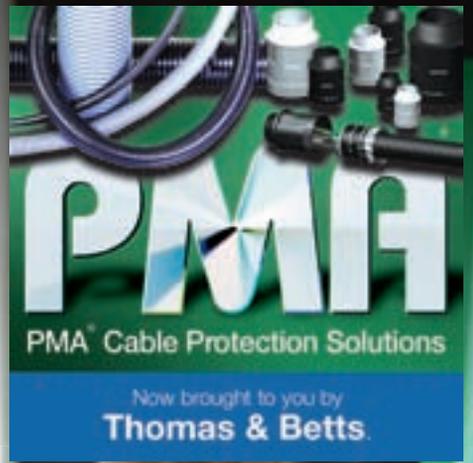


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Electrical Business

MAY 2012



Taking the trades to our teens

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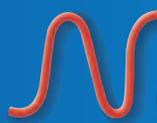
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- Digesting Ontario's FIT Program review
- Lighting controls and building energy codes
- Vibration analysis and preventive maintenance

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Taking the trades to our teens: **Future Building 2012**



The skilled trades suffer from a common stereotype: they only attract people who don't have the smarts to go on to university.

We often hear of looming shortages in our pool of skilled tradespersons, but what is industry doing about it? Well, among its outreach efforts, IBEW participates with the Ontario Construction Secretariat (OCS, www.iciconstruction.com) in Future Building (www.futurebuilding.ca): an interactive three-day exhibition that provides young career seekers, grades 7 through 12, the opportunity to experience hands-on activities in the construction sector.



who explained OPG will be hiring well over 1000 trades for the Darlington Refurbishment Project, so it's important for them to ensure the right people are available when the need comes.

A common problem is that our high schools no longer have the variety of shop classes as in days gone by, so mechanically inclined, problem-solving students have nowhere to start developing their talents. And besides

not being seen as glamorous, the skilled trades also suffer from a common stereotype: they only attract people who don't have the smarts to go on to university.

We all know nothing can be further from the truth. As OCS' Jim Wright points out in my video, a successful candidate for the skilled trades will have good marks in English, Math and sciences. But the only way to combat these stereotypes and misconceptions is through education and promotion.

So kudos to Future Building for providing valuable information to students, teachers, aboriginal youth, adults considering a career change, educators and the general public about opportunities for a rewarding future in the construction industry. **EB**

Anthony Capkun

Got a similar program in your jurisdiction? Tell me about it at acapkun@annexweb.com.

The annual event travels around the province. This year's installment, held in Toronto, attracted several thousand visitors. Of course, our interest lay in the electrical trade. We chatted with Local 353's James Gribben to learn more about the IBEW booth and the kids' impressions, and Bradley Watt, who helped out with the electrical skills competition.

Both agreed that—with the exception of those kids who have parents in the skilled trades—the next generation knows nearly nothing of the skills and opportunities that can be found by apprenticing, then working, in the skilled trades. (Need proof? Check my video at EBMag.com "School kids find out what goes on behind the walls", and watch their hacksaw skills... or lack thereof.)

Also participating in Future Building was Ontario Power Generation (www.opg.com). I spoke with Robin Granger, construction manager-nuclear refurbishment,



On the cover

One of the many students who stopped by the IBEW Local 353 booth at Future Building 2012 to bend some pipe and learn about becoming an electrician.

Photo A. Capkun.

Contents

14 Before you buy your next work truck...

As vocational trucks continue to grow in complexity and sophistication, fleet managers are under increasing pressure to maximize their vehicle investments. This process starts well before a new work truck joins the fleet. No longer is it prudent to just buy what you've always bought.

18 Using vibration analysis in your preventive maintenance program

Vibration in industrial equipment can be both a sign and a source of trouble, but how can the plant maintenance professional tell the difference between acceptable, normal vibration and the kind of vibration that requires immediate attention to service or replace troubled equipment?

22 Digesting the results of the Ontario Feed-in Tariff Program review

Anyone remotely connected to the renewable energy space in Ontario has been on high alert for the better part of March in anticipation of the government's Feed-in-Tariff program review. Now, digesting and acting on the review's results is the real-time activity in the renewables sector.

28 Lighting controls play a key role in meeting building energy codes

According to the U.S. Department of Energy (DoE), lighting is by far the largest consumer of electricity in commercial buildings. Lighting controls can drastically reduce that appetite; they provide flexible control over the lighting in a space, and support energy savings by reducing the amount of power or time the lighting system is in use.

32 Installing a high-performance structured cabling system

Data centre hardware installations are rarely pain-free. Things often go awry due to poor planning or consideration for how cable infrastructure is affected. Structured cabling is an integral part of any hardware rollout plan, yet it is often the last thing on the checklist for hardware rollouts.

page 14



page 22



page 28



DEPARTMENTS

- 4 Industry News
- 10 Personalities
- 11 Mind Your Safety
Maintain your equipment; reduce your risk (Part 2)
- 12 From the Legal Desk
The name is Bonds...
Performance & Labour and
Material Payment Bonds (Part 2)
- 31 Calendar
- 34 Products & Solutions
- 38 Code File
Poor power factor costs you money
- 38 The Code Conundrum

RECALL: Altec Industries recalling some AA755 and AA755L vehicles

Electrical Business has learned from the National Highway Traffic Safety Administration (NHTSA, www.safercar.gov) in the States that Altec Industries (www.altec.com) is recalling certain model year 1993-2004 AA755 and AA755L vehicles because continuous overloading or side loading of the booms could cause the lower boom to crack near the lower boom pivot. Continued use could cause the boom to fail, increasing the risk of injury to people or property below. About 1222 units are potentially affected by this recall. Altec says it will notify owners and provide a boom stiffener kit. Altec has not provided a notification schedule. Owners may contact the company at (877) 462-5832.

Electrical Business

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

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Ontario Power Authority and Independent Electricity System Operator to merge?

Ontario is proposing to merge the Ontario Power Authority (OPA) and the Independent Electricity System Operator (IESO) into a single organization that “would save ratepayers millions of dollars a year and better meet today’s electricity supply needs”.

“The electricity system has changed a great deal in the past eight years,” said Chris Bentley, minister of energy. “As we modernize, we are looking at every aspect to provide the best value for Ontarians.”

The government intends to introduce legislation that would, if passed, create a single new agency that will merge OPA’s planning knowledge with IESO’s operational expertise. The mandate of the new, merged agency would be to “establish market rules to benefit consumers, align contracts and create an electricity system that is more responsive to changing conditions”.

The new agency would eliminate duplication, says the government, and save ratepayers up to \$25 million a year.

It would allow for a more seamless and coordinated approach to planning, says the government, as Ontario integrates new renewable energy projects into the grid and shuts down its last coal-fired plants by the end of 2014.

Worker electrocuted, Westario Power fined \$110,000

Westario Power Inc., a Walkerton, Ont., power distribution company, was fined \$110,000 for a violation of the Occupational Health and Safety Act after a worker was killed.

On September 21, 2010, there was a severe thunderstorm in the Port Elgin area, and the power went out at the company’s Port Elgin substation. Workers went to the substation to restore power. They attempted to de-energize its equipment so they could replace a damaged insulator. However, some of the equipment was still energized when a worker started replacing the insulator. The worker came into contact with the energized equipment and was electrocuted.

A Ministry of Labour investigation found the substation did not have a current single-line diagram to help workers develop a work plan, identify hazards and fully de-energize the equipment. As a consequence, the workers did not have the information they needed to perform their work in a safe manner.

International Association of Electrical Inspectors (IAEI) launches online career centre

The International Association of Electrical Inspectors (IAEI, www.iaei.org) has launched an interactive job board: IAEI Career Center (careers.iaei.org). With its focus on electrical industry



David Clements, IAEI

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Thomas & Betts

companies, the IAEI Career Center offers its members—and the electrical industry at large—an “easy-to-use and highly targeted resource for online employment connections”.

For job seekers (careers.iaei.org/search.cfm), IAEI Career Center is a free service that provides access to employers who are hiring and to job

postings in the electrical industry.

“We’re very excited about IAEI Career Center because we know how critical it is for employers in the electrical industry to attract first-rate talent with a minimum expenditure of time and resources,” said David Clements, CEO/executive director for IAEI. “And it’s important for us to help enable

smooth career transitions for those seeking industry jobs.”

Experimental smart outlet promises flexibility, resiliency to grid architecture

Sandia National Laboratories has developed an experimental ‘smart outlet’ that autonomously measures, monitors and controls electrical loads with no connection to a centralized



PHOTO BY RANDY MONTVOYA

Anthony Lentine with the smart outlet.

computer or system. The goal of the smart outlet and similar innovations is to make the power grid more distributed and intelligent, capable of reconfiguring itself as conditions change.

The outlet includes four receptacles, each with: voltage/current sensing; actuation (switching); a computer for implementing the controls; and an ethernet bridge for communicating with other outlets and sending data to a collection computer.

The outlet measures power usage and the direction of power flow... which is normally one-way, but could be bi-directional when something like a photovoltaic system is connected to send power onto the grid. Bi-directional monitoring and control could allow each location with its own energy production—such as photovoltaic or wind—to become an ‘island’ when the main power grid goes down.

SaskPower delivers employment positions to Sandy Bay youth

SaskPower is launching a new program that will provide term employment positions to four graduates of Sandy Bay’s Hector Thiboutot Community School each year. The new grads will work at SaskPower’s nearby Island Falls Hydroelectric Station, located two kilometres upriver of Sandy Bay on the Churchill River, near the Saskatchewan-Manitoba border.

Program details are currently being finalized in partnership with the community, including criteria for program applicants. In July, SaskPower will work with Sandy Bay officials to select the inaugural candidates. The four positions at the Island Falls Hydroelectric Station will last for 14 months. Currently, 23 people are employed at the hydro station.

“By offering these recent grads real-life work experience, they’ll be better qualified for permanent positions at our Island Falls hydro facility,” said Robert Watson, president and CEO, SaskPower.

In addition to this new employment opportunity, SaskPower says it will continue to develop and implement initiatives that will help build a long-term, sustainable relationship between SaskPower and Sandy Bay.



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Thanks to Hungry for Change, Eel Ground's nutrition program bears fruit

In 2007, Byron Bushey—head of Miramichi, N.B.'s Children's Aid Society—and former principal of Eel Ground First Nation School, Peter MacDonald, set out to find creative solutions to the root problems in the Aboriginal community, many of which stem from poverty and the toll it takes on a child's ability to attend and learn in school.

Many of the children's health was already compromised by years of poor nutrition. Fetal alcohol syndrome and Type II diabetes were both present in the kindergarten to Grade 8 school, and were significant and growing problems at Eel Ground as they are throughout Canada's Aboriginal communities.

MacDonald, Bushey and a team of

healthcare professionals and nutritionists developed a nutrition program to offer both remedial help for families living in poverty on the reserve, plus incentive for children to attend school and improve their capacity to learn once there.

With the support of Hungry for Change (www.hungryforchange.ca) and Canadian Feed The Children (CFTC), Eel Ground developed a menu of high-quality calories suited to the unique needs of this population. Thanks to Hungry for Change, close to 30,000 meals were served to the 85 students of Eel Ground First Nation School last year.

And talk about impact! Eel Ground's current principal, Donald Donahue, and teachers have noted a marked improvement in the children's behaviour and learning capabilities—not to



mention their actual educational outcomes. Adele Small, Canadian Feed The Children's program manager for Canada, reports that teachers regularly comment that students are showing fewer disruptive behaviours in class and better able to focus throughout the day.

Schneider Electric Teachers - educational & professional training programs in the energy sector

Schneider Electric (www.schneider-electric.ca) and its foundation announced the creation of Schneider Electric Teachers Association. This non-government organization (NGO) aims to promote volunteering of current and retired Schneider Electric employees in partner organizations of the Schneider Electric Foundation, dedicated to teaching and professional training within the energy field.

