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ASSOCIATION OF ONTARIO

Volume 44 • Number 1 • Winter 2005/2006



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# The Ontario **ELECTRICAL CONTRACTOR**

Volume 44 • Number 1 • Winter 2005/06

President's Message .....	7
New Canadian Electrical Code Revision .....	7
Survivor Cancun .....	10
ECAO's Annual General Meeting .....	14
Justin Arsenault Awarded ECAO Scholarship .....	16
Claiming Cash-refundable Tax Credits for Your Employees .....	17
It's Time to Fix Your Portfolio When... ..	18
Should You Invest in GPS? .....	20
Do Professional Engineers Know the Electrical Safety Code? .....	22
Toolbox Talks .....	27
Industry Briefs .....	28
Index to Advertisers .....	29



On the Cover: Half of the Wilma Survivors from ECAO pose outside the Reef Club before making their way home.

The Ontario Electrical Contractor is  
published quarterly for:

**ECAO**  
ELECTRICAL CONTRACTORS  
ASSOCIATION OF ONTARIO

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*The Ontario Electrical Contractor is the official publication of  
the Electrical Contractors Association of Ontario. Its purpose  
is to provide information and editorial comment on issues  
that are relevant to the electrical contracting industry.*

#### Editor:

Angela Altass:

#### Published by:

**MediaEDGE**  
PUBLISHING INC.

5255 Yonge Street, Suite 1000  
Toronto, ON M2N 6P4  
1-866-216-0860 ext.229  
Email: [robertt@mediaedge.ca](mailto:robertt@mediaedge.ca)

1 Wesley Ave., Suite 301  
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## President's Message

**T**his issue, my first as ECAO President, tells the story of "Survivor Cancun." Those of us who lived it lived a lifetime of experiences in eight days. The team play, resourcefulness and resilience displayed by the ECAO members shone through the adverse conditions. Special thanks to the ECAO executive and staff for holding it all together.

Another fallout from Wilma was the postponement of the ECAO Annual General Meeting. It took place November 24, 2005 in Toronto and a synopsis is reported here. Congratulations to the award winners and the new board of directors.

In addition to regular features on personal finances, safety and products, this issued contains an article by Peter Marcucci tackling the controversial issue of engineers' knowledge of the electrical code.

I hope you enjoy this issue and, as always, I look forward to your comments and feedback



By Brad Vollmer

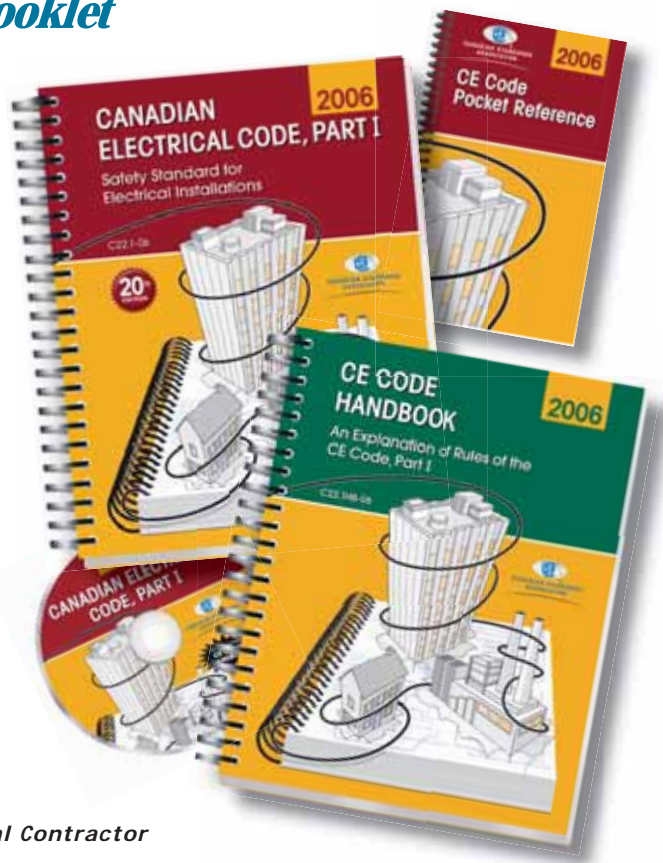
# NEW CANADIAN ELECTRICAL CODE REVISION

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**T**he Canadian Standards Association reissues the *Canadian Electrical Code* and its companion the *CE Code Handbook* every four years. Available as of January 2006, both books are now in an easy to use spiral bound format.

This year, for the first time, a pocket-sized quick reference booklet will be packaged with the *Canadian Electrical Code*. It can easily be taken on site and contains the most frequently used tables, charts and graphs.

Developing and updating the *Canadian Electrical Code* is just one of the many initiatives undertaken by the Canadian Standards Association to fulfill its mandate to make standards work for people and business and to make life safer for everyone. The books are written and updated by a volunteer committee of experts from regulatory authorities, electrical manufacturing, utilities and related industries.



*Continued on next page*



Revisions are made as safety requirements and technologies change. All electricians must adhere to these codes and therefore must have the latest version. Once the new versions are completed they are written into legislation although each province has its own timetable for adopting the new code.

The *Canadian Electrical Code*, Part 1 includes important changes in areas such as: Bonding and grounding; Hazardous locations – classifications; Ground fault circuit interrupter requirements; Sewage lifts and treatment plants; and Sunlight, shock and arc flash protection.

The *CE Code Handbook* is an explanation of rules of the *Canadian Electrical Code*. All sections have been rewritten in a more friendly, consistent format and examples of calculations have been added.

Not long after the print versions are available, the Smart CD is launched. The *CE Code Smart CD-ROM* contains the full text of the *Canadian Electrical Code* and the *CE Code Handbook* with interactive calculations, all in an easy-to-navigate format.

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# SURVIVOR CANCUN

**I**t was all going so well. ECAO's chosen location for the 2005 Industry Conference was turning out to be the best ever! The Fiesta Americana Grand Coral Beach in Cancun, Mexico, a five-diamond, five-star rated resort, delivered everything it promised – white sand beaches, beautifully appointed rooms, exceptional cuisine and exemplary service.

The weather also cooperated, at least in the beginning, and gave us sunny days and breezy nights. The conference kicked off Sunday night with the Opening Mix & Meet – a fiesta of colour and a royal feast, held in the ballroom foyer. Presentations began the following morning by our Mexican counterparts, providing an eye-opening view of the contracting industry in this developing country. Delegates and guests were also provided with informative sessions on ECAO's Health & Welfare Benefit Plan and Web Marketing initiatives. Excursions were very popular and in the following days conference goers enjoyed traditional Mexican shows, the ruins at Tulum, the eco-park at Xel-Ha and of course, golf. By Tuesday the weatherman was predicting a turn in the weather later in the week and the tour company suggested moving the boat trip to Isla Mujeres (translation "Isle of Women") ahead by one day. This was announced Tuesday night while delegates enjoyed a traditional Mexican dinner in La Joya – Cancun's finest – located right in the hotel. Although some of the delegates decided against the boat tour, a good group set off on Wednesday to discover what the island had to offer. The rest lounged around the pool enjoying the beautiful weather.

Meanwhile, nature plotted its course...

