

AN ANNEX PUBLISHING & PRINTING INC. PUBLICATION • VOLUME 49 • ISSUE 7

Electrical Business

JULY 2013



Get up to code.
See how on [Page 5](#).

■ Also in this issue...

- Pulsating lights because of... Martians?
- Summer 2013 work truck round-up
- Fire alarm systems



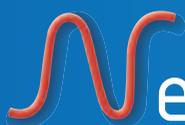
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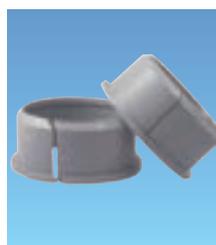
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the One Piece Expansion Joint provides fast trouble-free installation and will ensure the owner receives a secure and appealing installation that will last the life of the system.



Looking at the situation now [...] I cannot wait to see the new dynamic that will emerge.

The end (and beginning) of an era

In Charlevoix, in the La Balbaie region of Quebec, Canada's Independent Electrical Distributors Limited Partnership II (a.k.a. IED) held its final annual general meeting, though under the banner of AD Canada. (It was the sale of EECOL to Wesco International last year that led to the merger of IED with AD to create the entity called AD Canada.)

This was also the last time the coveted Tom Torokvei Award would be bestowed on someone for their contributions to independent electrical distributors; specifically IED. This year, the final recipient was Kevin Mallory, vice-president and general manager of Hubbell Canada LP.

For me, the occasion was bittersweet; I attended my first IED AGM in St. Andrews-by-the-Sea, N.B., several years ago, and these distributors have become very dear to me. Some have become great friends, so it made me sad knowing this was the last IED annual meeting.

Just a few years ago, though, I attended my first North American meeting of U.S.-based Affiliated Distributors' Electrical Supply Division. I didn't know what to expect and, to my pleasant surprise, I met another group of Canadian distributors who also endeared themselves to me.

While some things have definitely changed through the merger, others have been maintained, such as the popular AD Rewards program (formerly IED Rewards... see our back page), and some key personnel,



such as Jim Milne, IED's general manager, and Chris Scott, vice-president of AD Canada.

Looking at the situation now—with both IED members and Canadian AD members together—I cannot wait to see the new dynamic that will emerge, starting with AD's Electrical Supply Division North American meeting in October. After all, up until a short time ago, AD and IED members were competitors; will their collective know-how take them to the next level as they compete against the Wescos, Rexels and Sonopars of the world?

Or, for that matter, how will all electrical distributors fare against emerging threats like online retail giant Amazon's new offering, AmazonSupply? Only time will tell, but I wish the new AD Canada and its merged affiliates the very best, and I look forward to seeing them succeed in their endeavours. **EB**

Anthony Caplan



On the cover and page 17

Defining lighting quality based on user satisfaction

Are you considering lighting quality when trying to build effective lighting design? Often times, lighting quality should take priority over energy savings and the economies of cost.

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Our resident electrical detective recalls a peculiar investigation—he was called in when all the lights in a very elaborate, multi-million dollar lighting consultant's showroom were rapidly pulsating On/Off non-stop. What did he find?



12 Benefit from diversity: add Fire Alarm Technician to your repertoire

New tools, intellectual and physical, are needed in an expanding work environment. A promising area for those among us who have limited ourselves to light and power wiring is fire alarm systems.



18 Your Summer 2013 work truck round-up

For the users of commercial vans, this is the year that your model landscape changes forever. Learn more about this huge market shift and the best product for you.



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WARNING: Counterfeit UL Mark on CFL

UL (www.ul.com) is notifying consumers and retailers that the compact fluorescent lamp (CFL) identified below bears a counterfeit UL Mark for Canada and the United States. It has not been evaluated by UL to the appropriate standards for safety. There is no model number on the product. The UL Mark is missing the following required markings:

- The word "LISTED"
- UL Control Number (four alpha-numeric characters)
- The product identifier: "Self-ballasted Lamp" or "Lamp Adapter"

As with any suspect product, stop using it immediately.

Official launch of Canadian Electric Vehicle Infrastructure Training Program

The Electric Vehicle Infrastructure Training Program (EVITP, www.evitp.org) and the National Electrical Trade Council (NETCO, www.ceca.org/netco)—the joint training arm of the Canadian Electrical Contractors Association (CECA) and IBEW, 1st District, Canada—officially announced the launch of a Canadian EVITP training and certification program for qualified Construction Electricians (NOC 7241).

EVITP—a non-profit collaboration of industry partners in the States providing training and certification for electricians installing electric vehicle supply equipment (EVSE)—was established to provide the EV transportation sector of the electrical industry (and all stakeholders) with a structured platform to facilitate training and certification for the installation of EVSE across residential, commercial/public and fleet markets.

The adaptation of the EVITP training and certification program for Canada was sponsored by NETCO on behalf of the electrical industry in Canada. This involved R&D with subject-matter experts across Canada and the U.S., collaborating to:

- Adapt the American curriculum and certification exam to the Canadian context.
- Recognize EVITP as an independent, third-party certifying body.
- Establish Canadian EVITP certification exam administration protocols.
- Sponsor two regional EVITP Instructor Training, Phase 1, pilots in British Columbia (June 10-13, 2013) and Ontario (July 22-25, 2013).
- Promote the establishment of EVITP National Training Centres in Canada.
- Implement a communications strategy promoting the availability of EVITP training and certification for Canada.

"The Canadian Electrical Contractors Association actively supports the development of the EV market in Canada and encourages electrical industry stakeholders to embrace emerging electrical technologies early," said CECA president and NETCO director Colin Campbell. "The EVITP training and certification program for Canada was developed with reference to the Canadian Electrical Code and the Interprovincial Standards Red Seal Program. It is an important milestone in addressing related workforce development."

EVITP instructor training will eventually be available to all stakeholders such as community colleges through National Training Centres that will be accredited by the certifying body. With assistance from NETCO, EVITP plans on implementing this model in Canada following the pilot training sessions.

To be eligible for EVITP instructor training, candidates must:

1. Hold a Construction Electrician (NOC 7241) Certificate of Qualification.
2. Have a minimum of two years of full-time or four years of part-time documented experience in delivering electrical trade-related training (e.g. supplemental apprenticeship training, journeyperson training, safety training) or electrical apprenticeship or pre-apprenticeship training. Candidates who do not meet the minimum requirement shall be mentored by a qualified EVITP trainer who will provide onsite coaching and support for the duration of the first training session delivered by the candidate instructor. The EVITP instructor credential shall be issued only upon recommendation of the mentor.
3. Demonstrate that their sponsoring organization is committed to addressing the demand for EVITP training and certification in his jurisdiction in a timely manner.

CCDA launches new Red Seal brand for the future

"At long last, on behalf of the CCDA, I am very pleased and excited to announce that the new Red Seal brand was officially launched last night right before the opening ceremonies of the Skills Canada National Competition in Vancouver, B.C.," said Dan Mills, chair of the Canadian Council of Directors of Apprenticeship (CCDA, www.red-seal.ca, a.k.a. Red Seal).

In 2011, Mills said CCDA officially launched the CCDA Strategic Communications Initiative to tackle the goal of developing a Communications Strategy for the Red Seal Program that would take the program into the future. A large portion of that project has been devoted to refreshing the Red Seal brand, added Mills.

"As part of the rebranding exercise, a new marketing and promotional logo has been developed for the program, and the program's communication tools have been completely made-over to reflect the program's new look," Mills stated. "Please do not hesitate to contact me should you have any comments or questions on this exciting announcement."



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Chelmsford contractor convicted and fined for non-legit electrical work

On May 29, 2013, an unlicensed contractor was convicted in a Sudbury, Ont., court of charges related to performing electrical work illegally and failing to apply for an inspection.

George St. Louis, a sub-contractor working in Chelmsford, was found guilty on one count of performing electrical work without an electrical contractor's licence and one count of failing to apply for an inspection. St. Louis was sub-contracted by a siding company to replace siding and windows. In the course of the installation, he moved some light fixtures and an electrical outlet.

The total fine was \$4000 for the violations, plus a \$1000 victim impact surcharge. Under Ontario Regulation 570/05, Licensing of Electrical Contractors and Master Electricians, only licensed electrical contractors are permitted to contract to perform electrical work in Ontario.

"Unfortunately, there are individuals that are prepared to do electrical work when they don't hold the appropriate licence, and they don't follow the rules and regulations," said Doug Crawford, the Electrical Safety Authority's (ESA's, www.esasafe.com) chief public safety officer.

ESA reminds consumers of the requirement to ensure that anyone you hire to perform electrical work has a valid ECRA/ESA electrical contractor licence.

Apprenticeship success starts with effective journeyman mentors

The skill and ability of the next generation of skilled trades professionals rely in large part on the mentors who teach them, says the Canadian Apprenticeship Forum (CAF, www.caf-fca.org), adding that apprentices in the skilled trades need strong workplace supports to become certified, making journeyman mentors crucial to apprenticeship success.

CAF says it provides fresh insights into the important role of mentors to apprenticeship completion across Canada in its newest report, "Effective Journeyman Apprentice Mentoring On-the-job: Tips, Strategies, and Resources".