"The idea behind Schneider Electric Teachers is to provide a platform for connecting skills with concrete needs, and make a distinctive contribution to education programs developed worldwide for the benefit of underprivileged young people," explained Christian Wiest, former executive vice-president at Schneider Electric and president of the association.

Schneider Electric Teachers' role is to link partner organizations of the Schneider



Electric Foundation with volunteers, current or retired employees of Schneider Electric. For this, a dedicated website — www.teachers.schneider-electric.org — was created; missions are posted by partner organizations, then offered to pre-registered volunteers whose profile meets search criteria. Schneider

Electric Teachers then organizes contacts, provides pre-departure training, takes in charge the organization and bears the costs for transport and accommodation.

"In a world in which the boundaries are continually evolving, we need to make a step change and establish new connections between the Schneider Electric community and its global environment," added Jean-Pascal Tricoire, president and CEO at Schneider Electric. "We are hoping to respond to 300 requests from partner organizations by 2014. This objective will be followed through our next sustainable development performance indicator, the Planet & Society Barometer."

The Schneider Electric Teachers Association is planning to develop its activities mainly in new economies (Africa, China, India and Brazil, during 2012). This initiative is an extension of the commitment undertaken by the Schneider Electric Foundation, which has 120 delegates in 70 countries and has already supported 150 projects worldwide.

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Hyundai and Magna launch Mahy E-Cell joint venture



Global shipbuilder Hyundai Heavy Industries (HHI, www.english.hhi.co.kr) and Magna E-Car Systems (www.magnaecar.com), a supplier of components and systems for hybrid and electric vehicles, are forming a joint venture named Mahy E-Cell as a platform to co-develop a battery cell and battery pack business.

“We are pleased to move forward together as partners with HHI to advance next-generation cell and battery pack technology to support the growth of the electric and hybrid electric vehicle markets,” said Frank Stronach, founder and chair of Magna E-Car.

Under the agreement, HHI and Magna E-Car will jointly conduct engineering, design, development and testing activities with the goal of preliminary validation of battery cell and battery pack technologies for electric and hybrid electric vehicle applications. The joint venture will be owned 60% by Magna E-Car and 40% by HHI.

“The establishment of Mahy E-Cell is a reflection of Hyundai Heavy’s determination to become a leading eco-friendly integrated energy company by advancing into Europe and North America’s electric car batteries market and ESS business,” said Mr. Lee Choong-dong, COO of HHI’s Green Energy Division. “We see solar energy, wind power and energy storage systems as integral to our future growth.”

HHI says it expects the establishment of Mahy E-CELL to serve as a stepping stone to enter the energy storage system business and plans to link its solar and wind power business with ESS as a new growth engine.

Got any paper insulated, oil-filled and lead-covered cable?

The Electrical Heritage Society of British Columbia seeks “a short piece of paper-insulated, oil-filled and lead-covered cable (with or without armour)”. This type of cable was once generally used for high-voltage feeders.

“I think any museum for electrical equipment should display a sample of this cable,” says the electrical heritage society, adding, “Many other types of cables and wires used in former days and would be interesting subjects for displays.”

If you have anything that fits the bill, email Karl Jessen at annakar1@shaw.ca

The Electrical Heritage Society of British Columbia has a display at the new EJTC Training Centre in Port Coquitlam, which you can see in our video (bit.ly/HwQ070) as we toured the facility last fall.

The Electric Circuit now in service for Quebec EV drivers

[Hydro Quebec Electric Circuit 1st Public EV Stations 3] The minister of natural resources & wildlife, and minister responsible for the Plan Nord, Clement Gignac, and the founding partners of The Electric Circuit (www.theelectriccircuit.com)—Les Rotisseries St-Hubert, Rona, Metro, the Agence metropolitaine de transport (AMT) and Hydro-Quebec—officially launched Canada’s first (they claim) public charging network for plug-in electric vehicles (EVs). More than 30, 240V Electric Circuit plug-in stations are now installed and available to charge EVs in parking lots of RONA and Metro stores and Rotisseries St-Hubert restaurants in the greater Montreal and Quebec areas.



“When the government launched its Action Plan for Electric Vehicles last April, we asked Hydro-Quebec to develop a strategy for the deployment of the public charging infrastructure in Quebec. Less than a year later, the major elements of the Action Plan are in place so that Quebecers can make the shift to sustainable mobility,” said Gignac.

“This is a major milestone in the rollout of the charging infrastructure needed to support the arrival of plug-in electric vehicles in Quebec,” said Pierre-Luc Desgagne, Hydro-Quebec’s senior director, strategic planning, on behalf of The Electric Circuit’s founding partners. “Drivers of electric vehicles will have access to a network of public charging stations that will be rolled out over the coming months.”

At least 120 stations will be open by the founding partners in the Montreal and Quebec regions by summer 2012. After that, the network will expand as more EVs hit the road.

To take advantage of Electric Circuit services, users just have to order a prepaid card at www.theelectriccircuit.com. A flat fee of \$2.50 will be billed per charge, no matter how long charging takes. For example, a prepaid amount of \$25 covers 10 charges.

Users will also have access to a 24/7 telephone help line run by CAA-Quebec and a charging station locator service provided by Hydro-Quebec.

Siemens Canada market launch - Sirius, T iastar and Sinvert PVM



PHOTO ANTHONY CAPKUN

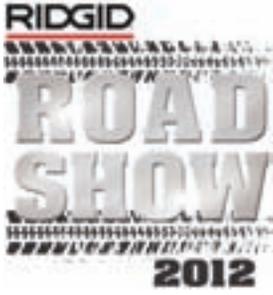
The cake-cutting officially launches Sirius Innovations, a re-engineered family of Tiastar motor control centres, and the Sinvert PVM family of solar inverters. Left to right: Dr. Ralf Wagner, global head of the Siemens Business Segment Systems Engineering; Michael Reichle, global head of the Siemens Business Segment Control Products; Joris Myny, Siemens VP of the Industry Automation and Drive Technologies Divisions in Canada.

Announced at an event attended by customers, channel partners and employees—and Electrical Business!—Siemens Canada’s Industry Automation division (www.siemens.ca) officially launched three new product lines in the area of industrial control. These include the next-generation of the Sirius modular system of power control products called Sirius Innovations, a re-engineered family of Tiastar motor control centres, and the Sinvert PVM family of solar inverters.

“Today’s announcement reinforces our commitment to providing answers for industrial innovation,” said Joris Myny, VP of the Industry Automation and Drive Technologies Divisions. “For 100 years, we’ve been helping our customers in Canada become more efficient and productive, and as these new product lines show, the future will be no exception.”

Meantime, Siemens says it has begun an 11-city tour across Canada, conducting half-day seminars to show off the productivity value these products provide to manufacturers. For more information on these events, visit www.siemens.ca/siriusinnovations.

Visit bit.ly/IgdQ4z for photos and bit.ly/Jb71s1 for video from the event!



2012 Ridgid Reputation Roadshow in Full Gear

Ridgid has launched its 2012 Reputation Roadshow (www.ridgid.com/roadshow), offering attendees product demonstrations and sneak previews of the company's latest tools and technologies in the commercial/ industrial, digital inspection/ locating and pressing markets. Besides American stops, the tour will make stops across four Canadian provinces before concluding in September.

"The Ridgid Roadshow is a great way for trade professionals to see the hottest new products and technologies and see solutions that can help improve their bottom lines," said David Roberts, marketing communications manager at Ridgid. "It also gives us an opportunity to listen to Ridgid customers, who know firsthand what tools the market needs."

Highlights include visual inspection products, utility locators, drain maintenance and pressing technology. Attendees also receive Ridgid gear, meet a Ridgid calendar model, enjoy lunch and have the opportunity to ask experts about any product in the Ridgid line.

Visit www.ridgid.com/roadshow for specific Canadian dates.

Over \$100 000 in Scholarships with 2012 EFC Foundation Scholarship Program

Don't forget... EFC has launched the 2012 Foundation Sponsorship Program, which provides post-secondary students the opportunity to receive over \$100,000 through 45 scholarships. And EBMag is a proud Media Partner! Visit www.electrofed.com.

BC Safety Authority proposes fee increases for 2012-2014

The BC Safety Authority is inviting feedback on a proposed weighted increase of 3% each year from 2012 through 2014 for electrical, elevating devices, gas, and boilers, pressure vessels and refrigeration fees. Homeowners will not have an increase in 2012.

Increase for passenger ropeways and amusement devices are now in effect. Railways will see variable increases starting 2013.

In the case of electrical, a new Electrical Contractor Licence, for example, would cost \$167 in 2012 rather than \$162. In 2013, that amount would rise to \$172,

and \$177 by 2014.

The BC Safety Authority says it has kept the costs of permits frozen for most technologies at 2008 levels "to support clients during the economic downturn, and has incurred deficits in 2010 and 2011".

The costs of permits, licences

and registration go to pay for an assortment of safety services, including safety officer-led education programs such as province-wide Tech Talks workshops.

For details on the proposed fees and how to provide feedback, visit safetyauthority.ca/page/fee-consultation-2012-2014. **EB**

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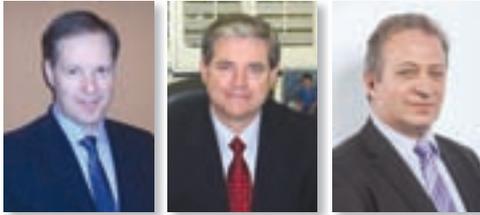
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Schneider Electric Canada (www.schneider-electric.ca) has appointed **Daniel Peloquin** as president, replacing **Gary Abrams**, who has been appointed to the position of transformation leader, Schneider Electric North America IT Transformation Initiative. In this role, Abrams will lead the deployment of IT systems in North American manufacturing and warehousing operations. The company has also named **Leonce**



Daniel Peloquin Gary Abrams Leonce Fraser

Fraser as VP Services & Projects. Fraser, who replaces Peloquin in this role, will lead activities that include Installed Base Services of electrical distribution systems (break/fix, retrofits, upgrades,

asset performance management and other consultative studies), Energy Management Services (power quality, monitoring and audit services), the Projects and Engineering Centre and Customer Operations.

Ideal Industries (Canada) Corp.

(www.idealindustries.ca), a provider of electrical tools and supplies for professional contractors, has announced the promotion of 10-year company veteran **Bill Stephens** to national sales & marketing manager. Here, Stephens is responsible for the overall planning and management of sales and marketing for the Canadian operation. With a primary focus on the electrical distribution channel, Bill will oversee existing product growth and new product development opportunities.



Bill Stephens

Meanwhile, Ideal Industries president and CEO **Jim James** has been named vice chair of its board. James has served as president and CEO since joining the company in August 2008. Previous to that appointment, he served as president of ITW Building Components Group, a division of Illinois Tool Works. "In his three years here Jim has skillfully guided Ideal through a severe recession, brought a new commitment to efficiencies and lean processes, and spearheaded several acquisitions that provide opportunities and access to new markets for us," said **Dave Juday**, chair of the board.

John A. Gorman has been named president of the **Canadian Solar Industries Association (CanSIA)**, (www.cansia.com), coming from



John Gorman

Sunlogics Inc., an integrator of solar energy systems, where he served as senior vice-president of external affairs and director (Canada). "I'm excited to have the opportunity to work on behalf of a membership whose work is close to my heart at this pivotal time in the development of the industry," said Gorman. Gorman's expertise in the energy sector began in 2000 with his appointment to the board of Hydro Ottawa Holdings. More recently, he played a role in the stakeholder engagement efforts associated with Ontario's Integrated Power Systems Plan (IPSP) and, later, the Feed-in-Tariff Program (FIT Program) through his work with the Ontario Power Authority (OPA).



