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ASSOCIATION OF ONTARIO

Volume 43 • Number 3 • Summer 2005

Company Running With  
Renewable Energy

Putting Safety Ahead

Skilled Trades Expos  
Hit The Road



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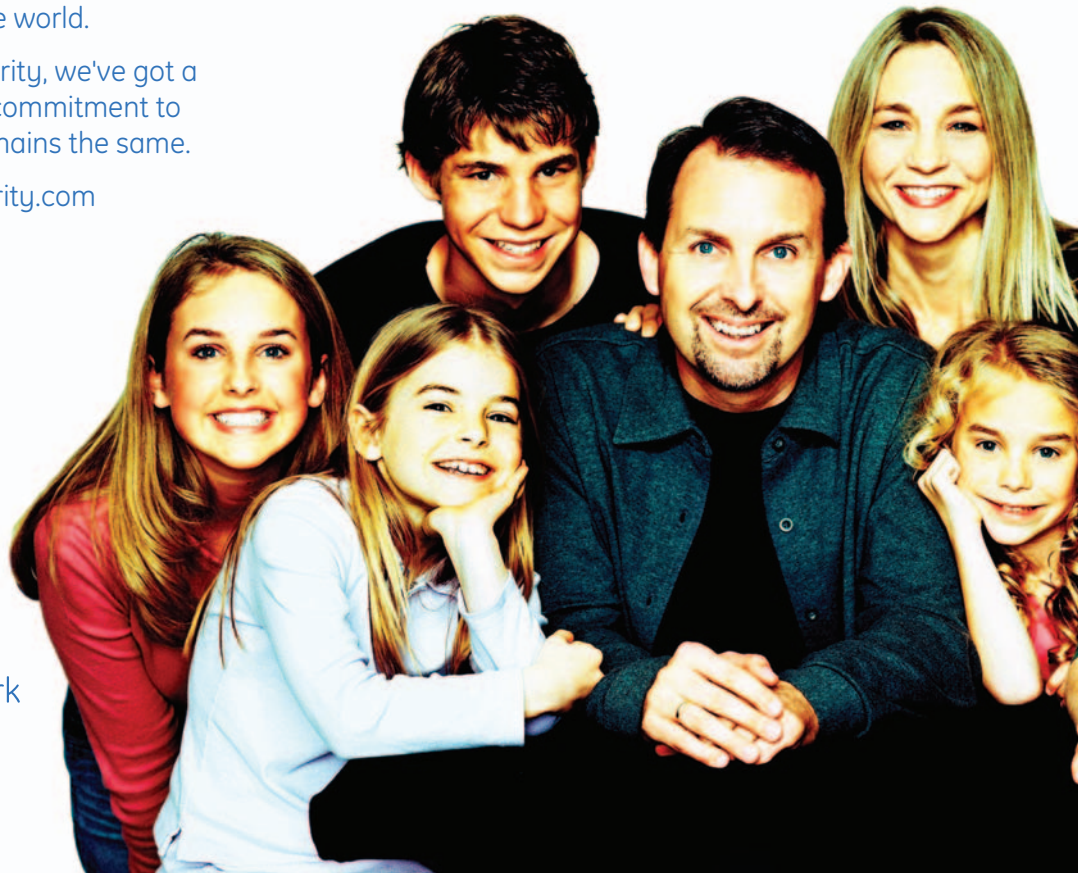
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# The Ontario **ELECTRICAL CONTRACTOR**

Volume 43 • Number 3 • Summer 2005

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**On the Cover:** The Ontario Electrical Construction Company's office at 7 Compass Court in Scarborough is the first commercial building in Ontario capable of operating off the hydro grid via renewable energy.

The Ontario Electrical Contractor is published quarterly for:

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# President's Message

## INNOVATION, PROFESSIONALISM AND QUALITY

**T**his month's issue begins with an intriguing cover story about alternate energy and electrical contracting. It's not what you would expect. It's not just about a contractor selling energy conservation and green power to his customers, it's about the "greening" of the contractor's business itself, generating both environmental and economic rewards. On March 17th, Ontario Electrical Construction Company Limited's head office became the first commercial building in Ontario capable of operating off the grid via renewable energy. By practicing what they preach, Ontario Electric is bringing micro-generation and renewable energy into the mainstream of commercial electrical construction.



By Dave Mason

In addition to innovation, electrical contractors are known for their professionalism and quality of work. To a growing extent, professionalism and quality means putting safety and skills training first. In his article, *Moving Safety Forward*, Rick Mei stresses the importance of keeping your occupational health and safety program dynamic and up-to-date. A safety program that does not evolve with changing times and conditions will become less effective and expose the contractor to increasing risk. Rick Mei is a representative of the Quality Connection Occupational Health & Safety Program which is available exclusively to ECAO members. As a "Quality Connection" contractor myself, I can attest to the value of this essential business tool.

Our financial advisor, Stanley Tepner, returns to this issue with a completely different take on safety with his article *Practicing Investment Safety*. Everything you need to know from piggy banks to PPNs is included in Stanley's laddered approach to investment safety.

Rounding out the safety and training theme, regular contributor Ted Olechna, ESA's Provincial Code Engineer, discusses *Protection of Circuits and Apparatus* and the Toolbox Talks covers *Arc Welding*. And finally see Gary Lehman's article and photo essay on Future Building 2005 and the Ontario Technological Skills Competition held recently.

As always, I welcome your comments on any issue you have read about or would like to see covered in our magazine. Enjoy summer safely!