Based on a series of interviews with employers, journeymen, apprentices and trainers, the report shares promising practices and makes recommendations to help employers maximize the apprentice-mentor relationship. Among other things,

the report suggests supports for journeyman mentors to enhance on-the-job training and ensure appropriate skills are transferred to the next-generation workforce.

"Apprentices tell us that their journeyman mentors are a critical element in their success," said Sarah Watts-Rynard, executive director

of CAF-FCA. "When employers make the decision to train an apprentice, it makes sense to support success in every possible way. That means choosing the right mentor and providing tools to support that relationship."

Interviews conducted in the course of this research point to

the business benefits of effective mentoring, says CAF, including enhanced productivity and reduced turnover. The report suggests that sharing mentoring approaches and developing a training plan for the journeyman and apprentice to follow are among the strategies employers can implement.

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Bill C-377 being used to bully union members says Canadian Labour Congress

The Conservative government and its anti-union allies cannot find a single constitutional expert who will agree that Bill C-377 is constitutional, says Ken Georgetti, president of the Canadian Labour Congress (CLC, www.canadianlabour.ca). Bill C-377 would force every labour organization in Canada to file detailed financial information to be posted publicly on a Canada Revenue Agency (CRA) website.

“This bill singles out unions and their members for discriminatory treatment, and it interferes with their right to freedom of association,” said Georgetti.

According to the congress, the Canadian Bar Association told the House of Commons Finance Committee in 2012 that Bill C-377 should be withdrawn because it would invade the personal privacy of individual Canadians.

In Senate hearings over the last two weeks, CLC says professor Bruce Ryder of the Osgoode Hall Law

School faculty called the proposed legislation a “Trojan Horse” that will use the Income Tax Act to single out and regulate unions.

“This bill is being used by the Conservatives to bully union members and to force us to provide detailed information that employer groups will then be able to use against us,” said Georgetti.

OPA wants unsuccessful Small FIT applicants to reapply

Ontario Power Authority (OPA, www.powerauthority.on.ca) published a letter addressed to all Small FIT applicants, thanking them for their interest in the feed-in tariff (FIT) program (fit.powerauthority.on.ca), and acknowledging it has received feedback from applicants asking for more information as to why their applications failed, and for the opportunity to correct errors.

“We appreciate these concerns and are taking steps to address them,” says OPA, adding that all unsuccessful applicants will have an opportunity to reapply during the next Small FIT application period to open in Fall 2013. OPA says it will hold Small FIT webinars in June to review program requirements, discuss the most common issues encountered during the application review, and discuss how to work together to improve the process.

OPA then provides a summary of some of the most common issues:

- Missing supporting materials submission.
- Wrong fees and securities provided.
- Wrong or inconsistent legal names.
- Missing originals.
- FIT reference numbers were not included on documents.
- Missing required forms.
- Incomplete forms.
- Inconsistent and inaccurate forms.
- Unacceptable locations.
- Lease, Option and Site Access Rights were not in the name of the applicant.
- Lease, Option and Site Access Rights conditions were in favour of the landlord.

To ensure all applicants received objective and equal treatment, OPA says it hired an independent evaluation monitor, through a competitive tender. The evaluation monitor reviewed a selected sampling of different types of applications to ensure the criteria for review was being applied objectively and consistently to all applicants.

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PowerStream and Ford support EV charging research at Georgian College



Georgian College (www.georgiancollege.ca) students and faculty will initiate research on power use, quality, consumption and costing for electric vehicles (EVs) thanks to a “first-of-its-kind” charging station supported by

PowerStream (www.powerstream.ca) and Ford Motor Company of Canada (www.ford.ca).

“Our goal is to contribute to research and analysis of the utilization of electric vehicles on the power grid but, most importantly, to prepare our students for work in the electrical and sustainable technology sectors,” said MaryLynn West-Moynes, president and CEO, Georgian College.

“The results and data the college will gather from this project will assist us in preparing our grid to handle the charging requirements of electric vehicles as their use becomes more common in the marketplace,” said Brian Bentz, PowerStream president and CEO.

PowerStream has invested \$250,000 in this station that Electrical and other Engineering students will use to analyze the impact and

opportunities that EVs create for electric utilities and society at large. The students’ research will also include recommendations on how best to manage vehicle charging patterns to optimize electricity use patterns and the electricity distribution system.

Ford of Canada has donated leases for a C-MAX Energi and a Focus Electric to be driven to collect the data for analysis, as well as two charging units.

Through this station, Georgian’s Electrical and Environmental programs, as well as the Automotive Business School of Canada, are collaborating to advance sustainable technologies. Students will have hands-on learning opportunities “to become leaders in the integration of electric vehicles, renewable energy and smart grid technology”.

CNSC finds no evidence of childhood leukemia clusters near nuclear plants

The Canadian Nuclear Safety Commission (CNSC, www.cnsccsn.gc.ca/eng) says it has completed a “ground-breaking” study on populations living near Ontario’s three nuclear power plants (NPPs), which finds “no evidence of childhood leukemia clusters” in the communities within 25 km of Pickering, Darlington and Bruce.

“This is an important study,” said CNSC president Dr. Michael Binder. “We often hear concerns from the public about a possible link between childhood leukemia and radiation from nuclear power plants. We now have Canadian data to reassure them with science-based and conclusive evidence that children living nearby are as healthy as children living elsewhere in Ontario.”

The “Radiation and Incidence of Cancer around Ontario Nuclear Power Plants from 1990 to 2008” study (RADICON) estimated radiation doses to members of the public living within 25 km of the three plants, and compared cancer cases among these people with the general population of Ontario. The study was conducted using data from the Canadian and Ontario Cancer Registries, and the Census of Canada.

Overall, the study finds that all cancers are “well within the natural variation of the disease”, and there is no consistent pattern across the three facilities studied. When looking at all age groups, some cancers were higher than expected and some cancers were lower than expected. The most likely causes of cancer in the communities are a number of known health risk factors.

“Sixty per cent of all cancers in Ontario are due to smoking, obesity,



PHOTO OF DARLINGTON NUCLEAR COURTESY OPG.

poor diet and physical inactivity,” said Rachel Lane, epidemiologist and lead researcher on the RADICON study. “Other studies have found that these health risk factors explain the pattern of cancers in Ontario communities. These health risk factors are the most plausible cause of cancer—not radiation.”

CNSC insists public radiation doses from Ontario nuclear plants are low: 100x to 1000x below natural background radiation (average background radiation is 1.8 millisieverts per year in Canada). The commission adds it will soon submit this study for publication in a peer-reviewed scientific journal. **EB**

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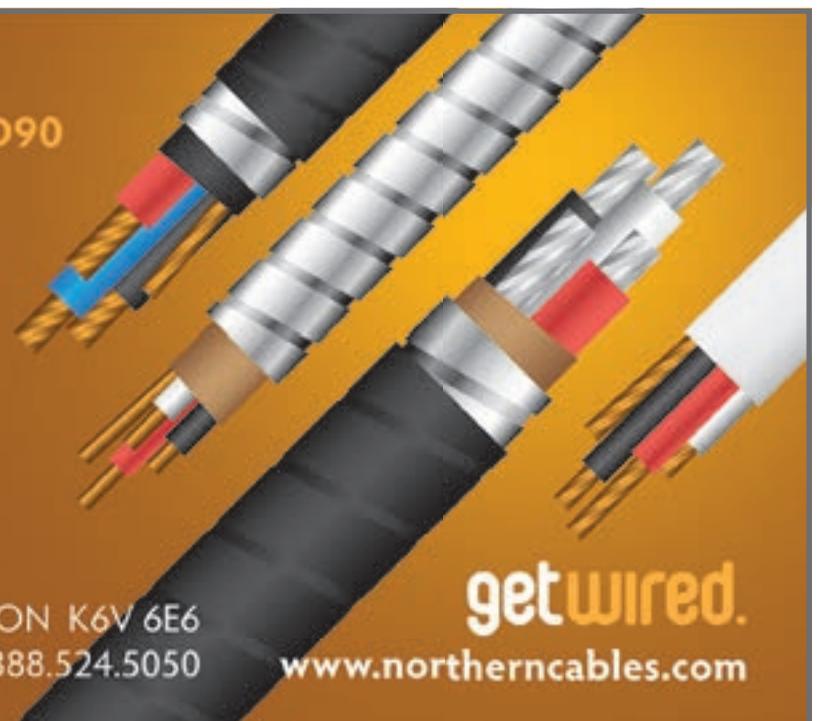
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Rick Blasl, national sales manager for **Lighting for Hubbell Canada LP** (www.hubbellonline.com) announced the appointment of **Drazen Jerkovic** as the Western Region sales manager. Drazen most recently served as regional sales manager for Western Canada



Drazen Jerkovic

and NW U.S. for Douglas Lighting Controls Ltd., and he possesses 12 years of experience in the lighting and controls industry. “We are excited

about our opportunities in Western Canada, and are confident that the knowledge and experience that Drazen brings with him will be key in both Hubbell and our Western Canada agents achieving our full potential,” said Blasl.

