



Canadian Standards Association  
Mississauga, Ontario  
**To the Part I Committee**

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Subject No. 3092

Chair: R. Leduc

Date: November 3, 2003

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Title: Bonding of Other Systems, Rule 10-616

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**Submitted by:** Richard Smith of Aliant Telecom, P.O. Box 340, Moncton, New Brunswick, E1C8L5 Tel: (506)8593106 on October 15, 2002.

**Proposal:** Add a new Rule 10-616 as follows:

**10-616 Bonding for Other Systems**

An approved, permanently accessible bus bar for connecting intersystem bonding and grounding conductors shall be provided at the meter box and at the service box location for buildings or structures and shall:

- (a) Be able to provide mechanical connection by means of a screw type compression connection for at least 6 conductors ranging from No.14 AWG to No.6 AWG; and
- (b) Be insulated from its support; and
- (c) Be effectually grounded with a No.6 or larger insulated copper conductor; and
- (d) Be located within 1.5 m of the meter box and the service box location.

**Reasons for request:**

The Code requires that separate systems be bonded to reduce the differences of potential between them due to lightning or accidental contact with power lines. Lightning protection systems, communication, radio and TV, CATV and Satellite TV / Internet systems must be bonded together to minimize the potential differences between the systems. Lack of interconnection can result in a severe shock and fire hazard.

This proposal is provided to address the difficulties Communication, Community Antenna Distribution, Radio and Satellite Television Installers encounter in complying with Code grounding and bonding requirements. These difficulties arise from the increased use of plastic for water pipe, fittings, water meters, and service conduit. In the past, bonding between communication, CATV, and power systems was usually achieved by connecting the communication protector grounds or cable shield to an interior metallic water pipe, because the pipe was often used as the power-grounding electrode.

Thus, the requirement that the power, communication, CATV cable shield and metallic water piping system be bonded together was easily satisfied. If the power ground was grounded to one of the other electrodes permitted by the Code, usually by a made electrode such as a ground rod,

the bond was connected to the power grounding electrode conductor or to a metallic service raceway, since at least one of these was usually accessible. With the proliferation of plastic water pipe, the increasing tendency for service equipment (often flush mounted) to be installed in finished areas, where the grounding electrode conductor is often concealed, installers are increasingly less likely to have access to a point for connecting bonding jumpers or grounding conductors. The increased use of Roof Mounted Receiver dishes for Television, High-speed Internet and voice and data services also present the Homeowner, Business owner or their service technician with the same issues as defined in this example.