The hotel was beginning to show concern for the weather forecast and it became apparent that preventive measures were in order. The management began evacuation procedures which consisted of preparing both onsite and offsite hurricane shelters and providing assistance for travelers wishing to leave the country. Three warning letters were issued (green, then orange, then red) providing updates on the weather, shelter preparation and evacuation plans and procedures. Hotel guests who could get flights, left as soon as possible. Those who couldn't, prepared mentally and physically for the evacuation. The ECAO group had their last dinner in the hotel and tried to make the most of the situation while the wind increased outside. Of the 190 delegates and family in attendance, 77 were able to obtain flights before the Cancun airport closed on Thursday at 2 p.m. Some of the delegates who left went from the frying pan into the fire when their flight had to make an emergency landing in Miami after experiencing engine failure. However, they were on their way home within the day.

Although the hotel had prepared the onsite shelter, the Mexican Army, responsible for the safety and security of citizens and tourists alike, decided Thursday morning that the Hotel Zone would not be safe given the predicted severity of the storm and ordered the evacuation of the entire area. The remaining 113 ECAO delegates were subsequently registered and transported to their assigned inland shelter at the University of Technology Cancun, a complex of buildings just off the highway south of the city of Cancun. The ECAO delegates and about 100 others were housed in the hospitality training centre of the university, a building containing a fully equipped hotel kitchen, a concierge desk, a bar (without alcoholic beverages) and a mock-up





Central Hall of Building F of the University of Technology Cancun

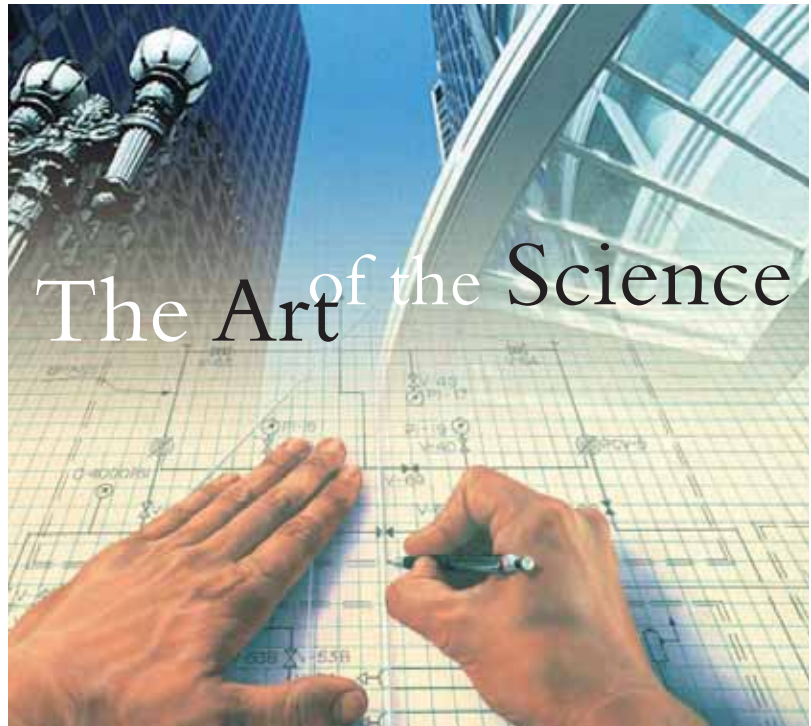


Night falls in the shelter.

of several hotel-style suites. Although the group was not given individual rooms or even beds to sleep in, they were blessed with a proper facility for preparing the 1,000 or so meals needed each day for the evacuees. The Fiesta Americana's General Manager, Peter Birchall, and about two dozen of his staff readied the facility for the impending storm.

The weather gradually worsened until 2 a.m. Friday when Wilma officially arrived. The hotel staff locked the shutters on the doors and windows and there we remained for three days, under lockdown, with just a brief interlude during the eye of the storm.

The noise level increased and the temperature rose, particularly when the power was cut off and the air conditioning was discontinued. Most of the evacuees were restless and wandered around off and on all night. Lighting was provided by flashlight and the beloved Guillevin book-light, a sponsorship item that literally became a lifesaver. By morning it became apparent that power was needed, not only to provide some lighting and boost morale, but also to prevent the food supply from spoiling. Several of the ECAO contractor delegates, John Salmon, Fred Black, Bill Debosky, Mike Floto and others, began negotiations with the management of the building next door to assess their respective needs and to distribute power in support of these essential services. In addition, power outlets normally located in the floor, were of no use in a building inundated with water and that too was soon fixed with a little expertise and a power bar. There were cheers all around when the power was restored and the lights came back on and everyone in the building, especially the general man-



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Aftermath of the storm on the grounds of the University.

ager of the hotel, was glad that some of the Canadian contractors were still in Cancun.

Things seemed to be going well until the hotel staff advised the group that the remaining evacuees from the Fiesta Americana, a group consisting mainly of Japanese tourists, were housed in another building on the campus that had sustained major damage during the night and that the occupants would have to be rescued as soon as the eye of the storm passed over. The group was asked to prepare space for the 150 or so newcomers and give up any spare chairs, blankets, pillows or towels to assist their fellow evacuees. Everyone waited for the opportune moment to spare these folks the terror of another night without shelter. The wind finally subsided (a relative term) and the transfer of persons and supplies began. The frightened and grateful tourists were welcomed with a round of applause and settled in for the night. Now numbering 350 souls, we hunkered down for the back half of the storm.

The relief of that crisis was soon forgotten when the next crisis became apparent – sanitation was beginning to become a problem. Without running water, the toilets had to be manually flushed, and the only place to get water was outside. Hotel staff risked

their lives to obtain rain water, which they laboriously dragged inside. They worked around the clock manually flushing and cleaning after each person and when finally exhausted, slept where they worked on the floor of the bathroom. The problem escalated when one of the bathrooms was rendered inoperative and unsafe when the rising water table caused the floor to heave and the tiles to crack. There was now only one bathroom left until the storm finished passing through on Sunday. Men and women alike chatted good-naturedly while waiting in line – a lesson in humility.

When Wilma finally moved northeast and headed towards Cuba, the shutters were opened and the evacuees poured outside. ECA Sarnia members, Dario Maola, Doug Bazeley, Greg Mellon, John Baxter, and Norm Christopher, took charge of raising an honorarium for the hotel workers in recognition of their tireless efforts on behalf of the evacuees. In a few hours they raised over \$4,000 USD in an empty 20L water jug which was presented to the Fiesta Americana staff in an impromptu ceremony. This donation was later matched by ECAO at its AGM in Toronto. Outside, the devastation was complete. Every tree had been stripped of its leaves, many of them uprooted. The building that had housed the 150 tourists who



were transferred to our building was completely gutted. The entire university grounds were under three feet of water. Luckily the buildings occupied were built on a raised footing, which was now just above the water level. The evacuees willingly remained outside and waited for the buses to arrive to transport them to the nearest airport in Merida, 300 km away. The bus trip would prove to be as much an adventure as surviving the storm and would take six or seven hours to complete. It would also require nerves of steel on the part of the bus drivers, some of whom seemed barely old enough to drive. Road signs were no longer available to guide the drivers and once again the Guillevin book-light came to the rescue when one bus took a wrong turn and encountered power lines. Joe Kurpe and Doug Hutchinson took control and guided the bus backwards to the nearest junction using the book-lights as roadside markers. There were many sections of the highway that were flooded where locals waited on either side of the flooded sections, sleeping in their cars or trying to hitch a ride with passing vehicles that were able to ford the expanse. It was early Monday morning when the buses finally arrived at their destinations. Half of the ECAO group was transported to the Fiesta Americana in downtown Merida. The other half were taken 30 minutes north of the city, to a coastal resort, until space could be freed up in Merida or flights could be obtained. Merida was becoming a popular place as Cancun tourists and citizens fled toward it in search of shelter.