Greenlee Communications (www.greenlee.com), a Textron company, has announced a leadership team with **Jason Butchko** as vice president and general manager, and **Roger Clitheroe** as global sales director. “We look forward to having Jason and Roger leading our Greenlee Communications global sales efforts,” said Scott Hall, president, Textron Industrial Segment and Greenlee. “I am confident they will be up to the challenge of leveraging Greenlee’s position as a



Jason Butchko



Roger Clitheroe

global leader in the communications marketplace.” Butchko holds over 10 years of leadership experience in the test and measurement instrumentation field, most recently with Ideal Industries Networks. Clitheroe has been with Greenlee since 2001 and holds over 20 years of communications sales experience. In his new role, he will be responsible for worldwide sales of Greenlee Communications products, drive global accountability for new product introductions, and oversee new market developments and revenue growth across the product portfolio.



Ron Bergeron

Ron Bergeron of Bergeron Electric (www.bergeronelectric.com)—an electrical contractor based in Cornwall, Ont.—was recently presented with the Richard Cullis Leadership Award of Distinction for his contributions to the Ontario Electrical League (OEL), its members and the

electrical industry. He first joined the league in 1972; he served as president of the local chapter on several occasions, and is a member of OEL’s board of directors. Since 2000, Bergeron’s firm has participated in three pilot projects with the Electrical Safety Authority (ESA). Also, he was a member of the Industry Advisory Board and the Contractor Advisory Council for ESA. He served three years as chair of the council. He made safety presentations to ESA’s board, the chair of WSIB and several government ministers. Ron has published several articles in trade magazines. In 2011, he was one of 25 people selected worldwide to present a paper to safety experts at the week-long IEEE Electrical Safety Workshop in Toronto. Congratulations Ron!

EGS Electrical Group

(www.appleonelec.com) says it has strengthened its management team with several promotions across its brands. **Andy Schwegel** has been promoted to vice-president and general manager of SolaHD and Heating Cable Systems. He is responsible for bringing a “renewed focus” to these two business segments with the goal of accelerating sales growth and expanding the businesses globally. **Jim Anderson** has been promoted to vice-president

of ECM Engineering and Product Development. He has been with EGS for 14 years, holding positions with increasing responsibilities within the Engineering group since 2001. **Kerry Nedic** has been promoted to vice president of marketing. She continues to be in charge of Pricing and Technical Support, and picks up responsibility for marketing communications and eBusiness. **Dan Douglass** has been promoted to vice-president of business development. He is responsible for growth at EGS in both existing markets as well as programs in new geographies, industries and product segments. He will have responsibility for customer support and the newly created strategic sales team. **Diane Fleming** has been promoted to director of global customer support, having responsibility for EGS global customer support organizations in Canada, Rosemont, Manila and Mexico City. **Heather Green** has been promoted to director of strategic sales. In this new role, she will be responsible for project pursuit, project execution, customer development, and S&OP planning.

Ron McDonald, vice-president and general manager of **Liteco** (www.liteco.ca), recently made some management announcements involving **Brian Dobson**, **Peter Case**, **Donna McLaughlin** and **Mike Hutchings**. Effective immediately, Brian Dobson is the manager of divisional business development, where he will work with Liteco’s branch managers—in conjunction with supplier partners—to identify and develop new sales opportunities in Atlantic Canada. Peter Case will assume responsibility of branch manager in the Saint John, N.B., branch. For the last 10 years, Peter performed the warehouse, counter sales and, most recently, outside sales functions at this location. Donna McLaughlin has assumed the role of divisional operations manager, where she continues to be responsible for the coordination of Liteco’s quality, health & safety, marketing and training programs, but will also now work with the general manager and buyers in maximizing inventory efficiency. While continuing to oversee Litetec operations, Mike Hutchings assumed the responsibility of manager of industrial sales. Mike will work with Liteco’s existing industrial sales team and suppliers to increase the company’s footprint in the industrial space. **EB**

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On July 1st 2011, Bemag Transformer became part of the Pioneer Power Solutions family (OTC symbol "PPSI"). This group also owns Jefferson Electric and Pioneer Transformers. By combining these three companies, Pioneer is able to offer dry and liquid cooled distribution and power transformers for the North American electrical market.



The Bemag manufacturing plant in Farnham Quebec will undergo major changes. 15 000 square feet are being added to facilitate the manufacturing of medium and power units.



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- Isolation transformers
- Transformers for non-linear loads
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- Line reactors starting at 45 Hp

Pulsating lighting can only mean one thing:

Martians!



Or can it mean something else?

Patrick J. Lynch, P.Eng.

Our client called and frantically explained his lights were pulsating. All the lights in his very elaborate, multi-million dollar lighting consultant's showroom were rapidly pulsating On/Off. In his own words: "It looks like the Martians had landed on the roof and are injecting high energy pulses into the lighting system". It was creating chaos.

Where do we start?

The usual fact-finding questions were asked:

When did the problem start? Four weeks earlier. The result was continuous pulsating—24 hours, non-stop, 7 days a week. Prior to those four weeks, the lighting was operating problem-free for two years.

Where is the problem occurring? Only in the lighting consultant's display theatre. This light theatre houses over 400 different styles of 600V, 347V and 120V manufacturer lighting simulation displays.

How is this theatre operated? The in-house lighting consultant brings outside electrical lighting consultants into the theatre and remotely (via RF hand-held control box) turns On/Off and dims these lights. As a visitor walks through the theatre, the in-house consultant selects various lighting arrangements for display. The lighting consultant then remotely turns On/Off the selected lights. (Note: Manually operating the light circuit breaker produces exactly the same rapidly light pulsating results as the RF control.)

The cost implication of this problem is clear: the lighting theatre can no longer be used to allow the various electrical lighting consultants to select and specify these lighting products for their new building designs. Competitors' lighting products would then be specified, leading to loss of revenue.

Why does this problem exist?

We checked the roof and, of course, could find no evidence of Martians. The Why question, then, is the mystery we are about to unravel.

The investigation begins

The 8-storey building is the corporate head office for the lighting division of this large multi-national company, and its corporate showpiece is the light theatre. For the last four weeks, they have had every local contractor and consultant troubleshoot the problem, all to no avail.

After arriving onsite, and after climbing down from the Martian-free roof, we connected our diagnostic equipment to the main lighting feeders. We spotted the problem immediately (site time elapsed: less than 1 hour). The voltage waveform had significant distortion with multiple symmetrical deep waveform notching (Refer to Figures 1 and 2).

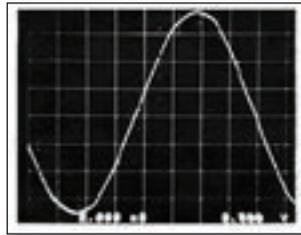


FIGURE 1
Voltage waveform
(Note symmetrical waveform notching and multiple zero crossings)
[Y Axis] Voltage
[X Axis] Time scale: 2 ms/division

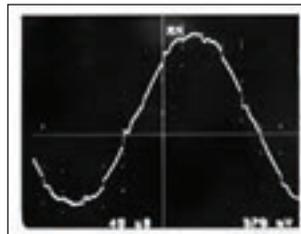


FIGURE 2
Voltage waveform
(Note symmetrical waveform notching and multiple zero crossings)
[Y Axis] Voltage
[X Axis] Time scale: 2 ms/division
(graticule scaling turned Off)

As a result, the problem was resolved for less than \$5000-worth of wire and labour using time-sensitive and cost-effective solutions. ...And there has been no more talk of Martians.

Due to this symmetrical voltage notching 'DNA signature fingerprint', we knew we were looking for a 12-pulse load connected somewhere to the main building utility power system.

We asked the facility managers whether any large (possibly rectifier-based) loads had recently been installed in the building. They immediately responded and told us that a large 300kW UPS (uninterruptible power supply) system had been installed in another wing of the building. We then asked the million-dollar question: When was it installed?

They said it had been shipped to this site and been installed about six months earlier, but had not been electrically energized until about 4-5 weeks ago. Coincidence, do you think?

We are now two hours into our site visit. We then relocated our diagnostic equipment closer to the 600V raw utility input side of the UPS system. We confirmed our suspicions;

the equipment revealed an increase of about 80% in these voltage distortion levels. The UPS was injecting this voltage distortion back into the utility power system. We are getting warmer to the problem.

We are now three hours into our site visit. We then had the client turn on his diesel generator and supply the UPS with generator power rather than utility power. The UPS voltage distortion was now contained within the generator system.

Instant success! The unseen Martians had left the building, and the lighting theatre was back up and working at 100% again. Site time elapsed: four hours.

Remedying the problem

Various very expensive voltage-filtering solutions were then examined. We're talking solutions in the \$40,000 to \$90,000 price range, with typical 12- to 15-week delivery times.

Instead, we found the light theatre electrical load factors were extremely small compared to this large UPS system; the UPS-supported loads were less than 20%. We directed the client to re-feed this light theatre with clean, distortion-free UPS power.

As a result, the problem was resolved for less than \$5000-worth of wire and labour using time-sensitive and cost-effective solutions. This site has been working problem-free for over seven years... and there has been no more talk of Martians. **EB**

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

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Benefit from diversity: add Fire Alarm Technician to your repertoire

David Herres

In our volatile economy, independent working electricians—as well as larger electrical contracting firms—are discovering benefits in diversity. A broader product spectrum translates to greater job stability and an enhanced revenue stream. New tools, intellectual and physical, are needed in an expanding work environment. Electricians, accustomed to dealing with complex mandates and challenging technical issues, are well-placed to step into new areas. To make this move possible, there are abundant print and internet resources.