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## SCARBOROUGH COMPANY RUNS OFFICE WITH RENEWABLE ENERGY CAPABILITIES

By Angela Altass

The Ontario Electrical Construction Company Limited, located at 7 Compass Court in Scarborough, is getting a lot of attention lately by offering a wind-solar power system to its customers. However, renewable energy isn't just something that the staff of the Ontario Electrical Construction Company is talking about; it is something they are making use of themselves.

The company held an official green ribbon-cutting ceremony on March 17 to celebrate being the first commercial building in Ontario capable of operating off the hydro grid via renewable energy. Donna Cansfield, parliamentary assistant to the Minister of Energy, was on hand to help cut the ribbon.

"We are receiving a lot of support from the energy ministry's office," said Howie Elliott of the Electrical and Renewable Energy Sales Department at Ontario Electrical Construction Company Limited. "We have also stirred up interest from Toronto Hydro. We feel as the electrical utility rates keep soaring, people will be more in tune to ways of conserving power without losing all their amenities."

Their renewable energy product is beneficial to any size building or business, especially the retail sector, added Elliott.



"In the retail sector, with their point of sale (POS) systems, if they were to go down, the retail business could not finish transactions and maybe lose business in the future," he remarked. "We are a turnkey operation. We will sell, engineer, install, meter and commission the product and after installation we can maintain the system as well. Our team of professionals can assist customers with design, technical expertise, permits and all engineering requirements for a total turnkey renewable energy solution. We

**continued on page 10**

### ELECTRICITY FACTS

With electricity increasingly in the news, here are a few key facts about Ontario's demand and supply to provide a little perspective:

- Ontarians are currently among the largest consumers of electricity in the world.
- Residential users account for nearly 31 per cent of our electricity consumption. Industrial users account for just under 32 per cent and commercial users just over 37 per cent.
- The average Ontario household uses 10,000 kilowatts of electricity per year. Generating that power produces emissions similar to driving a car 10,000 km.
- Ontario's electricity supply comes from a variety of sources: nuclear generation accounts for 35 per cent of supply, hydro for 25 per cent, coal for 25 per cent, and oil and gas provide 14 per cent. Renewable sources currently account for less than one per cent.
- Ontario is facing an electricity supply-demand challenge: As coal-fired generation is taken out of service by 2007, and existing nuclear plants approach the end of their operational life spans, we'll need to replace as much as 80 per cent of our current generating capacity over the next 15 years.
- The Ontario government has signed contracts for 10 renewable energy projects, including five wind projects. These projects will produce 395 MW of electricity – or enough power for over 100,000 homes.

For more information, visit the Ontario Ministry of Energy website at [www.energy.gov.on.ca](http://www.energy.gov.on.ca) or call 1-888-668-4636.  
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haven't experienced any real hurdles with this product. We do feel that the government needs to include more funding for the public sector, such as schools and hospitals, which could really benefit from our product. The schools could have the monitoring of

the renewable energy as part of their curriculum."

Since the installation of the system at their own office, Ontario Electrical Construction Company Limited has been very pleased with the results.

"It has been better than anticipated,"

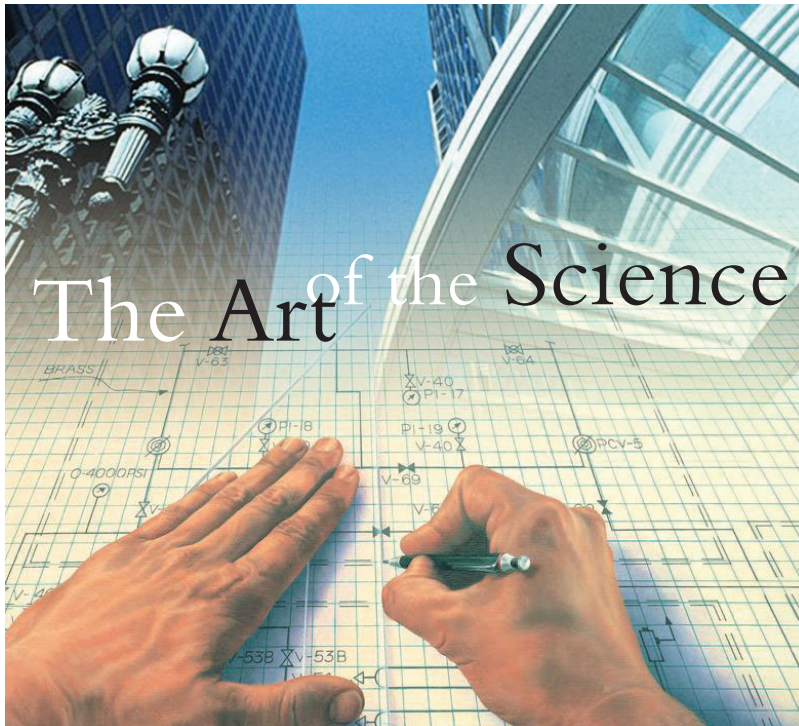
commented Elliott. "We are able to harness enough power through renewable sources that we can run our entire business off grid four to eight hours per day during the week during peak time and eight to fourteen hours on weekends."

This "green power" that is running the Scarborough office off grid is a hybrid system comprised of wind turbines and a solar array. The system includes a weather station complete with fully integrated software for complete power consumption, profiling all the inputs/outputs of the wind-solar-utility power systems.

"As a contractor in the industry we have seen an increased demand for electrical power and the need for renewable energy sources has become even more important than ever," said Elliott. "With positive vision, we have taken this energy and harnessed it for our own building. We started with a .55 KW wind/solar array in place that ran our computer and phone systems. Since putting that small system on-line we have enjoyed clean, uninterrupted power and no downtime through several short power outages. We believe our new and much larger system to be another step toward lessening the demand on the power grid and ensuring the smooth operation of our business."