Jerry L. Bowman

BICSI—an international association supporting the information technology systems (ITS) industry, (www.bicsi.org)—announced the ascension of **Jerry L. Bowman** to the position of president. Bowman has served on the BICSI board for six years prior to this new role, with the past two years as president-elect. Throughout his 15 years of BICSI membership, he has been a member and chair of several BICSI committees, and was instrumental in the creation and implementation of BICSI's NxtGEN Program. Outside of this volunteer position with BICSI, he is the president and COO for Beacon Enterprise Solutions Group Inc. Bowman's term continues through January 2014.

Bender (a global player in ground fault equipment, www.bender-ca.com) announced the current executive vice-president of Bender Canada, **John Nesbitt**, is retiring this year. A new head of sales was brought in from Germany to take over: **Andreas (Andy) Moeschl**. Moeschl is a power engineer and holds an MBA. During his 22-year professional career, he worked for Siemens in Germany and for

Bender. His main job at Bender was to develop a representatives network in the Middle East. Together with Bender Canada team, he aims to establish a similar network throughout Canada.

Royal Philips Electronics

(www.philips.com) has appointed **Eric Rondolat** as CEO of Lighting and member of its executive committee, effective April 1, 2012, succeeding **Frans van Houten** who has led Philips Lighting on an interim base. Rondolat joins Philips from Schneider Electric. "Eric has an impressive international career in the technology industry covering both established and fast growing emerging markets, most recently Asia Pacific based in China," said Frans van Houten, CEO of Royal Philips Electronics.



Eric Rondolat

Beghelli Canada (www.beghellicanada.com), a manufacturer of emergency and architectural lighting, has hired **Paul P. Black** as manager of operations. He will lead the engineering, purchasing and production teams at the Markham, Ont., facility, bringing with him more than eight years of operation experience and more than two decades of lighting sales, design and management experience.



Paul P. Black

Ash Sahi, president and CEO of **CSA Group** (www.csagroup.org), has appointed **Nashir Jiwani** to the position of vice-president, Canada. Jiwani is responsible for "accelerating the growth of testing and certification services and offerings in Canada, as well as ensuring the provision of global services to all Canadian clients". Prior to joining CSA Group, Jiwani served as COO at Aliya's Foods Ltd. (Edmonton, Alta.). Other career positions included VP operations, Hartmann North America; business director, Dupont Liquid Packaging Systems (Savli, India); as well as various management positions with Dupont Canada Inc. (Whitby, Ont.). Jiwani holds a bachelor's degree in mechanical engineering from McGill University and an MBA from York University. **EB**

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| Dave Smith

Maintain your equipment; reduce your risk

Part Two

Once an organization has committed itself to the goal of developing a world-class maintenance program, the first order of business is to determine the standards that will define it.

As it is not easy developing an electrical maintenance program, I will list the key North American electrical maintenance standards that we reference in our training courses and will be referenced in the new CSA Z463.

The first cornerstone are IEEE standards; specifically, three standards derived from what are known as their 'colour book' series.

The first of these is 3007.1, "IEEE Recommended Practice for the Operation and Management of Industrial and Commercial Power Systems", intended for the numerous personnel who are responsible for safely operating and managing industrial and commercial electric power facilities.

The contents include power system documentation (especially the requirement for a single-line diagram and other plans); system operation and management clarifies the interaction of load distribution; system integrity, power factor, system protection coordination; and the effect of operating economics. The last section—system control responsibilities and the corresponding switching and clearing procedures—address a significant aspect of power system operation and management, and define the responsibility of the owner and everyone who interacts with the system.

This essential document is the beginning of executive due diligence in the ownership and management of a system. A CEO does not need to be able to manage the system, but their deputy certainly does.

The second standard is 3007.2, "IEEE Recommended Practice for the Maintenance of Industrial and Commercial Power Systems", which covers the maintenance of industrial and commercial power systems, electrical equipment maintenance, how to develop successful maintenance strategies, and the common testing methods used as part of an electrical equipment maintenance program.

It is another excellent document, as it addresses the difficulty in determining the basis for a preventive maintenance program as described in last month's article, and the design considerations that balance the competing economic needs of providing maintenance and the importance of reliable power. In addition it defines the goal of enhanced safety as a product of creating an electrical preventive maintenance program.

High-voltage and high-current systems possess thousands of horsepower of energy that can be instantly released with deadly effect, and an effective maintenance program restrains these. One client recently had a piece of switchgear hand grenade itself into fragments moments after several employees had moved away from in front of it. A change in time and there would have been two serious injuries that could have paid for an immense amount of maintenance activity. When investments in maintenance are reviewed, a percentage should be correctly categorized as part of the health and safety program.

A system could have corona quietly destroying it and a maintenance program that excludes corona testing may discover its existence with an explosion and, in the least, a production loss.

IEEE 3007.2 includes a clear example of a reliability-centred maintenance program for the electrical system of a high-rise building, including a Failure Modes and Effects Analysis (FMEA) of the system. It is clear from this exercise that an RCM program requires a huge upfront cost from a committed management team, but it is equally clear that the reward is a reduction in operating costs to \$6.00/hp per year.

This standard defines the fundamentals of electrical equipment maintenance, insulation tests, inspections and test frequency, protective device testing, analytical tests, grounding tests, functional testing, testing procedures and specifications, and maintenance of standby power equipment.

The series concludes with 3007.3, "IEEE Draft Recommended Practice for Electrical Safety in Industrial and Commercial Power Systems", which covers all aspects of electrical safety in industrial and commercial power systems but, more importantly, provides additional context for NFPA 70E and, therefore, CSA Z462. There are many other IEEE standards that are essential additions to a maintenance library, but these three make a solid cornerstone for an electrical preventive maintenance program and, by extension, a reduction in workforce injuries.

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

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

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Part Two



I'm a subtrade: what are my rights?

On any project, subtrades are very much invested in the bonding process. Bonds are a subtrade and sub-subtrade's only means of recourse should a general contractor go bankrupt. As such, the subtrade has the right not only to claim through the bond in the event of the general contractor's default, but also to request to see the bond at any point during the project.

Let's remember that labour and material payment bonds are called "two tier bonds" on federal government projects because a claimant for such bonds not only includes the general contractor's subcontractors, but the sub-subcontractors as well.

Most subtrades do not ask to see the bond, but experts recommend that companies do just that to ensure the proper documentation exists on any job. Jensen suggests contractors not only ask to see the bond, but also record the bond number, the bonding company name and the bond's value. Subtrades would also do well to ensure the bond is affixed with a valid seal, and even to call the bonding company to confirm that the bond is valid. (There are also other rights beyond the bonds themselves, but these are beyond the scope of this article.)

Is a bond still valid when it is missing a key element, such as a signature?

The D'Aoust case sets out some of the formalities of a bond. Even though many legal requirements have been done away with, a fully executed (signed) bond and delivery of that bond are still required.

What if the general contractor defaults during a job?

Bankruptcies happen and can occur at any time—even in the middle of jobs—and bonds exist as a measure to protect subtrades and owners from this exact situation. When a contractor defaults on his obligations, the responsibility can fall to the surety company to acknowledge the notice of default and investigate the situation.

The bonding company is ultimately required to expend the total amount of the performance bond to complete the project in a reasonable manner. That is, the bonding company is not expected to pay all the subtrades generously for their work, but to ensure that each trade is paid reasonably for its work through to the completion of the project.

In the final analysis, the bond is put in place to pay the difference between the upfront costs paid by the general contractor to its subtrades, and the total project value. The same holds true for labour and material payment bonds. The surety investigates the subtrade's claim, and it is up to the subtrade to bring itself within the meaning of Claimant under a labour and material payment bond. That will typically involve timely notice (usually 90 days from either the claimant/subtrade's last day of work or the principal/GC's last day of work, and the potential for starting a lawsuit within a certain period of time—typically one year.

How do bonds cover change orders?

Change orders are a reality on any project and can cause all sorts of problems when their payment terms are not properly clarified at the onset of a project.

With particular reference to the bonding process, the principal (i.e. the GC) is typically required to provide the bonding company with regular updates on the project's scope of work, especially in cases where there is a significant change to the project's value (where project cost doubles, for example). This communication allows the bonding company to periodically adjust the value of its bond, and to ensure at all times that the value of the bond exactly matches the value of the project.

This practice, however, is not commonly followed. More often, these updates are not made—even when contractually required by the general contractor.

A surety's obligation remains the penal value of a bond and nothing more. Again, think of the bond as a form of guarantee. When you sign a guarantee at the bank with a fixed limit, then your exposure is for that fixed limit.

Can I lien a government job?

No. This is precisely why bonds are essential tools in this industry. Lien legislation is not applicable to federal jobs, but 'two tier' bonds exist to ensure that subtrades and sub-subtrades are paid through the bonds.

Lien legislation is applicable to all other projects, including projects owned by the Ontario government; however, liens are not registered on provincial projects, but the balance of the processes remain largely the same.

Bonds are still reliable instruments

Despite recent events in the local industry, it is worth mentioning that bonds are still reliable instruments. As with any legal document, parties to the bonding process would do well to make sure the proper documentation is in order. **EB**

Dan Leduc is a partner at Norton Rose LLP and co-chair of the firm's Canadian Construction Law Practice Group. He is frequently called upon to advise and represent owners, engineers, subcontractors, suppliers and builders in such front-end services as contract review, tender issues and general construction matters, as well as in litigation and arbitration. Dan can be reached at (613) 780-1536 or dan.leduc@nortonrose.com. For Part 1 of this column, check out EBMag March 2012.

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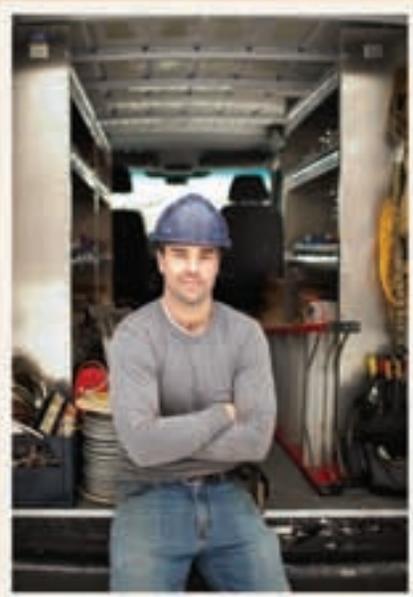
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WORK ORDER



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Before you buy your next **WORK TRUCK...**



PHOTOS FROM NTEA'S WORK TRUCK SHOW 2012. • PHOTOS A. CAPKUN.

Bob Johnson

As vocational trucks continue to grow in complexity and sophistication, fleet managers are under increasing pressure to maximize their vehicle investments. This process starts well before a new work truck joins the fleet. No longer is it prudent just to buy what you've always bought. To keep your vehicle maintenance and operation costs down, take these four steps before buying another work truck.

STEP 1. Establish then follow a logical design process

Taking a systematic approach to specifying a new work truck makes it easier to ensure that all parameters are met while removing some of the guesswork that can happen otherwise.

The first step in the process should be to research and define the vehicle's application so you can better identify its functional requirements. Ask yourself what the vehicle will be used for. Exactly what will you haul with it? What special circumstances will it encounter and how often? What does the operator need to accomplish with the vehicle?

Don't just say, "I need a line truck". Really

explore what that line truck has to do to be most productive. Subsequent steps should include analyzing the operating environment, evaluating driver/operator productivity considerations, and conducting a performance review of existing equipment.

STEP 2. Identify the vehicle's functional requirements based on the application you have defined

When specifying a vehicle chassis, make sure that the completed vehicle will be optimized for its intended application as defined in Step 1. This will result in a safer, more productive vehicle, and will minimize its overall life-cycle cost of ownership.

For example, if you have determined the truck needs to carry six #3 widgets, defining the size of those widgets will impact the vehicle's bed size, and how much they weigh

will affect the vehicle's payload requirements.

Questions to ask include: What are the performance requirements, such as maximum gradability, maximum road speed, braking and fuel economy? What type of second unit body and/or special equipment is needed? 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?