A promising area for those among us who have limited ourselves to light and power wiring is fire alarm systems. A fire alarm system has vastly greater functionality and complexity than the familiar battery-powered residential smoke alarms, even when tied into the electrical system and wired as a group to sound the alarm in concert.

Alarm system characteristics

A fire alarm system is characterized by a central control panel with a user interface and alphanumeric display. It is connected to discrete zones, each composed of daisy-chained indicating devices, which include smoke

detectors and pull stations, among others. There are other zones made up of indicating appliances, such as horns, chimes and strobe lights. Additionally, there are lines to automatically closing fire doors, flammable gas shutoff valves, automatic telephone links to the local fire department and monitoring agency, stair pressurization, vent shutdown, elevator capture, sprinkler grid and other building systems.

The defining characteristic of a fire alarm system is its supervisory capability; all lines are supervised on a 24-hour basis. This does not mean that humans are paid to sit at a bank of monitors day and night. The supervisory function is electronic and automatic. It consists of a DC voltage emanating from the control pane, applied to each zone and system tie.

It is unthinkable that, in the event of a fire, the system would fail to sound the alarm. To prevent that unfortunate occurrence, the control panel causes the system to be mostly in one of three states: Normal, Alarm or Trouble. It is virtually impossible for the system to fail to enter the Alarm state in the event of fire without first entering the Trouble state, which alerts maintenance workers to take corrective action or, when they are unable, to call in a fire alarm technician.

When the system is Normal, when there is no evidence of combustion and the system is capable of responding when and if the need arises, the control panel indicates that status. When there is evidence of combustion, the control panel activates the indicating appliances, usually loud horns and, for the hearing impaired, strobe lights, or softer chimes in a hospital or nursing home where strident alarms could stress vulnerable occupants. Simultaneously, automatic telephone calls are placed to the fire department and/or monitoring agency.

When the system enters the Trouble state, a lower-level buzzer sounds, audible only in the vicinity of the control panel, which should be located in the maintenance office or behind the front desk of a hotel. To see how the trouble state is initiated, we have to look at the zone wiring. Each zone that is made up of indicating devices corresponds to a discrete area of the building; for example, 3rd Floor, East End.

Zone wiring is permitted by the CEC (Canadian Electrical Code) in Canada as well as the NEC in the States to be 16 AWG (smaller than the 14 AWG minimum for power and light conductors). Two wires, made up in red jacketed fire alarm cable, are

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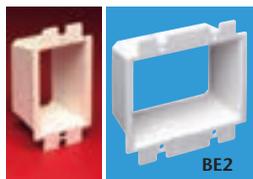
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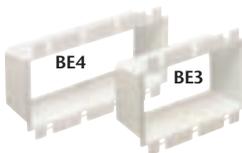
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MC/HCF/AC Steel & Aluminum	.405 to .605	14/2, 12/2	.485 to .610	14/3, 14/4	.370 to .490	14/2, 12/2	.405 to .610	14/3, 14/4, 12/2, 12/3, 12/4
MCI-A Steel & Aluminum	.440 to .550	with / without ground	.480 to .580	12/3, 12/4	.370 to .490	with / without ground	.405 to .610	12/3, 12/4, 10/2, 10/3
AC90, ACG90	.450 to .550	14/3, 12/3	.480 to .550	10/2, 10/3	.450 to .480	14/3	.480 to .550	10/2, 10/3
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conveyed typically within electrical metallic tubing (EMT) to successive smoke detecting heads and pull stations. These devices are wired in parallel like receptacles in a branch circuit. When there is no sign of combustion, the indicating devices do not conduct (are open) and, when there is sign of combustion or a pullbox is activated, they conduct.

The control panel applies 24 volts to the line at all times. One conductor is positive and the other is negative, and both are isolated from ground. Because of the low voltage, these lines qualify as power-limited

or Class 2. The DC voltage serves the dual purposes of providing bias for solid-state components, including LEDs within the smoke detectors, and performing the supervisory function. The control panel contains circuitry that monitors that state of each branch zone and system tie for line faults.

The nuances of panels and indicating devices

How, you might ask, is the control panel able to differentiate between an open line fault and the normal condition when all indicating devices are open or non-conducting? The answer is by means of an ingenious device known as the end-of-line resistor. After the last indicating device, a kilohm-range resistor is shunted across the line. In the U.S. it is connected to the two output terminals of the last device, while in Canada it is required to inhabit a separate enclosure. In Europe, an end-of-line capacitor is used, but the principle is the same.

The control panel watches the current in all supervisory lines and enters the Trouble state, emitting an audible alarm and creating an appropriate report in the alphanumeric display. Similarly, should one of the DC lines become faulted to ground, there will be a Trouble response. Should the lines become shorted to each other, the control panel would not be able to distinguish the condition from an activated indicating device, and there would be a false alarm. This is unlikely, though, because one line will usually fault to ground first and make a trouble alarm before the other line faults to ground.

When there is a Trouble alarm, especially of the ground-fault variety, it should be fixed immediately because, when they proliferate, they are extremely difficult to locate. For this reason, among others, maintenance on a fire alarm system should be relentless and aggressively proactive.

The conductors for the indicating appliance branch zones are heavier, usually 14 AWG, because they draw more current than the indicating devices when the multiple horns and strobes are activated. The setup is similar with regard to the end-of-line resistor, but this device usually has a different value, so they must not be interchanged.

The supervisory function works in other ways also. Each zone has a card or circuit board that is inserted into the corresponding slot inside the control panel. Sometimes a card will go bad, and the supervisory function detects this condition; the system enters the Trouble state and the alphanumeric display reports the condition. The cards are easy to replace, but measures should be taken to protect the semiconductors from damage due to static electricity. A grounding bracelet is excellent but, lacking that, you can periodically touch the grounded chassis and be sure to handle the card only at the edges. Spare cards should be kept on hand to avoid an extended outage.

The telephone link (a.k.a. city tie) consists of two dedicated telephone lines to



the local fire department and/or monitoring agency. Periodically, the control panel makes test calls and, when either line is defective, the system will enter the Trouble state and a report will be generated for the alphanumeric display.

The fire alarm system is tied to the sprinkler system. A water flow sensor will trigger the fire alarm so, in that sense, every sprinkler head is an initiating device. The supervisory function is applicable here, as well. When the sprinklers are configured as an air-over-water system, low air pressure—indicative of a slow piping leak—will trigger a Trouble alarm before the air pressure drops to the point where the clapper flies open, flooding the zone. Moreover, should the water supply fail, a Trouble alarm will ensue, with the appropriate report in the control panel's user interface.

An old fire alarm system that is still functional is known as a legacy system. These systems often continue to provide robust fire alarm capability, but they may become 'buggy': prone to frequent Trouble states and false alarms.

False alarms, while preferable to a situation where a system would fail to go into Alarm in the event of a fire, are highly objectionable because they are annoying in venues such as restaurants and hotels where customers are present, and they are also bothersome in office buildings and industrial facilities where the workflow is disrupted causing a loss of productivity. And worse, repeated false alarms lead to a complacent attitude where an alarm caused by a real fire could be disregarded.

Legacy systems identify the source of an alarm only by the affected branch, whereas a newer system with addressable heads will pinpoint the exact location. A legacy system can be upgraded by installing new heads and bases, pulling new cable into the existing raceway, and replacing the cards in the control panel, which is retained. Doing an upgrade of this sort will greatly decrease the frequency of trouble events and false alarms.



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Investigating alarms

In the event of an alarm, the procedure is for the nearest qualified worker—frequently an electrician—to ascertain from the control panel the location of the affected initiating device, then press the ACK (Acknowledge) button. This will enter into the system's history the time of the response, which could become important for diagnostic or legal purposes. The ACK button will not silence the alarm. There is a Silence Alarm button, but it should not be used at this time.

Next, or simultaneously, a worker should quickly go to the affected zone. When it is not an addressable head system, it will be necessary to travel along the branch zone until the affected head is found. Heads that are unaffected have the characteristic blinking LEDs that we have all seen in indoor public places. When the head has become activated, it can be identified by the fact that the LED is no longer blinking but Steady On.

When there is no fire, or the fire can be readily suppressed, that fact should be reported to a co-worker back at the control panel so the alarm can be silenced. To communicate efficiently between the zone location and the control panel, it is essential to have two-way radios or cell phones. When none of the heads have become activated, there is the possibility that one of the pull boxes has been activated, either in response to perceived emergency or by a malicious prankster.

Often, a head will be activated by dust, steam or water from a leak. Or it may have acquired dust inside so that there is no sign of anything out of the ordinary other than the fact the LED is not blinking. It is frequently possible to clean the head right on the spot. Remove it from the base and position it so the opening is down. Rap sharply on it several times. Then blow all around the opening, then rap some more. Re-insert the head into the base and have the worker at the control panel press the System Reset button.

