

## The new electrical code: What you need to know

are being made which recognize new products, harmonize with North American and world standards, improve safety and relax overly restrictive practices.

The 2002 regulation will adopt both the Canadian Electrical Code Part I, C22.1-2002 (a nationally recognized code prepared by the Canadian Standards Association) and requirements unique to Ontario in a document entitled *Ontario Amendments to the Canadian Electrical Code Part I*.

There are changes to installations as well as processes that will affect engineers. The following are some excerpts from the 2002 code.

**Rule 2-010** requires that plans be submitted and approved before work is to commence. Plans are to be submitted by their author or firm, which means that they are to be submitted by the professional engineer responsible for the design. With input from the industry, it has been identified that there has been inconsistent interpretation of this rule in respect to low voltage installations (less than 750V) in terms of circuit capacity and which installations required a plan review. The result in some instances has been expensive corrections involving replaced electrical material and equipment.

Experience shows plan reviews are cost efficient in the long term because they provide engineers the opportunity to address code concerns prior to energization, reducing defects and the cost of repairs. To ensure the plan review process would be workable, a working group was formed representing ESA, electrical contractors and PEO, with a goal to examine the existing rules and field practice, and address safety, fiscal and practicality concerns. The working group created the new rule and Appendix B changes that address the blended concerns of the three groups represented.

**Rule 4-004** allows underground conductors with ampacities calculated in accordance with IEEE 835, or from Appendix D tables, to have a load factor applied if it is less than 1. Experience has shown conductors have been over-sized, based on demand load (continuous or non-continuous loading) in lieu of known diversity and load factor for the given

### What are the exceptions?

The code applies to electrical work and electrical equipment, operating at all voltages, in electrical installations in Ontario, with the following exceptions:

- ◆ electrical equipment and installations used exclusively in the generation, transformation or transmission of electrical power or energy intended for sale or distribution to the public;
- ◆ electrical equipment and installations in communication systems from the transformer or other current limiting device used at the junction of the communication system with the electric circuit supplying the communication system;
- ◆ electrical equipment and installations in the cars, car-houses, passenger stations or freight stations used in the operation of an electric railway or electric street railway and supplied with electric current from the railway power-circuit;
- ◆ electrical equipment and installations in railway locomotives and railway cars and in signalling systems, communication systems, wayside train monitoring systems and track facilities, including the branch circuit supplying such electrical equipment or electrical installations when such electrical equipment or electrical installation is used in the operation of a railway;
- ◆ electrical equipment and installations on an aircraft;
- ◆ electrical equipment and installations in a mine as defined in the *Mining Act*, except any dwelling house or other building not connected with or required for mining operations or purposes or used for the treatment of ore or mineral;
- ◆ electrical equipment and installations on a vessel of non-Canadian registry or on a vessel that is required to be certified in accordance with the *Canada Shipping Act* except for such equipment and installations required to connect the electrical supply from the on-shore electrical supply facility to the service box on the boat and including the service box;
- ◆ electrical equipment forming an integral part of a self-propelled vehicle that is required to be certified in accordance with the *Motor Vehicle Safety Act*. Equipment supplying electrical power from an electrical installation to the vehicle and those portions of a vehicle capable of receiving electrical power from an electrical installation are excepted.

installation. A P.Eng. must supply documentation for the detailed calculations for review.

A change to rules in **Section 18** (Hazardous Locations) requires that all new installations be classified based on the Zone system of classification. The OHSA *Regulation on Industrial Establishments* requires a P.Eng. to conduct the Pre-start Health and Safety Review. (See PEO's *Guideline for Professional Engineers Providing Reports for Pre-Start Health and Safety Reviews*, available from PEO's website at [www.peo.on.ca](http://www.peo.on.ca))

**Section 24**, which covered the patient care areas of hospitals, has been expanded to include these areas in health care facilities. Because procedures once reserved for hospitals are now performed in medical clinics, this section has been modified to apply to patient care areas of health care facilities and its requirements are based on the care area (i.e., basic, intermediate, critical). Facilities that will now fall into the scope of Section 24, include: hospitals, outpatient clinics, surgical clin-

ics, dentists' offices and doctors' clinics. Also included are patient care areas of extended care, multilevel care, and rehabilitation facilities.

Problems in home wiring, like arcing and sparking, are associated with a large percentage of electrical fires. These fires claim many lives and injure many victims every year. A new electrical safety device for dwelling units, called an Arc Fault Circuit Interrupter (AFCI), is expected to provide enhanced protection from fires resulting from these unsafe home-wiring conditions. Typical household fuses and circuit breakers do not respond to early arcing and sparking conditions in home wiring. By the time a fuse or circuit breaker opens a circuit to defuse these conditions, a fire may already have begun.

**Rule 26-722(f)** of the code requires an arc-fault circuit interrupter to be installed to protect branch circuits that supply receptacles installed in bedrooms (sleeping facilities) of dwelling units. AFCIs represent a major improvement in electrical fire safety in residential applications. A limitation was

put on mandating of the AFCI to receptacles in sleeping facilities of dwelling units to permit these new devices to be introduced into the public domain on a gradual basis. Future editions of the code, which is updated every four years, could expand coverage. AFCIs should not be confused with Ground Fault Circuit Interrupters (GFCIs). The popular GFCI devices are designed to provide protection from the serious consequences of electric shock. AFCIs are intended to address fire hazards.

**Rule 75-248** requires that guys be installed for poles, except for free-standing terminals where the pole structure and base assembly are installed with engineering direction. Free-standing terminal poles are high voltage structures and base assemblies that are installed without the use of guys.

To find out about workshops on the 2002 code, as well as other related electrical inspection information, visit ESA's website at [www.esainspection.net](http://www.esainspection.net).

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**The Ontario Electrical Safety Code establishes standards and requirements for the safe installation and maintenance of electrical equipment. Compliance with the requirements of this code and proper maintenance and operation will ensure an essentially safe installation, thereby preventing fire and shock hazards.**

In January, the Ontario government approved the 2002 Ontario Electrical Safety Code. This regulation (11/02) will come into force on April 25 and requires that all electrical installations in Ontario conform to its requirements. Anyone performing electrical work in Ontario should have a current (23rd) edition.

The unique requirements for Ontario are necessary to meet the legal requirements for implementation here and deal with special installation practices that are not covered in the Canadian Electrical Code Part I. In particular, Rules 2-000 to 2-036 contain the legal provisions on which the Electrical Safety Authority (ESA) mandate for administering inspection and approving electrical wiring installations and equipment is based. Changes