



2008 Annual Technical Conference

OLD BUSINESS ITEM UPDATE

Agenda item # 2008ag-16

2006 CEC 30-504 Stairway (lighting)

Question/enquiry: Do motion detectors and wireless switches comply with the intent of sub-rule 30-504 (1)

Recommendation: For discussion.

Background information:

When the basement is developed a 3-way wall switch is required. If the staircase is drywalled it is difficult to install the three wire cable to the existing switch located at the head of the staircase. Motion detectors and new wireless switches are available that can be installed rather than a conventionally wired 3 way switch. These are approved and appear to meet the intent of the rule when wall mounted at the head and foot of the stairway.

30-504 Stairways (see [Appendix G](#))

- (1) Every stairway shall be lighted.
- (2) Except as provided in Subrule (3), 3-way wall switches located at the head and foot of every stairway shall be provided to control at least one luminaire for stairways with four or more risers in dwelling units.

Switch- defined term in Section 0

Switch — a device for making, breaking, or changing connection in a circuit.

General-use switch — a switch intended for use in general distribution and branch circuits and that is rated in amperes and is capable of interrupting its rated current at rated voltage.

2008 Conference Conclusion: *Note: for details reference 2008 conference minutes*

- Motion detectors and new wireless switches are available that can be installed rather than a conventionally wired 3 way switch. These are approved and appear to meet the intent of the rule when wall mounted at the head and foot of the stairway.
- A wireless switch would suffice; the code does not specify that the switch be hard wired. If the wireless switch achieves the objective of the code, then there is nothing wrong with a wireless switch.
- Code does say it has to be wall mounted, but it might not necessarily need a conventional wall switch.
- Some disagreed, commenting code refers to a wall switch. That could be interpreted as a hard wired wall switch.
- A switch is a switch and it should not matter how this is achieved, we should not restrict new technology. There are a number of motion detector switches in bathrooms which turn lights on and off and they have been used for some time now.

February 2008: Forward to Part 1 for interpretation.

February 6, 2009: Carry forward – at Part 1 Subject 3412

May 2008: Part 1 committee answer to the question/enquiry:

Does a wireless switch such as a motion detector (battery powered and secured/attached to the building structure), used in lieu of a “hardwired” wall switch, meet the requirements of sub-rule 30-504 (2)

Answer: No.

Note – The Part 1 committee interpretations must be based on the literal text and not the intent.



2009 Annual Technical Conference

Agenda item # 2008ag-17 carried forward from 2008 conference

2006 CEC 46-202

Emergency systems reference to CSA standard

Question/enquiry:

Emergency lighting can be provided by selected general lighting run by emergency generators rather than providing (battery powered) unit equipment emergency lighting.

The 2006 CEC has a new clause requiring the installation to conform to CSA C282.

Is it the electrical SCO's responsibility to ensure all the installation, testing and maintenance program items listed in this standard are met? Or does this responsibility fall to the Building SCO as both codes have this requirement? Or both?

Recommendation: As with fire alarms, the building and electrical disciplines must work together to ensure everyone involved in the development are aware of and meet the code requirements, including those in referenced standards. The installation performance tests listed in Section 9 of the CSA C282 should, as a minimum be witnessed and signed off by the electrical engineer of record.

Background Research Summary:

- Both ABC and CEC codes reference CSA C282 standard
- The standard when referenced in each code becomes mandatory in its entirety.
- Both inspection disciplines are responsible for inspection to code and to the requirements in the CSA standard.
- The standard carries many requirements including load testing, transient surge suppression and specific lighting levels in the area of the generator.
- Section 46 has significant changes in the 2009 CEC.

Background Information:

46-202 Supply

- (1) The emergency supply shall be a standby supply consisting of
- (a) a storage battery.....to supply and maintain at not less than 91% of full voltage the total load of the emergency circuits for the time period required by the National Building Code of Canada, but in no case less than 30 min..... or
- (b) a generator driven by a dependable prime mover.
- (3) Where a generator is used, it shall be
- (a) of sufficient capacity to carry the load;
- (b) arranged to start automatically without failure and without undue delay upon the failure of the normal power supply of the equipment connected to this generator; and
- (c) **in conformance with CAN/CSA-C282**, except for a generator installed in health care facilities as described in Rule [24-306](#).

