbia—along with generous industry partners—is excited to present the Heritage “What Am I?” PHOTO CONTEST.



Pictured on the left is an item from the heritage society's collection of electrical artifacts. The contest begins when you think you know what this item is. Of course, we're not going to show the item in its entirety—that would be too easy! (You'll have to wait until next month to see the whole picture, as well as the correct answer.)

Here's how to play

Visit EBMag.com where you'll find an entry form along with a multiple choice answer form. If you've answered correctly, your name will be added to all the other correct entries, from which one (1) winner will be randomly chosen before next month's installment of the Heritage “What Am I?” Photo Contest. Read the small print below for more information. Good luck!

This month's awesome prize!



This month's awesome prize was donated by our friends at Thomas & Betts Canada. A cost-effective tool for simple labelling, the EZL-75 thermal label printer lets you quickly type and print. Or don't even bother typing: instead, use hot keys to choose symbols and more than 150 commonly used words for security, location and VDV labelling from the EZL-75's built-in library. Hot keys provide one-touch flagging for wires and cables and fixed-length labels for faceplates and security panels. There are several label types from which to choose, depending on the application at hand.

Last month's photo: answer

Pictured here is a **Bluenose dry cell battery** (1.5 volts), commonly called “radio battery” because it was often used to power radios. Winner to be announced.



No purchase necessary. Open to residents of Canada of age of majority, excluding Quebec. You must answer a timed skill-testing question to win. Prize valued at about \$99.00. The contest is not open to anyone affiliated with, or related to, members of Electrical Business or the Electrical Heritage Society of British Columbia. (That would be unfair.)

Industry Announcement

St. Thomas Holding Inc., wholly owned by the City of St. Thomas, and the owner and operator of St. Thomas Energy Services Inc. (STESI), has entered into an agreement to purchase the shares of two companies near the Town of Tillsonburg: Tiltran Services and Lizco Sales. This is the first transaction of its size in Ontario involving a municipally-owned utility company purchasing a competitive, privately-owned services company.

Tiltran specializes in the engineering, construction and maintenance of high voltage electrical power, wind and solar systems. Lizco has the largest, privately-owned transformer inventory in Canada.

Together, the companies will have the ability to gain access to broader markets and larger projects, find ways to secure new revenue streams and be aggressive in pursuing new business opportunities. The transaction will be completed on January 2, 2008.

St. Thomas Energy Services Inc. along with their new partners Tiltran and Lizco will continue to provide excellence in service to their customers in Ontario, Canada and North America.

For more information, please contact Brian Hollywood, President and CEO, St. Thomas Energy Services Inc. at 519.631.4211 ext. 238, www.stesi.com or Pat Carroll, President, Tiltran Services at 519.842.6458 ext. 225, www.tiltran.com.



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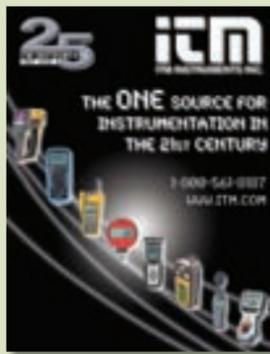
Cambrian College professor Marcia Ranger received her Master Electrician license. Ranger graduated from Cambrian's Electrical Techniques program in Sudbury back in 1994, then worked in a number of commercial and industrial jobs throughout Ontario and Manitoba before joining Cambrian's Electrical and Powerline program staff in 2006. "This certification is definitely a positive thing for me to have, and it will help to enhance my teaching at the college," said Ranger, adding, "Over the years, I have seen more women pursuing careers in the trades. There are a lot of opportunities for employment in the field of construction, and I encourage women to consider this as an option when choosing a career."



Steve Boccadoro, GM of **Eaton's Electrical Group (Canada)** recently made a couple of personnel announcements. First, **Perry D'Ortenzio** has been appointed national marketing manager for Canada. D'Ortenzio most recently served as segment marketing manager for Eaton's industrial/OEM business. Prior to this, he held progressive positions within the sales, marketing and manufacturing operations of the business. He has been with the organization since 1980 and will continue to be located in Burlington, Ont. Meantime, **Mike Masur** has been appointed plant manager of the low-voltage distribution assemblies operation in Milton, Ont.



(though he's been recently serving in this role on an interim basis). Masur was the engineering manager for the Milton operation prior to this, and has held various progressive positions within marketing and business development.



ITM celebrates 25 years of service
 Congratulations to Canadian-owned test and measurement company, ITM Instruments Inc., which is celebrating 25 years of service.

Thanks to **Larry McIntosh**, **Nedco Ontario's** GM, for letting us know about two additions to the GTA (Greater Toronto Area) management team. **Scott McMillan** has assumed the position of GTA district manager/contractor sales manager, while **Scott Watkin** has assumed the position of Keaton branch manager. McIntosh says customers will greatly benefit from the professionalism and experience that both men have developed throughout their careers.

Mossadiq Umedaly has been appointed chair of the **BC Hydro Board of Directors**, replacing **Larry Bell** who is retiring from the position he has served since 2001. Umedaly currently serves as chair of Xantrex Technology (prior to which he was the company's CEO), but has also held senior positions with Ballard Power Systems and Aga Khan Development Network. He is currently a member of the Premier's Technology Council and British Columbia's Climate Action Team.



Q-Tran Inc. founder John Tremaine (centre) is flanked by his sons Gean Tremaine and Jordan Nodelman.

Q-Tran celebrates 15 years

Q-Tran Inc., a designer and manufacturer of power supply systems, transformers and components, is celebrating its 15th anniversary this year.

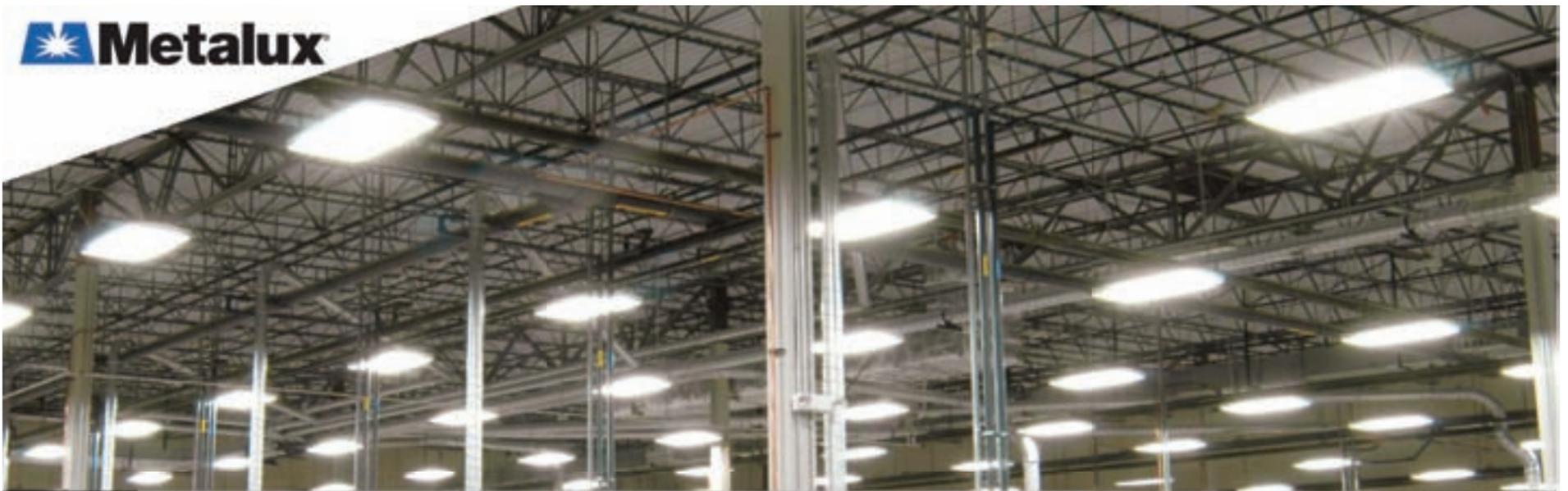
The company was founded by John Tremaine, a lighting designer born into a family of lighting entrepreneurs and innovators. (He began his career with The Miller Co., a firm acquired in the 1930s by his great-grandfather, who established the National Electric Lamp Association [NELA]. In the early 1920s, NELA became GE's lamp division, and now serves as a prestigious research institute.)

In the early 1980s, Tremaine began working with low-voltage lighting and discovered flaws in the way power was fed to low-voltage fixtures. Determined to resolve the challenges inherent in power supplies available at the time, he established Q-Tran in the basement of his showroom.



Thomas & Betts has expanded its All-Struct aluminum structures offering, and introduced a new name and logo ("Your complete structure solution") to boot.