You will also need to consider special equipment/second unit requirements, such as the size of special equipment to be upfitted to the chassis, the weight of these components, cargo storage needs, component installation requirements and operational requirements (i.e. power sources for equipment, equipment access, etc.). For many vehicles, accessory items like generators, hose reels and compressors, must also be taken into account.

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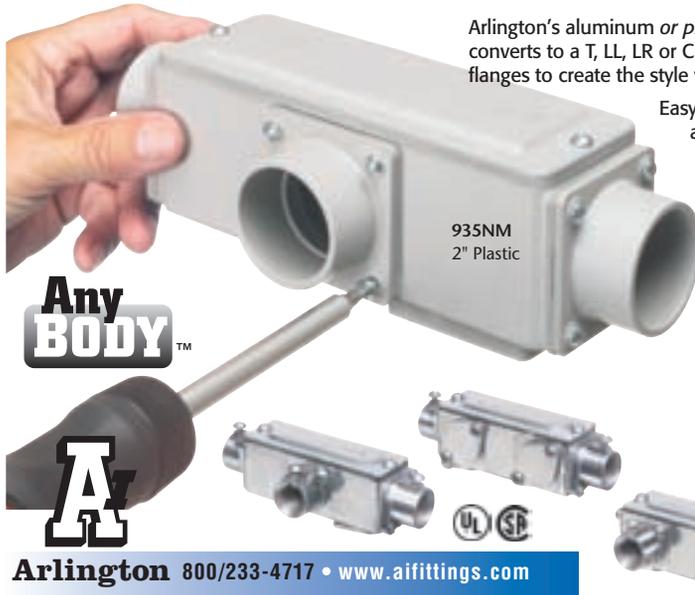
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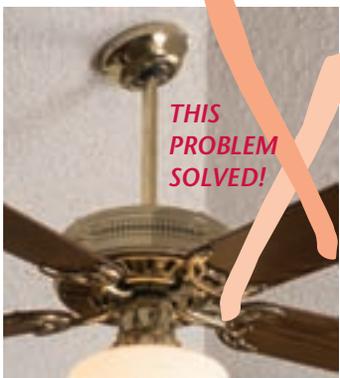
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Make the effort upfront to add trucks to your fleet that have been properly selected to best meet your needs. Your operators, maintenance providers and bottom line will all benefit.

STEP 3. Factor in vehicle operating conditions and environment

Consider the vehicle's duty cycle, including the percentage of time it will be used on-road versus off-road. Also evaluate its operational cycle, including desired cycle time and daily hours of operation. Other factors include loading cycle, climate/weather, terrain and maintenance considerations. These elements may affect your component choices.

For example, if the vehicle will be used in temperatures above 90°F for an extended period, 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 and install upgraded air dryers on trucks equipped with air brakes; and specify heated mirrors and windows to reduce fogging problems.

STEP 4. Review the 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. When a particular truck has higher

maintenance costs than similar vehicles in the fleet, that truck may be a victim of driver abuse. A high incidence of repeat repairs within a short period may indicate poor maintenance and repair procedures.

Learning more

Need some help? The National Truck Equipment Association (NTEA) offers its members free access to extensive vehicle engineering, specification and design resources unavailable anywhere else. NTEA's engineering staff can explain best practices for specifying chassis, selecting truck bodies and equipment for specific applications, specifying second units, performing weight distribution calculations and conducting accurate payload analysis.

NTEA also keeps fleet managers abreast of important regulatory changes, including Federal Motor Vehicle Safety Standards, Canadian Motor Vehicle Safety Standards, CDL licensing requirements, and federal lighting regulations.

A wealth of free information is available at NTEA.com. These materials include productivity and engineering guidelines, chassis manufacturer sales and technical contacts, and product and industry directories.

Another valuable resource is The Work Truck Show. This annual trade show, produced by NTEA, is the largest event in North America dedicated to Class 1-8 vocational trucks and equipment. In most vocational fields, industry-specific shows offer fleet

managers the opportunity to check out specialized equipment and training, but do not provide information helpful in specifying truck chassis, bodies and equipment. For this reason, vocational fleet managers should consider attending The Work Truck Show in addition to their own industry shows every year.

This single 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, new and updated federal regulations, methods for reducing maintenance costs and downtime, vehicle specifications, and updates on new chassis from the leading manufacturers.

Even if you're not in the trucking business, as a fleet manager, trucking is your business. Take time and make the effort upfront to add trucks to your fleet that have been properly selected and upfitted to best meet the needs of your business. Your operators, maintenance providers and bottom line will all benefit. **EB**

Written by Robert "Bob" Johnson, director of fleet relations for the National Truck Equipment Association (NTEA). The NTEA is located in Farmington Hills, MI. For more information, contact info@ntea.com, or call 1-800-441-NTEA (6832).

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USING vibration ANALYSIS in your preventive MAINTENANCE PROGRAM

In simplest terms, vibration in motorized equipment is merely the back and forth movement, or oscillation, of machines and components, such as drive motors, driven devices (i.e. pumps, compressors) and the bearings, shafts, gears, belts and other elements that make up mechanical systems.

Vibration in industrial equipment can be both a sign and a source of trouble. Other times, vibration just “goes with the territory” as a normal part of machine operation and should not cause undue concern. But how can the plant maintenance professional tell the difference between acceptable, normal vibration and the kind of vibration that requires immediate attention to service or replace troubled equipment?

Vibration is not always a problem. In some tasks, vibration is essential. Machines such as oscillating sanders and vibratory tumblers use vibration to remove materials and finish surfaces. Vibratory feeders use vibration to move materials. In construction, vibrators are used to help concrete settle into forms and compact fill materials. Vibratory rollers help compress asphalt used in highway paving.

In other cases, vibration is inherent in machine design. For instance, some vibration is almost unavoidable in the operation of reciprocating pumps and compressors, and internal combustion engines. In a well-engineered, well-maintained machine, such vibration should be no cause for concern.



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When vibration is a problem

Most industrial devices are engineered to operate smoothly and avoid vibration, not produce it. In these machines, vibration can indicate problems or deterioration in the equipment. When the underlying causes are not corrected, the unwanted vibration itself can cause additional damage.

In this paper we are focused not on machines that are supposed to vibrate as part of normal operation, but on those that should not vibrate: electric motors, rotary pumps and compressors, and fans and blowers. In these devices, smoother operation is generally better, and a machine running with zero vibration is the ideal.

Most common causes of machine vibration

Vibration can result from a number of conditions, acting alone or in combination. Keep in mind that vibration problems may be caused by auxiliary equipment, not just the primary equipment. These are some of the major causes of vibration.

Imbalance

A 'heavy spot' in a rotating component will cause vibration when the unbalanced weight rotates around the machine's axis, creating a centrifugal force. Imbalance could be caused by manufacturing defects (i.e. machining errors, casting flaws) or maintenance issues (i.e. deformed or dirty fan blades, missing balance weights). As machine speed increases, the effects of imbalance become greater. Imbalance can severely reduce bearing life as well as cause undue machine vibration.

Misalignment/shaft runout

Vibration can result when machine shafts are out of line. Angular misalignment occurs when, for example, the axes of a motor and pump are not parallel. When the axes are parallel but not exactly aligned, the condition is known as parallel misalignment. Misalignment may be caused during assembly or develop over time due to thermal expansion, components shifting or improper reassembly after maintenance. The resulting vibration may be radial or axial (in line with the axis of the machine) or both.

Wear

As components such as ball or roller bearings, drive belts or gears become worn, they may cause vibration. When a roller bearing race becomes pitted, for instance, the bearing rollers will cause a vibration each time they travel over the damaged area. A gear tooth that is heavily chipped or worn, or a drive belt that is breaking down, can also produce vibration.

Looseness

Vibration that might otherwise go unnoticed may become obvious and destructive when the component that is vibrating has loose bearings or is loosely attached to its mounts. Such looseness may or may not be caused by the underlying vibration. Whatever its cause, looseness can allow any vibration present to cause damage, such as further bearing wear, wear and fatigue in equipment mounts and other components.

Effects of vibration

The effects of vibration can be severe. Unchecked machine vibration can accelerate rates of wear (i.e. reduce bearing life) and damage equipment. Vibrating machinery can create noise, cause safety problems and lead to degradation in plant working conditions. Vibration can cause machinery to consume excessive power and may damage product quality.

In the worst cases, vibration can damage equipment so severely as to knock it out of service and halt plant production.

Yet there is a positive aspect to machine vibration. Measured and analyzed correctly, vibration can be used in a preventive maintenance program as an indicator of machine condition, and help guide the plant maintenance professional to take remedial action before disaster strikes.

Characteristics of vibration

To understand how vibration manifests itself, consider a simple rotating machine like an electric motor. The motor and shaft rotate around the axis of the shaft, which is supported by a bearing at each end.

One key consideration when analyzing vibration is the direction of the vibrating force. In our electric motor, vibration can occur as a force applied in a radial direction (outward from the shaft) or in an axial direction (parallel to the shaft). An imbalance in the motor, for instance, would most likely cause a radial vibration, as the heavy spot in the motor rotates creating a centrifugal force that tugs the motor outward as the shaft rotates through 360 degrees.

A shaft misalignment could cause vibration in an axial direction (back and forth along the shaft axis) due to misalignment in a shaft coupling device. Another key factor in vibration is amplitude, or how much force or severity the vibration has. The farther out of balance our motor is, the greater its amplitude of vibration. Other factors, such as speed of rotation, can also affect vibration amplitude. As rotation rate goes up, the imbalance force increases significantly.

Frequency refers to the oscillation rate of vibration, or how rapidly the machine tends to move back and forth under the force of the condition or conditions causing the vibration. Frequency is commonly expressed in cycles per minute or Hertz (cpm or Hz). One Hz equals one cycle per second or 60 cycles per minute.

Though we called our example motor "simple", even this machine can exhibit a complex vibration signature. As it operates, it could be vibrating in multiple directions (radially and axially), with several rates of amplitude and frequency. Imbalance vibration, axial vibration, vibration from deteriorating roller bearings and more could all combine to create a complex vibration spectrum.

Conclusion

Vibration is a characteristic of virtually all industrial machines. When vibration increases beyond normal levels, it may indicate only normal wear, or it may signal the need for further assessment of the underlying causes, or for immediate maintenance action. Understanding why vibration occurs and how it manifests itself is a key first step toward preventing vibration from causing trouble in the production environment. **EB**



This article is based on the Fluke white paper "Introduction to vibration". Visit www.fluke.com. And be sure to check out our video on the new Fluke 805 vibration meter. Visit EBMag.com and, under Videos, look for "Redefining the vibration screening tool category with Fluke 805".

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Digesting the results of the Ontario Feed-in Tariff Program **review**

Bernadette Corpuz

The Ontario Government recently released the results of its review of the Ontario Feed-in-Tariff (FIT) program. Anyone remotely connected to the renewable energy space in the province has been on high alert for the better part of March in anticipation of these results. Within hours, briefings were published throughout the province. Now, digesting and acting on the review's results is the real-time activity in the renewables sector.

The review provides numerous recommendations on changes to the FIT program that, collectively, address policy areas as well as technical program adjustments. The recommendations reflect the government's continued statements on its commitment to renewable energy and economic development, while balancing issues of community engagement and affordable electricity prices.

The province has indicated it will adopt all of the recommendations in the review. For starters, the review does not recommend any changes in the pricing or terms of the FIT contracts that have *already been signed* by the Ontario Power Authority (OPA). The

responsibility will now be turned over to OPA to revise the FIT Program rules and contract to reflect the recommendations.

Several major changes to the FIT program will likely arise from these recommendations. While the specifics won't be clear until OPA issues the revised rules and contract, these changes will include a reduction in FIT program pricing for wind and solar, as well as revised price adders for aboriginal and community projects, a decision not to proceed with the 'Economic Connection Test' (ECT), the implementation of a point based system to assign priority to new FIT applications, and tighter change of control and assignment provisions for aboriginal and community projects that were given priority because of this status.