ABC 3.2.7. Lighting and Emergency Power Systems

3.2.7.5. Emergency Power Supply Installation

1) Except as required by Articles 3.2.7.6. and 3.2.7.7., an emergency electrical power system shall be installed in conformance with CAN/CSA-C282-M, "Emergency Electrical Power Supply for Buildings."

3.2.7.6 - references emergency power for health care facilities

3.2.7.7 - references fuel supply shut off valves

CAN-CSA C282 - Emergency Electrical Power Supply for Buildings

1. Scope
2. Definitions and Reference Publications
3. General Requirements
4. Emergency Electrical Power Supply System
5. Emergency Electrical Power Supply Plant
6. Generator Set
7. Generators, Exciters, and Voltage Regulators
8. Transfer Switches
9. Initial Installation Performance Tests
- * **9.2 Operational Test**
- * **9.3 Full Load Test**
10. Operation and Maintenance Program

Note: CSA C282 has many additional requirements such as:

- Extra emergency lighting in the generator room – to be 50 lux
- Transient voltage surge suppression on the supply side of power to emergency lighting
- AHJ shall be given notice at the time of final tests so that it may witness them

2009 Conference Conclusion: *Note: for details reference 2009 conference minutes*

- When the building is under construction, the Building SCO takes overall responsibility for the installation and to ensure all the installation and testing items listed in CSA C282 are met.
- It is the responsibility of the electrical SCO to ensure wiring methods meet electrical code requirements including those included in referenced standards.
- The installation performance tests listed in Section 9 of the CSA C282 should be witnessed and signed off by the electrical engineer of record.
- Once the building is occupied, maintenance and operation requirements outlined in the standard are the (enforcement) responsibility of the Fire discipline.

ACTION: Information only, Item Closed



2009 Annual Technical Conference

Agenda item # 2009ag-01

SCO qualifications

Question/enquiry: Considering the amount of experience and time it takes to become an electrical contractor/business owner. I find it disheartening to find newly acquired Journeyman electricians becoming inspectors, telling us what is right or wrong.

Recommendation: Collaborate for change to the inspectors association to increase the pre-requisite to become an inspector.

Background research summary:

- Prerequisites for becoming a SCO appear to be higher than that of a Master electrician.
- The question “should a electrical SCO be a master electrician” needs to be addressed.
- Standards in Alberta for time in the trade for becoming an electrical inspector are higher than in the building discipline.
- The idea of lowering SCO qualifications was brought up at ETC and rejected.

Background information:

Safety Codes Council: Electrical Group A Entry Qualifications

Alberta Journeyman Electrician certification, or recognized equivalent, and six (6) years of electrical field experience after diploma or degree. or

Electrical Engineering Technologist diploma, or equivalent recognized in Canada, and eight (8) years of work experience after diploma or degree (which must include work related to wiring methods and installation). or

Electrical Engineering degree, or equivalent recognized in Canada, and eight (8) years work experience after diploma or degree (which must include work related to on-site field applications).

Electrical Group A - Safety Codes Council course requirements (5):

Interpretation and Application of the Safety Codes Act; Written Communication; Clearly Communicating; Electrical Basics 2002; Electrical, Group A CEC C22.1-06

- **SCO designation carries a mandatory requirement for training at each code release**
- **No requirement to be a master electrician to become an SCO.**

REQUIREMENTS FOR WRITING THE MASTER ELECTRICIAN EXAMINATION

1. 3 years has held (i) Alberta electrician certificate of proficiency,
(ii) Provincial journeyman electrician certificate of proficiency issued by a province other than Alberta
(iii) Alberta restricted master electrician certificate and has been actively engaged in electrical contracting and upgraded his qualifications to an Alberta electrician certificate of proficiency.
2. Two part exam where the candidate must attain average of not less than 75% with a minimum of 60% in each part of Part I and Part II.

Masters Examination based on:

- Canadian Electrical Code
 - STANDATA- Electrical part only
 - Worker's Compensation Board - Alberta. Information for Employers
 - Apprenticeship and Industry Training Act, Apprenticeship Program Regulation
 - Apprenticeship and Industry Training Act: Electrician Trade Regulation
 - Occupational Health and Safety Act (OHS)- Employers Guide
 - Certificate and Permit regulations AR 168/2007
-
- **New Masters will require mandatory training at each code release**

2009 Conference Conclusion: *Note: for details reference 2009 conference minutes*

There were suggestions that an SCO should be required to be a master electrician, however the qualification requirements for electrical SCO's are the highest under the Safety Codes Act. Perhaps as a group we need to do a better job of communicating the qualification requirements of SCO's to industry.