The line now includes a range of structures for roadway, traffic or area lighting—in both traditional and decorative styles—in aluminum or steel. Business unit manager **Michael Shenouda** says the line is expanding further to include traffic accessories and overhead signage structures. **EB**



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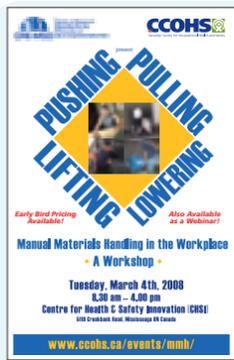
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Annual General Meeting
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 Visit www.ied.ca/events.html



Industry Conference
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 Visit www.ecao.org

The Power Show 2008 (Electric Expo)
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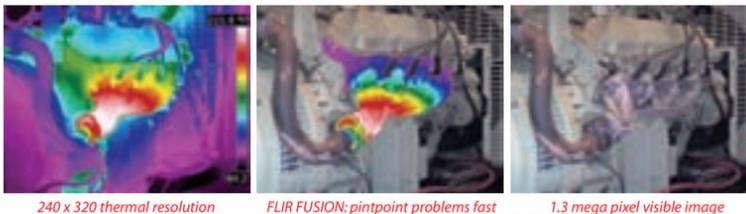
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Lighting controls

By Craig DiLouie

lead to energy savings and improved occupant satisfaction

What are the benefits of combining advanced lighting control strategies in the same space? Are the energy-saving benefits of lighting controls persistent over time? Can advanced lighting controls be successfully applied to open offices given concerns about jurisdiction conflicts, lighting uniformity, etc.? Can they enhance worker satisfaction?

A new office lighting field study addresses these questions. Involving about 90 workers in a real-world open-office environment, the one-year study determined that occupancy sensing, daylight harvesting and individual occupant dimming control worked together in the building to produce average energy savings of 47% while correlating with higher occupant environmental and job satisfaction.

The study clearly demonstrates that sophisticated lighting control strategies can be combined to generate persistent, large

energy savings in open-plan offices (hence, a greener planet) while improving occupant satisfaction with their jobs and workspace.

"The industry has long sought objective evidence that lighting controls not only save energy, but also benefit organizations in other ways such as occupant satisfaction," says Dr. Guy Newsham, senior research officer at the National Research Council of Canada's Institute for Research in Construction (NRC-IRC). "This research provides such evidence."

The study

The one-year study occurred within four floors of an open-plan office building in Canada. The building selected for the project was attractive to the research team for several reasons. First, it contained a sophisticated control system operating in an open-plan office setting, an environment often perceived as unfriendly



This photo is a close-up of the integral photosensor and occupancy sensor in the luminaire. Photo courtesy National Research Council of Canada's Institute for Research in Construction (NRC-IRC).

to sophisticated control strategies. Second, this control system combined three control strategies: occupancy sensing, daylight harvesting and individual dimming control. Third, the control system was already installed and operational. Finally, the site manager was agreeable to the research team not only monitoring energy savings, but also surveying occupants on matters related to environmental and job satisfaction.

Four years earlier, the building had installed 195 direct/indirect lighting fixtures to replace 530 recessed 2x4 T8 deep-cell parabolic fixtures. The new fixtures—centred over the cubicle workstations and containing 3x32W T8 lamps powered by two electronic ballasts—reduced installed lighting wattage by about 40%.

The direct/indirect lighting system features advanced controls while the parabolic system does not. Workers occupying 86 workstations on three and a half floors participated in the study using the advanced controls, while workers on half of one floor continued to use the old parabolic system—a setup that allowed a comparison between the two groups. Monitoring software was installed to collect detailed data for a period of one year.

"Our research group has had a strong interest in lighting controls over many years, and the opportunity to conduct a field study offered a great complement to the laboratory studies we've conducted," Newsham points out. "There was almost no information available on the long-lasting success of energy-saving lighting control technologies when used in combination in real buildings. In addition, a field study allowed us to explore effects that simply can't be addressed in anything but a real workplace, such as those related to organizational productivity. I think everyone agrees that new technologies should demonstrate benefits for occupants and their organizations, as well as energy savings, and such outcomes will promote their adoption."

The control system

The direct/indirect fixtures contained an integral occupancy sensor and photosensor. Connected to a fixed-output electronic ballast, the centre lamp produced the indirect (uplight) component of the fixture; this ensured uniformity of light on the ceiling. The two outboard lamps—connected to a dimmable electronic ballast—produced the direct (downlight) component of the fixture. Light output varied based on signals from four control inputs.

When the occupancy sensor detected vacancy in the workstation below, it signalled the dimming ballast to gradually dim the downlight (outboard) lamps until reaching 0% light output, at which point they were switched Off. When the sensor detected occupancy, it signalled the ballast to start the lamps and restore light output to the last set level.

The photosensor monitored light levels on the task plane, which received variable contributions from daylight available through windows. When light levels exceeded the occupant-set level, the photosensor signalled the dimming ballast to dim the downlight lamps.

Occupants could also dim the lamps forming the

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direct, or downlight, component of their lighting fixtures via an onscreen slider on their desktop PCs, thereby enabling them to choose their own preferred task light levels.

With this setup, researchers were able to study the overall effect of the combined control system, and estimate the relative contributions of each control type to the overall savings, for a period of one year. The study was conducted in three phases:

- **Phase 1** (39 workdays) with just the occupancy sensors and individual dimming controls active, and with a sensor time delay of eight minutes with seven minutes of dimming before shutoff;
- **Phase 2** (140 workdays) with all controls enabled, and with an occupancy sensor time delay of 12 minutes with three minutes of dimming before shutoff; and
- **Phase 3** (61 workdays). The same as Phase 2 but with e-mail reminders encouraging occupants to use the individual control feature in their workstations.

The control system was recalibrated just before the study was initiated. As new employees were hired and entered the study area, or existing employees re-assigned, the IT department (responding to a request from the energy manager) quickly re-enabled the individual control feature, which would prove critical in sustaining this control strategy.

A fourth control strategy—global automatic On/Off switching from a central point of control based on a daily schedule (7:30 a.m. to 5:00 p.m. workdays)—was in effect but not included in the study.

The results

By replacing the recessed parabolic fixtures with the direct/indirect fixtures, energy savings of about 40% were realized, and lighting power density was reduced from about 0.92W/sf to about 0.54W/sf.

The combined control system increased lighting energy savings to 67-69% compared to the old parabolic system. Further, the direct/indirect fixtures operating with the control system produced 42-47% energy savings as compared to when the fixtures operated at full light output without the controls. All energy savings resulting from the use of the controls were accompanied by corresponding demand reductions. Because the controls ensured that not all lighting power was used at any one time, the average lighting power density in use was about 0.28W/sf. The site manager estimated a simple payback for the advanced system, based on energy cost savings alone, to be two to four years in a new installation, and four to 12 years in a retrofit.

When installed alone, the occupancy sensors would have produced an estimated average 35% savings, daylight harvesting 20% and individual dimming control 11%. Daylight harvesting savings were higher in perimeter workstations (as would be expected due to their proximity to windows), and the researchers estimate that savings would have matched the occupancy sensor savings were perimeter fixtures allowed to dim below 50% output based on the photosensor signal (deeper dimming based on occupancy sensors or personal control was allowed).

Occupant surveys demonstrated a correlation between the presence of the controls and higher job and environmental satisfaction. While individual dimming's contribu-

tion to overall energy savings was relatively small, researchers credited the improvements in occupant satisfaction to the individual control feature. The researchers are currently looking deeper into the relationship between the controls and worker satisfaction, and hope to publish their results next year.

"This study demonstrates that the right package of controls—properly maintained—can produce large, persistent energy and demand savings coupled with benefits to occupants and their organizations, and refutes suggestions that these kinds of control systems cannot work well in open-plan offices," concludes Newsham. Although such systems have a higher initial cost than standard office lighting systems, the overall benefits seem to justify the investment: occupants claim greater comfort, and the energy savings realized mean less power generation required, hence a healthier environment. **EB**

Working on behalf of the Lighting Controls Association, Craig DiLouie is principal of Calgary-based Zing Communications and a past contributor to Electrical Business. The field study discussed above was supported by the Government of Canada, BC Hydro Power Smart and Ledalite Architectural Products.



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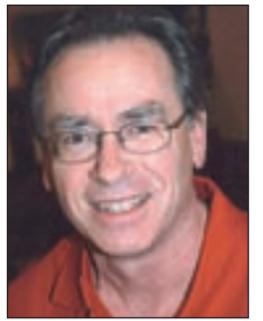
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To hell in a handbasket



By Dave Smith

Do you ever think that when we make our plans we always base them on things going perfectly instead of to hell in a handbasket?

Before you place your body close to an energy source, you need to do a risk analysis. Ask yourself: Is this new equipment or some beat-up piece of crap? Is it well maintained, or has it been ignored for years? NFPA 70E uses the term 'Hazard/Risk Category', which is a really good way to look at any situation—electrical or otherwise.

I was once tying into a 600V main panel at a facility on Lake Ontario. I took off the front outer covers then started to remove the final plate (which was also covering the main lugs). This plate was held in place by four standoffs. I removed two of them. Then, when I took off the third, the plate started falling into the main lugs because *someone hadn't installed* the fourth standoff.



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You know when people talk about their lives flashing before their eyes? Well, I didn't experience that, but as the plate fell into the lugs, I remember thinking: Here goes my head. It all happened so fast that there was no getting out of the way. I expected that plate to blow straight out into my face.

The plate hit the lugs with a clunk and... *nothing happened*. I couldn't believe it! I took out the plate and discovered I had been saved by the manufacturer's foresight: the back of the plate was insulated. Thank you Federal Pacific! You saved me from both someone else's stupidity and my own expectations that everything will go right.

A journeyman in one of my classes told me he once took off a subpanel cover when a ground wire came loose and hit a lug. He thanked God the subpanel cover was still in his hands when this happened because it acted like a shield, taking most of the blast. Nonetheless, the journeyman got really painful burns to his fingers.