Eventually the ECAO group was reunited in Merida and the task began to secure flights. Luckily an Air Canada flight was due into Merida Monday night and after hours of negotiating, waiting and keeping our fingers crossed, the ECAO group was on its way back home. Special thanks go out to Debbie DeCaire and Steve Blanchet for their efforts in helping to secure flights and to the management and staff of the Fiesta Americana Grand Coral Beach Cancun for their unwav-

ering dedication to their guests' comfort and safety.

Thanks also to our industry partners, Federated Insurance, Skipwith & Associates Insurance Agency, Guillevin International and Digital Internet Group, for their financial support, and to our seminar leaders, Gerry Skipwith and Debbie DeCaire (Skipwith & Associates Insurance Agency), Geoff Cain (Digital Internet Group), Awad Hanna (University of Wisconsin-Madison), Mauro Di Tullio (Federated Insurance) and Katherine Jacobs (Ontario Construction Secretariat).

The Electrical Contractors Association of Ontario also thanks all the people who sent us their detailed accounts, observations and photographs of the Cancun experience which can be viewed on the ECAO website. Every person has a different take on events, but there are certain constants that always emerge. The unexpected severity and duration of the storm caught everyone, including the authorities, by surprise. Wilma broke all the rules and brought a terrible reality to the concept of "riding out the storm" for everyone. All evacuees have a new understanding and respect for just how wrathful Mother Nature can become. In the face of this new reality, the esprit de corps, resourcefulness and teamwork of the ECAO delegates in dealing with

adversity are also common themes in the participants' accounts. The ability of 50 business leaders and their families to work together as a unit contributed greatly to the eventual happy ending to the Cancun saga. All acknowledge that the outcome would have been much different had it not been for the efforts of the Mexican people who faithfully looked after them when they didn't even know the plight of their own family and friends. The best news is that all ECAO evacuees did make it home safely and as ECAO delegates Dave and Anne Jones pointed out, the experience leaves one with a greater respect for life and "everything around us".



One of David Jones' many hats



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# ECAO'S ANNUAL GENERAL MEETING

ECAO's Annual General Meeting, postponed from the Cancun conference due to Hurricane Wilma, was held November 24 in Toronto. Public Relations Committee Chair, Jack Gibson, began with presentations of the R. H. (Hugh) Carroll Safety Awards. Congratulations to the following member companies on their achievements in safety excellence:

- **Gemor Electric Limited** (Category: Rate Group 704 – up to 50,000 Total Work Hours)
- **Vollmer & Associates** (Category: Rate Group 704 – 50,001 to 200,000 Total Work Hours)
- **S & S Bolton Electric** (Category: Rate Group 704 – 200,001 to 500,000 Total Work Hours)
- **Black & McDonald Ltd.** (Category: Rate Group 704 – over 500,000 Total Work Hours)
- **Comstock Canada Ltd.** (Category: Rate Group 830 – over 50,000 Total Work Hours)

There were no submissions received for Category: Rate Group 830 – under 50,000 Total Work Hours.

Following the safety awards, the 2005 Douglas J. B. Wright Award for contractor contribution and dedication for the betterment of the electrical industry was presented by Wayne Gatien, ECAO's line contractor representative and a former recipient of the award himself. This year's recipient, Peter Bryant, President of Esten Electric Ltd., director of ECAO and chair of the Electrical Trade Bargaining Agency, was unable to attend but was present by way of a photo presentation of Peter's many years of industry involvement. Congratulations Peter!

Retiring directors, Jim Gruber (treasurer), Wayne Gatien (past-president and line contractors' committee) and George Boals (past-president) were recognized for their years of dedication and hard work on the ECAO board. Together these men served on the board for a total of 40 years and held a number of key offices and responsibilities. Their collective experience and individual commitment to ECAO will be missed, but not forgotten.

Following his parting presidential address to the delegates, Dave Mason was thanked by President-elect, Brad Vollmer. Dave Mason was recognized as the quintessential



Outgoing President, Dave Mason (left) receives thanks on behalf of ECAO from incoming President Brad Vollmer.

*[Photo Credit: Milne Studios Photography]*



Mauro Di Tullio, Federated Insurance (left) receives thanks from ECAO Executive Vice-President, Eryl Roberts (right) for his presentation on Federated's "The Right Road" fleet management system. *[Photo Credit: Milne Studios Photography]*



association volunteer for his contribution to the local, provincial and recently, national electrical contractor associations. Dave Mason was presented with a Fred Remington bronze statue. Dave's final act as president was to move a motion that ECAO contribute an additional \$5,000 to the hotel workers who supported ECAO delegates in Cancun.



**ABOVE:** Retiring Directors Jim Gruber, Treasurer (left), Wayne Gatien, Line Contractors' Committee Representative (second from left) and George Boals, Past-President (right) are recognized by ECAO President Dave Mason. *[Photo Credit: Milne Studios Photography]*

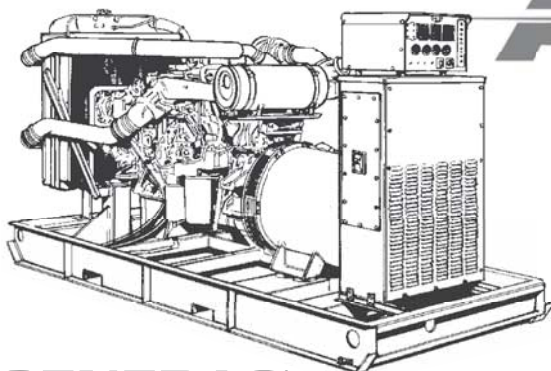
**RIGHT:** Public Relations Chair, Jack Gibson (right) presents the R. H. (Hugh) Carroll Safety Awards to Gerry Snyder, Gemor Electric (left) and Brad Vollmer, Vollmer & Associates (centre). Additional recipients not in attendance are S & S Bolton Electric, Black & McDonald Ltd. and Comstock Canada Ltd. *[Photo Credit: Milne Studios Photography]*



The nominating committee report was accepted as presented, installing the 2005-2006 directors. The new board held its first meeting following the AGM. The 2005-2006 directors are:

Ove Bakmand	Gary Ganim
Rick Ball	Jim Kellett
Gary Beer	Dan Lancia
Fred Black	Dave Mason
Ed Braithwaite	Bill McKee
Peter Bryant	Greg Pahomey
Gary Carr	John Raeppele
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# JUSTIN ARSENAULT AWARDED ECAO SCHOLARSHIP



In recognition of the importance of education and the need to have post secondary graduates enter the construction industry, the Electrical Contractors Association of Ontario established a "scholarship program" in 2004 for children or wards of salaried employees of association member companies.

Justin Arsenault, son of Rob Arsenault, Vice President and Chief Financial Officer at E. S. Fox Limited in Niagara Falls was the first recipient of this award in 2005 and put his \$2,000 towards his studies in Civil Engineering at Queen's University last fall.