ACTION: Information only, item to be taken back to originator to see if any further action is requested. Item Closed



2009 Annual Technical Conference

Agenda item # 2009ag-02

Un-licensed electricians

Question/enquiry: Ontario is cracking down on unlicensed electricians (see attached article from Electrical Source Magazine). It would be nice for our government to do the same.

Recommendation: For discussion.

Background Research Summary:

- The licensing issue is probably relevant to all jurisdictions across Canada.
- In Alberta we do not have requirements to license contractors (Provincially)
- We do have the enhanced master's program that is moving forward which should allow for dealing with masters not accepting responsibility for their permits.
- Is the issue licensing or is the issue electrical work is being done by unqualified workers?

2009 Conference Conclusion: *Note: for details reference 2009 conference minutes*

When discussed on the floor this item doesn't seem to be a business licensing problem, it is actually a problem with the qualifications of the person doing the electrical work. In Alberta, we have municipal business licenses and we have trade qualifications. Lots of concerns were expressed over when a non-electrician does the work and the potential for abuse of homeowner permits. The new masters program, hopefully it will take care of part of the problem. One way to ensure the proper people are doing the electrical work is to develop a good working relationship with the Apprenticeship and Industry Training consultant in your area. A few municipalities are using a "Home Owner Declaration" to go over the conditions of issue for a home owner permit which lists persons helping them with the work (to ensure they are not acting as a contractor) before they are issued a homeowner permit.

ACTION: Information only, Item Closed

Post conference - additional information

- **Copy of BC directive for homeowner permits**
- **Copy of City of Airdrie Homeowner declaration**



DIRECTIVE

No: D-E3 040722 2

QUALIFIED PERSONS WORKING UNDER AN ELECTRICAL INSTALLATION PERMIT ISSUED TO A HOMEOWNER
--

This Directive is being issued by a provincial safety manager pursuant to section 30 of the Safety Standards Act.

Date of Issue: July 22, 2004

General Details

This directive is being issued to clarify that homeowners may have qualified people help them perform electrical work provided that those people are not paid to assist the homeowner. If a person is being paid to do the work, that person is acting as a contractor. In that case, the contractor must be licensed by the BC Safety Authority and the permit must be obtained under his or her license.

Specific Details

Under section 17 of the Electrical Safety Regulation, a homeowner may perform electrical work in their own home under an installation permit. Section 17 does not, however, clearly indicate that anyone else may assist the homeowner in performing the work. This directive details when a homeowner may be assisted by a qualified person.

When a homeowner applies for an electrical installation permit, the homeowner must fill out a "Homeowner Declaration" form and attach it to the application. In that form, the homeowner is required to sign the following declaration:

I own and occupy or intend to occupy this dwelling. I am responsible to ensure that the installation will comply with the Safety Standards Act. I have read and understand the Electrical Safety Homeowner Guide. I am qualified and I will do the work without assistance, or if assisted, it will be by a qualified person not under contract, and who will not receive remuneration.

A qualified person is an individual who has knowledge of the electrical system and equipment being installed or altered and who is aware of the hazards involved. A qualified person may be an electrician, a licensed electrical contractor, or an individual who is competent to perform electrical work.

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Toll Free: 1-866-566-SAFE (7233) Fax: 604 660-6215 Web Site: www.safetyauthority.ca E-mail: info@safetyauthority.ca



A homeowner must name all qualified persons who may assist the homeowner on the Homeowner Declaration form. The homeowner must not pay a qualified person named on the form. Otherwise, the qualified person is acting as a contractor. Under section 23 (1) of the *Safety Standards Act*, a person must not perform work as a contractor unless the person is licensed to do so.

To summarize, it is an offence for homeowners to pay a qualified person, including a contractor, to perform the work under a homeowner's permit. It is also an offence for a contractor to work for remuneration under an installation permit issued to a homeowner.

A handwritten signature in black ink, appearing to read "Rick May".