So how do you plan your tasks? Do you think nothing will ever go wrong or do you think that there's a ground wire waiting to pop loose behind every door? When you always prepare for the worst (which is the driving concept behind NFPA 70E), an accident may still knock you flat on your back, but then you'll strip off your PPE and find out you're okay.

But PPE (personal protective equipment) is your last defence. Your first defence is good planning. Each and every time you bring your body close to an energy source, make sure you've planned for everything going to hell in a handbasket.

And the bigger the job, the more carefully you have to plan, because now you're dealing with more people and, often, multiple trades. After all, your outfit might have a superior safety program and stellar record, but what do you know of the other firms or individuals you're working with? The electrical safety requirements of NFPA 70E Article 110 are intended precisely for these situations.

Plan for the unexpected on each and every job. Make sure everyone is following the safety plan, and get your PPE shields in place to protect you.

Until next time, be ready, be careful and be safe. Ⓢ

Dave Smith is president of Canada Training Group and has been providing consulting services to industry since 1980. This story and others can be found at www.canada-training-group.ca. Please feel free to use this information to support your safety program. Dave can be reached at davesmith@canada-training-group.ca.



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Before you buy the next truck for your business

With The Work Truck Show* fast approaching, the National Truck Equipment Association (NTEA) presents the following considerations before you buy your next truck.

As vocational trucks continue to grow in complexity and sophistication, companies are under increasing pressure to maximize their vehicle investments. This process should start well before a new work truck is ordered. No longer is it prudent just to buy what you've always bought. To keep your vehicle maintenance and operation costs down, you need to do some homework before you make another call to your truck dealer.

Start by establishing and following a logical design process, as outlined here in four steps. Taking a systematic approach when specifying a new work truck makes it easier to ensure it actually meets your needs.



Photo courtesy NTEA.

The Work Truck Show gives you the opportunity to make side-by-side comparisons of truck chassis, bodies, components and accessories from 500 suppliers.



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STEP 1: Determine what you need the truck to do

Start by asking yourself what the vehicle will be used for. Exactly what will you haul with it? How far will it be driven and how often? What special circumstances will your drivers/operators encounter and how often?

Don't just say, "I need a pickup truck". Really explore what that pickup truck has to be able to do to be most productive.

For example, does your truck need to haul equipment? Does the operator need to be able to get equipment on and off the truck frequently? Do you need to haul material to job sites? What kind of material are you hauling and how much? Will the truck have different uses at various times of the year? How many workers/passengers will the truck normally carry?

Think about the environment in which the vehicle will be driven and used. Consider how available features can improve or hinder operator productivity. Spend some time looking at the performance of the trucks you currently own/use. Talk to your vehicle operators and maintenance crew to find out which trucks and equipment they prefer and why.

STEP 2: Thoroughly explore technical details to achieve your goals

Now that you've identified what you want the vehicle to do, it's time to figure out how to make it happen. If you've determined that the truck needs to carry let's say, oh, six No. 3 widgets, for example, then the size and weight of those widgets will impact both the vehicle's bed size and payload requirements.

Questions to ask include: What are your performance requirements, such as speed with a full load, braking considerations and fuel economy? What type of truck body and/or special equipment is needed? Be sure to account for the size of special equipment to be upfitted to the chassis, the weight of these components, cargo storage needs, component installation requirements and operational needs (i.e. power sources for equipment, equipment access, etc.). What payload weight and volume will the vehicle have to carry? What are the dimensional requirements, based on the size and shape of materials to be transported?

For many vehicles, accessory items like generators, hose reels and compressors must also be taken into account. Your local vehicle equipment distributor can be a useful resource in this process.

STEP 3: Factor vehicle operating conditions and environment

Consider how often the vehicle will be driven in the city, on the highway/off the highway, and in combination. Will it be used predominantly in level or hilly terrain? Also evaluate its operational cycle, including desired cycle time and daily hours of

Workhorse introduces new walk-in truck look



Photo courtesy Workhorse Custom Chassis

A lot has changed under the skin of the walk-in truck, and it's also going to look a little different. This face-lift is the latest in a series of walk-in changes introduced by Workhorse Custom Chassis; the grill of the new nose design clearly identifies the walk-in as a cousin of International Truck and Engine Corp. (of which Workhorse is a wholly owned subsidiary).

The initial Workhorse model was available on an 86-in. wide body, but now (or imminently) you can specify a 96-in. wide version. Both models have cargo body lengths from 10 ft to 22 ft, built on the full range of Workhorse gas and diesel chassis options from 9400 lb GVWR to 23,500 lb GVWR. Workhorse uses General Motors 4.8L, 6.0L and 8.1L Vortec gas engines and International's 4.5L MaxxForce 5 V6 diesel power plant.

Workhorse launched its heavy-duty W62 truck

chassis in March 2007, offering both gas and diesel engine options in the higher 19,500 lb and 23,500 lb GVWR range for walk-in trucks. In May 2007, it announced a variety of extended service coverage plans to boost the warranty options available with each of its chassis models.

"The new walk-in capabilities we've created, combined with a growing number of International dealers adding Workhorse to their portfolios, bodes well for the growth of this truck category. These trucks are going to be more accessible and more useful to more businesses than ever before," said Jay Sandler, Workhorse vice-president. He's pretty confident about this truck: "Once businesses try a walk-in, they don't go back to whatever medium-duty truck they were using. And, with the recent chassis upgrades we've developed to go along with this body upgrade, that's going to be more true than ever". **EB**

operation. Other factors to consider include loading cycle, climate/weather and maintenance. These elements help determine the correct selection of engine, transmission and other components.

For example, if the vehicle will be used in temperatures above 90°F for extended periods, you may want to upgrade the engine and transmission cooling systems, select high-temperature-rated tires, and specify deeply tinted glass in the cab. In a very humid climate, you may choose to relocate air system tanks or use remote drain systems to facilitate manual draining, install upgraded air dryers and specify heated mirrors and windows.

STEP 4: Review maintenance histories of existing vehicles in the fleet

Look for common failure patterns to see whether there are areas where vehicle specifications may need to be upgraded. Typical high-maintenance areas include suspension systems, front-end/steering, brakes, engines, transmissions, differentials and vehicle frames.

Going through this process can also alert you to other potential issues within your operation. If a particular truck has higher maintenance costs than similar vehicles in the fleet, that truck's driver may be responsible. A high incidence of repeat repairs within a short period may indicate poor maintenance and repair procedures.

Where to go for additional resources

Need some help? A wealth of free information is available at www.ntea.com, including a directory of chassis manufacturers, industry glossary and directory, etc. Another valuable resource is the aforementioned Work Truck Show—the largest event in North America dedicated to Class 1–8 vocational trucks and equipment. The show gives you the opportunity to make side-by-side comparisons of truck chassis, bodies, components and accessories from 500 suppliers.

Many of the exhibitors also bring engineering and technical staff to the event, so you can get many of your questions answered right on the show floor. A full educational conference offers some 40 technical sessions on topics such as life-cycle cost analysis, methods for reducing maintenance costs and downtime, vehicle specifications and updates on new chassis from leading manufacturers. **EB**

— With files from Robert (Bob) Johnson,
NTEA's director of fleet relations

Note

* The Work Truck Show 2008 is held in conjunction with the annual NTEA (National Truck Equipment Association) Convention, February 26–28, in Atlanta, Ga. For more information, visit www.ntea.com.

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Keeping the lights on when power glitches, then switches

Automatic transfer scheme retrofit ensures reliable power in Calgary high-rises

The critical use of power in large commercial facilities makes continuous electric power extremely important. To provide a more reliable utility supply, the power system often employs redundant utility sources via a transfer scheme that switches from a preferred to an alternate source in the event of a power upset. A continuous power supply relates to health and safety issues, computer and process loads, and comfort requirements such as HVAC and lighting. And there must be assurances that, when a transfer occurs, lighting in important areas—like stairwells—continues to show people the way out.

With the increased demand for electricity combined with the aging infrastructure of the electric power grid, disturbances such as voltage spikes/sags and severe weather conditions continually increase the probability that large buildings will incur the need to transfer between power supplies at increasing intervals. When the transfer does not occur within a few seconds or automatically, both building and tenant operations could be interrupted, quite possibly exposing building owners to extensive liabilities.

“Such outages are extremely impactful [because] building tenants usually have to be evacuated for the duration,” says Roland Davidson, RET, operations manager at ARX Engineering (Calgary, Alta.). “In extreme cases, it could be inherently precarious

for building occupants if the emergency power systems were to fail. With elevators not operating, they must navigate through dark halls and stairwells without the help of emergency lighting to vacate the building.”

The increased frequency of power transfer scheme failures can be attributed to the age of the equipment in these large commercial buildings and the use of archaic technologies that are inadequate for today’s power systems requirements. These designs incorporate devices such as electromechanical relays and pneumatic timers known to have a limited service life cycle, which have been supplanted by more advanced microprocessor-based devices.

Reaching a more reliable solution

Since 1982, ARX (and its predecessor Magna IV Engineering Ltd.) has been providing electrical engineering, equipment maintenance and commissioning services to the utility, industrial, commercial and institutional sectors. It works with building management and external resources to achieve high-performance building infrastructure management. Maintaining an efficient infrastructure—including electrical power systems—is quite significant, because a typical building’s life cycle cost can be broken down like this: 30% to construct and 70% to manage, operate and maintain.

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failures to these systems. However, within a one-year period, at least three major facilities in Calgary experienced a failure of the utility source where power was not automatically restored via the alternate source. These events all resulted in building evacuations.