The system will take a minute or so to reboot, just like your home computer. When the cleaning operation is successful (as it is most of the time), the alphanumeric display will report "System is Normal". When the Trouble or Alarm state persists, the best thing to do is to replace the head with a new one (it is essential to

have spare heads in the inventory).

To perform maintenance and repairs on a fire alarm system, it is preferable to have documentation. There are numerous fire alarm system manufacturers throughout the world. Most systems are quite similar, though they differ in a few details. Installation and operating manuals can be downloaded from the internet. After initial installation

and in the course of repairs, it is necessary to program the control panel. This is done by depressing various combinations of keys at the user interface. The manufacturers' manuals provide complete details so, if you have a mind for this sort of thing, it is not too difficult.

Of course, rules and regulations vary between jurisdictions, so you may require additional training

and even certification to work in and around fire alarm systems. **EB**

A regular contributor to Electrical Business, David Herres is a Master electrician and author of nearly 40 articles on electrical and telecom wiring. He recently authored "2011 National Electrical Code: Chapter-by-Chapter", published by McGraw-Hill and available at Amazon.com.



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Defining lighting quality based on user satisfaction

Craig DiLouie

Lighting quality is a critical consideration in effective lighting design, and often should take priority over energy savings and the economies of cost. But what is lighting quality?

It goes beyond energy and cost and light levels to include brightness, light distribution, colour, aesthetics, daylight, ease of use for controls and other issues. While many of these are covered by individual recommendations and metrics enabling optimization for a given space, there is no single lighting quality metric.

Rather than pursue a single objective metric, perhaps the right approach is to give building owners and designers the tools they need to evaluate lighting quality subjectively, based on user satisfaction, on an application-by-application basis.

For the office lighting market, the Pacific Northwest National Laboratory (PNNL) in the United States has done just that. Funded by the Lighting Controls Association, National Electrical Manufacturers Association (NEMA), General Services Administration and the Department of Energy, PNNL's Light Right Survey offers a free tool for office building owners and managers and industry practitioners.

Residing here, the Light Right Survey includes 50 questions that can be used to profile the respondents, inventory the type of lighting they are using in their workspace, determine how satisfied they are with their lighting conditions, and gauge their lighting preferences.

Questions span all aspects of lighting quality, with controls-related questions asking users whether they can control their task lighting, whether and how they can control their overhead and task lighting, whether the overhead lights automatically turn Off (and On) based on occupancy, and how satisfied they are with their controls.

The results can be used as a diagnostic tool to find problems and correct them, measure the effectiveness of lighting approaches and improvements or justify proposed improvements, increase communication between lighting decision-makers and lighting users, and identify lighting strategies that increase worker satisfaction.

"Lighting provides a great opportunity for increasing worker satisfaction, reducing a building's operating costs, and saving energy," says Tracy Beeson, Energy and Environment Directorate, PNNL. "There is no better way to understand the acceptability of a lighting system than to ask the people who live and work in the space."

Multiple surveys can be conducted by the survey manager using a simple interface. Data results can be viewed as raw numbers, in an HTML executive summary, and in an advanced report presenting the data in a narrative format with suggested ways to correct possible problems.

Philips is currently supporting a new feature allowing photos of actual lighting equipment to be uploaded into the survey. In the future, PNNL may aggregate data into a national database, allowing benchmarking.

This is an exciting tool for the lighting industry, providing the basis for conversation between building owners and managers and lighting users—and between building owners and managers and lighting practitioners—about lighting quality and its effects. For lighting practitioners, it provides opportunities to support clients by interpreting survey results, validate their work, and help clients justify investment in new lighting approaches that prove effective. **EB**

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



Overall Survey Progress:

Overhead Lighting Controls

Do the overhead lighting fixtures in your workspace turn on automatically (when you enter the space, on a set schedule, or both)?

Yes
 No
 Do not know

Do the overhead lighting fixtures in your workspace turn off automatically (when you leave the space, on a set schedule, or both)?

Yes
 No
 Do not know

Can you control the overhead lights in your personal workspace without changing the lights in neighboring areas?

Yes
 No
 Do not know

How are your overhead lights controlled (check all that apply)?

Switch at wall
 Handheld remote
 Interface at your computer
 Automated system / controlled by building management
 Other (please specify)
 Do not know / Does not apply

To what extent can light levels from your overhead lights be adjusted?

Lights turn on and off only
 Light level settings are available for high, low, and/or medium
 Continuous dimming available

Do you notice the brightness of the overhead lights changing automatically?

Yes
 No
 Do not know

Does the change in brightness bother you?

Yes
 No
 Do not know

Previous Next

FIGURE 1
Screen capture from one of the pages of PNNL's Light Right Survey.

2013 WORK TRUCK

round-up

Howard J. Elmer

For the users of commercial vans – whether the small corner flower shop or courier giant UPS – this is the year that your model landscape changes forever. Not only are there more new models available than ever before, but many of them are sourced in Europe – and will be available with small diesel engines. This is a huge market shift; one that's long overdue and its best result for you – the van buyer – will be sharper prices on better product.

But, I am not talking about just the Mercedes-Benz Sprinter, which did lead the way for European imports. This year Ford follows suit with its full-size Transit and Chrysler is bringing the Fiat Ducato here as the new Ram ProMaster. For a market that traditionally changes little, this is the big shift I'm talking about.

It all started with Mercedes though. They offered their Sprinter to Dodge where it was sold for years while Daimler and Chrysler were working through their ill-fated merger. Once that went south, Dodge lost Sprinter, a financial blow certainly. However now with a new dance partner – Fiat – they are once again importing not one, but eventually two sizes of commercial vans to the North American market.

Of course this strategy is one that Ford had already adopted with the importation of their Transit Connect Van. This vehicle's big brother though is the Transit and it's now being built in Kansas City. It will offer the EcoBoost V6 engine but also a South African built 3.2L diesel.

These product moves herald an interesting time in commercial van production in our hemisphere – see all the vehicles mentioned already exist in other parts of the world and in those places they are already competitors in a very healthy and profitable market – now that competition is being brought to Canada.

For Mercedes the “why” is simple – money. Their vans are market leaders in Europe with sales of about 18% of the total market. This range includes the Sprinter vans, but also the midsize Vito and smallest Vario – a van very much built in the same class as the Ford Transit Connect. These last two are what Mercedes is saying they will be bringing to Canada rounding out their van offerings.

Also on the lighter side this year; Nissan's NV200 comes on line to confront the Ford Transit Connect and the Ram Cargo Van (Caravan). In addition both Mercedes and Chrysler say they will each bring at least one more smaller European-sourced van into this market by year's end.

VANS

■ 2013 Ford Transit

The full-size Ford Transit has been a staple in Europe for well over a decade, now we get it here. The body is supported by a unibody chassis and is available in two wheelbases (129.9 or 147.6-inches), single or dual rear wheels and three roof heights (83.2, 100.8 or 110.2-inches). The engine is front mounted and it's a rear wheel drive setup. Cargo volumes will range from 250 to almost 500-cubic feet.

This will be the first time Ford has offered a small diesel in its North America product; however they will also offer two gas engine options as well. All three will come with the same transmission; a six-speed automatic. The 3.7L V6 will also be offered with a LPG or LNG prep kit. Ford has not released the weight capacities for the various size Transits yet.

Cab Style:	Van	Van interior:	500 cu.ft. max.
Engine size:	3.7L V6 (base) 3.5L EcoBoost V6 3.2L Power Stroke diesel	Door opening:	Rear Height: N/A
Power (hp/torque):	N/A	Cargo space dimensions:	Height: 81.5" max. Width: 69.8" Length: 171.5"
Max. Payload:	N/A	Dimensions:	Length: 266.1" max. Width: 82"
Max. Towing capacity:	5,000 lb.		

■ 2013 Ford E-Series Cutaway Vans

After 61 years the E-series van has been retired. The full-size Transit replaces it – however for the time being the E-350/E-450 Cutaway E-series vans remain. For many upfitter applications these veteran trucks continue to be good performers and Ford will continue to offer them.

Wheelbase:	138", 178"
Cab Style:	Van, Cutaway
Engine size:	5.4L V8, 6.8L V10,
Power (hp/torque):	255/350, 305/420,
Max. Payload:	N/A
Max. Towing capacity:	10,000 lb.

Ford Transit Connect Cargo





Ford Transit Connect HighRoof

■ **2014 Ford Transit Connect**

This small van has built itself a nice niche over the past four years with a personal-use wagon; commercial versions and even an all-electric van. For 2014 it is updated substantially. It gets two new engines, will now tow (this was not an option before) and offers even more trim packages. It can be ordered with second-row seating, offers options like a rear view camera, 6.5-inch touch screen display with navigation, and sync with MyFord Touch.

It will be available late this year.

Cab Style:	Van
Engine size:	2.5L I-4, 1.6L EcoBoost I-4
Power (hp/torque):	N/A
Max. Payload:	1,600 lb.
Max. Towing capacity:	2,000 lb.
Van interior:	130 cu.ft.
Door opening:	
Rear Height:	52.1"
Cargo space dimensions:	
Height:	59.1"
Width:	48.1"
Length:	72.6"
Dimensions:	
Length:	189.7"
Width:	70.7"



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2014 Ram ProMaster

Based on the Fiat Ducato (one of the most successful commercial vans in Europe) the new Ram ProMaster will sport two roof heights (either 90 or 101-inches), three wheelbases and four body lengths. It will have diesel and gas engines. Where it differs from the others is in its FWD propulsion. Either motor will use a six-speed automatic transmission. Because of its FWD setup it has very low step-in height and great space offerings. It will be on sale soon.