Ontario Electrical Construction Company Limited is familiar with provincial and federal incentive programs that make a renewable energy system financially attractive as well as ecologically being the correct decision, commented Elliott.

Further information on Ontario Electrical Construction Company Limited's renewable energy product is available by visiting [www.onelec.com](http://www.onelec.com), e-mailing [info@onelec.com](mailto:info@onelec.com) or calling 416-363-5741.



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# UPCOMING EVENTS

**Electrical Safety Authority  
2005 Annual General Meeting  
and Electrical Safety Forum**

Mississauga Convention Centre  
Mississauga, Ontario,  
September 14, 3:30-8 p.m.  
Featuring  
Michael "Pinball" Clemons

**Electrical Contractors Association  
of Ontario**

**2005 Industry Conference**

Fiesta Americana  
Grand Coral Beach  
Cancun, Mexico,  
October 16-23  
[www.ecao.org](http://www.ecao.org)

**Canadian Electrical Contractors  
Association**

**2006 National Conference**

The Fairmont Empress  
Victoria, British Columbia,  
June 21-24  
[www.ceca.org](http://www.ceca.org)



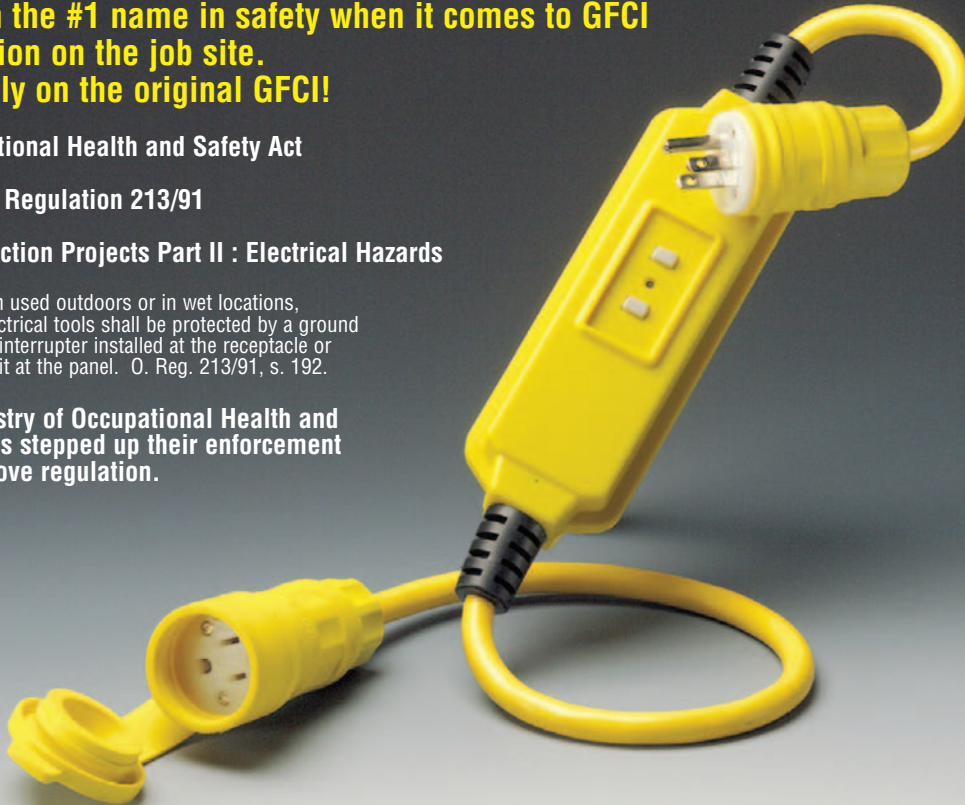
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- Construction Projects Part II : Electrical Hazards

**192.** When used outdoors or in wet locations, portable electrical tools shall be protected by a ground fault circuit interrupter installed at the receptacle or on the circuit at the panel. O. Reg. 213/91, s. 192.

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# PRACTICING INVESTMENT SAFETY

By Stanley Tepner

Practicing safety in the workplace is a mainstay of the electrical contracting industry. As this issue of *The Ontario Electrical Contractor* is devoted to matters of safety, it provides the ideal opportunity to write a column about “safe” investment practices.

The question is: “What is a safe investment?” Many people will tell you that a safe investment is one in which your principal is guaranteed. Such a guarantee is supposed to protect one’s capital.

I would argue, however, that there is no truly “safe” investment, because even the most conservative investment can expose individuals to risks that simply preserving the face value of their principal won’t prevent.

Purchasing power risk, liquidity risk, re-investment risk and tax rate risk are just some of the elements that can wreak havoc on a “safe” investment portfolio. Purchasing power risk is the chance that you won’t be able to buy as much with your investment principal and earnings in the future as you can today, due to inflation. Liquidity risk is the possibility of being locked into an investment when you would otherwise want to use the capital for other purposes. Re-investment risk is the converse of liquidity risk. It is the prospect that your re-investment alternatives (say, upon the maturity of a GIC or bond) are less attractive than the investment that you had been holding. And, finally, tax risk considers the possibility that the tax treatment of your investment will be harsher in the future than currently anticipated. Other common forms of risk faced by investors are credit risk, business or event risk and market risk.

We can’t protect against all investment risks all the time, so we should hedge our exposure by properly diversifying our investment.