In his covering letter to ECAO, Justin wrote, "If I am fortunate enough to receive one of your generous awards, it will assist me greatly in working towards my goal of becoming a professional engineer." Congratulations Justin and good luck!

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\* October 17, 2005 issue of Engineering News-Record (ENR) magazine.

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\*\*\* Accubid's estimating, project management, and service management products won in 1992, 1994, and 1998-2003. Select's CAD products, which were acquired by Accubid in 2004, won in 1987, 1992, 1994, 1998, and 1999.



# CLAIMING CASH-REFUNDABLE TAX CREDITS FOR YOUR EMPLOYEES

By Santino Mariani

**D**id you know that five years' worth of refundable tax credits worth thousands of dollars may be languishing unused in your company's tax portfolio? Or that these tax credits can provide you with cash refunds? If it sounds too good to be true, it is only because many tax credit programs instituted by the Ontario Ministry of Finance are not widely known. Your company may still be able to claim tax credits lying dormant in past years' returns. The programs centre on tax credits for:

- Apprentices employed and trained in a number of recognized trades
- Co-op students
- New graduates of recognized universities, colleges, or other selected institutions

Your company may be eligible for refundable tax credits going back five years, or for any taxation year that is not statute-barred.

All three tax credit programs share a number of key characteristics making them attractive to Ontario enterprises:

- **Cash refund available:** These programs provide cash refunds to eligible taxpayers.
- **Credit for common business activities:** The tax credits are aimed at helping Ontario enterprises with the expenses incurred with the hiring, training and integration of younger members of the workforce.
- **Eligible expenditures easily tracked:** The credits are refundable against salaries, wages and other remunerations paid to the employees.
- **Credits for last five years:** Unclaimed tax credits can still be recovered and applied toward your current tax burden or refunded in cash.
- **Low administrative burden:** The forms and corroborating documentation needed to apply for the credit are minimal, a dramatic difference from other tax credit programs.
- **Available to a wide variety of enterprises:** The tax credits are available to both incorporated and unincorporated business entities.

Below are brief outlines of each of these three programs:

**Apprenticeship Training Tax Credit** – The 2004 Ontario Budget announced a refundable tax credit for an Ontario business hiring and training apprentices in a number of recognized trades. The ATTC reimburses businesses up to 25 per cent of eligible expenses up to a maximum tax credit of \$5,000 per hire for each 12-month period worked for a period not exceeding 36 months. Businesses with payrolls under \$400,000 are reimbursed 30 per cent of eligible expenses. Apprentices that were hired prior to the 2004 budget may qualify for the Co-operative Education Tax Credit, which is described below.

Short-term employment periods, such as summer apprentices can also qualify, subject to the credit limitations noted above.

**Co-operative Education Tax Credit** – The 1996 Ontario Budget announced a refundable tax credit for an Ontario business hiring students enrolled in a recognized post-secondary co-operative education program. The CETC reimburses businesses for 10 per cent of eligible expenses up to a maximum tax credit of \$1,000 for each qualifying placement (generally a four-month work-term) of an Ontario student. Businesses with payrolls under \$400,000 are reimbursed 15 per cent of eligible expenses.

**Ontario Graduate Transitions Tax Credit** – This tax credit is similar in many respects to the Co-operative Education Tax Credit. The 1996 Ontario budget announced a refundable tax credit for an Ontario business hiring students who are newly graduated from a recognized university, community college or vocational school. Employers must meet the government's definition of a "newly graduated" hire in order to qualify. The GTTC reimburses businesses 10 per cent of eligible expenses up to a maximum tax credit of \$4,000 per hire for the first 12-month period worked. Businesses with payrolls under \$400,000 are reimbursed 15 per cent of eligible expenses. This credit has since been eliminated; however, retroactive claims can be made.

*Santino Mariani is a senior tax manager with KPMG with over 10 years' of income tax experience and can be reached by telephone at 416-228-7114. His clients range from owner-managed private companies to large public corporations.*

# IT'S TIME TO FIX YOUR PORTFOLIO WHEN...

By Stanley Tepner

One of the best things about long winter nights is how they entice us to spend more time “cocooning,” which usually means staying inside the warm comfort of your own home. It’s not uncommon for us to use these extended home hours to tend to items that we may have overlooked during the warmer months of the year, such as our personal finances and investment portfolios.

This year, when you sit down to review your portfolios, why not don your “doctor’s cloak” and attempt a diagnosis of its health. You don’t need to go to medical school for this diagnosis; I will lead you through by providing a checklist of warning signs. If you recognize any of these signs, it may be a clear indicator that it is time to do something to fix your investment portfolio.

**1. There are so many individual holdings in the portfolios that you’ve lost track of what they are, and why you own them.** Years ago I wrote an article entitled, “The Mutual Fund Candy Shop.” It discussed the similarities between selecting mutual funds for an investment portfolio, and selecting candies for a bag of bonbons. The candy shopper is taking one of these, and one of these, and a couple of those, and so on, not wanting to miss a single enticing flavour. Too many investors adopted the same approach and loaded up their portfolios with the “flavour of the day;” many still have all or most of these flavours. If you can’t follow everything you own (and that means every stock, bond, mutual fund, hedge fund and the like), or if you can’t explain exactly why you own every security you have, then you have a major portfolio problem.

**2. There are a lot of “loser” positions in your portfolio.** Why do people keep their losers and sell their winners? Most of it is psychological. The common thinking is, “if I don’t sell it, then I haven’t had to admit a loss.” So too many people hold on to their losers in hope that they eventually return to what they paid for the security. Then they can sell it without having to admit that they “took a loss.” Realistically, however, when you look at any investment, profitable

or not, it is worth what it is worth. Because of that, you should only own investments that have the best overall chances of appreciating, and fit within a properly constructed, diversified portfolio. You have to ask yourself a simple question: “if I have cash, would I buy that (losing position) today?” If you wouldn’t buy it today, then you should probably sell it today and place your money in something that has more upside potential.

**3. The fees you pay are higher than your returns.** This is an obvious problem. Just remember to include both visible and invisible fees in your analysis of costs.

**4. There have been frequent changes made within your portfolio.** This is not necessarily a symptom of a problem, but it is at least an alert to potential problems. When lots of changes are taking place, you have to ensure that they are not done as “commission grabs” by advisors, nor are they recklessly subjecting you to unnecessary capital gains taxes that could have been deferred.





**5. Your portfolio is full of last year's hottest investments.** This is a really scary symptom of poor investment management. Too many people base their "buy" decisions based on last year's most successful investments. Too many investment advisors recommend last year's top performers. The problem is that rarely do these performers "re-perform." Think of the swarms of investors to high tech stocks and mutual funds in the first quarter of 2000. These individuals saw their values drop precipitously. Often the best investments to buy are those that had historically been top performers, but had recently gone through a period of under-performance. They may well be on the cusp of seeing their best ideas come to life in the near future. They had lots of great ideas in the past. It's psychologically easier to buy something that is "hot" versus something that is "cold," but the "cold" item could prove to be the better selection.

**6. Too much of your portfolio is concentrated in one or more names.** This problem is the corollary of #1 above. As you concentrate your assets, you increase the riskiness of the portfolio, because when bad things happen to a very large asset, it really hurts the overall portfolio.

