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**April 2001**

## **Avoiding electrical shocks and fire hazards from ungrounded steel studs**

The Electrical Safety Authority has been informed a homeowner received a serious electrical shock when attempting to check for a blown fuse in the electrical panel where the steel studs framing his fuse panel had not been bonded to ground. During the renovation of the homeowner's basement, metal stud framing was used with non-metallic sheathed cable (NMD-90) wiring and non-metallic or PVC boxes. When the drywall was installed one of the screws penetrated a switch leg, energizing the complete metal stud assembly at 120 volts when the power was turned on.

The use of non-metallic or PVC boxes together with no physical connection between the bonding conductor of the cable and the metal stud assembly energized the entire wall system for weeks before the homeowner checked the blown fuse.

### **Caution:**

The Ontario Electrical Safety Code requires that metal stud partitions be bonded to ground so that the branch circuit over current device will operate in the event the studs become energized.

Precautions should be taken to ensure that wall assemblies are at the same potential to ground as the electrical service box. Metal or steel boxes can be secured to the studs in compliance with the Ontario Electrical Safety Code or the metal frame can be separately bonded by a conductor to connect each isolated section, ensuring good electrical contact with all framing members.

Rule 10-002 of the Ontario Electrical Safety Code requires that grounding and bonding shall be done in such a manner as to serve the following purposes:

- (a) To protect life from the danger of electric shock, and property from damage by bonding to ground non-current-carrying metal systems;

Experience has shown that metallic wall assemblies using non-metallic wire and boxes are susceptible to electrical faults, resulting in a potential exposure of persons to electrical shock.

The bonding requirements of Rule 10-400: Exposed, non-current carrying metal parts of fixed equipment shall be bonded to ground if equipment is: (g) in electrical contact with metal, metal foil, or metal lathe; supports the general concept of bonding metal studs.

From this point of view, ESA will require metal studs assembled to form a steel building frame or wall assembly, which is not intentionally bonded to ground and may become energized, to be bonded to the service equipment enclosure. The bonding conductor shall be sized in accordance with Table 16.

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