Rick May
Provincial Safety Manager, Electrical



Section 17 of the Electrical Safety Regulation

When a homeowner may perform electrical work under a permit

- 17 (1) Subject to this section, a homeowner may perform electrical work in their fully detached dwelling under an installation permit.
- (2) An installation permit may be issued to a homeowner only if
- (a) electricity is not fed or supplied from the fully detached dwelling to a separately owned or occupied property, and
 - (b) the electrical work involves only installations in which the current and voltage do not exceed current of 200 amps and voltage of 150 volts to ground, single phase power.
- (3) An installation permit issued under subsection (2) does not authorize the issue of a permit to install the connection from a manufactured home or recreational vehicle to the power supply of a manufactured home park or recreational vehicle park.
- (4) A homeowner who performs electrical work under an installation permit must request that the work be inspected by a safety officer
- (a) if the work or a phase of the work is completed, promptly on that completion, or
 - (b) if no other inspection has been made within 180 days from the start of the permit, immediately before the expiry of the 180 day period.
- (5) If an inspection is required after a request under subsection (4), the inspection must be made after completion of the electrical work and before
- (a) the concealment of any portion of the rough wiring, and
 - (b) the connection of power to the electrical supply system.
- (6) A homeowner may perform the electrical work in the homeowner's fully detached dwelling under an installation permit issued to a licensed electrical contractor for that work if
- (a) the contractor who holds the permit supervises the work, and
 - (b) the homeowner only performs work referred to in subsection (2).



Safety Standards Act

Licensing of contractors

- 23 (1) A person must not do any of the following unless licensed by a provincial safety manager or authorized to do so under this Act:
- (a) manage or direct individuals doing regulated work;
 - (b) do regulated work for another person who is not a licensed contractor.

Issue of permissions

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- (4) A person who holds a permit issued under this section must comply with the terms and conditions of the permit.

References:

Bill 19 – 2003	Safety Standards Act
B.C. Reg. 100/2004	Electrical Safety Regulation
B.C. Reg. 105/2004	Safety Standards General Regulation

For more information, please contact your local safety officer. A list of area offices is available on our web site at: http://www.safetyauthority.ca/contact/BCSA_Area_Offices.pdf

Qualified Persons Working Under an Electrical, Plumbing or Gas Installation Permit issued to a Homeowner for a single family dwelling

This information is to clarify who qualifies for a homeowner permit and who may assist the homeowner to do that work.

- A “homeowner permit” may be issued to an owner who resides in a single family residential dwelling where the system (electrical, plumbing or gas) serves that dwelling. This includes a house (and accessory buildings) and suites within a duplex, fourplex or townhouse. Homeowner permits cannot be issued for any portion of properties intended for rental purposes.
- The Permit Regulation states a homeowner may perform electrical, plumbing or gas work in their own single family dwelling but does not clearly indicate that anyone may assist the homeowner. You are allowed to have a qualified person help you with your installation, however if a person is being paid to do the work that person is acting as a contractor. In that case, the contractor must be licensed and registered with the City of Airdrie and the permit must only be issued under that license. Licensing also confirms persons doing work in the compulsory certification trades (electrical, plumbing and gas) are certified to do so.
- When an owner applies for a permit, the homeowner must fill out a ‘Homeowner Declaration’ form. On that form the homeowner is required to name all the persons assisting with the installation and sign the following declaration:

I own and occupy this dwelling. I am responsible to ensure that the installation will comply with the Safety Codes Act. I am qualified and I will do the work without assistance, or if assisted, it will be by a qualified person not under contract, who will not receive remuneration.

- A qualified person is an individual who has knowledge of the system and equipment being installed or altered and who is aware of the hazards involved.

Note: The information on this form is collected under the authority of the City of Airdrie Building Inspections Bylaw and is used solely for the purposes relating to the administration of the Building Inspections program. Questions about the collection of this information can be directed to the Building Inspections Department at:
400 Main St. SE Airdrie, AB, T4B 3C3 Phone 948-8832. Fax 948-8834. Website www.airdrie.ca

Residential dwelling – Homeowners Declaration:

Daytime telephone number: ()	Permit number:
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Name:

Homeowner address:

Project address (if different from above):
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Identify qualified persons giving assistance:

Electrical:	
Name: _____	Qualifications: _____
Name: _____	Qualifications: _____

Plumbing:	
Name: _____	Qualifications: _____
Name: _____	Qualifications: _____

Gas:	
Name: _____	Qualifications: _____
Name: _____	Qualifications: _____

I own and occupy this dwelling. I am responsible to ensure that the installation will comply with the Safety Codes Act and Regulations. I am qualified and I will do the work without assistance, or if assisted, it will be by a qualified person not under contract, and who will not receive remuneration.