**7. No thought was given about how to structure your portfolio to minimize income taxes.** There are numerous strategies that could be used to minimize income taxes, including the use of corporate-structure mutual funds (instead of the traditional trust-structure funds) in your non-registered accounts (RRSPs, RRIFs and LIRAs are "registered" accounts); the corporate-structure funds allow you to switch around a family of funds without triggering a taxable capital gain. A perfect example of how you might use this: say you felt the Japanese market was the place to be and invested \$20,000 in a Japanese corporate-structure fund; two years from now your investment doubles and you want to move it to a different fund in the corporate family. With trust-structure funds, the switch is a taxable event; with corporate-structure funds, the switch is tax deferred. Other tax minimization strategies affect whether you own interest-paying investment inside or outside of registered accounts. It is important to determine the tax impact on each kind of investment before deciding where they should be placed. Fortunately, you can re-align investments by swapping them between registered and non-registered accounts.

**8. Your investments don't truly represent your personal view of the world, nor your appetite for risk.** When was the last time you truly assessed what kind of investment best represented both where you felt the world was heading, and what kind of risk you were comfortable with. There are several exercises you ought to embark upon to help answer these two questions. There are questionnaires and personal evaluation techniques that you should spend some time with. The results may astound you, and ought to lead to better investment portfolios that truly reflect your views and circumstances.

So take advantage of the long winter nights to do a proper self-diagnosis of your investment portfolio. You may need to perform some minor or major surgery, and take on some new prescriptions, but you'll feel a lot better in no time.

*Stanley M. Tepner, MBA, CA, CFP, TEP, is a First Vice President and Investment Advisor with The Tepner Team at CIBC Wood Gundy in Toronto. He can be reached by telephone at 416-229-5566 or 1-800-488-8688 or by e-mail at stan.tepner@cibc.ca. The views of Stanley Tepner do not necessarily reflect those of CIBC World Markets Inc.*

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# SHOULD YOU INVEST IN GPS?

By Wayne Candy

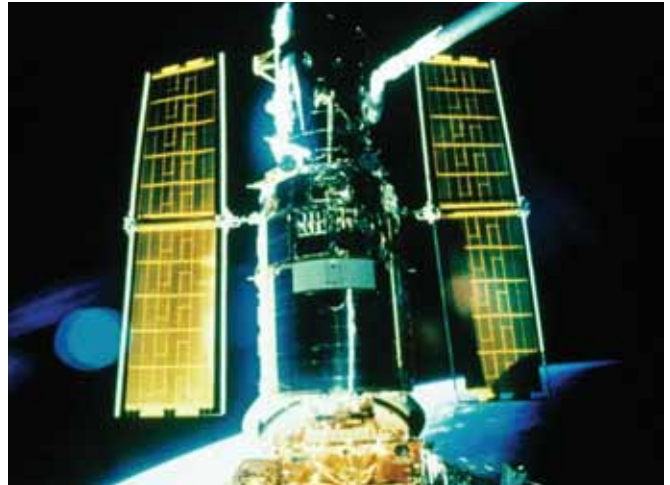
**T**he quest to make business processes faster, cheaper and more efficient is relentless.

Monitoring the performance of field staff and vehicles has been predominantly a paper chase, reliant upon manual inputs and countless man-hours spent attempting to compile all the separate information into some form of concise reporting.

With wages, overtime, benefits, vehicle leases or depreciation, fuel, insurance and maintenance typically ranging around the \$80 per hour/per vehicle mark, field assets are a cost centre that may comprise the largest expense in your business and yet has the least amount of hard data to make informed management decisions.

One technology that is rapidly and broadly being deployed is the use of GPS or the Global Positioning System as a method to capture and automate the recording of critical data on staff and vehicle performance.

The GPS constellation of 24 satellites was put in place and is maintained by the US military. These satellites send a “ping” or signal to the earth once per second. GPS receivers mounted in vehicles latch to these satellites, triangulate and record vehicle activity based on time, speed and location. The availability, content and granularity of reporting are determined by the type of GPS system selected and the software used to generate the reports.



## *Applications for GPS Data*

- Customer service – Verify start/stop times, reduce billing errors, and perform client profitability to man-hours analysis.
- Risk management – Monitor and correct problem driving behaviors (speeding, harsh braking, idling), reduce accidents, unauthorized after-hours vehicle use and moonlighting. Breadcrumb trail of accident occurrences.
- Routing – Optimizing routes results in lower fuel costs and overall vehicle maintenance. Automate dispatching and contact drivers more efficiently.
- Maintenance/Fuel – Automate preventive maintenance schedules, reduce idling, improve fuel economy and extend vehicle life.
- Back Office Processes – Reduce paper work (time cards/payroll), reduce overtime, accumulating vehicle data for maintenance.
- Monitor Power Take Offs (PTOs) or auxiliaries – Comparative of PTO activity to idling, reducing excess idling and in Ontario monitoring activity for the provincial fuel tax rebate program.



### *Are you Passive or Real Time?*

One of the first decisions is to choose between an active (real time) or passive system. Active or live systems allow for "near real time" tracking of vehicles and send the data back by satellite or over a wireless network, like your cell carrier. Therefore there is a monthly fee.

Passive systems collect the location data in the same way but because it isn't sent over a wireless network there is no monthly charge. Trip data is downloaded from a key fob or through a 900 MHZ wireless transfer when a vehicle returns to home base. Both systems incur hardware and installation charges. The main factor in selection is to determine how dynamic your fleet activities are. If your vehicles are primarily routed with minimal changes to their schedules throughout the day, passive GPS is likely the best fit. If you are in a highly dynamic environment (vehicles continually respond to emergency breakdowns), live or "near real time" should be given consideration. In most cases you will still have to contact the individual vehicle to determine if they are or will shortly be available to dispatch.

Competitive forces in the marketplace have driven prices lower and you should expect to pay \$700-\$1,100 for vehicle hardware, plus installation. If you go live then you can expect monthly data plan charges from your cell carrier of anywhere from \$30-\$60 per month on top of the initial hardware and installation costs. Leasing the hardware and software is an option.

The reporting software will determine further costs. If you choose a "web enabled" solution, where your information is hosted on the web, make sure the GPS vendor is established and financially stable. In the event that they fail, you will lose access to your data and your hardware investment will be out the window. The most secure investment has your data residing on your equipment, with no reliance on outside storage.

With all the costs involved, solid GPS management of your fleet can result in significant savings and should show return on investment in less than six months.

*Wayne Candy is the president of Mobilizz Inc. and can be reached by e-mail at [wcandy@mobilizz.com](mailto:wcandy@mobilizz.com). Mobilizz specializes in tools for field asset management. For further information visit [www.mobilizz.com](http://www.mobilizz.com).*



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# DO PROFESSIONAL ENGINEERS KNOW THE ELECTRICAL SAFETY CODE?

By Peter Marcucci, P.Eng.

Over 60 per cent of electrical plans submitted to the Electrical Safety Authority (ESA) do not meet the requirements of the *Electrical Safety Code*. Plans prepared and submitted by professional engineers for regulatory approval frequently contain errors and deficiencies associated with cable sizing, over-current protection and ground-fault protection. Are engineers making reasonable provision for the safeguarding of life, health or property?