The recommendations: six areas of strategic policy

The FIT review process was launched October 31, 2011, and ended December 14. During that time, the deputy minister met with 80 energy sector stakeholders and received 200 written submissions and about 2900 online responses to survey questions.

The recommendations are organized into six strategic policy areas, each comprising several detailed recommendations.

1. Continue Ontario's commitment to clean energy

- Ontario should procure 10,700 MW of non-hydro renewable energy generation by 2015 (previously 2018).
- At the end of 2013, the government should review Ontario's electricity supply and demand forecast to explore whether a higher renewable capacity target is warranted.
- Up to 50 MW of the remaining FIT contract supply should be reserved for hydroelectric projects.
- Beginning this year, conduct an annual review of FIT prices to reflect current costs; setting and publishing prices each November that will take effect January 1 of the following year.

2. Streamline processes and create jobs

- The Ministry of Energy (MoE), Ministry of Natural Resources (MNR) and Ministry of Tourism, Culture and Sport (MTCS) should collectively change Renewable Energy

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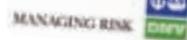


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Approval (REA) requirements to improve service and ensure that the scale of the environmental approval processes correspond to the size and impacts of projects. Three approval streams are recommended:

a. Exemption: MicroFIT solar projects should remain exempt from REA regulations but subject to

enhanced land use protection.
b. Self-screening: MoE's self-screening registry system—the Environmental Activity and Sector Registry—should be expanded to include eligible small-scale solar (less than 500 kW) and bio-energy projects. The review expects this change could reduce timeframes from

18 to 24 months to just two to three months.

c. Full environmental approvals including REA regulations: large projects should continue to require the full environmental assessment process. Ministries should reduce duplication, improve service standards and streamline the process by:

i. Final comment letters that MTCS and MNR provide proponents should be a required part of a complete submission rather than required before the final public meeting.

ii. Timelines for MNR's review of Endangered Species Act permit applications should be reduced.

iii. MTCS should create a streamlined process to review archaeological reports.

- MNR should review and update its policy approach to renewable energy development on Crown land, the release of which should be aligned with provincial energy plans.
- The commercial operation milestone for rooftop solar PV should be shortened from three years to 18 months.
- Create a new Renewable Energy Committee that includes senior officials from relevant ministries to drive the progress of projects through the approvals process.

3. Encourage greater community and Aboriginal participation

- Introduce a system to prioritize FIT applications for small and large projects that award 'points' to projects with minimum equity participation from Aboriginal and local communities, public schools, colleges and universities, and healthcare facilities.
- Maintain adders for community and Aboriginal projects with adjusted prices. The adders should align with new participation and equity requirements for the FIT program.
- Set aside a minimum of 10% remaining FIT contract capacity for local community and Aboriginal projects with greater than 50% equity participation. Enhance limitations on assignment and change of control for priority participation projects (except rooftop solar).
- Reaffirm commitment to FIT support programs. The MoE should consider amendments to the Community Energy Partnerships Program (CEPP) in light of FIT program amendments and relaunch the program by July 1, 2012. The Aboriginal Energy Partnerships Program should be aligned with any new participation requirements introduced in revised FIT Program rules.

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4. Improve municipal engagement

- The OPA should introduce a point system for small and large FIT applications that award points to projects that have demonstrated support from local municipalities or Aboriginal communities.
- Enhance municipal engagement in the FIT program.
 - a. For large FIT projects, require contract launch meetings with municipalities, developers, government officials, utilities and agencies to define expectations.
 - b. MoE should also revise the Municipal Consultation Form in the REA process in consultation with the Association of Municipalities of Ontario (AMO).
- Clarify and strengthen project siting rules to ensure responsible project development.
 - a. Enhance protection of agricultural lands by prohibiting solar ground-mount projects over 10 kW on prime agricultural land.
 - b. Prohibit solar ground-mounted projects of any size in residential areas and lands bordering residential areas. Permit projects in commercial or industrial areas only when they are

producing renewable energy as a secondary use.

- Support municipalities in the development of new resources and protocols to support the integration of renewable energy in communities.
 - a. Allocate \$100,000 annually of CEPP funding to the development of a community guidance and outreach project with AMO.
 - b. The Renewable Energy Facilitation Office should update the Municipal Guide to renewable energy projects with AMO.
 - c. Ensure project developers and other stakeholders work with AMO to develop best-practice guidance materials.

5. Reduce price to reflect lower costs

- FIT program prices for wind and solar should be reduced by more than 20% for solar and about 15% for wind. The current prices for other renewable technologies should remain the same (See Table 1 “Price Schedule”).
- Set prices when contract is offered rather than at the time of contract application for small and large FIT projects.

TABLE 1: Price schedule

Fuel	Project Size	Original FIT Price (c/kwh)	New FIT Price (c/kwh)	% Change from Original FIT Price
Solar Rooftop	≤10 kW	80.2	54.9	-31.5%
	> 10 ≤ 100 kW*	71.3	54.8	-23.1%
		<250kw		
	> 100 ≤ 500 kW*	63.5	53.9	-15.1%
>250 ≤ 500kw				
>500 kW	53.9	48.7	-9.6%	
Solar Groundmount	≤ 10 kW	64.2	44.5	-30.7%
	> 10 kW ≤ 500kW*	44.3	38.8	-12.4%
	> 500 kW ≤ 5 MW*	44.3	35.0	-21.0%
	> 5 MW		34.7	-21.7%
Wind	All sizes	13.5	11.5	-14.8%
Water	≤ 10 MW	13.1	13.1	0.0%
	> 10 MW ≤ 50 MW	12.2	12.2	0.0%
Biomass	≤ 10 MW	13.8	13.8	0.0%
	> 10 MW	13	13	0.0%
Biogas on Farm	≤ 100 kW	19.5	19.5	0.0%
	100 kW ≤ 250 kW	18.5	18.5	0.0%
Biogas	≤ 500 kW	16	16	0.0%
	> 500 kW ≤ 10MW	14.7	14.7	0.0%
	> 10 MW	10.4	10.4	0.0%
Landfill Gas	≤ 10MW	11.1	11.1	0.0%
	> 10 MW	10.3	10.3	0.0%

* New project size



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6. Expand Ontario's clean energy economy

- The Ministry of Economic Development and Innovation (MEDI) and MoE should develop a “Clean Energy Economic Development Strategy” that includes:
 - a. Financial support through the Smart Grid Fund to support Ontario-based demonstration projects.
 - b. With key stakeholders, consider establishing a “Clean Energy Institute” to spur domestic innovation.
 - c. Support manufacturers by showcasing smart energy solutions through an export strategy.
 - d. Create a “Clean Energy Task Force” to advise the Minister of Energy and MEDI on strategies for the clean energy sector.
- The government should explore partnerships for renewable energy projects in off-grid Aboriginal communities.
- Establish a working group to explore opportunities for self-consumption or net-metering programs in Ontario that build on the FIT design.

Technical tweaking

The review also offers a number of technical recommendations that relate to additional proposed adjustments to the FIT Program.

1. OPA should allow for a window during which existing contracts can voluntarily withdraw from the FIT Program without penalty.
2. Provide a transition process for:
 - All pre-existing FIT applications and,
 - MicroFIT applications submitted after September 1, 2011. All these applications to transition to the eligibility requirements in the new FIT and microFIT programs.
3. OPA should work with Hydro One and local distribution companies (LDCs) to implement the minister's directive from August 19, 2011, to allow for the participation of constrained microFIT projects.
4. Update the microFIT process, include an Application Approval Notice instead of a Conditional Offer of microFIT contract.
5. Following commercial operation, a portion of the FIT price should escalate with inflation

over time to reflect ongoing operations and maintenance costs.

6. Strengthen FIT project due diligence requirements in areas like awareness of regulatory approvals, structural safety and application fees for small FIT projects.

Transmission and distribution

1. To promote efficient use of land and connection infrastructure, OPA should consult stakeholders to develop a rule regarding the appropriate maximum distance between a project site and its connection point.
2. Maintain Hydro One's technical limit for connecting micro-sized projects to its distribution system (7% Rule), pending the results of additional studies.
3. Regularly update and publish FIT transmission availability tables following, at a minimum, each round of FIT contract awards.
4. Where OPA's screening process indicates that upgrades are required to connect a project, OPA should offer contracts only to projects where the need for minor transmission upgrades is identified.
5. Based on planned transmission projects and recommended changes to the FIT program, do not proceed with the ECT.
6. Establish best practices and processes for LDCs and transmitters that will improve communication, transparency and coordination between OPA, LDCs, transmitters and generators regarding the Connection Impact Assessment (CIA) process and the status of applications.

What might this mean?

Existing projects, existing applications

When a party already has a signed FIT contract, then the new rules should not affect that them. However, for those with applications in the queue, the review contemplates some type of transition process to new program eligibility requirements and rules. This is as explicit a statement as any that the new rules will apply to projects that are the subject of existing applications.

A proponent of such a project may want to lobby for a transition process that enables it to ‘supplement’ its current application to satisfy any new eligibility requirements and points allocation system or, alternatively, for greater grandfathering provisions. The suggestion that the time stamp will be maintained may be valuable when it can help an existing project applicant break a tie in the new points system.

Connections

The recommended elimination of the ECT answers the lingering questions of how this program tool was to work in the context of the province's Long-Term Energy Plan. The number of recommendations related to transmission and distribution indicate that connection issues will continue to be a significant factor in the actual build-out of FIT projects.

While the proposed points system strongly favours projects that have community involvement and acceptance—and a certain degree of

project-readiness—connection will still be a very practical and challenging issue to address. The FIT review seems implicitly to acknowledge this, for example, by imposing greater responsibility on applicants for increased due diligence requirements in areas of regulatory awareness, safety and application security fees for small FIT projects.

In tandem, the review recommends increased transparency and availability of information on connection capacity, which also supports the notion that it is now particularly incumbent on an applicant to assess its project's viability from all angles—not only price.

Solar

Much of the discussion in this article applies to the solar industry, but certain aspects are specifically focused on solar.

The recommended price decreases targeted the solar and wind technologies largely as expected. In the solar group, the ranges between and within the categories of rooftop and ground-mount narrowed, with the most significant cuts directed at microFIT projects.

In addition to pricing, certain program recommendations will catch the eye of the small solar project applicant more than others: new restrictions on ground-mount projects; one microFIT project per owner (rather than property); no microFIT for business (commercial FIT).

Solar photovoltaic FIT projects are recommended to have a shorter time period for commercial operation (18 months from three years). While this may create development pressures, the potentially negative effects should theoretically be mitigated when approval processes are similarly streamlined.

New and existing solar project applicants alike will want to review the proposed new rules for implications on technology, size and scale of planned projects. And, where the full impact of the recommendations cannot yet be determined without additional details, industry will want to attempt to influence those implementation details as much as possible.

Impacts

The recommendations characterized as 'technical' may have as

significant an impact on FIT projects (and, in some cases, potentially greater) as those set out in the six strategic areas. In particular, this may apply to the implementation of the points system and the manner in which connection capacity can be enhanced.

The government has formally endorsed all of the recommendations, and the OPA is now

developing draft FIT program rules and contracts to implement those recommendations. These materials will be posted on OPA's website (fit.powerauthority.on.ca) for review and comment in the coming weeks. **EB**

Bernadette Corpuz is a senior associate in the Electricity Markets Group of the law firm Borden Ladner Gervais

LLP (BLG). As a member of this group, Corpuz advises a range of energy market participants, including distributors, transmitters, generators and commercial users with respect to a variety of commercial- and corporate transaction-related matters, including mergers and acquisitions, financing and energy markets. She can be reached at bcorpuz@blg.com or (416) 367-6747.

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As the building industry moves (albeit slowly) toward Zero Net Energy—the goal of the Architecture 2030 program—the industry is recognizing that lighting controls play a crucial role in energy conservation. According to the U.S. Department of Energy (DoE), lighting is—by far—the largest user of electricity in commercial buildings. It consumes 38% of a building's total electricity use—more than space heating, cooling, ventilation, equipment and computers combined (Figure 1).