Signature of Applicant: _____

Signature of witness: _____

Dated this _____ day of _____ 2009 at Airdrie, AB



2009 Annual Technical Conference

Agenda item # 2009ag-03 Enforcement of CEC 2006 2-024 approved equipment

Question/enquiry: When is the government of Alberta going to start to enforce this regulation?

Recommendation: Have the government hire inspectors to enforce their regulations or have an independent Electrical Safety Association with the power of search, seizure and enforcement supported and financed by the government.

Background information:

As an inspector for QPS Evaluation Services, I am constantly asked to complete field evaluations on electrical equipment with plastic involved, and a large majority fail the required match test. In some cases the plastic burns as well as gasoline. AHJ's are expected to provide this service for the government in the hopes that the courts will recover their costs.

2009 Conference Conclusion: *Note: for details reference 2009 conference minutes*

When discussed on the floor there did not appear to be much support for a change in the system. SCO's have the authority under the Safety Codes Act to do something about unapproved equipment - they can issue an order, or we can refuse the product. There are provisions in place right now. It is up to the SCO on site to make the call.

ACTION: Information only, Item Closed



2009 Annual Technical Conference

Agenda item # 2009ag-04

2006 CEC section 2

Question/enquiry:

Electrical equipment such as a panelboards, have markings and labels that contain important safety information. Examples are approval labels, shock and flash warnings and panel directories.

In residential construction particularly, the panelboard has become a community bulletin board for stickers containing building component information such as spray foam installation dates, backflow prevention devices and other non electrical labels.

These labels placed on the panel are blocking or directing user's attention away from the required mandatory electrical safety and product identification.

Recommendation: Create a new rule in Section 2 that prohibits installation of labels, stickers or similar markings on electrical equipment that are not installed by the manufacturer or required by the electrical code.

Background research summary:

- Inspection labels are one of the main labels that appear on panelboards – will need to continue to allow this practice or come up with acceptable alternate solutions.
- Labels can cover or block cover screws, panel directories or manufacturers model identification labels.

Background Information: an example of important required labeling

2-306 Shock and flash protection

(1) Electrical equipment such as switchboards, panelboards, industrial control panels, meter socket enclosures, and motor control centres that are installed in other than dwelling units and are likely to require examination, adjustment, servicing, or maintenance while energized shall be field marked to warn persons of potential electric shock and arc flash hazards.

(2) The marking referred to in Subrule (1) shall be located so that it is clearly visible to persons before examination, adjustment, servicing, or maintenance of the equipment.

2009 Conference Conclusion: *Note: for details reference 2009 conference minutes*

These labels are blocking (or covering) the required electrical safety labels and directories. Our own inspection labels and those of Alberta Municipal Affairs are also contributors to this practice (e.g with manufactured homes labels). The practice should be limited to only those labels directly applicable to the electrical installation. It may be difficult to put in the code under Part 1 because it is trying to prevent the actions of other disciplines (from defacing the electrical panel). There are some examples in other CSA standards that have provisions disallowing the practice of placing signage (such as advertizing) where it distracts from mandatory signage in critical areas. It may be better to tackle this issue at the local level or perhaps in the form of a STANDATA issued to all disciplines.

ACTION: Carried forward to the AEICTC and the CECAC



Agenda item # 2009ag-05 2006 CEC 6-300 and Table 19 service entrance cables

Question/enquiry:

- 1) Can we stop the use of USEB cable use within a building?
- 2) Should an unfused cable (USEB or TECK) be permitted in an insulated wall between the meter socket and the open floor joist

Recommendations:

- 1) USEB cable use within a building should be discontinued
- 2) That an un-fused cable must be installed exposed and when below 1.5m above grade level be installed in an approved raceway or protected with a steel conduit while inside and insulated wall.