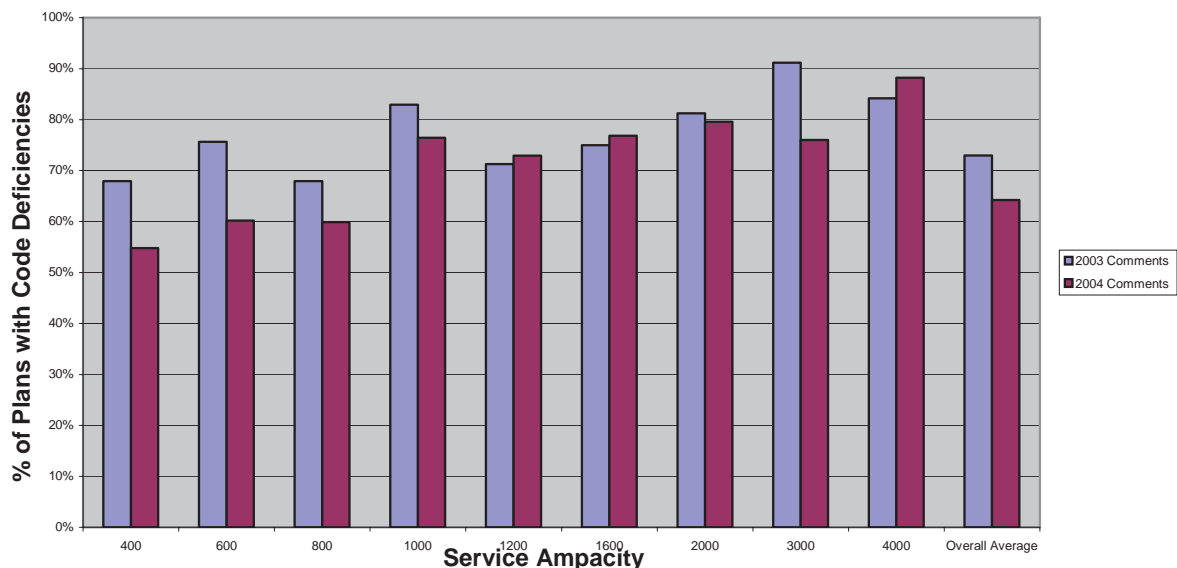
Recent issues of *Engineering Dimensions* have highlighted the debate that rages on over the *Building Code Statute Law Amendment Act* and the requirement that engineers demonstrate a minimum understanding of the *Ontario Building Code (OBC)*.

However, in addition to the OBC, several other Ontario acts and regulations require plans to be submitted to regulatory authorities for review or approval. Included are plans for boilers and pressure vessels, amusement devices, elevators and electrical installations.

In the case of electrical installations, plans are submitted to

ESA, a not-for-profit corporation with regulatory responsibility for electrical safety in Ontario. When Ontario Hydro was restructured into a number of separate companies in 1999, ESA assumed responsibility for the electrical safety activities previously handled by Ontario Hydro's electrical inspection department. The *Safety and Consumer Statutes Administration Act (SCSAA)* and an administrative agreement with the Ministry of Consumer and Business Services establish the legal framework for ESA's operation as an administrative authority. In addition to the SCSAA, ESA is designated by Ontario Regulation 89/99 as being responsible for the electrical safety requirements of the *Electricity Act*, 1998 (Section 113) and the regulations made thereunder. Ontario Regulation 164/99, as amended, adopts, by reference, the *Canadian Electrical Safety Code (CESC)*, together with specific Ontario amendments, and is referred to as the *Ontario Electrical Safety Code (OESC)*.

The OESC, with some exemptions, establishes the administrative and technical requirements that apply to electri-





cal installations and equipment in all types of buildings and associated structures in Ontario. These administrative requirements include the need to file an application for inspection and to have electrical installations inspected. They also include requirements for authorizing connections, maintaining records of electrical work, reporting serious electrical incidents, approving electrical equipment, and submitting plans and specifications.

### Submitting electrical plans and specifications

Rule 2-010 of the OESC deals with plans and specifications. For certain types of electrical installations, Rule 2-010 (1) prohibits the commencement of work on an electrical installation until the plans have been reviewed and approved by the ESA (unless a deviation to this requirement is granted).

Further, Rule 2-010 (2) of the OESC requires the plan's author or firm to submit the plans. Rule 2-010 (2) was introduced in 2002. Prior to that, the contractor was responsible for obtaining approval of electrical plans.

### Are engineers required to submit electrical plans?

Since 2002, most engineers have been submitting electrical plans directly (as required by Rule 2-010) rather than having clients or contractors do so. However, some engineers or engineering firms have questioned this requirement. PEO has confirmed that preparing electrical plans and specifications falls within the definition of professional engineering under the *Professional Engineers Act* (PEA) and the scope of practice of a professional engineer. Subject to any exceptions provided for in the PEA, this requires the plans to be prepared by, or under the supervision of, a professional engineer.

Further, the PEA, through section 72(2)(d) of Ontario Regulation 941, requires all engineers to make respon-

sible provision for complying with "applicable statutes, regulations, standards, codes, by-laws and rules." This includes the OESC. So, under these circumstances, a professional engineer who is the author of such plans, or the engineer's firm, is required to submit plans to ESA. Failing to comply with the OESC requirement to submit plans might be viewed as a professional misconduct under the PEA. (For information on plan submission requirements, refer to ESA Bulletins 2-11-11 and 36-1-16).

### Quality of plan submission

From January 1, 2004 to October 8, 2004, ESA received over 1,950 plans submissions. ESA's goal is to complete the review and approval process within two weeks. During this period, the average turnaround time for low-voltage plans (under 750 volts) was about 6.5 business days. During eight weeks in May and June 2004, the turnaround time was more than 10 working days,

the longest turnaround being 11.7 days. The average turnaround time for high-voltage plans was fewer than four days. ESA also has a process in place to deal with rush requests. Incomplete submissions, or submissions with errors and deficiencies invariably result in delays in review and approval beyond the target turnaround times.

ESA has also tracked the type and numbers of drawing deficiencies and has shared this information with PEO. Unfortunately, this tracking has highlighted some disturbing results. From September 2003 to August 2004, 2,295 plans were submitted to ESA and 69 per cent had technical deficiencies. PEO and ESA share concerns about this statistic. Are engineers who are responsible for electrical plans living up to their obligations with respect to code compliance and hence making "reasonable provision for the safeguarding of life, health or property?"