Lighting controls can drastically reduce that appetite.

They can eliminate 60% or more of the wasted lighting energy in buildings while enhancing occupant comfort and productivity. They provide flexible control over the lighting in a space, and support energy savings by reducing the amount of power or amount of time the lighting system is in use.

Energy codes and standards

In the States, the nation's top three building energy codes and standards—California's Title 24, the International Energy Conservation Code (IECC) and ASHRAE 90.1—are used by nearly every state as the basis for their local building energy code. They provide the minimum acceptable energy performance requirements for new construction or major renovations of commercial buildings.

These codes/standards reflect the importance of using lighting controls to conserve energy. In fact, they all have similar mandatory lighting control requirements that designers and engineers must meet for their new construction for major renovation projects.

Focus on ASHRAE 90.1 2010

Sometimes referred to as America's primary commercial energy code, ASHRAE 90.1, "Energy Standard for Buildings Except Low-Rise Residential Buildings" was published in late 2010. The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) partners with the Illuminating Engineering Society (IES) to produce the standard, which provides the minimum requirements for the energy-efficient design of buildings, excluding low-rise residential buildings.

Below are some of the mandatory lighting control requirements contained in the standard:

Area control

Each area enclosed by ceiling-height partitions must have an accessible, independent switching or control device (such as an occupancy sensor, manual switch or dimmer) to control the general lighting. Each control device shall be readily accessible and located so the occupants can see the controlled lighting and can only override the automatic lighting shut-off requirement by a maximum of two hours.

Occupancy sensor or timer switches that turn off lighting within 30 minutes of vacancy are required in the following spaces:

1. Classrooms and lecture halls
2. Conference, meeting and training rooms
3. Employee lunch and break rooms
4. Storage and supply rooms between 50 sf and 1000 sf
5. Rooms used for document copying and printing
6. Office spaces up to 250 sf
7. Restrooms
8. Dressing, locker and fitting rooms

Automatic shut-off

All indoor lighting systems must include a separate automatic shut-off control, such as an occupancy sensor or time switch. An astronomical timeclock that provides a building lighting off-sweep after hours is a common way to comply with this requirement.

Daylight control

An automatic reduction in lighting power in areas where daylight can help illuminate the space will be required in most areas that are side-lighted (with windows) or top-lighted (with skylights). Areas greater than 250 sf for side-lighted areas or greater than 900 sf for top-lighted areas shall have a multi-level photocontrol (including continuous dimming devices) for the general lighting.

Exterior lighting control

Permanently installed outdoor lighting must be controlled by a photo-control or astronomical time switch that automatically turns off the lighting during daylight hours. In addition, the new standard also requires that facade and landscape lighting be turned off between midnight and 6 a.m., or in conjunction with business opening and closing times.

Other outdoor lighting, such as advertising signage, must operate at 70% power (or lower) between midnight and 6 a.m., or in conjunction with business closing and opening times, or when no activity has been detected for 15 minutes.

Manual-On control

All automatic control devices shall not be set to automatically turn the lighting On. This effectively requires manual-On/automatic-Off controls, or up to 50% auto-On capability for automatic controls. These controls already exist, and are referred to as 'vacancy sensors' or 'multi-level' occupancy sensors. Auto-On is allowed in some spaces, including:

- Public corridors and stairwells
- Restrooms
- Primary building entrance areas and lobbies
- Areas where manual-On operation would endanger safety or security

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Multi-level lighting control

Most areas must provide at least one light level between 30% and 70% of full lighting power in addition to Off. This can be done by continuous, or stepped, dimming, or stepped/dual switching of luminaires or lamps while maintaining a reasonably uniform level of illuminance throughout the area.

Stairwell controls

Lighting in enclosed stairwells shall have one or more control devices to automatically reduce lighting power by at least 50% within 30 minutes of all occupants leaving.

The examples above represent a portion of the new ASHRAE 90.1 regulations related to lighting control. Other items include automatic receptacle shutoff (to control task lighting and other plug loads), parking garage lighting control (automatically reduced lighting power when daylight is present and/or during periods of vacancy), and functional testing requirements (to ensure that the lighting controls operate as intended).

Lastly, there are now extra lighting power credits for using additional lighting controls in a space above and beyond the mandatory controls for that space. The additional lighting power credit can be used anywhere in the building, not just in the space with the additional controls.

Stringent energy requirements

All in all, lighting control are vital components for helping us meet the increasingly stringent energy code requirements; requirements that help us meet our energy conservation goals in an energy-starved world. For more information on building energy codes and standards, visit www.energycodes.gov. **EB**

A marketing manager with Lutron, Michael Jouaneh's primary focus is energy conservation and sustainability. He is active in the development of energy and green building codes/standards, and has authored several articles, white papers and case studies on high-performance green buildings. He frequently presents at industry events, such as Lightfair and Greenbuild.

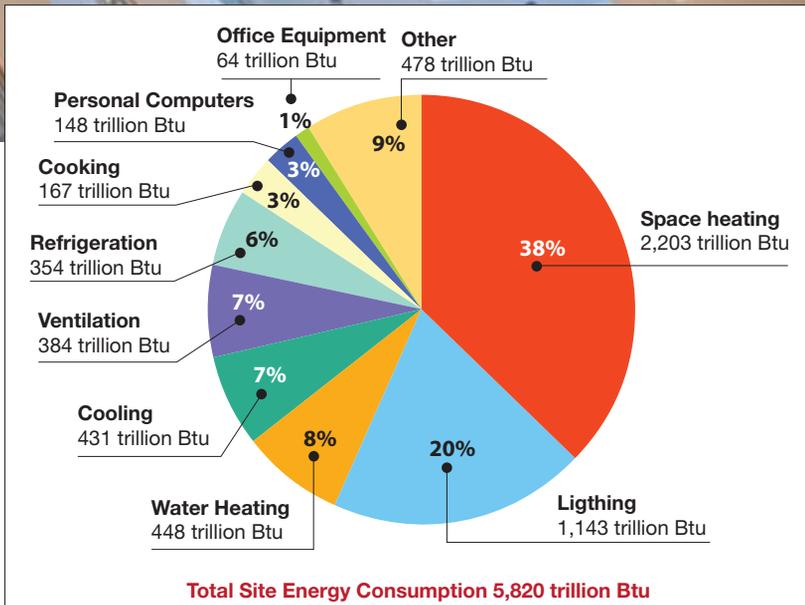


FIGURE 1
More site electricity is consumed for lighting than any other end use. (Source: U.S. Dept. of Energy, Energy Information Administration, 2003 Commercial Building Energy Consumption Survey [CBECS], released April 2009.)



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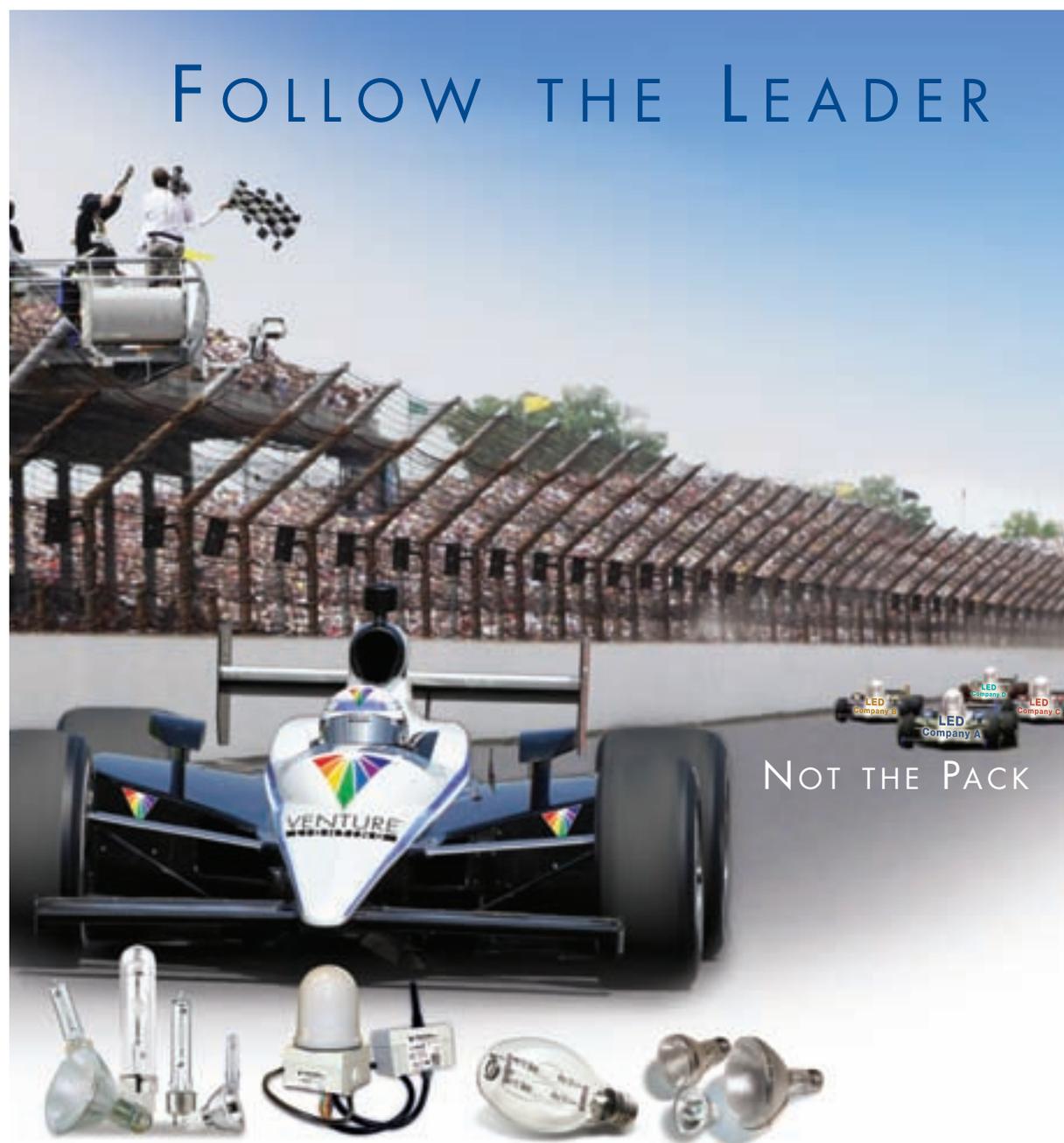


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Installing a high-performance structured cabling system

Josh Taylor

When optimizing data centre infrastructure performance, it is important not to overlook network cabling. As hardware speeds increase, optical loss budgets decrease, so installing high-performance cabling with low dB loss is more critical than ever. By maintaining low loss budgets, your cabling infrastructure will be compatible with future generations of hardware. You will also save time, money and frustration by not having

to replace your existing cabling infrastructure on future hardware upgrades.

Installing a high-performance structured cabling system yields a high return on investment. You will:

1. Maximize your networking hardware investment.
2. Implement fewer cabling infrastructure upgrades in the future.
3. Spend less time on maintenance.

(A sidenote to this point: be wary of “proprietary” high-performance systems as any possibility of futureproofing your data centre could be negated with proprietary connectors or polarity methods. Stick to the standards!)

Installing a high-performance structured cabling system

Hardware installations are rarely pain-free. A common reason why things often go awry? A lack of planning or consideration for how

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cable infrastructure is affected. Data centre cabling is an integral part of any hardware rollout plan. Unfortunately, it is often the last thing on the checklist for hardware rollouts.

We encourage our customers to follow best practices when it comes to cable management, including creating a structured and scalable environment as specified in the TIA-942 design standard "Telecommunications Infrastructure Standard for Data Centres", published by the Telecommunications Industry Association).