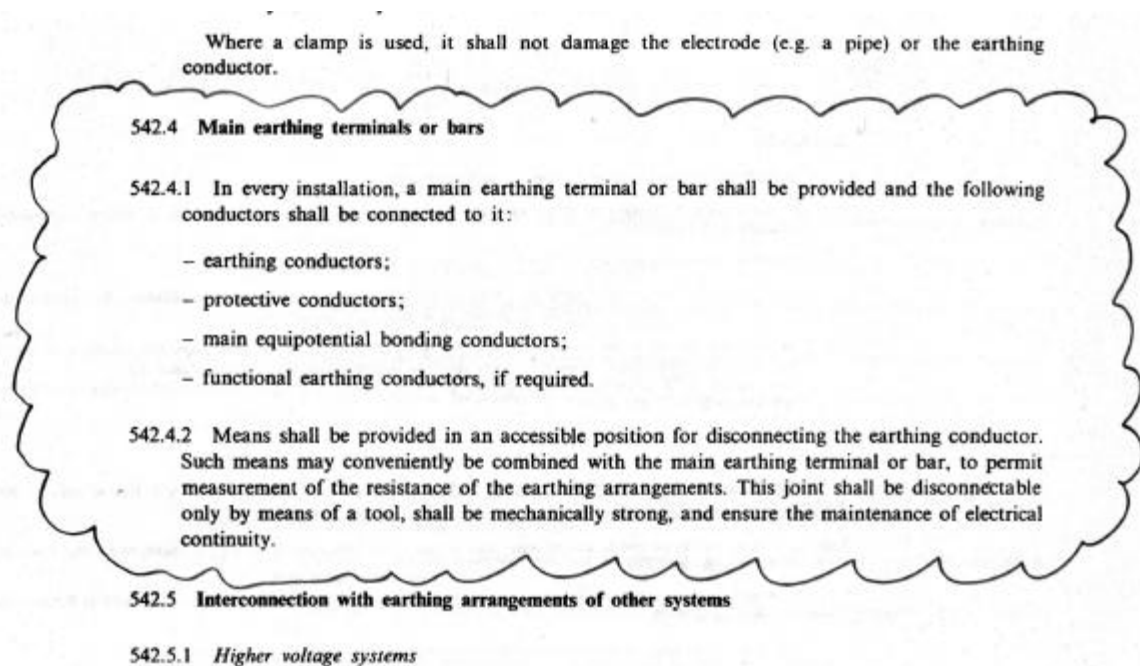
### **Supporting Information:**

This proposal will harmonize the CEC Section 10 with the intent of NEC Section 250, specifically with Rule 250.94.

The Canadian Protection Engineers Group (electrical protection engineers representing Canadian Telecommunication companies) has reviewed this proposal and supports the application.

### **Chair's Comments:**

For information, following is an excerpt from the IEC Standard 364-5-54 on "Earthing arrangements and protective conductors". The excerpt describes the "Main earthing (grounding) terminals or bars".



Also for information is a diagram from the IEC Standard depicting the earthing and protective conductor arrangement (see following page).

I look forward to your views on this proposal.

## APPENDIX B

## EARTHING AND PROTECTIVE CONDUCTORS



- 1 = protective conductor
- 2 = main equipotential bonding conductor
- 3 = earthing conductor
- 4 = supplementary equipotential bonding conductor

- B = main earthing terminal  
M = exposed conductive part  
C = extraneous conductive part  
P = main metallic water pipe  
T = earth electrode

### Subcommittee Deliberations (1<sup>st</sup> Round)

Ten (10) of a possible 12 members responded. Six (6) agreed with the submission and 4 disagreed with comments as follows:

S/C Member	Agree with Submission	Disagree with Submission	Comments
1		Ψ	Currently, Rule 10-502 permits us to use the grounding conductor as a grounding conductor for equipment, conduit, enclosures etc. but rule 10-806 prevents the grounding conductor to have a joint or splice. Perhaps we can look at having a permissive notwithstanding Subrule to Rule 10-806
2		Ψ	This is more of a design issue than it is a safety issue. I could support revisions to Subrule 10-806(1) that would permit more choice such as the proposed arrangement, but not in the form of a prescriptive Rule.
3	Y		<p>I agree with the submission with comments as follows:</p> <p>Why not replace the submitter's phrase "... at the meter box and at the service box location for buildings or structures..." with the wording in the NEC: "...at the service equipment and at the disconnecting means for any additional buildings or structures...". With both Service Box and Disconnecting Means defined in the CEC, rationalize to:</p> <p>"...at the service box and at the disconnecting means for any additional buildings or structures..."</p> <p>One other consideration: the word "approved" is used - does that then mean that this busbar and it's connection devices be a new piece of equipment that would then involve Part 2 standards? On the other hand, if it is a made on jobsite item from approved constituent parts, then we would have to be much more prescriptive for sizing. We would also want some sort of signage describing its use and danger due to casual disconnection.</p>
4	Y		I think this would improve safety of grounding systems to cope with all the electronic devices now being installed in homes and businesses.
5	Y		
6		Ψ	This rule is very prescriptive and adds a lot of expense to all installations including those where it would not be necessary. How about a more objective type rule such as: "provision shall be made at the service ground to tie in other system grounding and bonding conductors. Accessibility shall be maintained.
7	Y		
8	Y		
9	Y		These systems should definitely be interconnected as has been established in the IEEE Std. 1100, Recommended Practice for Powering and Grounding Sensitive Electronic Equipment". Seems there is a need to facilitate the interconnection.
10		Ψ	<p>I really can't see the requirement for such a "Grounding Bus" to be installed on any type of installation.</p> <p>I realize the requirements for additional bonding of other types of equipment, such as those stated in the proposal, however there are all kinds of different means to interconnect these systems to the common grounding conductor. There is usually either the exposed grounding conductor or at least the enclosure, which can be used to provide a point for this interconnection.</p> <p>The Code is not designed to be used as a basis for describing how to install electrical equipment for other than safety standards. This proposal seems to be asking for design criteria, which may or may not be required. If there is a requirement for such a grounding bus, I think it should be left up to the designer to request additional grounding or bonding interconnection points, which will have to be installed to meet all of the existing installation requirements.</p>