We can’t protect against all investment risks all the time, so we should hedge our exposure by properly diversifying our investment among different asset classes (some of which are bonds, stocks, real estate, commodities, collectibles, etc.)

With that preamble to remind you of the importance of diversification, let’s climb the investment safety ladder and look at a series of investment choices that, at the very least, should preserve your principal (we’ll also discuss some of the risks and costs of these investments.)

- 1 The first rung on the ladder is cash: if your piggy bank is full of “twoonies, loonies” and other pocket change, you’ve got principal protection and liquidity taken care of, but no earnings, so inflation can eat away the benefit of this saving



technique. Don't let that coin collection get too large; it can take hours to roll them for deposit at the bank. Another quick way to convert coin to cash is using machines often found in grocery stores where you drop all your coins in a slot and moments later, you are handed a grocery coupon for the value of the coins, less a commission.

- 2 The second rung is paper currency: easy to hoard, easy to count, easy to lose if not protected (paper burns and tears); it's better to deposit paper in bank accounts.
- 3 The third step up consists of the chequing and savings account facilities offered by banks, trusts and credit unions; their interest rates are pretty low, and after income taxes, don't keep pace with inflation. It is important to keep the federal deposit insurance limits in mind.
- 4 The fourth rung represents the first time that you can choose to lock your money in for a fixed, but short, period of time, in exchange for a slightly higher rate of return; typical vehicles are government treasury bills ("t-bills,") corporate commercial paper and short-term certificates of deposit. T-bills and commercial paper are typically purchased at a discount to their maturity values (i.e. 98 cents on the dollar.) When they mature for a dollar, the two-cent increase is deemed to be interest income. There is little, if any, principal risk with these instruments, but the returns are low.
- 5 The fifth step up comprises cashable guaranteed investment certificates (GICs), which offer a set rate of return if held to a specific maturity date, but allow the investor to redeem all or part of their holding at an earlier date with full interest and no penalty. Cashable GICs don't pay as much as fixed GICs for the same time period, but the liquidity feature may be worth giving up the extra income.
- 6 As we continue up the rungs, we select investments that offer progressively higher rates of return, but also have longer terms to maturity, included in this category are fixed-rate GICs and straight bonds; both typically offer a pre-determined coupon rate of interest. All things being equal, the advantage may go to bonds issued by high-quality institutions and governments. They may be sold prior to maturity. GICs aren't nearly as liquid. Credit risk is an important consideration in the bond market. As a general rule, the weaker the issuer's credit, the more it has to pay an investor to buy it, and the greater the chances of a default. GICs are typically offered for terms of up to five years. Bonds are available for these shorter periods, and for decades longer, if desired. Strip bonds are a form of bond suitable for registered plans like RRSPs. They are purchased at a discount, like t-bills, and mature at their face value, without paying interest along the way, though providing a compounding return from acquisition to maturity. It is important to note that bonds fluctuate in value; if interest rates are on the rise, they usually drop in value; if rates fall, they rise. Picture a seesaw.
- 7 The seventh rung is occupied by corporate preferred shares, which typically pay quarterly dividends and can be attractive to income-seeking investors because they are taxed more favourably than bonds in Canada. As with bonds, credit quality is a key consideration in selecting preferred shares and each issue may have its own unique set of redemption, conversion and other attributes that must be understood before it is purchased.
- 8 Rungs four through seven feature investments that try to return one's principal amount along with a fixed rate of return. Rung eight comprises investments in securities that attempt to return one's principal along with a stream of income that fluctuates along with market interest rates. Such floating-rate investments tend to be particularly attractive when interest rates are on the rise.
- 9 Rung number nine consists of step-up bonds; these issues offer pre-determined, progressively higher interest rates to the investor, which usually increase every year or two. The right to redeem the bonds is exclusively that of the issuer; the rates are usually quite attractive relative to shorter-term (one- to three-year) investments during the early life of a step-up bond, but if the step-up rate begins to noticeably exceed the future market rate, the issuer will likely redeem the bond.
- 10 Our final two rungs take us away from investments that provide pre-determined income but they still preserve the face value of the initial investment, usually if it is held to maturity. Rung 10 comprises principal-protected notes (PPNs), which, instead of a fixed rate of interest, provide returns based on the performance of one or more underlying investments. One example of a PPN is a five-year note where the upside is tied to the performance of a portfolio of mutual funds; if the funds appreciate, an investor should enjoy a positive return at maturity; if the funds end up being worth less than they were at the beginning, the investor would not suffer the loss of principal that would have occurred from owning the funds directly. A PPN investment strategy that my team frequently recommends is our own version of a "step-up:" when a PPN has

appreciated, we often sell it and replace it with a new PPN at the new and higher principal-protected value.