“Rather than continue to repair these problematic systems, ARX was determined to design a new, modern protection and control scheme,” explains Davidson. “The goal was a solution that would not only improve reliability but also enhance the performance of the system.”

With the backing of Brookfield Property Management and Oxford Properties, ARX was commissioned to design a retrofit transfer scheme that would improve reliability, meet current utility requirements, provide enhanced protection features and provide feedback to building operators.

After consulting Schweitzer Engineering Laboratories Inc. (SEL), the design undertaken employed a flexible microprocessor-controlled protective relay that boasts monitoring, protection, communications and automation features.

“At one facility, we employed two SEL-351 relays on each of the main breakers, plus four SEL-551C overcurrent/reclosing relays on the feeder breakers,” Davidson says. He goes on to explain that the scheme is a 25kV preferred source with a hot alternate. Many of the major office towers in downtown

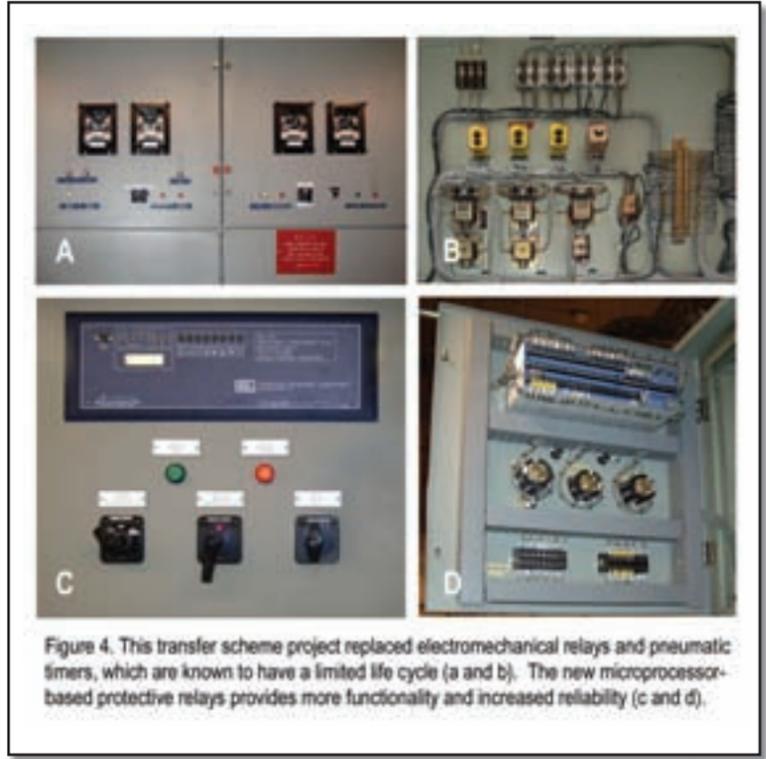


Figure 4. This transfer scheme project replaced electromechanical relays and pneumatic timers, which are known to have a limited life cycle (a and b). The new microprocessor-based protective relays provides more functionality and increased reliability (c and d).

Calgary are serviced by a 25kV network with the preferred feed in one building being the alternate in an adjacent building, he says. Upon the failure of one of the 25kV feeds, the affected buildings will transfer automatically to their alternate source. The local utility then restores the buildings back to their original state after the problem is corrected.

Comprehensive system features

Transfer scheme design parameters include a selectable preferred source, automated and synchronized transfer to a second source in case of a power sag or other disturbance, and remote alarm notification to building engineering staff should there be a loss of the standby (secondary) source. Overcurrent protection and lockout features are standard functions of the relay and are incorporated into the overall design.

Davidson also reports that features of the relay have really helped with reporting and troubleshooting. “Event reports, communications, load profiling, ease of installation, flexible programmable logic and enhanced protection features have considerably improved the reliability of this system for the property owners,” he says.

With the successful installation of this system at five facilities within the Calgary marketplace, building owners have seen the benefits of the installation; they haven’t experienced any malfunctions and have renewed confidence in the event of a problem with the alternate supply. An unforeseen benefit is that they are now made aware when the utility transfers them onto the alternate source without notification, and whether there’s a problem with that alternate source.

A new focus on commercial facilities

A past winner of the BOMA (Building Owners and Managers Association) Service Excellence Award, ARX Engineering has been nominated for the BOMA Innovations Award for the Calgary area because of these new automated transfer schemes and related equipment recently installed in several of the city’s high-rise office buildings.

From the outset, ARX Engineering management recognized that the complex electrical distribution systems existing in major commercial facilities were essentially being ignored by industry. As the marketplace has become more competitive, proactive building owners have challenged ARX to find innovative solutions to enhance the reliability of the power supply at these facilities.

“Commercial power systems like those found in high-rise buildings can now enjoy the same benefits of high-speed digital protection and control that electric utilities have enjoyed for decades,” says Erik Newman, vice-president of sales and customer service at SEL. Commercial customers can enjoy the benefits of safe, reliable and economical power while gaining additional information about the status of the power system—something previously unavailable from older technologies. 

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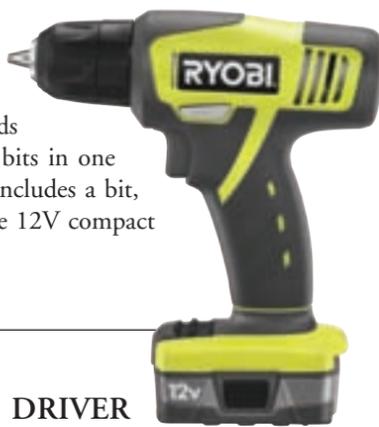


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Don't let this power go to your head

EB's round-up of the latest in drills and drivers

RYOBI'S 12V COMPACT LI-ION DRILL is suitable for tight spaces on the jobsite. At only 1.8 lb and a one-hour charge time, the drill features a heavy-duty 3/8-in. keyless chuck for quick bit changes and retains its charge after during long periods of inactivity. For added user benefit, the MagTray magnetic holder keeps screws and bits in one place, while the ergonomic handle with overmould enhances user comfort. The drill includes a bit, two batteries, diagnostic one-hour charger and storage bag. As with all Ryobi tools, the 12V compact Li-ion drill comes with a two-year warranty.



MILWAUKEE'S 12V SUB-COMPACT DRIVER delivers 100-in.-lb in a package weighing just 2 lb, which is enough to drive 130, 3-in. screws on a single battery charge. With fade-free Li-ion technology, the driver employs a 1.4Ahr battery to run longer and fits easily in a pocket or tool belt. Additional features include an LED to illuminate the work, built-in battery fuel gauge and a one-handed chuck. The variable speed trigger provides increased control, especially when working in small spaces or at awkward angles. The 2401-22 includes a soft carrying case, two batteries, 30-minute charger and two bits: #2 Phillips and flat. It is backed by Milwaukee's five-year tool and two-year battery warranties.

The lightweight **RIDGID COMPACT 18V LI-ION DRILL/DRIVER** (R86006) features 455 in.-lb of torque with fade-free power, which means it will run just as well at the end of a charge as at the beginning. It provides at least 2000 cycles (recharges) per battery and, with registration in the Ridgid Lifetime Service Agreement, the original owner gets free parts, service and batteries for the life of the tool. The battery employs an electronic circuit that protects it from damage and overheating, and boasts a slide-in battery pack for one-handed load-n-lock. The heavy-duty 1/2-in. single-sleeve locking carbide chuck tightens quickly and securely, while the automatic spindle lock allows you to open and close the chuck with one hand. The high-impact torque adjustment ring with 24-position clutch provides versatility for any driving task. The tool also offers soft overmould gripping areas for enhanced comfort, and non-marring touch points to protect finished surfaces. It comes with two batteries, a 30-minute charger, bit and a bag.



METABO'S BHE 20 IDR ROTARY HAMMER now offers integrated dust reduction (IDR) technology to contain airborne dust particles when drilling in masonry materials. The IDR works in all positions, though it's best suited to overhead drilling applications. When drilling overhead, the IDR feature protects both the tool and user from dust. The tool's vacuum features a separate motor, allowing the tool to run at full power. The hammer weighs 7.7 lb and features a rated input power of 450W. It's rated up to 3/4-in. diameter holes and offers a maximum impact rate of 4900 bpm. The dust reduction filter is easily cleaned with compressed air or rinsing with water, and all wear parts are field-replaceable without the use of tools. ^{EB}

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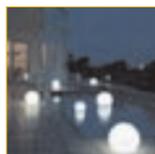
Fields of Application



Christmas Lighting



Solar Panels



Exterior Lighting

- Airports
- Alternate Energy
- Car Washes
- Construction Sites
- Cranes
- Elevators
- Exhibitions / Trade Fairs
- Green Houses
- Municipal / Public Facilities
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Pathfinding via solar-powered LEDs