**Chair's Comments (1<sup>st</sup> Round)**

Most of the comments in disagreement with the proposal are not opposed to the busbar being used to accommodate multiple connections but are rather opposed to the Code prescribing it. The rationale is that it is a design issue. Some have suggested amending Rule 10-806(1) to add a permissive (shall be permitted) clause allowing the busbar. In reading Rule 10-806(1), I see that a busbar is already permitted to be used and therefore see no need for an amendment.

Another suggestion is to write the requirement in a more objective format. In reviewing Rule 10-502, I see this rule to be fairly objective.

Based on the discussions above, I see no compelling reason to introduce design into the code for this issue and see the existing rules to be open enough to allow the busbar to be used as deemed necessary.

**Chair's Proposal:** I propose a Subcommittee recommendation to reject the proposal and close the subject.

**Subcommittee Deliberations (2<sup>nd</sup> Round)**

After going out to the Subcommittee members for their second round vote indicating whether they agreed with a proposed Subcommittee recommendation to reject the proposal and close the subject. 7 of 11 members responded in agreement with the recommendation. Subsequently, the chair received comments from the submitters slightly updating their proposal. This information was shared with the S/C. Members that had already voted were asked to indicate whether they wished to maintain their original vote and members that had not yet voted on the 2<sup>nd</sup> round recommendation were asked to consider this new information when making their vote.

As a result, 8 of 11 members affirmed or reaffirmed the recommendation to reject the proposal and close the subject (one with comments), one member reconsidered and voted in support of the proposal and 2 members did not vote.

The member supporting the proposal offered the following comment:

I have been on both sides of this subject. I want to vote for it again now (same as my first time vote)!

What they are asking for is not some new design feature in the service panel, but a Code item that requires part of the grounded metal installation be readily accessible for bonding use. The reason they want this is that they have found in many cases the electrical ground conductors and raceways are buried in walls etc. All they are asking for is that, for example, when a service is installed, a loop of ground conductor or conduit is left protruding from the wall within 1.5 metres of the meter box and service box.

A member in support of rejecting the proposal commented as follows:

The submitters correctly identify the Code requirement that separate systems be bonded. Their proposal suggests means by which this could be accomplished. In my opinion, ways to meet a requirement are a design issue, and we should avoid introducing them into the Code.

One of the reasons for the proposal is "difficulties Communication, Community Antenna Distribution, Radio and Satellite Television Installers encounter in complying with the Code". The submitters go on to point out some of those difficulties. My understanding of

the purpose of the Code is to set safety requirements for installations and leave it up to installers to come up with the solutions and means to achieve compliance, which may include overcoming difficulties. Access to a means of bonding or grounding can always be accomplished... sometimes it may not be easy, but it is achievable. The Code mandates the requirement for effective grounding of systems and does not prohibit any of the means proposed in the submission; it is the responsibility of the installer to comply, even if it may be difficult and may require special expertise to do so.

**Chair's Comments (2<sup>nd</sup> Round)**

Considering all of the comments made, the Chair concludes that the consensus of the S/C is that the proposal attempts to introduce unnecessary design requirements into the Code and that arguments in favour of the proposal are non-persuasive.

**Subcommittee Recommendation:**

Reject the proposal and close the subject.