Canadian Standards Association
Mississauga, Ontario
To the Part I Committee

Subject No. 2691 Chair: W. McMullan & S. Douglas Date: January 10, 2005

Title: Receptacles and GFCIs on Construction Sites, Rule 76-017

Submitted by: Len Rhodes, Chief Electrical Inspector, District of West Vancouver, 750,17th Street, W. Vancouver, B.C. V7V 3T3 on February 20, 1996

Proposal: Add a new Rule 76-017 as follows:

76-017 Receptacles. Receptacles installed to provide power for buildings or projects under construction or demolition shall be:

(a) Protected by ground fault circuit interrupters of the Class "A" type; and

(b) Specification grade where 15 A and 20 A non-locking receptacles are used.

Reasons for Request: Inspections conducted by Workers' Compensation Board and electrical inspection authorities have found that the condition of extension cords and equipment on construction sites is such that it poses a significant electrical safety hazard.

A focused campaign to look at the condition and use of extension cords on construction sites was initiated in September 1995. Such numbers of hazards were found that a proposal to amend Section 76 to require ground fault circuit interrupters on general purpose receptacles used for construction power has gained widespread support.

Supporting Information: An accident investigation in the District of West Vancouver, British Columbia concluded that the failure to ground a portable skill saw connected through an extension cord with the ground pin broken off was the cause of a near fatal shock to a worker cutting reinforcing steel for a pool installation.

As a result, the condition of cords and equipment on construction sites was specifically looked at. Many situations were found that were considered extremely dangerous.

A campaign in West Vancouver was started in an attempt to determine the scope of the problem and to bring to the industry, an awareness of the hazards. Electrical equipment suppliers supported the efforts and were supplying cord end caps free of charge. When the inspectors found a hazardous cord end, it was ordered removed from use. If the cord was later found to be still in use, the cord end was cut off and a replacement was given to the cord owner. Each cord

end was tagged as to the date and location when it was found. From September through to December 1995, more than 200 hazardous cord ends were removed.

Very often the receptacles the cords were plugged into were in very poor condition as well. It appears that a standard grade receptacle does not stand up to the severe environment of a construction site.

It is clearly the responsibility of the company and its employees to ensure their equipment is in good order. It is also understood that the equipment, when in good working order, does not present an electrical safety hazard. However, a construction site is unique in that it is a very rough environment for these cords. Extension cords can be easily damaged and present a hazard to workers. These workers appear not to fully understand the extent of danger they may be subjected to.

This proposed requirement for ground fault protection of receptacles is consistent with the National Electrical Code N.F.P.A.70, 1993 Edition of the United States. Ground fault protection on construction sites has been a requirement for a number of years.

Organizations Supporting Proposal

This proposal has been presented to the following organizations:

- Electrical Inspectors' Association of British Columbia
- Electrical Contractors' Association of British Columbia
- Canadian Homebuilders' Association of British Columbia
- Workers' Compensation Board of British Columbia

All organizations express a sincere concern regarding the sheer numbers of hazards found on construction sites.

Some comments offered by the organizations include:

- any action should be cost effective;
- every effort should be taken to reduce the possibility of nuisance tripping;
- GFCI protection should be on each receptacle as opposed to a circuit or feeder; and
- a good quality receptacle should be used (specification grade or better).

The Workers' Compensation Board is also considering including a requirement for ground fault protection in their Industrial Health and Safety Regulations.

Conclusion

Having ground fault protection on the general use receptacles does not alleviate the owners and workers of their responsibilities for maintaining the equipment in good working order. However, ground fault protection will greatly reduce the hazard to personnel when the inevitable damage to the cord takes place. I believe this proposal will provide suitable regulation to address this electrical safety hazard.

Chair's Comments: In addition to this proposal a similar proposal in Subject 2202. To avoid duplication a recommendation has been sent to Part 1 to close Subject 2202, Following is Subject 2202 as submitted.