Cab Style:	Van	Van interior:	N/A
Wheelbase:	118", 136", 159"	Door opening:	N/A
Engine size:	3.6L Pentastar V6 (base) 3L I-4 EcoDiesel	Rear Height:	N/A
Power (hp/torque):	280 hp / 260 lb.-ft. 174 hp / 295 lb.-ft.	Cargo space dimensions:	Height: N/A Width: N/A Length: N/A
Max. Payload:	5,291 lb.	Dimensions:	Length: 195" to 250"
Max. Towing capacity:	5,090 lb.		Width: 82.7"

Ram Cargo Van

The cargo version of the Caravan has been a Chrysler staple now for over a decade. It's available again this year without changes.

Wheelbase:	121.2"	Door opening:	N/A
Cab Style:	Van	Rear Height:	N/A
Engine size:	3.6L V6	Cargo space dimensions:	Height: 48.2" Width: 49.03" Length: N/A
Power (hp/torque):	283/260	Dimensions:	Length: 202.8" Width: 78.7"
Max. Payload:	1,800 lb.		
Max. Towing capacity:	3,600 lb.		
Van interior:	144.4 cu.ft.		

2013 Nissan NV1500 to NV3500

Nissan has recognized that a North American market of over 200,000 commercial van units sold each year is very worthwhile to be involved in. For that reason its American built NV was launched just two years ago and is working at building market-share. Its entry into the

2013 Nissan



commercial van market has offered a broader choice to buyers and its design and options are well suited to its purpose. Its design uses many European cues – and as such is competitive with the new imports.

Wheelbase:	146.1"
Cab Style:	Van
Engine size:	4L V6, 5.6L V8
Power (hp/torque):	261/281, 317/385
Max. Payload:	3,858 lb.
Max. Towing capacity:	9,000 lb.
Van interior:	234.1 cu.ft. (standard) 323.1 cu.ft. (high-roof)
Door opening:	Rear Width: 61.6"
Cargo space dimensions:	Height: 70.2" Length: 150.2"
Dimensions:	Length: 240.6" Width: 79.9"

■ 2013 Nissan NV200

The newest compact cargo van – the Nissan NV200 is the little brother to the full-size NV that started selling across North America two years ago. This smaller NV200 is set to battle the popular Ford Transit Connect van. It will arrive late this year. This smaller size should make it maneuverable in city traffic, yet it will still fit a standard sized pallet between the wheelhouses – says Nissan. Suspension is independent struts and stabilizer bar in front and a leaf spring design in the rear. The front disc and rear drum brakes offer ABS and Electronic Brake force Distribution (EBD) standard.

The NV200 has dual sliding side doors; tall 40/60 split rear doors (that open to 90 and 180 degrees), a low floor and tall interior cargo height.

Driver conveniences include 6-way driver seat, a "Mobile

Office" with a centre console space for laptops and hanging files; pen/pencil tray, CD holder, and dual cupholders. Also the passenger seat folds down to serve as a flat worktable.

Wheelbase:	1115.2"
Cab Style:	Van
Engine size:	2L I-4
Power (hp/torque):	N/A
Max. Payload:	1,500 lb.

Max. Towing capacity:	N/A
Van interior:	N/A
Door opening:	Rear Width: N/A
Cargo space dimensions:	N/A
Dimensions:	Length: 186.2"



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2013 Mercedes Sprinter



2013 Mercedes Sprinter Cutaway



■ **2013 Mercedes-Benz Sprinter 1500 to 3500**

Mercedes continues to push its Sprinter into the Canadian commercial market with offers of multiple models, bus-style versions and cutaways that the RV market has jumped on. In an effort to show buyers how tough their truck is they put on a tortures drive from Edmonton to north of the Arctic Circle.

I drove a Sprinter in Alaska in January in temperatures down to -48C. My unit had a diesel preheater, auxiliary heater and heated mirrors – it needed them and they all worked well.

Sprinter offers the most standard safety systems with Adaptive ESP, skid control, roll-over trailer stability, understeer control, load adaptive control, Advanced ABS, brake force and brake wipe.

Wheelbase:	144", 170"
Cab Style:	Van
Engine size:	3L V6 turbodiesel
Power (hp/torque):	188/325
Max. Payload:	5,375 lb.
Max. Towing capacity:	5,000 lb. or 7,500 lb.
Van interior:	547 cu.ft.

Door opening:	Side sliding door 51.2"
Cargo space dimensions:	Height: 65" standard roof and 76.4 high-roof
	Width: 53.1 between wheel arches Length: N/A
Dimensions:	Length: 289"
	Width: 79.3"

■ **Chevy Express Cargo Van 1500 to 3500**

The Chevy Express Van is the last of the Detroit "old school" type vans standing. I'd expect GM to change its offerings soon – but not this year it seems. With the intense new competition it's possible that they will slash prices – otherwise things remain the same for Express with the exception of a new a rear vision camera, rear park assist and a navigation/radio combination.

Wheelbase:	135", 155"
Cab Style:	Regular Van, Extended
Engine size:	4.3L V6, 4.8L V8, 5.3L V8, 6L V8, 6.6L V8 turbo-diesel
Power (hp/torque):	195/260, 280/295, 310/334, 324/373, 260/525
Max. Payload:	2,287 to 4,187 lb.

Max. Towing capacity:	6,700 to 10,000 lb.
Van interior:	239.7 to 319.9 cu.ft.
Door opening:	Rear Height: N/A
Cargo space dimensions:	Height: 52.9"
	Width: 52.7" between the wheel wells
	Length: 124" to 155"
Dimensions:	Length: 224" to 239"
	Width: 79.4" EB

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Visit www.ecao.org



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Weasel clauses for the non-weasel

Also known as ‘exculpatory provisions’, ‘weasel’ clauses allow a party to a contract to limit, waive or exclude (“weasel out of”) an obligation, liability or responsibility it would otherwise have under the contract.

While they sometimes elicit a negative reaction, these clauses are a common and necessary element of virtually all commercial agreements, and they should be understood. In fact, they represent a viable commercial means by which parties to a contract can, by agreement, pre-allocate risks and remedies.

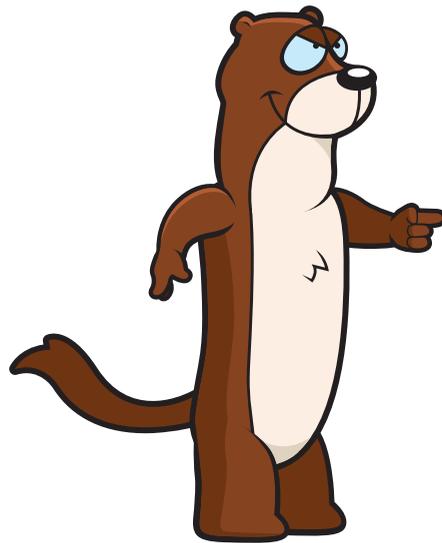
Many different types of exculpatory provisions are commonly used in the Canadian construction industry, whether as part of standard form industry contracts, government contracts or negotiated agreements. Broadly speaking, limit of liability provisions, liquidated damages provisions, warranty provisions, waiver of claim provisions, indemnification provisions, and site investigation/unanticipated conditions provisions all represent examples of contract clauses that allow parties to limit, waive or re-allocate risk in relation to events that could occur during the performance of a contract.

While it seems reasonable that parties to a commercial agreement would attempt to bring certainty to their business arrangement, there are often concerns—in hindsight, at least—that some contractual pre-allocation of risk may result in harsh or unfair outcomes. So how do courts deal with enforcing exculpatory provisions in such cases?

The initial question usually asked is whether such provisions are enforceable under Canadian law. The short answer is Yes, they are generally enforceable, subject to certain, limited exceptions. However, exculpatory clauses bring into relief the tension that exists between the concept of freedom of contract and the inherent jurisdiction of courts to, in a broad sense, oversee commerce and ensure adherence to public policy.

While the ordinary rules of construction that apply to written contracts apply also to exculpatory provisions, their application may have dire commercial consequences to contracting parties, so Canadian courts tend to view weasel clauses with a critical eye so as to interpret them with caution.

The general approach, as with any other contractual provision, is to consider the clear and plain meaning of the language in light of the reasonable expectation of the parties.



However, the language will be more strictly construed against the party who benefits from the exclusion or restriction. Beyond that, the Supreme Court of Canada described the specific methodology that Canadian courts are to use when considering the effect of an exclusion or limitation of liability provision in the case of *Tercon Contractors Ltd. v. British Columbia (Transportation and Highways)*.

Essentially, a court faced with request to enforce a weasel clause is to ask itself three questions: 1) Does the clause in question apply to the circumstances at issue? 2) If it does, is the weasel clause “unconscionable” as at the time the contract was made (in this context, unconscionable refers to an unequal bargaining power between the parties)? 3) If the clause applies and is valid, is there an overriding public policy consideration that suggests that the courts should not enforce the clause?