Background Research Summary:

- There are huge inconsistencies within Alberta on how we allow this cable to be used.
- The municipalities are split as to how they are allowing USEB to be run in a dwelling unit from the meter base to the service panel.
- Some Utilities and municipalities require the cable to be in a conduit (as mechanical protection meter base to panel). This causes other problems as the bend radius is compromised when installing it in a raceway smaller than 2" and this cable is not approved to be run in a raceway.
- When not in a conduit, the cable makes a 90° bend behind the meter socket and usually have no support from there to the floor joint, therefore these cables are subject to contact with nails and screws.
- USEB cable is subject to damage in particular by those with no knowledge of bend radius. The cable is under constant threat of over-bending and pinching by the other trades during the framing process or when other building services are routed through the area the cable is located in.
- Could not come up with any proof that Alberta is the only province that allows USEB from the meter base to the panel – although this is believed to be true.
- Manufacturers have identified specific bend radius allowed for USEB. It is believed that is the cable is over-bent, the concentric neutral cuts into the insulation of the conductors leading to failure. Once it is over-bent, it must be replaced.
- Could not come up with any failure history records – although we have seen evidence at the EIAA conference of failures outside before the meter base.
- This issue has been before the EIAA conference since the 2005 conference. That item was defeated at ETC.

Background Information:

From: STANDATA CEC-6:

When USEB-90 cable is used for an underground service installation, it may extend from the meter socket to the service box.

Any cable extending into a building is required to have the appropriate flame spread rating unless it is enclosed in metallic armour or a raceway. To comply with the Alberta Building Code, the raceway must be non-combustible unless the building is of combustible construction, in which case a combustible raceway having a flame spread rating of not more than 25 may be used.

Where USEB-90 is installed in a raceway, care must be taken to ensure the cable is not bent or handled in a way that will damage the conductors or the outer jacket.

2009 Conference Conclusion: *Note: for details reference 2009 conference minutes*

It is difficult to come up with documented evidence that there is a failure problem. Most provinces do not allow this cable to run beyond the meter base. There is no readily available failure history. Past EIAA conferences have seen video evidence of spectacular failures of these cables on the exterior of houses. Fire investigations in the Edmonton area indicate failures of USEB installations are due to incorrect installations.

Problems occur underground and when using USEB cable from the meter socket to the panelboard. Concern is over compromising bending radius and mechanical damage.

There are unqualified people (subcontractors) in some areas of the province that are responsible for running the cables in the trench that have no idea how to do so.

A new rule in the 2009 CEC 12-012 (12) may help - Where underground raceways or cables are subject to movement by settlement or frost, provision shall be made so as to prevent damage to the conductors or the electrical equipment.

No one at the conference could answer what the allowable bend radius is for the 3 most common USEB cables in use or what size of conduit is required in order to maintain the minimum radius. (Subsequent research has provided the answers – see attachment)

If we want it changed we need to put in a clear submission to Part 1.

Please report all failures to AMA so a proper history can be documented.

SCO's may reject installations if the bend radius of the cable has been compromised.

ACTION: Carried forward to the AEICTC

Post conference - additional research done has provided the following information for item 2009ag-05 - use of USEB cable for service entrance

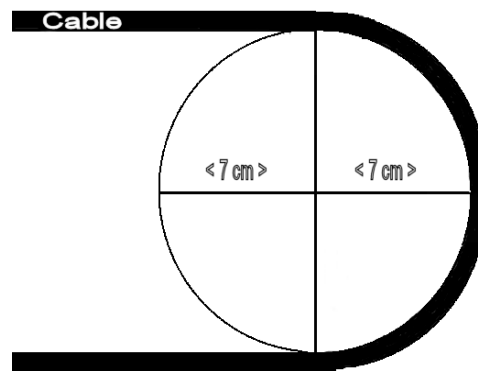
Concerns have been expressed at more than one EIAA conference over tight bends placed in USEB cables that could compromise the lifespan and safety of these cables. This can occur when the cable is placed in conduit (for mechanical protection) or when run free, either underground or between the meter base and the panelboard in residential construction. Questions that came forward from the 2009 conference floor and could not be completely answered at the conference were:

- What is the allowable bend radius of the cable?
- If installed in conduit, what is the minimum size of conduit that can be used before the bend radius is compromised?

Specific rule that applies: CEC 12-110. The radii of bends in conductors shall be sufficiently large to ensure that no injury is done to the conductors or their insulation, covering, or sheathing.