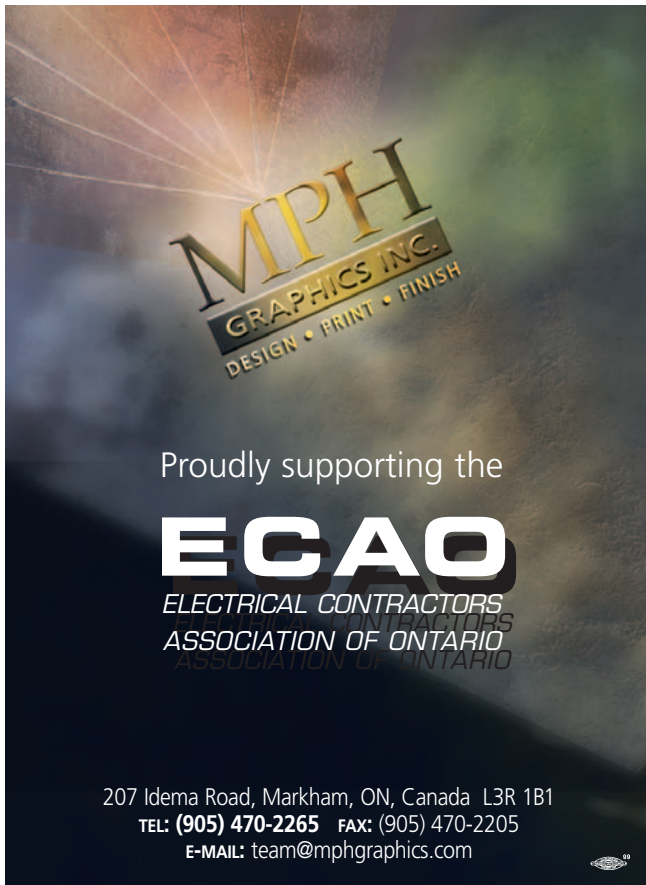
- 11 The eleventh rung of our investment safety ladder consists of segregated (seg) funds, which are basically mutual funds with an insurance wrapper around them that guarantees a specific minimum return of capital at some point in the future. In most respects, seg funds behave just like regular mutual funds, but can be noticeably more expensive to own than the identical mutual fund that is not a seg fund. They may also come with a variety of features that help justify the additional costs. One feature many offer is the ability to reset your future principal guarantee at a higher value, if the investment has appreciated in value. Another feature that is extremely important to business people is that seg funds may offer protection from creditors.

Everyone should practice safe investing by building and managing a diversified portfolio of investment tailored to their unique requirements. These requirements usually become crystal-clear when a detailed personal financial plan and an

Everyone should practice safe investing by building and managing a diversified portfolio of investment tailored to their unique requirements.

investment risk profile evaluation are properly completed. Then you'll know which "rungs" of the investment safety ladder are best for you.

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# MOVING SAFETY FORWARD

By Rick Mei

In developing and maintaining an active safety program, the ability to cover every contingency remains a constant challenge.

The *Workers Health and Safety Act* is very clear that you are to “take every precaution reasonable in the circumstances for the protection of a worker.”

Many feel that this is a statement of impossibility. It would entail being able to conceive of every possible cause of an accident and put measures in place to prevent them. And merely complying with the letter of the law will not be a valid defence if an accident occurs. Does this give you license to ignore the problems and hope for the best? No.

As owners, directors or managers, there are prudent steps you can take to move safety forward.

As a starting point, spend some time reviewing your company’s safety program. The following can be used as a guide as you begin your review process. You may wish to begin by asking:

## **How is our record to date, with respect to:**

- Deaths, lost time, medical aid, first aid, near misses?
- WSIB ratings and costs?
- Rebate position (negative/positive)?
- Ministry orders?

## **Is our program:**

- Current (to legislative requirements)?
- Communicated and understood?
- Adequately and consistently providing documentation?

Even if you are satisfied with the results of the above short review, remember, where health and safety is concerned, improved efforts pay. Add to the list above, take action and move safety forward.

Here are some other areas that you may wish to address or consider.

The *Occupational Health and Safety Act* requires that you review your health and safety policy statement and program annually and that your statement is currently dated, signed

and posted in the workplace.

Have you laid out a safety plan, including your objectives, a time frame to meet the objectives, and assigned responsibility to an individual(s) by name, not title? Is there a process in place to measure your progress? If you have a safety committee or worker representative(s), have they been involved? Remember that one of your key objectives should be to identify hazards, remove hazards, to eliminate their causes and to communicate every step of this process within your company.

You should provide a full company indoctrination to all new employees. This process should cover all office/shop employees as well. If you have long-term employees, it may be a good idea to provide a full indoctrination for them on a regular basis. How valid is an indoctrination done five or 10 years ago? If you hire subcontractors, they should also be indoctrinated (site specific, at least). And remember to keep records of all indoctrinations. When employees are moved from site to site, a site-specific indoctrination is required and, once again, a record kept.

If you hire a company or individual to perform work at your office (cleaning, lawn, windows), who may also work alone or at night, you should provide safety instruction. Do they have liability insurance or WSIB coverage?

Are emergency plans in place at your site location(s)? How about your office, shop and storage areas? Are they visibly posted?

Do you meet all the required legislated training requirements within all areas of your company (e.g. first aid, CPR, fall protection, man lifts, propane, fork lifts, explosive actuated tools, WHMIS, WHMIS review)? Has current training in the *Occupational Health and Safety Act* and applicable regulations been taken by management and supervisors? Who, within your company, is trained in workplace inspections, accident/incident investigation, safety committee/worker representative? Do you, your supervisors and managers meet the defini-

tion of "competent" under the *Act*?

Do you have employees trained in confined space, tagging and lockout, fire protection, emergency procedures, material handling, hot or live work, signs and barricades, personal protection or suspended access equipment? Do you review employees' responsibilities and do you also review their four basic rights (right to know, right to participate, right to refuse work and right to stop work under certain circumstances) under the *Act*?

Before work starts on a project, is a project safety analysis conducted?

Do you conduct job task analysis during a project or where risk factors are high?

Do you perform valid workplace inspections, planned or unplanned, by management, supervisors, committee or safety representative(s)? How about your office, shop and storage areas?

Do you conduct accident/incident investigations for lost time and medical aid? How about non-disability first aid, property damage, fire, explosions, chemical spills/releases, chronic/acute occupational illness or near misses? Do you compile an annual accident analysis for review?