Data centre hardware installation checklist

I always encourage our customers to take cabling infrastructure into account before installing new hardware. When you fail to do so, your team is vulnerable to spending countless hours troubleshooting links and channels, only to find out that it is a cabling issue that could have been prevented; for example, incorrect fiber polarity.

You can avoid this kind of nightmare by becoming familiar with your current system. Most organizations don't have the luxury of shutting down the network, so understanding the infrastructure that's already in place and mapping out the end-vision of your data centre is critical for successful implementation.

As opportunities for modifications to your data centre present themselves (for example, a hardware upgrade), take advantage of the occasion to correct existing problems; not only will this ensure a smooth upgrade, but you'll be better off in the long run, as well.

Pre-project checklist when adding hardware to your data centre

1. Have an overhead diagram of your data centre that includes cabling pathways.
 - a. Include media type and other specifications (i.e. multimode OM3 fiber).
2. Include hardware naming schemes and port counts.
3. If you are currently not utilizing a structured cabling method (TIA-942), create a plan for it.
4. Work up a plan to identify areas that will grow, and create a plan for that growth.

Project checklist when adding hardware to your data centre

1. Identify where hardware will be mounted and add to overhead diagram.

2. Ensure you have proper cabling to support install, including:
 - a. Trunking to MDA (main distribution area)
 - b. Open ports at MDA
 - c. Appropriate patch cabling for both MDA and equipment rack
3. If you do not have appropriate structured cabling:
 - a. Identify trunking needed:
 - i. Type of fiber, number of ports needed and connector types
 - ii. Identify the same for the MDA
 - iii. Identify number of patch cords

This checklist appears somewhat obvious at face value. However, it will allow for easy, pain-free hardware installation. An overhead data centre diagram should be maintained and consistently updated; it can be an incredibly useful tool for data centre managers and technicians alike.

Data centre teams are encouraged to meet prior to hardware upgrades and work through this checklist. Many times there are 'silo' groups (for example, SAN, networking and telecom) that have different needs. It is important for a team to be in lockstep with the cabling plan, as layer one (the PHY or 'physical' layer) is the base of the communications pyramid.

The importance of TIA-942

We are big proponents of using the

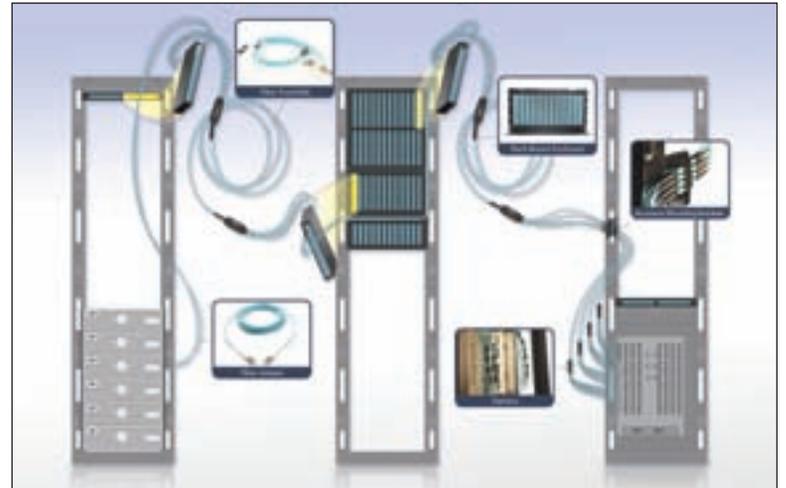


FIGURE 1

Example of a typical structured cabling system following TIA 942 standards.

telecommunications infrastructure standard for data centres, or TIA-942. It essentially creates a 'switchboard' for your cabling system. TIA-942 is a better alternative to running a patch cable from port A to port B (known as 'point-to-point' cabling).

TIA-942 dictates that you use patch cords from the equipment to a patch panel (typically at the top of the rack) and trunking products (cables that aggregate multiple lines and are typically condensed in size) to run to a main distribution area. This is the 'switchboard'.

At the MDA, all of your active ports will be represented (or emulated). This allows you to

make all of your MACs (moves, adds and changes) in one area with short jumper cables. Following these guidelines will allow you to grow easily and reduce the installation time of new hardware. Because accidents are much less likely to occur with this model, you will also maximize uptime.

Following this standard ensures optimum performance. To do this, however, requires time set aside for diligent planning and installation. **EB**

Josh Taylor is a senior product manager for CABLExpress. He can be reached at jtaylor@cxtec.com or (800) 913-9465.

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EB lighting products

Standard Products Omni directional lamps



Standard Products claims its Omni directional lamps mimic the even light distribution and glow of an A19 incandescent lamp while minimizing energy and maintenance costs and creating a comfortable atmosphere, lasting 50 times longer than incandescent light sources. The lamps offer dimming to 5% and universal burn position. **STANDARD PRODUCTS**
www.standardpro.com

Halco Lighting releases 16W ProLED PAR38 lamps



Halco Lighting Technologies has introduced its 16W ProLED PAR38 lamps which claim to offer high power LED with superior optics and thermal construction for long life and energy efficient illumination. According to the company, the lamps are 82%

more efficient than 90W Halogen PAR38s over the life of the ProLED lamp, and produce up to 1020 lumens. The bulbs are UL rated for damp locations. **HALCO LIGHTING TECHNOLOGIES**
www.halcolighting.com

Lumenpulse releases Lumenfacade Horizontal



Lumenpulse has launched its Lumenfacade Horizontal, a linear, high-performance, LED projector with a 2-inch profile. Developed for exterior floodlighting and wall grazing of tall structures, each luminaire can be mounted end-to-end to form a continuous line of up to 152 feet using a single power feed (regular output version). The fixture is available in 1', 2', 3', or 4' sections and is ready for power inputs from 120 to 277 V. **LUMENPULSE**
www.lumenpulse.com

Tempo Industries introduces Series 7000 LED luminaires

Tempo Industries' new Series 7000 linear LED luminaires claim to provide white low-glare, direct-downward, ultra long-life illumination at low watts. Series 7000 is offered in standard four- and eight-foot



lengths with energy efficient, thermally optimized Zamak housings pioneered by Tempo, while lengths can be joined mechanically and electrically into continuous rows, adds the company. The series is listed for damp locations. **TEMPO INDUSTRIES**
www.tempoindustries.com

HessAmerica Livorno luminaire selected for 2011 IESNA annual Progress Report



Livorno, HessAmerica's new, architectural LED pole-mounted luminaire, has been selected for inclusion into the Illuminating Engineering Society of North America (IESNA) 2011 annual Progress Report. The Livorno LED pole-mounted luminaires are available in two sizes— with pole heights scaled proportionately, the cast aluminum luminaire accommodates two Levo LED modules in its smaller model; and up to six modules in a larger size, for applications where higher mounting heights are recommended. **HESSAMERICA**
www.hessamerica.com

Phoenix Products ModCom LED floodlight

Phoenix Products Company has launched the ModCom series, an instant-on, surface-mounted LED fixture designed to replace high wattage HID floodlights. The LED luminaire delivers up to 25,000 lumens and offers a 70% energy savings when compared to a 1000W HPS fixture, it adds. The series is IP 67 rated and ETL/cETL certified to UL 1598, 1598A Marine Outside Type (Saltwater) and CSA C22.2 No. 250.0.

PHOENIX PRODUCTS COMPANY
www.phoenixproducts.com

Robertson Dark Knight auto shut-off lighting technology

Robertson Worldwide has unveiled its Dark Knight integrated auto shut-off technology which provides energy savings through an integrated shut-down timer built into the ballast circuit, it claims. By offering an automated shut-down feature, the ballast ensures that luminaires equipped with the technology are turned off at the end of the workday, helping to eliminate unnecessary electricity use and creating substantial cost savings, it explains. The technology is designed with a time-delay circuit that interrupts the power to the lamp(s) after a predetermined passage of time from power-up of the AC power.

ROBERTSON WORLDWIDE
www.robertsonww.com

EB products

Arlington's Strut Clip holds hangers, conduit on strut



Arlington has announced its new UV-rated, non-metallic Strut Clip which holds pipe hangers and conduit on interior or exterior strut. Strut Clip works with most pipe hangers, including Arlington's QuickLatch hangers, and fits conduit in multiple sizes. The clip is threaded for a 1/4"-20 screw (installed). **ARLINGTON INDUSTRIES**
www.aifittings.com

Five new IEEE standards for the smart grid



IEEE has introduced five new standards, as well as a modified standards-development project, to aid with the worldwide rollout of the smart grid. The newly-published standards include:

- IEEE C37.118.1-2011 – Standard for Synchrophasor Measurements for Power Systems
- IEEE C37.118.2-2011 – Standard for Synchrophasor Data Transfer for Power Systems
- IEEE C37.238-2011 – Standard Profile for Use of IEEE Std. 1588 Precision Time Protocol in Power System Applications
- IEEE C37.232-2011 – Standard

for Common Format for Naming Time Sequence Data Files (COMNAME)

• IEEE 1020-2011 – Guide for Control of Small (100 kVA to 5 MVA) Hydroelectric Power Plants

Additionally, IEEE Standards Association (IEEE-SA) has modified the scope and purpose of an existing standards-development project related to the smart grid: IEEE P1409 – Draft Guide for the Application of Power Electronics for Power Quality Improvement on Distribution Systems Rated 1 kV Through 38 kV. **IEEE**
www.ieee.org

Hilti Super Premium and Universal Premium Diamond blades

Hilti claims its new Super Premium (SP) and Universal



Premium (UP) Diamond blades last longer, cut faster and are suitable for all kinds of cutting applications in various base materials. According to Hilti, the SP blades feature Equidist technology— where all diamonds in each segment are spaced at regular intervals— which help ensure consistent high cutting performance, while the UP blades are top value standard blades of base materials such as concrete, masonry and asphalt.

HILTI
www.ca.hilti.com

Fluke 805 vibration meter



EBMag was there at the Fluke Press Summit 2012 in April when Fluke unveiled its new 805 vibration meter, a portable multi-function vibration screening tool that promises quantifiable information on the bearing and overall health of motors and other rotating equipment. The 805 is suitable for frontline mechanical troubleshooting teams that need “reliable and repeatable measurements” of rotating equipment to make imperative go/no-go maintenance decisions. The 805 measures overall vibration from 10 Hz to 1000 Hz and provides a four-level severity assessment for overall vibration and bearing condition. It measures bearing condition (CF a.k.a. Crest Factor Plus); that is, detects peaks in the vibration signal readings of roller bearings from 4000 Hz to 20,000 Hz, and uses a proprietary algorithm to interpret severity, as well as performing other duties.

FLUKE
www.fluke.com

Wiremold Resource RFB4E Series of floor boxes



Legrand/Wiremold has introduced an advanced four-compartment recessed floor box for concrete floors, including bare concrete and terrazzo. The Resource RFB4E Series floor box accepts 6” round Evolution Series Poke-Thru covers that are available in three styles and five colours. According to the company, the RFB4E Series floor box provides ample capacity where a larger box is not required.

WIREMOLD
www.legrand.us/Wiremold.aspx

GE Energy offers FDIR/FLISR reliability system

GE has released the End-to-End Fault Detection, Isolation & Restoration (FDIR/FLISR) system, a distribution automation solution to help utilities improve the reliability of their distribution

network. According to the company, the solution is capable of detecting power system outage locations and automatically sectionalizing and reconfiguring distribution circuits to restore power to as many customers as possible, helping to reduce typical customer outage time from hours to under a minute. The solution can

also help improve a utility’s SAIDI and SAIFI reliability indices, it adds.
GE ENERGY
www.ge-energy.com

Schletter 2.5 kW FS kit for small ground mount PV projects
Schletter has introduced the 2.5 kW FS kit for residential small

ground mount PV projects. The FS kit is designed for up to 95 mph wind / 35 psf snow or 105 wind/30 snow and offers optional high-load add-on with choice of 130/10, 125/40, 120/50, or 105/55 wind/snow loads.
SCHLETTER
www.schletter.ca



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Appleton upgrades PowerPlex panelboard



After three years on the market, Appleton has upgraded its PowerPlex panelboard to include an integral bus bar system which customers can order to replace the standard hard-wired system. Rated at 100 Amp, Appleton claims the new bus bar system results in greater wiring space and doesn't require rewiring if the branch circuit ampacity increases. Suitable for use on lighting, heat trace and power circuits, the PowerPlex is engineered for Class I Zone 1 and Class I Division 2 environments like those found in petrochemical and chemical plants, waste treatment centres.