Municipality takes a green step forward for park illumination

Seth Warren Rose

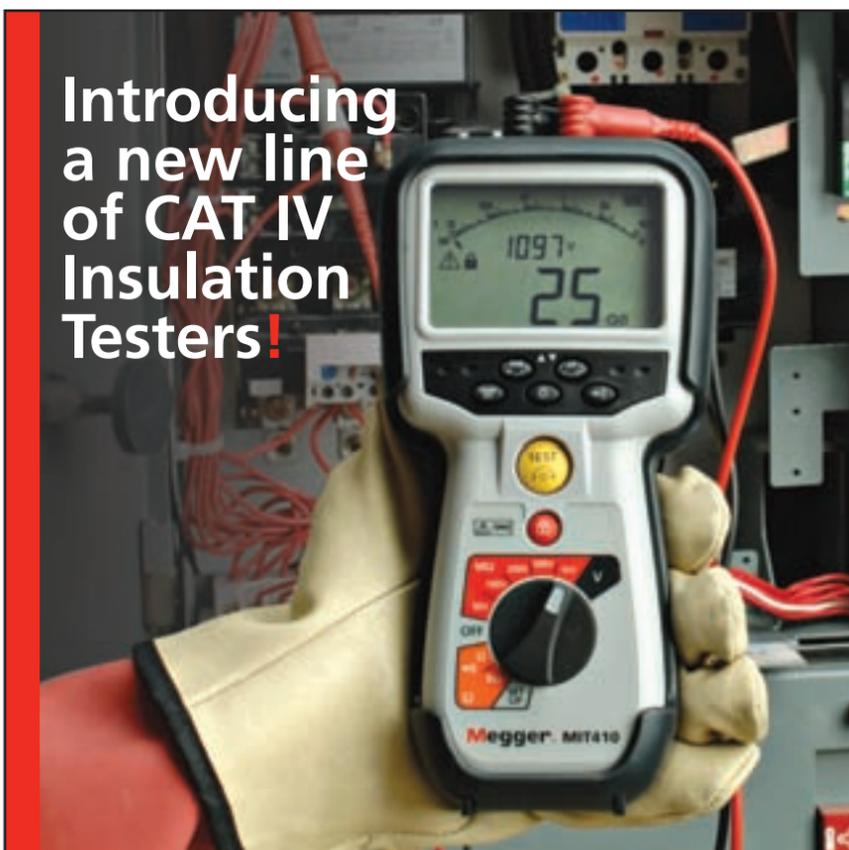


Swan Lake Park in Liberty, New York, is one of the first public parks in the United States to specify solar-powered LED lights for an outdoor-area application. The economic benefits of the lighting solution were obvious to Swan Lake Park, but electrical contractors shouldn't overlook the solar power business opportunity either. Solar-powered area lighting is a gateway for the electrical business community to offer a substantial new product to parks, parking facilities and college campuses for areas located far from the grid.

The rise of solar power

Solar-powered lights, of course, eliminate electricity bills. More than that, various tax credits may be available from local, provincial and federal agencies. In 2006, the United States solar energy industry saw record growth as a result of rising energy prices as well as increased federal funding for local, safe and clean alternatives.

The Solar Power 2007 tradeshow, held last September in Long Beach, Calif., saw a three-fold increase in attendees over the previous year, and sold out far in advance with



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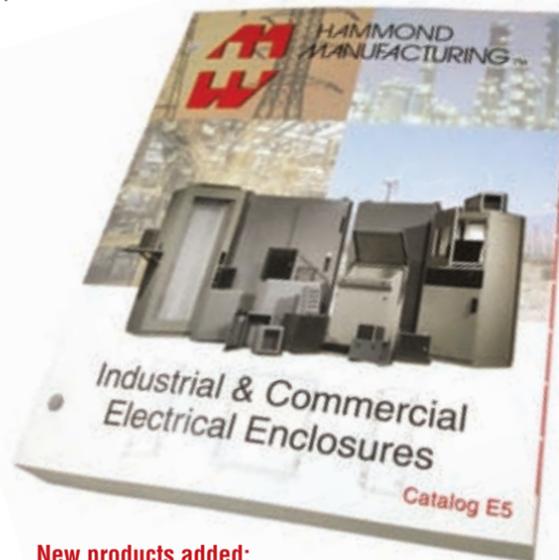
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more than 200 exhibitors. The show, normally targeting the business community, even attracted 3000 members of the general public.

According to the Solar Electric Power Association in Washington, D.C., "In 2007, Solar Power visitors reported that they plan to spend US\$3.9 billion with the companies that exhibited on the show floor".

Back to the park

The solar-powered LED lights at Swan Lake were supplied by SolarOne Solutions of Framingham, Ma. It manufactures solar-powered outdoor lighting systems in collaboration with decorative fixture manufacturer, Hadco Lighting. The lighting system uses solar-powered panels of photovoltaic (PV) cells that convert light energy into electrical energy. What sets these lighting fixtures apart from the rest, however, is SO-Bright—the technology that makes the fixtures more efficient and reliable, ensuring that the lights are always on, regardless of cloudy, sunless days or long winter nights.

Solar-powered LED lights are part of a solar street lighting demonstration project co-funded by the New York State Energy Research and Development Authority (NYSERDA). The project is being overseen by Sullivan Renaissance, a beautification and community development program principally funded by the Gerry Foundation. "In this rapidly changing world, it is important for municipal government to try out new forms of energy," says Frank DeMayo, supervisor of the Town of Liberty. "Liberty is proud to be included in a solar lighting test, which we are confident will work to the benefit of our taxpayers, our public and the environment. This is the way of the future."

According to DeMayo, the new lights showcase how Liberty is not only friendly to the environment but friendly to companies that are green themselves. "We're looking to set a tone as an environmentally conscious place—to make Liberty a 'green' community. We're going to do the responsible thing."

From Liberty's point of view, the system was easy to install and preserves the land by doing away with the trenching and repaving required for underground lines. The fixtures themselves have a decorative and contemporary design and, of course, the municipality enjoys bragging rights that come with installing environmentally friendly lights. Fossil fuel-burning power plants are responsible for two-thirds of the sulphur dioxide, a quarter of the nitrogen oxide and almost half of the human-produced carbon dioxide emissions that create smog, acid rain and global warming. Solar power, of course, burns no fossil fuels.

High-performance solar lights

Proper solar lighting design mandates that the system operate through the longest night/shortest day. Under these conditions, the needs of the battery are not always well matched to the power characteristics of the solar panel. Winter in the northern latitudes is the greatest challenge for solar-powered lighting.

SolarOne, however, has developed a light that marries effective general illumination with the energy efficiencies required for applications in geographies that receive less sunlight. The SO-Bright Maximum Power Tracking (MPT) lighting controller is the electronic brain of the lighting system. The technology actually captures more energy from the solar panel in winter months while providing additional run-time through sunless periods.

The MPT algorithm essentially joins the power characteristics of the two devices, ensuring that the maximum amount of energy available from the solar panel finds its way into the battery. "This advancement in solar-powered lighting control addresses charging efficiency when and where our customers need it most," says Moneer Azzam, SolarOne president.

Traditional outdoor HID lighting requires more energy than small solar panels can generate, which is why the solar-powered lighting system at Swan Lake Park takes advantage of new advances in light

emitting diodes (LEDs). These lamps contain no mercury, glass or filaments, and produce no infrared or ultraviolet radiation. They have low energy consumption and a long service life.

Six solar-powered street lights will be installed at Swan Lake Park along the pathway, which is sufficient for lighting the area at night. According to the Hadco Lighting's photometric report, the average footcandles where the lights are positioned on the walkway is 0.64. The lumens per fixture are 2400.

The community wanted fixtures that would enhance the beauty of the park, provide safety and be Dark Sky compliant—all of which the LED fixtures neatly achieve. They employ round strings of small LEDs, providing an attractive, uniform light. The LEDs themselves are housed inside a Hadco Lighting fixture that's a throwback to classic streetlighting of the early 20th Century. The solar panels add a decorative touch where banners are often placed on the pole, and offer the clearest possible message that Swan Lake Park is going green.

DeMayo says he noticed the bright white colour in a test run of the fixtures to light up Swan Lake. "We liked them in terms of the colour. We liked the white light—more halogen looking... it's very effective."

Illuminated pathways attract pedestrians to designated walkways, making it easier to patrol areas at night and reduce accidents. With no underground cabling restraints, lamps can be positioned with great flexibility. Dark spots can be lit at night without connecting to the electrical grid, creating more usable outdoor space. LED light levels are infinitely adjustable and the white light provides greater visibility without overlighting or trespassing into the night sky. DeMayo particularly likes that the stars are not washed out by the lights: "The lights are very directional. There is no light pollution".

With businesses facing \$100-a-barrel oil costs coupled with concerns about the environment, the time is right for solar energy to come to the forefront. For Swan Lake Park, installing solar-powered outdoor lighting is as much about the green benefit as it is about enhancing safety. For savvy contractors, it's a new opportunity to generate new business. **EB**

Seth Warren Rose is the executive writer for the Eneref Group, which advances ecologically sensible building products (www.eneref.com). He has over 25 years of experience in marketing green building design and construction products.

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Saskatchewan introduces new labour legislation

Saskatchewan's government fulfilled a promise, said Rob Norris—the minister of advanced education, employment and labour—to ensure a fair and balanced labour environment that will contribute to economic growth and security as he introduced amendments to The Trade Union Act.

The amendments include:

- requirement of 45% written support for an application of certification/decertification;
- mandatory secret ballot certification/decertification vote;
- permitting the employer to communicate the facts and his views with employees;
- repealing the three-year limitation on the length of a collective agreement;
- requirement of the Labour Relations Board to issue a decision within six months following a hearing. If the decision is not issued in that time, either party can apply to the court for an order requiring the board to issue its decision; and
- requirement of the board to submit an annual report con-

taining details of cases heard, the time between filing of the application and the hearing, and the time between the hearing and issuing the decision.