Do you have a claims management program that includes monitoring injured workers' progress, alternative work opportunities and assigned responsibility (by name) for program management?

At this point, you may have recognized areas where your current health and safety program could be improved.

Here are some other areas for your consideration:

- Environmental policy
- Drug and alcohol policy
- Discipline policy
- Tools and equipment training
- Fleet safety training

Once again, can you add to this list? Safety programs, just like production processes, can usually be made better. By

constantly reviewing situations, questioning existing practices and taking action you can move safety forward.

*Rick Mei is a representative of Quality Connection, the Joint Electrical Promotion Plan's occupational health and safety program and may be contacted at 1-800-270-1475.*





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## SKILLED TRADES EXPOS HIT THE ROAD

The Joint Electrical Promotion Plan (JEPP) was busy recently juggling two major career promotion events back to back in two different locations. The Ontario Construction Secretariat (OCS) sponsored Future Building 2005, which was held in Sudbury, April 26-29, and the 16th Annual Ontario Technological Skills Competition took place in Waterloo, May 2-4.

Both events are designed to promote the skilled trades as viable career options for students.



*Students arrive at the Future Building show in Sudbury.*



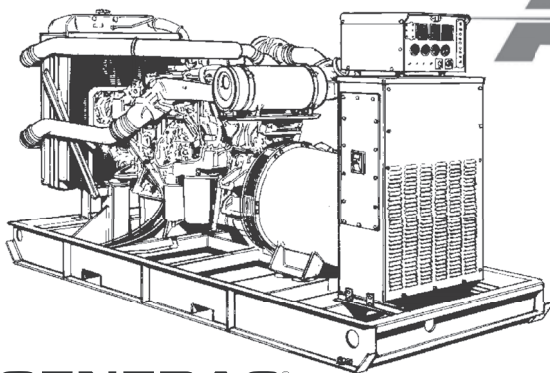
*Students get hands-on experience at Future Building 2005.*

### FUTURE BUILDING 2005

The OCS decided to take the Future Building show on the road this year and in the future will do so every other year. Sudbury was chosen for the first road show and in everyone's estimation was a huge success. Over 6,000 students, teachers, advisors and parents visited the show. School boards from as far away as Sault Ste. Marie bussed their students in for this event.

Sixteen construction trades were represented and promoted themselves with hands-on demonstrations of their trades. JEPP sponsored a 48'x24' electrical pavilion that featured the four electrical trades: power lineman, construction and maintenance electrician, residential electrician and the network cabling specialist. Hands-on activities enabled students to experience first-hand some of the skills of the trades. Activities included bending conduit, making a wire joint, pulling wire through a conduit system, making a telephone connection and testing it out, working with a high voltage "hot-stick" and working with rubber gloves. A mini traffic control sys-

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tem was set up as a self-demonstration activity. With all the different activities the electrical pavilion was one of the most popular and volunteers were busy throughout the day. After taking part in two activities students earned their reward – a miniature hardhat key chain. As you can see from the accompanying photographs the students were lined up to participate.

## 16TH ONTARIO TECHNOLOGICAL SKILLS COMPETITION

Another successful event again was the 16th Annual Ontario Technological Skills Competition. Over 1,200 contestants competed in 45 skills competitions while over 9,000 elementary and secondary school students took part in workshops and activities, visited career booths and watched the competitions.



*Patrick O'Donnell (left) and John Sebastian demonstrate the Network Cabling Specialist trade at the 16th Ontario Technological Skills Competition.*

JEPP sponsored the secondary and post-secondary electrical wiring competitions and held a demonstration of the Network Cabling Specialist trade. Seventeen apprentices vied for honours in the post secondary competition while 18 students from high schools across Ontario competed in

the secondary competition.

Prior to the actual competitions on the elementary day, JEPP conducted six workshops for students who had signed up specifically to learn more about the electrical trades. They were highly motivated to find out more and it was gratifying to see such enthusiasm and interest in the electrical trades.

During the two days of the competitions, JEPP also supported the Electrical Contractors Association of Central Ontario and their counterpart IBEW, Local Union 804 with a booth in the Career Showcase. Students and advisors could obtain information about apprenticeship in the electrical trades.

At the closing ceremonies the gold, silver and bronze medals were presented. The gold for the secondary competitions went to Shane Martin of Upper Canada DSB and to Taylor Lichti,



*George Kardaras, (left) took home a silver medal, while Taylor Lichti won a gold medal, and Rob Kendrick (right) received the bronze medal during the 16th Annual Ontario Technological Skills Competition.*

MTCU for the post secondary competition. Taylor will now go on to the national competitions in Edmonton.

Special thanks to Independent Electrical Supply Co., Ideal Industries, Greenlee Textron and Cutler-Hammer for supplying material and equipment for the two events.

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# 007: ARC WELDING

## A Misconception

Many people assume arc welding is inherently safe, because you don't have to deal with gas bottles and their attendant risk of fire and explosion. However, arc welding equipment has its own set of problems.

## Non-welder cautions

If you see an arc from a welder, turn your head immediately. If you are walking when this happens, stop where you are until the welding has stopped or you can shield your eyes enough that you can see where you are going.

Never try to get the attention of the person doing the welding, unless there is an emergency.

Never touch something that has just been welded on. It is likely hot enough to cause a severe burn. The more massive the object, the longer it will stay hot.

Do not assume danger has passed just because the person welding set down the welding rod. The next step is likely to be hammer tapping on the weld or some other action that could send debris flying your way.

## Welder Cautions

Match your welder to a power source rated to supply that welder. Not all arc welder receptacles are the same.