APPLETON
www.appletonelec.com

American Ladder Institute updates A14.7 standard

The American Ladder Institute (ALI) has released the updated A14.7 standard, which provides technical specifications for mobile ladder stands and mobile ladder stand platforms. The standard prescribes rules for mobile ladders, also referred to as rolling ladders, which are primarily used in the workplace and are generally purchased to perform a specific task. This revision replaces A14.7 2006 and includes new and/or enhanced definitions, testing protocols and user requirements; revised drawings; and an expanded label/marketing section.

AMERICAN LADDER INSTITUTE (ALI)
www.americanladderinstitute.org

Azco Technologies AZWSFR600-BK fire retardant cable wrap

Azco Technologies has released the AZWSFR600-BK fire retardant cable wrap 1/2" x 600' spool that can be cut to bundle cables. The product is for general use and can also be used in plenum ceiling / air



handling space applications. According to the company, it allows installers to properly bundle cables cost effectively without code violations that can often be ignored in air handling spaces.

AZCO TECHNOLOGIES
www.azcotecnologies.com

Strattec improves Padlock 2.0



Strattec Security Corp., a automotive lock and key manufacturer, has introduced its upgraded Padlock 2.0 featuring Bolt Breakthrough One-Key Lock technology. Bolt's Padlock 2.0 features a new design with a spring-loaded, chrome-plated 5/16" diameter hardened steel shackle inside a crush-resistant body shell. It also includes an automotive-grade, stainless steel lock shutter to help keep out weather and debris, and a six-plate tumbler sidebar to help prevent against picking and bumping.

STRATTEC SECURITY CORP.
www.boltlock.com

NEMA WD 7 Occupancy Motion Sensors Standard

The National Electrical Manufacturers Association (NEMA) has published NEMA WD 7 Occupancy Motion Sensors Standard, which aims to promote uniformity for the definition and measurement of characteristics relevant to the use and application of occupancy motion sensors. The standard covers the definition and measurement of field of view and coverage characteristics relevant to the use and application of vacancy and occupancy sensors using individual or any combination of passive infrared, ultrasonic, or microwave technology. These sensors are used in systems for control of lighting, heating,

ventilating, and air conditioning (HVAC), and other devices.

NEMA
www.nema.org

AEMC releases micro-ohmmeter 6290

AEMC describes its new high-current micro-ohmmeter 6290 as a portable, microprocessor-controlled instrument, featuring optimized filters and protection for measurements in electrical substations. According to the company, model 6290 can be used to accurately measure very low contact resistances of high voltage circuit breakers, switches, busbars, etc., with test currents up to 200A. It employs the four-terminal Kelvin method to prevent errors caused by test leads and their contact resistances, it adds.

AEMC INSTRUMENTS
www.aemc.com

Snake Tray offers Snake Nut fastener



Snake Tray has introduced the Snake Nut fastener for threaded rod, saying it eliminates the time consuming method of running hex nuts up a threaded rod. According to the company, users simply insert the Snake Nut onto the threaded rod and tighten into place with set screw. Once locked into place, Snake Nut holds up to 9000 pounds. It is available in 3/8", 1/2" and 5/8" sizes.

SNAKE TRAY
www.snaketray.com



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Canadian Standards Association	30
CodeSafety Associates	37
Copper Wire Stripper	37
Eiko	37
Falvo	37
FLIR Canada	4
Fluke	10
GE Lighting	17
Hammond Power Solutions	12
Hubbell Wiring	24
Hubbell Lighting	33
IED	40
IPEX	21
Leviton	29
Maintrain	35
Mercedes-Benz	13
Mersen	9
Nexans	1
Northern Cables	7
Philips Lighting	19
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Poor power factor costs you money

Power factor is a term normally used when describing the efficiency of the electrical power distribution system. To understand power factor we need to understand the relationship between KW, KVA and KVAR.

Power factor is defined as the ratio of the true power measured in kilowatts to the apparent power measured in KVA. The reactive power is measured in KVAR and it is the power that produces the magnetizing flux in electrical equipment, such as transformers and motors.

When the true power is measured to be 1000 KW in a distribution system, and the apparent power is 1250 KVA, then the power factor would be 0.8 or 80%. Electrical loads with a low power factor will draw more current than the load with a higher power factor for the same amount of useful power transferred, and require larger wires and systems.

Many industrial facilities have inductive loads such as induction motors, transformers, HID luminaire ballasts, welders, induction furnaces, etc., where it is important to install power factor correction capacitors to make the system more efficient.

Electrical distribution companies usually charge higher costs to customers for electricity when the power factor of the distribution system is below 0.9. By raising the power

factor above 0.9, the system uses less KVAR. This results in reducing the peak KW billing demand and saving you money.

Power factor correction capacitors can be installed centrally as a single large unit located at the electrical substation, or as individual units that are part of the equipment.

Canadian Electrical Code (CEC) Rules 26-208 and 26-210 specify the conductor size and overcurrent protection for field-installed capacitor banks. The minimum ampacity of capacitor feeder circuits and branch circuits must be at least 135% of the rated current of the capacitor, but the overcurrent protection must not exceed 250% of the rated current of the capacitor.

Rules 26-212 and 26-214 specify the location and rating of the disconnecting means for a capacitor feeder or branch circuit. The disconnect location requirement is similar to that for motors, where the disconnecting means must be located within sight of—and not more than 9 m from—the capacitor (unless the disconnecting means can be locked in the Open position).

A warning notice on the disconnect switch is also required stating that the circuit has capacitors, and that a waiting period of 5 minutes is necessary when the circuit is opened, after which the capacitor must be discharged before handling. The disconnect switch for a capacitor

feeder or branch circuit must be rated not less than 135% of the rated current of the capacitor.

Rule 26-216 specifies the requirements for a capacitor connected by means of contactors. Open-type contactors used for capacitor switching must have a current rating not less than 135%, but the enclosed-type contactor rating must be at least 150% of the rated capacitor current.

The payback on the improved power factor investment is usually very good. With better power factor you get lower power cost, increased system capacity, reduced system losses and cooler-running, more-efficient motors. Your local distribution company can help with determining your power factor. Capacitor suppliers and engineering firms can provide the assistance you may need to determine the optimum power correction factor and to correctly locate and install capacitors in your electrical distribution system. **EB**

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

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Tackle The Code Conundrum... if you dare!

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

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

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

Question 1

Overload protection shall not be required for a manually started motor rated at ____ hp or less that is continuously attended while in operation, and that is on a branch circuit having overcurrent protection rated or set at not more than 15 A, or on an individual branch circuit having overcurrent protection as required by Table 29 if it can be readily determined from the starting location that the motor is running.

- a) 1/2 hp c) 2 hp b) 1 hp d) 5 hp

Question 2

For areas where flammable finishes are regularly sprayed, all space within 6 m horizontally in any direction from dip tanks and their drain boards, with the space extending to a height of 1 m above the dip tank and drain board, is considered:

- a) Class I, Zone 1 c) Class II, Division 1
b) Class I, Zone 2 d) Class II, Division 2

Question 3

For areas where paint finishes are regularly applied by spraying, the spraying equipment for a spray booth shall be interlocked with the spray booth ventilation system so that the spraying equipment is made inoperable when the ventilation system is not in operation.

- a) True a) False

Answers to Code Conundrum EBMag April 2012

Q-1: Where a fan is used to ventilate commercial cooking equipment, the control for the fan motor shall be permitted to be located within sight of—and within 9 m of—the ventilation duct or hood.

b) False. Ref. Rule 26-754.

Q-2: Plug fuses and fuse holders shall not be used in circuits exceeding 125 V between conductors.

b) False. Ref. Rule 14-202.

Q-3: Conductors in the high voltage circuits of X-ray equipment shall be of the ____ type.

c) Shockproof. Ref. Rule 52-004.



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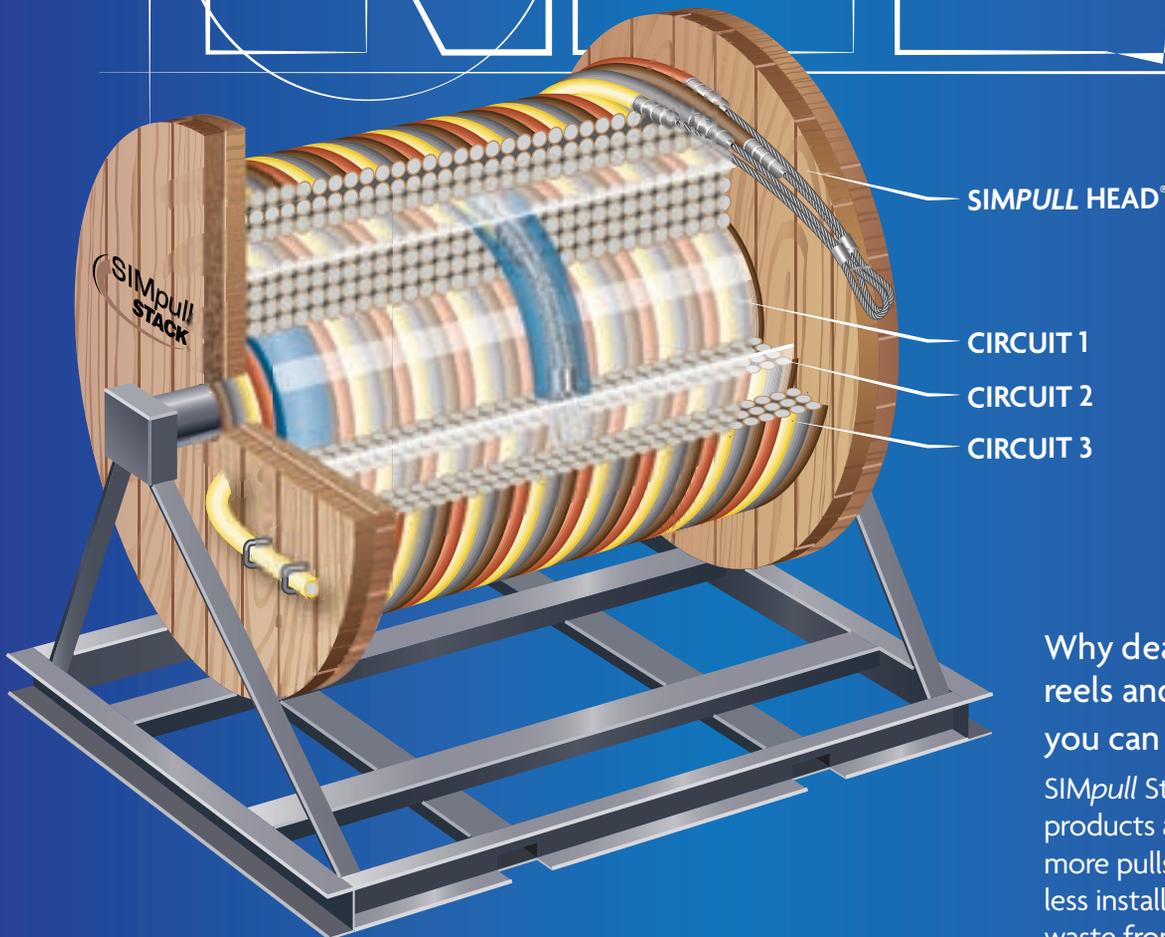


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