In coming to its decision in *Tercon*, the Supreme Court of Canada affirmed there is a very strong public interest in the enforcement of contracts, so the jurisdiction that courts have to override this freedom of contract on public policy grounds is narrow. This means that parties entering into contracts that include exculpatory provisions should be very mindful of the scope of such clauses given that they will likely be enforced.

Some of the practical considerations to keep in mind when negotiating such contractual terms include:

Limitation of liability

1. What is the appropriate limit (usually expressed in dollar terms or as a percentage of contract value) keeping in mind the

nature of the contract, market conditions and the fee/profit to be earned?

2. Are there any exclusions or exceptions to the limit and, if so, are they reasonable?
3. How will risk within the limit be managed by the affected party (e.g. insurance, bonding)?

Consequential damage waiver

1. Is the waiver intended to be mutual and, if not, should it be?
2. How is ‘consequential’ damages defined?
3. Given the nature of the contract, what kind of direct damages might be suffered by each of the parties, and what is the nature of the possible consequential or indirect damages?

Indemnification

1. What losses are to be made good, and does the indemnification obligation extend to providing a defence to the other party?
2. Is the exposure mostly or entirely covered by insurance?
3. Where are the triggers for the obligation to indemnify, and how is partial or joint responsibility treated?
4. What, if any, limitation periods apply to claims for indemnity?

Exculpatory/weasel clauses are important risk allocation mechanisms in today’s commercial agreements. To be effective, they need to be clear and reflect the overall deal between the parties. Notwithstanding that certain risks may be remote, careful consideration must be given to how they will be managed should contemplated events come to pass. While it may seem advantageous to one party to re-allocate to the other an inordinate amount of risk in a given case, contracts that lack balance—even though they likely will be enforced—are often a false economy (which, ultimately, benefits neither party). **EB**

Ian Houston is regional leader of the Construction, Engineering, Surety and Fidelity Group in the Toronto office of Borden Ladner Gervais LLP (www.blg.com), and a Fellow of the Canadian College of Construction Lawyers. His practice ranges from providing commercial law advice on contractual and procurement issues, to assisting clients in resolving disputes through litigation or alternative dispute resolution methods. Ian can be reached at ijhouston@blg.com or (416) 367-6111.

There is a ton of additional information at EBMag.com, and be sure to follow our Tweets (twitter.com/ebmag) to learn about web updates, live event reporting and more!



New Standard Products LED lamps boast black heat sinks



Standard Products says it has introduced its next generation of LED lamps, offering increased efficacy, exceptional colour consistency and crisp light. Available in various shapes and colours, the dimmable lamps join Standard's existing family of reflector lamps, which include Omni (8W and 12W), BR30, GU10 and PAR30SN. Black heat sinks are also offered in PAR20, PAR30SN and PAR38 lamps, boasting a uniform, modern look to recessed housings. The lamps are Energy Star approved.

STANDARD PRODUCTS
www.standardpro.com

Verde Retrofit LED GU24 is a direct replacement for 13W CFLs

American Illumination's Verde LED GU24 is a direct replacement lamp for 13W CFLs. Part of the Verde Retrofit Series, the

company says this model is one of the few GU24 direct replacement light bulbs available, and is the only one compatible with the GU24 locking ring. The bulb consumes 8.5W of total power and emits over 700 lumens (warm white) for an 80+ lumens/W efficacy, says the company. The bulb promises "considerable light output" for residential and commercial applications, such as decorative pendants, chandeliers, vanity lights and various indoor fixtures. This GU24 contains Chip on Board (COB) LED technology, which means high heat conductivity and low thermal resistance for improved heat management, boasts American. The multi-directional diffuser emits a beam spread over 180° for even illumination without visibly unattractive LED hot spots, adds the company.

AMERICAN ILLUMINATION
www.american-illumination.com



Hubbell unveils three new Prescolite solutions for downlighting

Hubbell Lighting introduced three new Prescolite LED solutions for downlighting applications: a 6-in. LiteBox LED downlight module (LB6LEDA10L), a 6-in. Retroficient LED downlight (RLC6LED) and a wall wash version of the 4-in. LiteFrame LED downlight (LF4LED). The LiteBox LB6LEDA10L's 1000 lumen output and distribution are comparable to a 75W PAR lamp, says Hubbell, while consuming 12 watts of energy. It is available in 3000K and 3500K with an 80+ CRI, provides flicker-free dimming to 15% with most standard dimmers, says the company, is suitable for temperatures up to 25C and wet locations; and has an integrated aluminum heat sink for thermal management. The Retroficient RLC6LED includes an adaptable trim ring and adjustable J-box that can be mounted from below the ceiling into existing 6-in. aperture housings. With lumen packages ranging from 1000 to 1600 delivered lumens, the



RLC6LED can replace up to a twin 26W CFL fixture with 50% of the wattage, says Hubbell, and is available in colour temperatures ranging from 2700K to 4000K. The 4-in. LF4LED line employs remote phosphor technology and is wiHUBB compatible and promises 50,000 hours minimum life up to 35C in open plenum applications. A remote emergency battery backup option is available for the LF4LED that includes a remote test switch and indicator light.

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EB lighting products

GE Lighting's Albeo LED high bay fixture



GE Lighting's new Albeo ABHX series LED high bay lighting fixture claims to replace a range of legacy high bay lighting systems—250W to 1500W high-intensity discharge (HID) and four- to eight-lamp T5/T8 high-intensity fluorescent lighting. The series is rated for 100,000 hours at L70, and is suitable for warehouses, industrial spaces and other commercial settings with high ceilings. Boasting long lamp-life and maintenance savings, GE also notes the fixture uses 70% less energy.

GE LIGHTING
www.gelighting.com

Shat-R-Shield offers 28W and 32W T8 fluorescent lamps

Shat-R-Shield has announced the new safety-coated, shatter-resistant T8 fluorescent lamps, boasting up to 75,000 hours life on instant start ballasts and 84,000 hours life on programmed rapid start ballasts. Offered in 28W and 32W, the T8 lamps are



dimnable, RoHS compliant and feature a colour rendering index (CRI) of 85. According to the company, the lamps offer up to two times long life, providing an additional eight years of maintenance free lighting for typical operating cycles.

SHAT-R-SHIELD
www.shatrshield.com

Acuity introduces Blanca white LED luminaires from Winona

Acuity Brands introduced Blanca 700 Series spot, flood, linear surface and linear cove white LED luminaires from Winona (photos below). They promise a smooth, uniform distribution of light for wash or graze applications, such as commercial building facades, architectural details, landmarks, hospital-



ity and archtainment. Blanca white LED luminaires are IP66 rated and are available in a variety of temperatures (2700K,

3000K, 3500K, 4000K) and multiple distributions.

ACUITY BRANDS
www.acuitybrands.com

Phoenix launches LEDLT Series impact-resistant linear LED tube light



Phoenix Products Co. Inc.'s LEDLT linear LED tube light is a 17W, 1250-lumen fixture designed for use in a variety of environments, such as railcars, heavy equipment, walkways, marine environments, exterior wet locations, and other industrial purposes. This impact-resistant, low-profile, polycarbonate tubular fixture uses 50% less energy than a two-lamp 17W linear fluorescent, says the company. It is IP66 rated, ETL/cETL certified to UL1598 and UL1598A, and CSA C22.2 No.250.0, adds Phoenix. With fully potted drivers and conformal-coated LED boards, the LEDLT is designed to prevent moisture intrusion as well as protection against shock and vibration.

PHOENIX PRODUCTS
www.phoenixproducts.com

EB products

Arlington non-metallic screw connectors now in 1-in. trade size

Arlington's one-piece, non-metallic screw-on connectors are now available in 1-in. trade sizes. Designed for use on non-metallic, liquid-tight conduit (Type B), they screw on to conduit by hand. The screw-on connectors ship fully assembled; they overlap conduit, hiding cut ends, and promise a reliable, UL-listed liquid-tight seal. They are available in 180° (straight) and 90°, in grey or black.



ARLINGTON INDUSTRIES
www.aifittings.com

Meltric publishes 2013-2014 catalogue featuring Decontactor Series

Meltric Corp.—maker of industrial-duty electrical plugs and receptacles—has published its new 2013-2014 product catalogue, which features Decontactor Series switch-rated plugs, receptacles and connectors. The 239-page catalogue also provides information about the company's other



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offerings, including CS1000 single-pole plugs and receptacles (up to 400A, 600vac) and a variety of Multipin devices (from 7 to 37 contacts). Decontactor Series switch-rated plugs and receptacles promise to allow technicians to quickly change-out motors, welders and other electrical equipment with plug-n-play simplicity.

MELTRIC CORP.
www.meltric.com

Streamline lockout/tagout with



Brady Link360 2.1

Brady is striving to streamline lockout/tagout and reliability procedures across entire organizations with its new Link360 2.1 software update. The new cloud-based software platform features a checklist feature for a step-by-step guide to lockout procedures, where users can also access a printed list of lockout devices to be used when performing the lockout procedure. Users can also save a scanned copy of a completed checklist, search for previous checklists and delete old checklists. The new update also offers the capabilities to add company logos to lockout procedure templates, change the password from the home page and transfer file ownership.