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**TABLE 1**


Common Drawing Defects			
Rank	OESC Rule	Defect Type	Frequency
1	Rule 14-606	With the overcurrent device sized at XX A on the primary of the XX kva transformer, the secondary panel must be sized as per Rule 14-606 (2).	28
2	Rule 4-004(1)(d)	The ampacity of the conductors from the pad mount transformer must be sized as per Rule 4-004(1)(d).	8
3	Rule 8-104	The ampacity of conductors supplying a panel shall meet the requirements of Rule 8-104.	7
4	Rule 26-258	The ampacity of the conductors connected to the secondary of the transformers shall meet the requirements of Rule 26-258.	6
5	Rule 26-256	On the primary side of the transformer, the overcurrent device shall be rated or set at not more than 125 per cent of the rated primary current of the transformer.	5
6	Rule 14-012	Drawing indicates fusing will be installed in the secondary board. All Class R fuse holders used on circuit in excess of 10 kA of available fault current, shall be equipped with fuse rejecters to prevent non Class R fuses from being installed.	5
7	Rule 12-012	The underground installation shall be identified as detailed in Bulletin 12-2-13.	5
8	Rule 14-102	Please note that Rule 14-102 requires ground fault protection on grounded services less than 150 volts to ground and 2000 amperes or more. It is the responsibility of the consultant, electrical contractor and switchgear manufacturer to co-ordinate the ground fault sensing method with each particular grounding arrangement.	4
9	Rule 26-700(11)	Receptacles located in bathrooms or washrooms and installed within 3 m of washbasins shall be protected by a ground fault interrupter.	3
10	Rule 14-606 (1)	Every panelboard shall be protected on the supply side by overcurrent devices having a rating not greater than that of the panelboard.	3
11	Rule 26-710	All stairwells shall have at least one duplex receptacle in each 10 m of length or fraction thereof.	3
12	Rule 36-214	(Tiebreaker installation) The main secondary breakers have no visible means of isolation or are not of a drawout type.	3



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## Common plan deficiencies

ESA plan approval staff have indicated that the most common errors and deficiencies in plans prepared and submitted by professional engineers are associated with cable sizing, overcurrent protection and ground-fault protection. To provide a better assessment, 90 drawings submitted by professional engineers were tracked to identify the most common errors. The top 12 errors, in descending order of frequency, are identified in Table 1.

Additionally, ESA has identified concerns about the quality of ground-potential rise and step-and-touch potential submissions in accordance with Rule 36-304 of the OESC. Given the extent of the deficiencies in some of these submissions, one might question the technical competence of the engineers responsible. Undertaking work that a practitioner is not competent to perform by virtue of the practitioner's training and experience falls within the definition of professional misconduct under the PEA. In other cases, it appears that computer-generated reports are being submitted with little or no review by the engineer or understanding of the results. PEO's guideline, *The Use of Computer Software Tools by Professional Engineers and the Development of Computer Software Affecting Public Safety and Welfare*, clearly establishes that engineers are responsible for verifying that results obtained from software are accurate and acceptable.

## When should drawings be sealed?

There is also a wide variance in practice associated with the sealing of drawings. PEO's practice bulletin, *The Use of a Professional Engineer's Seal* (January 2005), provides guidance in this area: "Seals must be affixed to final drawings, specifications, drawings or sketches accompanying change notices and site instructions, and studies containing technical information or engineering direction. The seal is also applied to forms for government or regulatory authority use." In this situation, drawings submitted to a regulatory authority should be sealed. This includes plans submitted to ESA for approval.

## What should engineers do?

Professional engineers responsible for electrical plans should:

- Understand their duties and obligations under the PEA, Regulation 941/90, PEO's practice guidelines, and the OESC.
- Ensure they are familiar with the technical requirements of the OESC, especially in those areas that have been identified in this article.
- Use the current edition of the OESC. The OESC includes all of the text of the CEC Part I, plus the Ontario admin-

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istrative and technical amendments (which in some cases override the CEC).

- Subscribe to the OESC bulletins. The bulletins provide in-depth information on the OESC, particularly for engineers, electrical contractors and electricians. They include additional guidelines and interpretations of the OESC and electrical safety flash notices. Bulletins are one way an engineer can keep up to date on OESC matters. The OESC and bulletins can be purchased online at [www.esa-safe.com](http://www.esa-safe.com).
- Contact an ESA technical advisor or code engineer to seek clarification on the requirements of the OESC. Their names and contact information are included in the bulletins.
- Purchase a copy of the *Canadian Electrical Code Handbook*, published by the Canadian Standards Association. This handbook provides additional information on the electrical code rules, including their intent and rationale.
- Improve their knowledge of the OESC. Code courses or seminars are offered by many organizations, including ESA, the Canadian Standards Association, universities, community colleges and other training providers.

- When using computer programs to assist in their work, engineers should be aware of engineering principles and correctly interpret and apply the results provided by software programs.

### The next step is up to you

PEO, as the regulator of engineering practice, is responsible for ensuring that engineers live up to their obligations under the PEA. ESA, as the regulator of electrical safety, is responsible for ensuring that electrical plans and installations meet the requirements of the OESC. Our obligations intersect in our common responsibility for public safety. Both organizations have agreed to work together to improve the quality of electrical plans submissions. As regulatory bodies, we have various tools at our disposal, which include building awareness, providing or promoting education, seeking additional regulations, and initiating discipline or other compliance actions. Creating awareness among engineers is our first step to addressing the problem. The next step is up to you.

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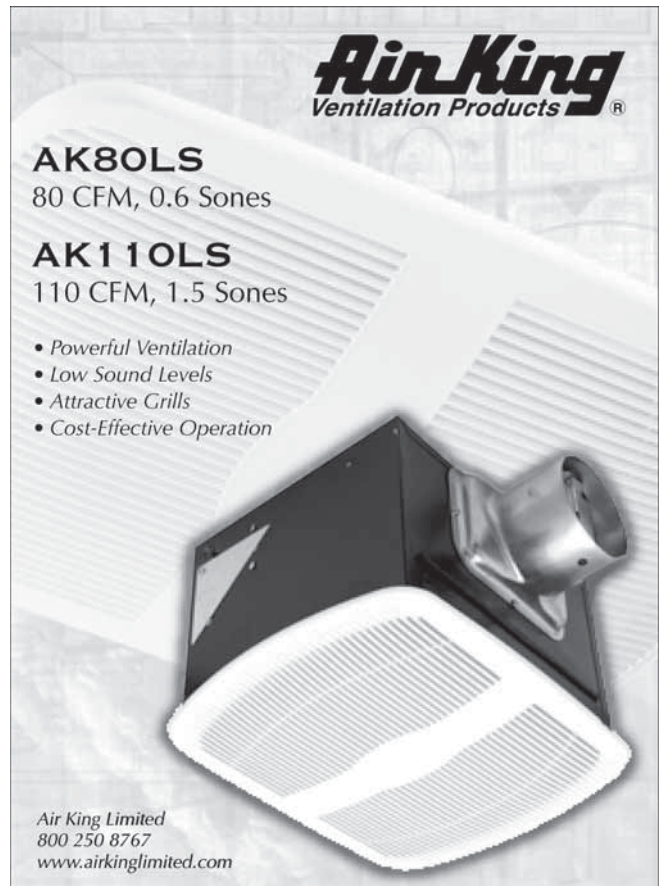


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# 009: ASSURED GROUNDING

An assured grounding program is a formal program for inspecting:

- Equipment connected by cord and plug and available for use.
- Portable cords.
- Receptacles that are not part of the permanent wiring of the structure.

## The inspections require:

- Visual checks of equipment for physical damage or defects, per a specific schedule.
- Continuity tests to ensure the grounding conductors are electrically continuous.
- Tests to ensure the equipment grounding conductors are connected to the proper terminals.

## The specific schedule for inspections is:

- Before the day's first use.
- After any repairs.
- After any suspected damage and before subsequent use.

These inspections are all your responsibility, except those performed by your tool crib – if you have one on site. If the tool crib does perform continuity checks and inspections, you add an extra measure of safety by doing a visual inspection once you

arrive at your specific work location. Additionally, OSHA requires your company to ensure the equipment undergoes inspection at three-month intervals.