ANNEX B

TO: Rick Gilmour - Standards Administrator of the Committee on the Canadian Electrical Code Part 1

FROM: Robert Nelson
118 Daffodil Cres
Ancaster, Ontario L9K 1E2

AFFILIATION: Electrical Apprenticeship Dept., Mohawk College

DATE: October 01, 1991

RE: Request for an Amendment to Rule 76-014 (5)(c)

Request (Specifically Worded): 76-014 (5)(c)
General use receptacle power branch circuits which are not part of the permanent wiring of the building or structure shall be protected by a Ground Fault Circuit Interrupter set at a value not exceeding the lowest rating of any receptacle connected on the branch circuit.

Reasons for Request:
1. The new Health and Safety Regulations for Construction Projects which took effect August 1, 1991 now requires for general construction work, Ground Fault Circuit Interrupters for any portable electrical tool used outdoors or in wet locations.

2. Rule 76-004 (1) requires that flexible cords or power supply cable shall be of the outdoor type. This indicates that construction or demolition sites could be open an exposed to the weather, or depending on the type of installation a wet location.

3. Article 305 (6a) in the 1990 National Electrical Code requires Ground Fault Circuit Interrupters be used on 15- and 20-ampere receptacle circuits on construction sites when they are not part of the permanent wiring of the building or structure as an alternative to a 'Assured Equipment Grounding Conductor Program.'

4. Rule 10-408 (4) allows Ground Fault Circuit Interrupters to be used as protection for tools or appliances in locations where a reliable ground cannot be obtained.

5. Using a Ground Fault Circuit Interrupter as supplementary protection would help over come the potential shock hazard where long runs of flexible cords (extension cords) are used on construction sites. Depending on the size of flexible cord used (usually either 16/3 or 14/3); the distance from the ground electrode to where the tool or appliance is used; the quality of the ground electrode (resistance to ground); the site conditions where the tool or appliance is used (wet, damp or dry location), the resistance to ground through the worker's body could less than through the grounding/bonding system. This could under a fault condition cause current to flow through the worker's body.

Round One Subcommittee Deliberation: Four members responded, one agreed, three disagreed with the following comments;

I agree with the concept and support the intent to increase the safety of construction sites. The reason that I have voted negative is that I feel that the proposal requires two modifications;

1) I believe that the intent is to protect extension cords that will be used by trades people to run power tools. The current proposal has a much wider scope, and requires that all receptacles be protected by GFCIs. Do we intend that a three-phase 40 A pump connected to a Diagram D2 receptacle GFCI protected. I would expect that the answer is NO. However, if the reply is YES, then has anyone considered the cost of the GFCI? I believe that the intent is to protect common tools, which will be rated 120 VAC, less than 15 A. I would change my vote to affirmative if the proposed Rule is limited to 15 and 20 A , receptacles.
2) Although we all know what "specification grade" receptacles are, I do not believe that we should put them into the CEC. I do not believe that commercial designations should be used in a Code. Perhaps we can use the term 'hospital grade". The proposed Rule could be like 24-106 (6). I realize that these are not the same device, but they are approximately the same cost, and provide a similar degree of reliability.

I agree with paragraph (a), but not (b). The submitter failed to provide information to show a specification grade receptacle will last significantly longer than a standard receptacle. I recommend deleting paragraph (b) from the proposal.

Round two proposal: Add a new Rule 76-017 as follows:

76-017 Receptacles. 15 A and 20 A Receptacles installed to provide power for buildings or projects under construction or demolition shall be protected by ground fault circuit interrupters of the Class "A" type.

Round Two Subcommittee Deliberation:
All six members agreed with the second round proposal.

Subcommittee Recommendation:

Add a new Rule 76-017 as follows:
76-017 Receptacles. 15 A and 20 A Receptacles installed to provide power for buildings or projects under construction or demolition shall be protected by ground fault circuit interrupters of the Class "A" type.