BRADY
www.bradycanada.ca

Champion offers new low-ash 15W40 synthetic CNG engine oil

Champion Oil recently unveiled a full synthetic low-ash oil for fleets fuelled by CNG (compressed natural gas), LNG (liquefied natural gas) or propane, which promises superior valve recession protection, low oil consumption, piston deposit control, good TBN retention, shear stability, enhanced valve train wear protection, excellent cold start protection, designed to control and reduce pre-ignition,

advanced oxidation control, long life and low exhaust emissions. The engine oil is available in 5-gal pails, 55-gal drums and 330-gal totes.

CHAMPION
www.championbrands.com

Jonard JIC-725 designed for coax with steel centre conductor
Jonard Industries has released

a specialty plier—the JIC-725 coax cable cutter steel—which is designed specifically for coax cables with a steel centre conductor (e.g. RG59/6, Cat 5, Cat 6).

Jonard says this plier has been tested on CCSC (copper-clad steel centre) conductor



cables, as well as aluminum and copper cables, without cutting blade degradation. Made from hardened chrome vanadium steel, this plier will also cut other cable types without deforming them.

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recession protection, low oil consumption, piston deposit control, good TBN retention, shear stability, enhanced valve train wear protection, excellent cold start protection, designed to control and reduce pre-ignition,

Greenlee develops Specialty, Extreme and Extreme Ti-Metal recipe saw blades



Greenlee, a Textron company, says its new high-quality reciprocating saw blades are designed to cut a variety of construction materials, thanks to its carbon-alloy blade frame and cobalt tool-steel teeth. The reciprocating blade line-up consists of standard-duty Bi-Metal blades, Specialty blades, Extreme blades, and Extreme Ti-Metal

titanium-coated blades. The Specialty blades are purpose-built for cutting construction materials, such as stainless steel, cement board, masonry block, and cast-iron pipe. The Extreme blades feature a wider, thicker blade frame, suitable for structural steel applications, such as angle iron, I-beam, structural tubing and C-channel. The Extreme

Ti-Metal blades boast titanium coating to help reduce friction and heat build-up, giving it the longest blade life in the entire Greenlee reciprocating blade lineup.

GREENLEE
www.greenlee.com

Guard the rack with Rittal enhanced Modulsafe Level E



Rittal's Modulsafe Level E is an enhanced version of the existing Safe platform and is suitable, insists the company, for critical data that requires total protection (see Video below). Modulsafe provides a platform that promises compact, single-rack protection as secure as the data centre. Creating a complete security zone around a 19-in. rack, Modulsafe Level E provides protection from unwanted access, fire, vandalism and theft. A new feature is the use of Rittal's TS IT server rack in place of the TS 8. Smart protection mechanisms, including sensors and monitoring software, maximize uptime.

RITTAL
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Parker publishes web-based Power Generation Interactive Resource Guide

Parker Hannifin Corp. offers a new interactive, web-based electronic sales tool for utility customers, OEMs and industry consultants in the power generation market.



Designed as an electronic flipbook that is continually updated online, the Parker Power Generation Interactive Resource Guide incorporates Parker products and technology platforms related to power generation into one. Provided within is a detailed listing of every product, subsystem and system that Parker offers in combustion turbine, combined cycle, coal-fired and nuclear power plants. It calls out specific areas of the power plants in which Parker offers what it calls "break-through technologies", including: air quality monitoring; water filtration; energy storage and conversion; biogas; and nuclear power.

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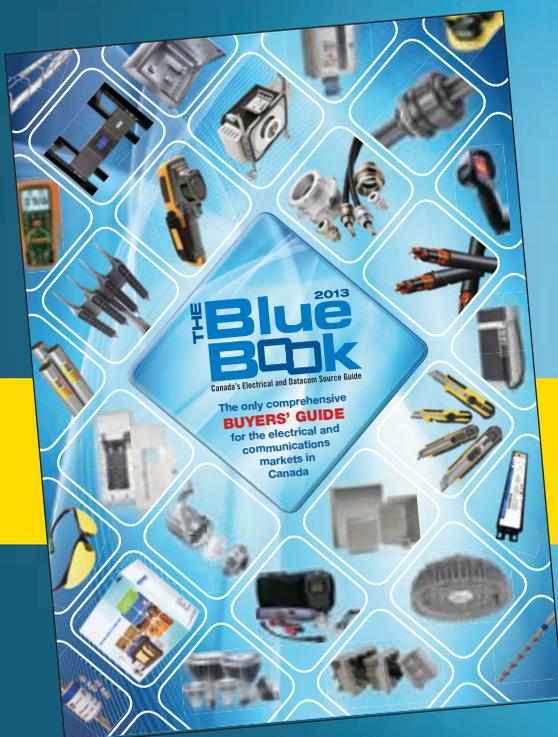
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Converting an existing ungrounded delta supply to a grounded wye supply?

Last year, there was an electrical incident involving a capacitor bank at an industrial facility in Ontario that caused damage to equipment and minor structural fire. During the investigation, it had been determined the consumer service was a 3-phase, 3-wire system, with no neutral nor grounded conductor.

Indicating lights were installed at service equipment as per CEC Rule 10-106; however, upon inspecting the utility transformer feeding this plant, it was discovered the transformer secondary was 3-phase, 4-wire grounded wye.

Further discussion with the local utility revealed they had changed the transformer some number of years ago from an ungrounded delta to a grounded wye secondary. Unknowingly, the customer never changed its distribution, and continued treating its service as ungrounded delta. A fault at the capacitor bank did not trip the upstream overcurrent protection, which caused the damage to the equipment and the fire.

Incidents like this remind us that we always need to be aware of the basic engineering concepts for electricity distribution. It illustrates how any changes in the system need to be carefully reviewed, and that required

changes be identified and completed.

Caution should be exercised when local utilities decide to convert existing ungrounded delta system to wye grounded. By design, a ground fault condition on a delta system will not operate an overcurrent device, but will only indicate a grounded phase conductor. When the supply transformers are changed to a wye grounded secondary system, a ground fault with high impedance at the customer side will allow fault current to flow, without the overcurrent device operating, eventually leading to fire.

Where the utility and customer are agreeable, conversions should be preceded by a general inspection to check the condition of equipment, grounding and overcurrent protection. In particular, any pre-existing phase-to-ground faults need to be rectified.

- All existing ground fault indicators are to be removed and all openings filled.
- The main overcurrent protection must be adequate for the available fault current it must interrupt (Rule 14-012).
- Where the existing service equipment grounding conductor meets the requirements of Rule 10-812, it can be re-used and shall

be terminated so as to ground the new system grounded conductor (Rule 10-204[1][b]). Adequate provisions shall be made to ensure that the service box enclosure is bonded to ground.

- There must be space and provision in the service box (main disconnect switch) for the termination and grounding of the neutral conductor (Rules 4-026 and 10-204). A new bonding jumper shall be installed to bond the service box enclosure to the new grounding block installed inside.
- The grounded conductor shall not be smaller than that permitted by Rule 10-204(2) and Table 16, and shall comply with Rule 4-022(3). The service neutral conductor shall be installed in the same manner as the ungrounded service conductors.
- For services operating at more than 150V to ground and 1000A or more, or less than 150V to ground and 2000A or more, ground fault protection shall be provided as required by Rule 14-102. Converting a delta service to wye without the inclusion of ground fault or similar protection exposes the service equipment to significant risk in case of a fault.

The changes outlined above need to be completed for converting existing ungrounded delta systems to wye grounded systems for safe, compliant installations. CEC Rule 10-204 requires that 3-phase, 4-wire systems be connected to a grounding conductor at each individual service. **EB**

Nancy Hanna, P.Eng., is the engineering manager for Codes & Standards Department at Electrical Safety Authority (ESA). Nancy can be reached at nancy.hanna@electricalsafety.on.ca.



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

Tackle The Code Conundrum... if you dare!

Answers to this month's questions in August'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

The metal assembly of a raised floor in a computer room must be bonded with a conductor no smaller than copper to form an equipotential plan.

- a) #12 AWG c) #8 AWG
- b) #10 AWG d) #6 AWG

Question 2

The CEC allows the usage of Nonmetallic Sheathed Cable in a building of combustible construction.

- a) True b) False

Question 3

For receptacles having CSA configurations 5-15R or 5-20R installed in buildings under construction:

- a) shall be protected by GFCI Class A
- b) Can be wired by NMSC according to Rules 12-500 to 12-526
- c) shall be kept entirely separate from lighting branch circuits
- d) All of the above

Answers: EBMag June 2013

Q-1: A swimming pool shall be permitted to be installed below an existing overhead 120/240 volt service conductor that supplies a residence provided the minimum vertical clearance of the lowest conductor is 4.5m above the surface of the pool water.

- b) False. Ref. Rule 68-054(3).

Q-2: A submersible pump installed in a lake shall be protected by a ground fault circuit interrupter of the Class A type.

- b) False. Ref. Rule 26-956(1)(d).

Q-3: Wiring of an essential electrical system in a patient care area shall be permitted to occupy the same raceway as non-essential wiring.

- b) False. Ref. Rule 24-302(3).



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