## Other facts

The use of GFCI devices does not eliminate the need for an assured grounding program. The lack of an assured grounding program requires the use of GFCI devices.

The National Electrical Code prohibits using assured grounding program in lieu of GFCI protection, but OSHA does not. The combination of assured grounding and GFCI adds an extra measure of protection.

Both an assured grounding program and a GFCI program require inspection and testing. The assured grounding program simply requires more of these.

Neither an assured grounding nor a GFCI program will protect you against a line to line or line to neutral short. They will protect you only from a ground fault.

Most assured grounding programs use a quarterly or monthly colour tag or tape to allow quick visual confirmation of inspection.

If your company does not have an assured grounding program, you should still employ the principles of such a program. That is, check equipment before you use it. Look for insulation damage, missing ground plugs, and broken ground wires.

If your company does have an assured grounding program, you can add an extra measure of safety by using GFCI equipment when it's available and testing such equipment prior to first day's use.

## Demonstration

Have a crewmember demonstrate ohmic testing of a portable cord to ensure the grounding conductor is not broken inside the cord. Note that you can obtain a good reading on a break if the cord is in the right position. Thus, a good test requires flexing or wiggling the cord.

*This Tool Box Talks article is reprinted with permission from 100 Safety Training Toolbox Talks for Electrical Construction Work, 2003, National Electrical Contractors Association (US). The complete set of 100 Toolbox Talks is available on CD-Rom for \$270 CAD or \$200 for CECA members. Go to <http://www.ceca.org/english/publications.html> to order, refer to Cat. #5059.*

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# Industry Briefs

## SPECTRUM POWER SYSTEMS REPRESENTS POWERWARE

**R**ob Wollner, vice president of Eaton Power Quality Limited, recently announced that effective October 3, 2005 Spectrum Power Systems have been appointed as the manufacturer's representative for Eaton's Powerware brand of UPS products and service sales for the GTA, Niagara Peninsula and Southwestern Ontario districts.

The Spectrum Power Systems team consists of AJ Bajwa, Greg Ireland, Rob Harrison, Jeff Marshall, Gary Thompson, Laura Sinclair and Lisa Tran (inside sales). AJ and his team will provide the additional support required to improve the level of service throughout this region and provide an increased awareness at both the contractor and the specifier level.

For further information, call 905-405-9791.

## ESA COURSES

The Electrical Safety Authority has released its 2006 Spring Training schedule. Courses to be held at the Metro Territory Office at 155D Matheson Blvd. West, U102 in Mississauga include:

Course	Date	Time
Grounding & Bonding	February 8	6 p.m. – 10 p.m.
Residential Installations	February 23	8:30 a.m. – 12:30 p.m.
Lock Out/Tag Out	March 3	8:30 a.m. – 12:30 p.m.
Conductors	March 28	8:30 a.m. – 12:30 p.m.
Safety in a High Voltage Environment	April 7	8:30 a.m. – 12:30 p.m.
HVAC Installations	April 13	6 p.m. – 10 p.m.
Industrial High Voltage	April 19	6 p.m. – 10 p.m.
Motor Installations	May 5	8:30 a.m. – 12:30 p.m.
Industrial Low Voltage	May 17	8:30 a.m. – 12:30 p.m.
Hazardous Locations	May 31	8:30 a.m. – 4:30 p.m.
Available Fault Current	June 7	6 p.m. – 10 p.m.

To register for courses telephone 1-877-372-7233. For course information and further details visit [www.esasafe.com](http://www.esasafe.com)

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# Index to Advertisers

## Benefits/Pension Consultants

Eckler Partners Ltd. .... 11  
Toronto, ON

## Breakers

Lizco Sales ..... 4  
Tillsonburg, ON

## Concrete Cutting

The Graff Company Ltd. .... 28  
Brampton, ON

## Concrete Products

Brooklin Concrete Inc. .... 13  
Newmarket, ON

## Contracting Software Products

Accubid Systems Ltd. .... 16  
Concord, ON

## Contractors

Carlton Electric Ltd. .... 30  
Ottawa, ON

## Control Components, Equipment & Systems

W.A. Electric Controls Ltd. .... 21  
Peterborough, ON

## Control Systems

Celco Controls Ltd. .... 24  
Winnipeg, MB

## Demolition

The Graff Company Ltd. .... 28  
Brampton, ON

## E-Business Solutions

Digital Internet Group ..... 25  
London, ON

## Electrical Contractors

D.J. Mason Electric  
Company Limited ..... 30  
Hamilton, ON

## Electrical Safety

Electrical Safety Authority .... 24, 25, 26  
Mississauga, ON

## Electrical Suppliers

Gerrie Electric ..... Outside Back Cover  
Burlington, ON

## Electrical Test & Measurement Instruments

AEMC Instruments ..... 23  
Dover, NH

## Electrical Wholesalers

Trade Electric/Sonepar Canada ..... 3  
Concord, ON

## Fire Alarms

Edwards ..... Inside Front Cover  
Owen Sound, ON

## Generator Systems

Sommers Motor  
Generator Sales Ltd. .... 29  
Tavistock, ON

Total Power Ltd. .... 15  
Mississauga, ON

## Government Relations Consultants

The Lyons Group ..... 27  
Toronto, ON

## Industrial Manufacturers/Suppliers

3BM Industries Ltd. .... 28  
Toronto, ON

## Infrared Cameras

Flir Systems Inc. .... 12  
Burlington, ON

## Insurance Agencies

Federated Insurance  
..... Inside Back Cover  
Toronto, ON

## Skipwith & Associates

Insurance Agency Inc. .... 29  
Port Perry, ON

St. Paul Gaurantee ..... 19  
Toronto, ON

## Labour & Employment

Stringer, Brisbin, Humphrey  
Management Lawyers ..... 21  
Toronto, ON

## Law Firms

Macleod Dixon LLP ..... 27  
Toronto, ON

## Lawyers, Labourers, Employment/Management

Stringer, Brisbin, Humphrey  
Management Lawyers ..... 21  
Toronto, ON

## Lighting Control Systems

Cristal Controls ..... 30  
Quebec City, ON

## Management Lawyers

Stringer, Brisbin, Humphrey  
Management Lawyers ..... 21  
Toronto, ON

## Manufacturers

Thomas & Betts ..... 6  
Montreal, QC

## Nursecall

Edwards ..... Inside Front Cover  
Owen Sound, ON

## Power Quality

Eaton Power Quality Limited ..... 9  
Toronto, ON

## Scrap Metal Recycling

Langille's Scrap and Cores ..... 30  
Brooklyn, ON

## Security

Edwards ..... Inside Front Cover  
Owen Sound, ON

## Sprinklers

Edwards ..... Inside Front Cover  
Owen Sound, ON

## Thermal Heat/Portable Printers

W.H. Brady Inc. .... 30  
Richmond Hill, ON

## Transformers

Synergy Energy ..... 8  
Richmond Hill, ON

## Transformers Oil/Dry

Lizco Sales ..... 4  
Tillsonburg, ON

## Union/Management Relations

Pathe Gardner & Associates Inc. .... 8  
Markham, ON

## Ventilation Manufacturers

Air King Ltd. .... 26  
Brampton, ON

## X-Ray & Radar Scanning

The Graff Company Ltd. .... 28  
Brampton, ON

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