The Yukon continues to invest in training opportunities

The Yukon's education minister Patrick Rouble said the Department of Education will continue its investment in Community Training Funds (CTFs)—a targeted approach to training that helps Yukoners across the territory take advantage of local employment opportunities.

“The government sees this kind of investment as integral to supporting our healthy, thriving community,” he said.

CTF continues to provide a variety of training opportunities for Yukoners by supporting various projects in trades and technology, literacy and basic employment skills development, as well as heritage and cultural worker development.

“Thanks to the funds that Yukon Women in Trades and Technology (YWITT) have received, the level of programming we are able to offer to women interested in the trades is greatly

enriched,” said YWITT program coordinator Betty Irwin, said. “Without money from CTF, we would not be able to offer programs and services such as the Young Women Exploring Trades Conference.”

To learn more, call (867) 667-5727.

TTC pleads guilty to failing to protect workers



The Toronto Transit Commission (TTC) pleaded guilty and was fined \$165,000 in the Ontario Court of Justice for failing to protect the health and safety of workers who were overcome by carbon monoxide gas in a subway tunnel in 2006.

Seven workers and their foreman were working in the early morning hours of February 7, removing MMF (manmade mineral fibre) material. Part of their equipment on a flatbed subway car included a gasoline-powered generator and two gasoline-powered power washers.

Toronto Fire Service reported carbon monoxide readings of over 1000 parts per million (ppm) when it first arrived at the incident location. Readings indicated that the workers had been exposed to carbon monoxide concentrations at least 40 times the current eight-hour average occupational exposure limit of 25 ppm and 10 times the short-term exposure limit of 100 ppm. Thankfully, there were no fatalities.

A Ministry of Labour investigation found that the TTC failed to ensure: that no internal combustion engine was to be operated in a building or other enclosed structure unless the exhaust gases and fumes from the engine were discharged directly outside to a point sufficiently remote to prevent the return of the gases or fumes; that there was an adequate supply of air for combustion and adequate natural or mechanical ventilation to ensure exhaust gases and fumes would not accumulate.

In addition to the fine, the court imposed a 25% victim fine surcharge on the total, which is credited to a provincial government fund to assist victims of crime.

Alberta's new conservation board opens its doors

The Alberta Energy Resources Conservation Board (ERCB) officially opened its doors last month with new leadership and, according to their news release, a more focused mandate to ensure fairness on all sides of energy development in Alberta.

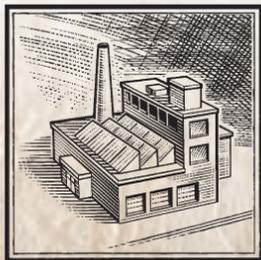
The ERCB will act in the best interests of all Albertans, it says, in overseeing the efficient and effective development of the province's energy resources, while balancing the need for resource conservation, public safety, environmental protection and technical innovation.

“We have paved the way for the ERCB to regulate Alberta's energy sector in a way that people know is balanced and fair, with an enhanced focus on conservation,” said acting chair Dr. William Tilleman, who will serve in that position until February when he passes the reins to Dan McFadyen (who was appointed in December).

The change over to the ERCB will have no effect on previous Alberta Energy and Utilities Board (EUB) operations. Information Services and the former EUB library will remain in their current locations, as will all field centres. Visit ERCB online at www.ercb.ca.

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8 ways to get the most from your workforce

Take away my factories and I'll build a new and better factory.
But take away my people, and grass will grow on the factory floor.

By Richard Hadden

— Andrew Carnegie

Andrew Carnegie was no bleeding heart, social humanitarian do-gooder, but rather a capitalist with a capital 'C'—a man whose fortune, in today's dollars, would stir envy in the heart of David Thomson. Yet the immigrant industrialist was simply acknowledging that in his steel business—just as in the electrical business—people meant profit. And in today's competitive labour market, your organization's ability to attract, retain and make productive the best talent available has a direct impact on your ability to grow, make money and sustain a competitive advantage.

To paraphrase the advertising slogan of Carnation Milk, *contented cows give better milk*. This means satisfied employees give better performances, which results in a more profitable business. In fact, our firm's research over the last 15 years shows that intentionally creating a great place to work—whatever it means—is one of the best things you can do for your bottom line.

Look at the financial performance of companies with the strategy of being an employer of choice—companies like Winnipeg's Wellington West Capital, Genentech, Starbucks and Sleep Country Canada—and you'll find revenue, growth and profit that far surpass that of competitors not known for being great companies to work for.

So what does it mean to be a great employer? It's not as easy as upping compensation or plugging in the latest, most elaborate and costliest employee perks. Instead, today's best and most profitable employers focus on sound organizational and leadership practices that get the most from everyone on the payroll—willingly and enthusiastically. Here are eight things you can begin doing right now that will have an immediate and long-lasting impact on your company's ability to succeed through its people practices.

- 1. Hire for fit.** Skills, expertise and experience aren't enough. Identify what it takes for people to be happy, productive and successful in your organization. Articulate those 'fit' requirements to all hiring managers and provide incentives for hiring around those factors. Use behavioural interviewing techniques to identify those candidates whose values and attitudes set them up for success in your organization.
- 2. Define your mission in clear and compelling terms.** I'm not talking about having the best-worded mission statement in Canada, but having a clear sense of mis-

sion is motivating. Make sure everyone—from your CEO to your newest hire—knows why your business exists, and can articulate its most important priorities.

Here's something you can do right now to see how you're doing in this department. On a piece of paper, write down what you believe to be your organization's top three business priorities. Put the paper in your pocket and go out and ask the first five or six employees you happen to see the same question. Compare their answers with yours and with each other's. Should the answers stray too far from one another, you'll know it's time to get busy focusing everyone on what matters most.

- 3. Invest in training.** Your employees want to be confident in their competence. There are few things more frustrating than being asked to perform without proper preparation. Ask employees what training they need, source the best training available (internally or from professionals outside) and make sure people know they're expected to use what they learn. Whenever anyone completes any kind of training, on-the-job or otherwise, ask them to write down in one page or less: a) three things they learned, and b) how they'll use the training.
- 4. Get rid of systemic barriers.** Everyone's got them: policies, procedures and rules that get in the way of your employees doing their very best work. As the late management guru Peter Drucker observed, "90% of what we call 'management' consists of making it difficult for people to get things done".

Here's a challenge: today, eliminate or fundamentally change one utterly stupid practice, policy or procedure that hampers the flawless execution of your mission. (If you can't think of anything, just ask your employees.)

- 5. Make everyone's work matter.** The minute someone loses sight of the importance of his work (namely, the customer), he can't possibly perform at the top of his game. And yet, if you're like most businesses, you have some good people who, in the regular course of performing their jobs, never encounter a real live paying customer.

Change that! Create opportunities for everyone on your payroll to have a "customer connection". Get

your back office professionals out on the counter from time to time. Let technicians go on sales calls. Send your HR manager out on an installation.

The next three items fall under the category of CARING. I'm not talking about coddling or pampering your employees, but doing simple things, every day, that let them know you care. We know that employees reserve their very best work for the leader who cares about them.

- 6. Listen. Really listen.** Don't just go through the motions. When an employee needs to talk, clear the decks, quiet your mind and stop multi-tasking!
- 7. Give clear, helpful feedback.** One of the most uncaring things I see business owners and managers do is fail to tell someone their performance isn't up to standard. Give bone-honest feedback, with sensitivity, and give people the chance they deserve to improve.
- 8. Be there when the wheels come off.** Whether at work or in our personal lives, we all experience pain, tragedy and difficult circumstances beyond our control. Caring leaders show up, in person, to help employees through the tough times. Dan Cathy, president of the U.S. restaurant chain Chick-fil-A, told a group of his company's managers, "When an employee experiences a personal hardship, and you go above and beyond for them, you'll have their full attention when you talk about going above and beyond for our customers".

Keep them content... and keep them!

What you've heard is true: *employees don't leave companies, they leave managers*; those who have failed them in some important respect. Leaders who hire well, articulate a clear mission, enable people to do their best work and care about their employees will both help their companies outperform the competition and keep the grass from growing on the factory floor. ☺

Richard Hadden, co-author of "Contented Cows Give Better Milk" and the newly released "Contented Cows MOOve Faster", is a Florida-based author, speaker and consultant who helps organizations outperform the competition by creating a great and profitable place to work. Visit him online at ContentedCows.com.

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Ontario Divisional Court complicates trust claims



By Stephen Tatrallyay, LLB

In a recent decision, the Divisional Court of the Ontario Court of Justice has ruled that there is no “shifting onus” involved in the proof of breach of trust claims against owners of corporations.

The Ontario Courts had previously interpreted the trust provisions involving “officers and directors” in section 13 of the Construction Lien Act as if they contained a test providing that, once a corporation was found to have breached the trust provisions of the CLA, a sole owner or director of that company (or other substantial corporate employee) sued for breach

of trust was presumed to know about—and have acquiesced—in his corporation’s breach of trust, and was therefore liable to the claimant for it (unless such person proved the contrary).

The theory behind this approach was that, in the absence of control of the corporation’s books, a claimant could never prove what had happened to corporate funds, but that a sole director, having day-to-day control over the affairs of his company, could be presumed to have known what was going on with its corporate affairs and, in particular, its finances.