Ensure the welder output is set right for the welding job you are doing. A setting that is too low is no safer than one that is too high.

Use the correct rod for the job. This reduces sputtering and other hazards. It's safer, and more quality-conscious, to take the time to get the right rod than it is to "wing it" with the wrong rod.

Do not wear contact lenses.

Put your welding helmet on before turning the welder on (or, if it lacks a switch, plugging it in). This one simple step saves time while improving safety.



Lower your visor before touching the electrode to the part being welded. Not only will you prevent damage to your eyes, but also you will get a better weld.

Raise your visor only when the weld is done.

Turn the welder off before taking your helmet off.

Wear gloves suitable for arc welding and dress properly to avoid burns.

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# Toolbox Talks

## Grounding

Your welding unit's ground lead will complete the circuit – take care where you connect it.

Do not assume you can just hook your ground clamp to any metal surface.

Do not use the body of a motor as an attachment point. This will likely

damage the motor, and could cause it to fly apart while you are welding.

One of the best places to ground is to structural steel, such as an I-beam.

After the first weld, examine the item you hooked your ground clamp on. If it is glowing, you obviously need to correct the problem. If it is not glow-

ing, you still may have a problem with too much current flowing through that item. If it is of sufficient mass, it should not feel hot to the touch. Carefully test it to see.

## Protecting Others

You must provide protection along the horizontal plane.

You can provide horizontal protection with any of several methods. For example, you can use freestanding screens. Just keep in mind your goal is to prevent the flash from injuring others. Remember, flash can reflect off shiny surfaces.

You must provide protection along the vertical plane if you are working in an area where people can be exposed if they are above or below you. If you are, for example, doing your work on a platform made of grating you must provide this protection.

You can provide vertical protection with any of several methods. For example, you can use fire-resistant plywood and welding blankets under your welding area. You have three goals. One is to prevent fires. Two is to prevent the flash from injuring others who walk above or below your job. Three is to prevent items from falling on others walking below you.

Establish a fire watch for 30 minutes after welding is completed.

*This Toolbox 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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## ACCUBID RELEASES CHANGEORDER VERSION 6

Accubid recently announced the release of Version 6 of ChangeOrder and ChangeOrder Pro, Accubid's change order management software for contractors.

Version 6 includes a number of new features and enhancements to help contractors better manage changes and increase their change approval percentages, including enhanced report features, temporary assemblies, spell checking, text formatting, and export to Excel, among many others.

ChangeOrder and ChangeOrder Pro allow you to manage contract variations and to produce consistent and professional-looking change notices. With ChangeOrder and ChangeOrder Pro, you can assess the big picture and see how change orders impact the project from start to finish. ChangeOrder Pro's premium features include more database assemblies, more specialized takeoff types, typical takeoffs, and labour factor adjustment for takeoff breakdowns.

Both ChangeOrder and ChangeOrder Pro work seamlessly with Pocket ChangeOrder, Accubid's handheld change order management solution for the Pocket PC. Using Pocket ChangeOrder, which is sold separately, contractors can price changes while they're still at the job site and impress clients with their immediate and on-the-spot response.

For more information on ChangeOrder and ChangeOrder Pro, visit the website [www.accubid.com](http://www.accubid.com) or phone 1-800-ACCUBID (222-8243).



## HUBBELL'S NEW HOME/WORK CABLING SOLUTION

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For the user, this cost effective solution incorporates the quality expected in a Hubbell product and built-in flexibility to upgrade and keep pace with evolving technologies. An easy-to-read label helps keep track of the individual system's infrastructure and the white powder coat finish provides a clean, durable chassis to house all components.

For further information, call Anthony Nigro, Commercial Product Manager at 905-837-6063, e-mail [anigro@hubbell-canada.com](mailto:anigro@hubbell-canada.com) or visit [www.HubbellOnline.com](http://www.HubbellOnline.com).



## FLIR OFFERS NEW VALUE PACKAGE FOR THERMACAM-P65 INFRARED CAMERA

The professional grade ThermoCAM P65 infrared camera value package recently introduced by FLIR Systems includes three software applications: Reporter Professional 7.0, Image Builder, and Database.

Also included is the choice of either a 450 wide-angle lens for surveying large areas or a 120 telephoto lens for viewing small or distance targets, along with an additional set of batteries. Customers purchasing the new P65 infrared camera value package will save over \$12,000.

"The P65 is the most highly refined, versatile infrared inspection system available today," says Tom Scanlon, FLIR vice president for Americas Thermography. "The P65 value package expands that versatility, and at a highly affordable price."

The ThermoCAM P65 provides thermal sensitivity of 0.08°C, which lets you see the smallest temperature difference clearly. The P65 advanced features include:

- A built-in visual camera that provides digital colour images linked with corresponding thermal images, viewable in the P65 integral high resolution viewfinder, ideal for outdoor inspection.
- Convenient image storage in Windows-friendly JPEG format on a re-



# New Products

movable CompactFlash memory card, or in internal flash RAM.

- Voice recording up to 30 seconds with each image using world-standard Bluetooth wireless technology, with a cordless earpiece, eliminating all cable connections to increase operator safety and mobility.
- FireWire (IEEE 1394b) connectivity, enabling the transfer of digital video up to 800 megabits per second, plus USB and IrDA connectivity.
- Onboard AVI video storage, allowing the recording of non-radiometric moving images for convenient playback using industry-standard players, plus radiometric burst recording for capturing moving targets in sequences up to 16 minutes long.
- A brilliant LED target illuminator that turns on automatically when the visual digital camera function is selected.