Recently, however, the Divisional Court handed down a decision in a case called *Duncan Ceiling and Wall Systems v Vin-Bon Retail Systems Ltd. and Locilento* ([2007] 67 CLR[3d] 17, 221 OAC 262 [Ont. Div. Ct.]) suggesting that this approach was no longer to be considered valid. In dismissing an appeal by the plaintiff from a judgment at trial—dismissing the action against sole director Locilento for want of evidence—the Court unanimously held

... there is nothing in s. 13(1) that refers to a shifting of onus or a burden on the individual defendant. While there is reference in the section to constructive knowledge of the conduct of the defendant corporation that amounts to a breach of trust, there must be a factual finding of actual acquiescence.

Depending on *how it is interpreted*, the decision will substantially reduce the chances of success of a trust claim against a director, as well as any leverage associated with bringing such action at all. An unpaid claimant would have to put forward evidence on which the judge *could* base a finding; not only that the director knew about the breach, but approved it. Presumably the purchase of a Porsche for the director would lead to an inference of approval, but there is no way of predicting what else might qualify.

The primary criticism of this decision is that one director will now point the finger at another, or that all directors will profess ignorance and blame the bookkeeper, and the section will lose virtually all of its meaning. It also goes against the intent of the legislation, as section 13(4) of the CLA provides for multi-person liability and allows the trial judge to deal with cases where liability has been unfairly apportioned. This would, again, place the onus on the director claiming unfairness to prove it, removing it from the claimant’s hands.

The decision is binding only in Ontario, although it will carry considerable weight in other provinces in which the legislation is similar. The manner in which the courts will apply the reasoning in the decision remains open for debate, but should be closely followed, since its interpretation will directly impact on the ability of claimants to bring such actions and, therefore, the likelihood of using the action as a tool to pressure a settlement. ^{EB}

Stephen Tatrallyay is a prominent Toronto Construction Lawyer and one of the members of Team Resolution, which provides neutral, third-party expertise and input aimed at resolving disputes outside of the courtroom (www.teamresolution.ca). A member of EB’s Editorial Advisory Board, he can be reached at (416) 482-5164 or via e-mail at statrallyay@rogers.com.

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SCR catalogue

An updated version of the Cristal Controls SCR catalogue is now available. It includes product information on the company's range of SCRs (silicon controlled rectifiers), SSRs, step controllers, thermostats, etc., for commercial and industrial use.

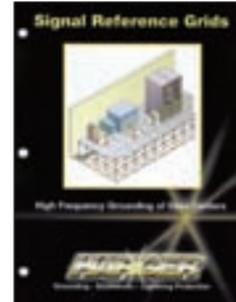
You can download the catalogue from Cristal's website, cristalcontrols.com, or call (800) 681-9590. If you live or work near Quebec City, then call (418) 681-9590.



Ceiling pendant linear fluorescents brochure

Lam's full-colour, eight-page Literod brochure showcases a range of ceiling pendant linear fluorescent products and their applications. Literod is a series of tubular-shaped fixtures in three diameters, with curved right-angle connections, that suspend from any ceiling surface or mount to walls. The fixtures provide direct, indirect or combination diffused white light. The brochure also describes how units can rotate up to 358°.

Copies are available by calling (714) 549-9765 or visiting www.lamlighting.com.



Signal reference grids brochure

Harger's Signal Reference Grids (SRGs) brochure details a low-impedance network of conductors that establish an equipotential plane for high-frequency, low-voltage digital signals. Intended for the proper grounding and bonding of sensitive electronic systems, the recommendations in Harger's SRGs are in full agreement with IEEE 1100. The flat strip SRG is the most economical solution, says Harger, to high-frequency grounding for a new raised floor installation.

Contact Harger Lightning & Grounding at (800) 842-7437 or visit www.harger.com.



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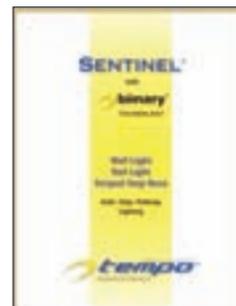
From the inventor of the pushwire connector comes the new 873 Series LUMI-NUTS® to meet and exceed the new NEC and CEC requirements for safe servicing/wiring of non-residential luminaires with ballasts.

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For more information on the new LUMI-NUTS® contact WAGO at 1-800-DIN Rail (346-7245) or info.us@wago.com www.wago.us/lumi-nuts.htm



LED aisle and step lighting system

A new brochure from Tempo describes its Sentinel system with Binary technology, which promises increased glare-free illumination and improved safety in a theatre environment. The eight-page, full-colour brochure provides general and application-specific information, along with complete product specs. Sentinel with Binary is also applicable to LED rail lighting and 'striped step nose' lighting systems available from Tempo.

Copies of the new literature can be obtained by calling (949) 442-1601 or visiting www.tempindustries.com.

Coax solutions guide

General Cable's Coaxial Cable Solutions Guide covers a complete line of Carol coax for high-speed, wide-bandwidth electronics products that run over long distances with minimal signal loss or degradation. The guide provides options for the right coax for every application, including CATV/MATV/DBS, HDTV/SDI and CCTV. The products are approved for plenum and riser applications, as well as common, general-purpose designs.

To download a copy, visit www.generalcable.com or call (859) 572-8000.

Residential contractor software

Available through Waltech Associates, Residential Wire Pro Contractor Software aims to set a new standard for residential wiring information and documentation. The built-in symbol library allows you to draw electrical floor plans without bothering with CAD software. With the software you can draw and print professional-looking electrical, VDV and security floor plans and provide detailed circuit information; provide detailed ground system information and underground wiring details; create invoices, estimates and load calculations; and export into other file formats, such as DWG, DXF and JPG.

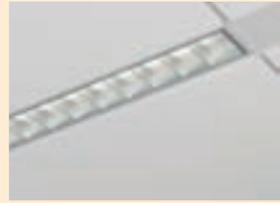
For more information, call Waltech at (905) 336-7664 or visit www.waltechassociates.com.

Updated 'White Book' standard for healthcare electrical systems

IEEE has updated its White Book standard, also known as IEEE 602, "Recommended Practice for Electrical Systems in Health Care Facilities". The 380-page document offers detailed recommended practices for the design and operation of electrical systems within a range of healthcare facilities. The White Book can be a resource for anyone responsible for the electrical design of hospitals, nursing homes, residential custodial care facilities, clinics, ambulatory health centres and medical and dental offices. Most equipment used in these facilities is sensitive to electrical disturbances, requiring reliable power sources. This version updates the 1996 version to reflect the most recent electrical standards and updates in medical equipment. The White Book is available in print and PDF formats under product numbers STDPT95609 and STD95609, respectively.

For more information, visit www.ieee.org.

Armstrong TechZone-compatible lighting fixtures



Zumtobel Lighting has partnered with Armstrong to offer a line of Armstrong TechZone-compatible lighting fixtures. There are currently three, though more are being developed: the RB

boasts the patented Bivergence louver; the RL is a lensed unit with a micro-pyramidal optic or opal lens; and the RLLC (recessed louver with light chamber). These luminaires are ideal for open offices, libraries, airports and other large, open areas where a clean, monolithic appearance is desired.

Zumtobel
www.zumtobel.ca

Luminaire provides full distribution



Columbia's EnergyMax Intersect is a two-lamp, energy-efficient, louvered luminaire designed to provide full distribution. It provides the same footcandles on the work surface as parabolics, says Columbia, while redirecting more light on the walls. The luminaire uses 66W of power, and is available with a step-dimming ballast to allow switching between 100% and 50% power for energy conservation. Used in conjunction with photocells for daylight harvesting for peak demand management (or with occupancy sensors), step dimming allows effective control over power consumption without having to switch off individual lamps.

Columbia Lighting
www.columbialighting.com

Handcrafted recessed pendants



Cooper Lighting has two new families of Shaper handcrafted recessed pendants designed for low-ceiling applications. They are illuminated

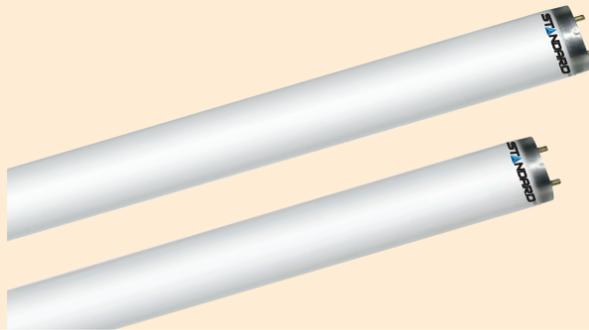
by a Portfolio architectural recessed CFL downlight and feature handcrafted art glass hung on stainless steel cables. Shaper's 497-RP Series features a 22-in. curved glass square available in five colourful options, while the 498-RP Series features a handcrafted kokomo art glass bowl. Both series offer trim ring, finials and hardware in 12 finishes. The Portfolio downlight features a precisely formed one-piece, clear Alzak, non-imaging optical reflector with a 55° cut-off to lamp and lamp image. The die-cast aluminum collar accommodates varying dimensions of ceiling material—up to 1-1/2-in. deep.

Cooper Lighting
www.cooperlighting.com

25W T8 lamps

Standard is offering a range of energy-efficient T8 lamps, including a 25W version. The lamps offer a minimum three-year payback, says the company, and reduced lamp-end blackening. They are TCLP-compliant (toxicity characteristic leaching procedure), and boast a good colour-rendering index (CRI) and lumen maintenance.