Working in concert with ThermoCAM reporting and database software as integral parts of the new value package, the P65 fully automates the process of collecting, reporting, and archiving infrared images and thermal data.

As an add-on to Microsoft Word, Reporter 7 automatically

downloads all IR inspection data for direct display in a Microsoft Word document. In less than 10 seconds, the IR data appears in easy-to-read inspection reports that include thermal and visual inspection, temperature measurements, and voice and text notes taken in the field.


"This gives a thermal inspector the ability to do a live post analysis without the need to refer back to the data in the camera," notes Scanlon.

The Image Builder software lets you fuse multiple thermal images into one large radiometric image making it ideal to capture larger targets such as buildings and smokestacks.

The Database software gives you complete archiving and tracking analysis for solving recurrent problems. Database also has exclusive, bidirectional communication with the Reporter 7 application; letting you change queries as needed to extend your analysis.

The capabilities and features of the P65, coupled with the software and the accessories in the value package, make it a complete turnkey solution for thermography inspections.

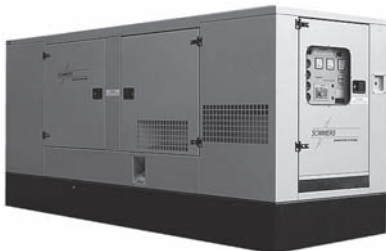
For more information, call 1-800-613-0507 or visit the website [www.flirthermography.com/P65data](http://www.flirthermography.com/P65data).





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imagination at work

# PROTECTION OF CIRCUITS AND APPARATUS

By Ted Olechna

This very statement: “protection of circuits and apparatus” is one of the fundamental concepts of the Electrical Safety Code. But what does it actually mean? An electric circuit is to be protected by an overcurrent device, which is capable of automatically opening an electric circuit, under both predetermined overload and short-circuit conditions, either by a fuse or circuit breaker. This identifies two types of devices that are used to protect electrical circuits. They are circuit breakers or fuses; most everything else is a derivative of these devices.

Rules 14-200 to 12-212 are specifically dedicated to fuses. This section identifies specific uses, types and ratings:

- A time delay fuse can withstand a specified multiple value of rated current for a specified time interval without opening. This type of fuse is used for motor loads that have a high inrush starting current.
- A low melting point fuse will open at an ambient temperature of 200°C when carrying 10 per cent of rated current. It is used to protect against overheating due to improper connection.
- A renewable fuse is a fuse in which the fusible element is intended to be renewed by the user with a renewal element as supplied by the manufacturer of the cartridge.
- A current-limiting fuse is capable of interrupting all available currents within its interrupting rating and, within its current-limiting range, limits the clearing time at rated voltage to an interval equal to or less than the first major or symmetrical current loop duration and limits peak let-through current to a value less than the peak current that would be possible with the fuse replaced by a solid conductor of the same impedance.
- Plug fuses can be used on 120/240 or 120/208 volt systems rated at not more than 30 A.
- A standard cartridge fuse (Class H) can be used on systems where the voltage and current does not exceed 600 volts and 600 amps.

The standard cartridge and plug fuses are further classified into types:

- A type D fuse has the characteristics of both a time delay fuse and a low melting point fuse
- A type P fuse has low melting point characteristics.



CSA Standards for fuses, CSA 22.2 No. 248 Series, were developed in 1994 through to 1997 to address a need from the industry to standardize in North America. These standards have been adopted as national standards of Canada and the United States and are in the process of being adopted in Mexico, making them tri-national standards.

When and where can a fuse be used? Wherever there is a requirement for overcurrent protection. The following is a sample of some of the rules that require overcurrent protection:

- Rule 6-200 requires that each consumer's services shall be provided with a service box, and the service box shall have either fuses or breakers.
- Rule 14-100 is a basic rule that states that each ungrounded conductor shall be protected by an overcurrent device at the point where it received its supply of current and at each point where the size of conductor is decreased, with exceptions as identified. This rule identifies when overcurrent protection is required and where it is to be located.
- As a general statement all transformers shall be protected by an individual overcurrent (fuse) device on the primary side; there are
  - 26-252 overcurrent protection for power and distribution transformers rated over 750 V
  - 26-254 overcurrent protection for power and distribution transformers rated 750 V or less, other than dry type transformers
  - 26-256 overcurrent protection for dry type transformers rated 750 V or less.





- Rule 28-200 states that each ungrounded conductor of a motor branch circuit shall be protected by an overcurrent device complying with specific requirements for specific motor applications.
- Rule 30-104 states that luminaires, lampholders, and lighting track shall be connected to a branch circuit protected by overcurrent devices with specific ratings for different types of installations.

When choosing the rating of an overcurrent device, double check what rating the Code permits for the specific applications. For instance, for a single phase motor the maximum fuse rating could be set as high as 300 per cent, while the overcurrent protection on the primary side of a transformer shall not be more than 125 per cent. There are different ratings set up in the Code depending if the overcurrent device is required for lighting, motors, or transformers, etc. In addition Rule 14-012 requires that overcurrent devices protect the installation from the available fault current. A fuse shall have the interrupting capacity so that when a short circuit occurs the arc produced can be extinguished.

Fuses can be used whenever an overcurrent device is required by the Code. Breakers have almost completely replaced residential fuses but in industrial installations, which can include high current as well as high voltage applications, fuses as well as breakers are used to provide overcurrent protection.

*Ted Olechna is a Provincial Code Engineer with the Electrical Safety Authority. He can be reached by e-mail at [ted.olechna@ElectricalSafety.on.ca](mailto:ted.olechna@ElectricalSafety.on.ca).*

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