Standard Products
www.standardpro.com



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Power quality analyzer

The compact Kyoritsu 6310 meter provides the information required for power consumption and energy-saving analysis, measuring 12 kinds of power parameters (including harmonics). You can store up to 1GB of data with a compact flash card or download directly to a PC via USB connection. The large colour LCD screen displays waveform and vector, and a built-in Print Screen function enables you to record screen display. The 6310 also monitors insulation at leakage current using optional leak clamp sensors.

ITM Instruments
www.itm.com

Narrow-tongue lugs

T&B introduced a new line of Color-Keyed narrow-tongue lugs; they've been precision-engineered for consistency in width along the entire length of the connector—from barrel to tongue—ensuring a good fit in confined-space applications. The lugs are suitable for



use in panels, switchgear, moulded-case circuit breakers, motor starters and other limited-space OEM applications.

Thomas & Betts
www.tnb-canada.com

Voltage quality recorder

New on the market is Fluke's single-phase, plug-in VR1710 voltage quality recorder, which is designed to be a simple tool for detecting and recording power quality problems. It helps users pinpoint the root causes of voltage problems by recording data specified by a user-selected average period on voltage trends, dropouts and

power quality parameters. The recorder plugs directly into the mains power socket, and includes a USB cable and PowerLog software for quick instrument setup and data downloads. PowerLog software includes graphical tools for data presentation that show RMS voltage and harmonic trends, actual transients, summary information and more.

Fluke Electronics Canada
www.flukecanada.ca



Combination multimeter/IR thermometer



Exttech (recently acquired by FLIR) has a newly patented EX470 combination True RMS multimeter and IR laser thermometer. The auto-ranging multimeter boasts a 4000-count display, 0.3% basic DCV accuracy, capacitance and frequency functions, and Type K thermocouple measurements. It is rated Cat III-600V and provides high-resolution measurements, including 0.1mV resolution for AC/DC voltage and 0.1µA resolution for AC/DC current. The non-contact thermometer features 8:1 distance-to-target ratio with 0.95 fixed emissivity, and a temperature range from -20°C to 270°C. Measurements are displayed on a large, backlit LCD with 1-in. digits. Other features include input fuse protection, audible/visible misconnection warnings, Max and Relative functions, and more.

Exttech Instruments
www.exttech.com





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Multiple services and service equipment

Depending on a particular facility's needs, electrical services—which are usually permanent installations but sometimes temporary—come in various forms, sizes and ratings. Canadian Electrical Code (CEC) Section 6 covers the installation of low-voltage services, service equipment and metering equipment. (For services operating over 750 V, refer to Section 36, which also supplements/amends the applicable general requirements for installations operating at voltages below 750.)

The code limits the number of electrical services that can be run to a building for two reasons:

- to reduce the risk of shock to those working on electrical systems supplied from multiple sources of power, and
- to facilitate easy power disconnection during emergencies.

To correctly apply CEC Section 6 to service installations, you must understand the definitions for *service box*, *supply service*, *consumer's service* and *readily accessible*.

A **service box** is an approved service entrance assembly consisting of a metal box/cabinet (constructed so that it may be effectively locked/sealed) with a service switch and fuses/circuit breakers. The switch or circuit breaker may be manually operated when the box is closed. This is usually the main switch or the combination panelboard in a residential application.

Supply service refers to the supply authority's conductors that extend from its mains to a consumer's service. There are two basic types of supply services: overhead conductors and underground conductors. For a typical residential underground service, the demarcation point between what

is owned by the customer and what is owned by the supply authority is the point where the supply conductors terminate on the line side of the customer-owned meter base.

Consumer's service is the customer-owned portion of an installation from the service box—up to and including the point at which the supply authority makes connection.

Readily accessible means the service switch can be reached and operated quickly, without someone having to climb over or remove obstacles, or use a ladder.

Rule 6-102, Number of Supply Services Permitted, basically permits only one supply service of the same voltage and characteristics to any building from the same system. But there are exceptions. Additional supply services shall be permitted for: fire pumps or other emergency systems; large industrial establishments and other complex structures; or completely self-contained occupancies that are not located above one another and have separate entrances with direct access to ground level. (Examples of complex buildings include a large shopping mall or a couple of apartment buildings sharing the same underground parking area.)

Another exception to Rule 6-102 is an installation where different voltage and system characteristics are needed, such as a 120/240 V single-phase, three-wire service, and a 600/347 V three-phase, four-wire service.

Where two or more supply services are installed in a building, all service boxes associated with the various consumers' services must be grouped in one area where practicable. When not grouped together, then a diagram showing the location of *all service boxes supplying power* to the building must be permanently posted *on or near each service box*.

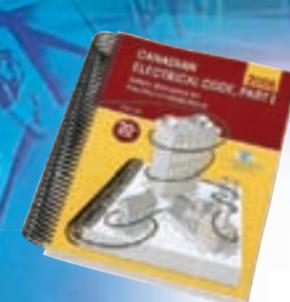
Rule 6-104, Number of Consumer's Services Permitted in or on a Building, basically permits up to four consumers' services of the same voltage and characteristics to terminate at any one supply service run to any building (unless there's a special deviation allowed by the inspector). This Rule is typically applied in residential townhouse power distribution—one single supply service from the supply authority supplies four ganged meter bases supplying four separate units.

Rule 6-200, Service Equipment, essentially requires each consumer's service to terminate in a single service box. Again, exceptions may be allowed when the service subdivision is made in an outdoor multiple- or dual-lug meter-base rated at not more than 600A and 150V-to-ground.

Arcs, explosions, electrical shocks and fires associated with multiple sources of power can cause serious injuries—even fatalities—so protect yourself from these hazards by following CEC's safety rules. When properly followed, they mitigate the risk of inadvertent contact with energized conductors. **EB**

Kris Paszkowiak, P.Eng., has taken his many years of experience—most of those with Ontario Hydro and the Electrical Safety Authority—and launched CodeSafety Associates, a new consulting firm serving the needs of the electrical industry. He holds a Master Electrician licence and has served numerous organizations over the years, including the Canadian Advisory Council on Electrical Safety, Committee on CEC Part I and UL Electrical Council. Contact CodeSafety Associates at (905) 599-2702 or e-mail kris.paszkwiaak@gmail.com.

<p>Questions and answers compiled by the Electrical Safety Authority</p>  <h2>Tackle the Code Conundrum... if you dare</h2> <p>So, you think you know the electrical code, eh? Well, we'll soon find out if you're an electrical code junkie or downright code-clueless. Take a look at the following questions and check your answers in March's Electrical Business.</p>	<h3>Question 1</h3> <p>Rigid steel conduit of a minimum nominal size of 53 (2) trade size shall be permitted to be used as a consumer's service mast.</p> <p>a) True b) False</p>	<h2>Answers to Code Conundrum</h2> <p>Electrical Business January 2008</p> <p>Q-1: Voltage applied to piping for pipeline resistance heating shall not exceed 120V, and the supply shall be from an auto-transformer.</p> <p>b) False, Rule 62-402(a). Voltage applied to the piping shall not exceed 30V, and the supply shall be from an isolating-type transformer.</p> <p>Q-2: A garage that is part of a bulk storage plant—in which tank vehicles are stored or repaired—shall be considered to be a Class I, Zone 2 location up to ___ mm above floor or grade level (unless conditions warrant more severe classification or a greater extent of the hazardous area).</p> <p>d) 450 mm, Rule 20-302(6). Garages in which tank vehicles are stored or repaired shall be considered Class I, Zone 2 locations up to 450 mm above floor or grade level (unless conditions warrant more severe classification or a greater extent of the hazardous area).</p> <p>Q-3: Tap connection conductors for a field-wired recessed luminaire shall be installed in a raceway extending at least 300 mm, but not more than 2 m, from the luminaire and terminated in an outlet box.</p> <p>b) False, Rule 30-910(3). Tap connection conductors shall be installed in a raceway extending at least 450 mm (but not more than 2 m) from the luminaire and terminated in an outlet box conforming to Subrule (4).</p>
	<h3>Question 2</h3> <p>Electrical metallic tubing (EMT) is permitted as a wiring method in Class III, Div 1 locations.</p> <p>a) True b) False</p>	
	<h3>Question 3</h3> <p>A heating cable set is permitted to be installed for freeze protection in a pipe containing sewage solids.</p> <p>a) True b) False</p>	



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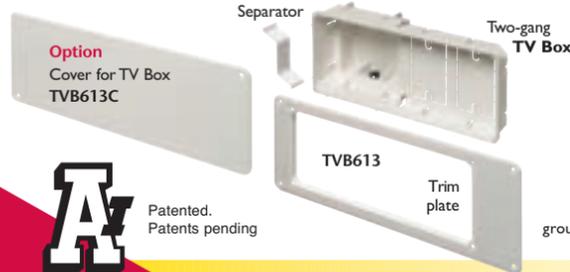
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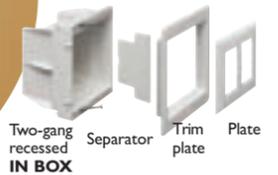
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Save up to \$200,000 a year while helping to protect the environment.

An 800,000 square-foot office building retrofitted with GE F28T8/SP35/UMX/ECO lamps powered by electronic ballasts to replace T12 lamps with magnetic ballasts could save up to \$200,000 a year in energy costs.* What's more, the resulting decrease in pollution would be equal to planting 395 acres of trees a year.

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*\$.10/kWh, 4,400 burn hours, 10,000 4-lamp fixtures.

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