Description and diagram (Wikipedia): Bend radius, which is measured to the inside curvature, is the minimum radius one can bend a pipe, tube, sheet, cable or hose to without kinking it, damaging it, or shortening its life. The smaller the bend radius, the greater is the material flexibility (as the radius of curvature decreases, the curvature increases). The diagram below illustrates a cable with a seven-centimeter bend radius.

The minimum bend radius is the radius below which an object such as a cable should not be bent.



These questions from the floor were taken to a USEB cable manufacturer's sales and engineering departments as follows:

Question 1) If a USEB90 cable is bent beyond its allowable bend radius, is the cable now damaged to the point it must be replaced? We understand that the concentric neutral, in an over-bent cable, will cut the insulation of the 2 insulated conductors leading to premature failure.

Answer from the cable manufacturer's representative: Yes, if the cable is bent repeatedly below its minimum bending radius there is a good possibility the insulation will crack, particularly at lower temperatures. Also the neutral wires may cut into the insulation reducing the effectiveness of the dielectric to the point where the voltage stress will cause the cable to fail.

Additional information provided. See attachments outlining minimum bend radius (last 2 pages) extracted from the AEIC "Underground Extruded Power Cable Pulling Guide".

Note: AEIC is the Association of Edison Illuminating Companies – an organization of investor owned electric utilities and its cable engineering section. It develops cable specifications and guides for its members.

Question 2 - What is the allowable bend radius for the following sizes of USEB90 cables (all aluminum) which are commonly used in Alberta installations - #2, 1/0 and 4/0

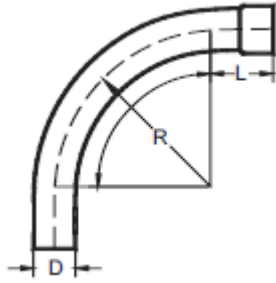
Answer from the cable manufacturer's representative:

On the specific sizes of USEB cables, the following minimum bending radius is applicable:

#2 - 136 mm (5")
1/0 - 190 mm (7.5")
4/0 - 230 mm (9")

If installed in conduit, what is the minimum size of conduit that can be used before the bend radius is compromised?

Bend radius of rigid PVC 90° (from manufacturer technical specifications)



27mm (1") - 5.75"
35mm (1 ¼") - 7.25"
41mm (1 ½") - 8.25"
53mm (2") - 9.5"

From the information provided, to maintain acceptable bend radius of USEB90 (alu) cable when placed in rigid PVC for mechanical protection:

#2 could be run through a 27mm (1 ") rigid PVC 90° elbow
1/0 could be run through a 41mm (1 ½") rigid PVC 90° elbow
4/0 could be run through a 53mm (2") rigid PVC 90° elbow

6.5 Minimum Bending Radius

If a power cable is bent in a radius that is too severe, the cable structure may be damaged. Field experience and laboratory tests have been used to establish the minimum bending radii for various cable designs. The following information outlines the minimum bending radii that have been established by ICEA standards, and are generally accepted for commonly used unarmored power cables. These are values to which insulated cables may be bent for permanent training during installation. Although developed as minimum training radii, the results from EPRI project EL-3333 indicate that they are appropriate for minimum cable pulling radii for conduit bends and sheaves if tension and SWBP limits are not exceeded. They are not necessarily applicable for cable pulled over rollers. The cable manufacturer should be contacted when rollers are used in a cable pull. In all cases the minimum radius specified refers to the inner surface of the cable and not to the axis of the cable.

For single cables, the minimum bending radius is a multiple factor "F" of the single cable overall diameter. For cable assemblies of either paralleled or multiplexed single cables, the minimum bending radius is a multiple F of the circumscribed diameter of the assembly. For three single cables paralleled or triplexed, the circumscribed diameter of the assembly is 2.155 times the diameter of a single cable. For four single cables paralleled or quadruplexed, the circumscribed diameter is 2.414 times the diameter of a single cable.

Therefore, for a single cable, the allowable minimum bending radius is:

$$R_{\min} = F \times \text{O.D.}$$

For an assembly of three single cables, the allowable minimum bending radius is:

$$R_{\min} = F \times (2.155 \times \text{O.D.})$$

For an assembly of four single cables, the allowable minimum bending radius is:

$$R_{\min} = F \times (2.414 \times \text{O.D.})$$

Where: $R_{\min}$ = minimum allowable bending radius
 F = multiplication factor for the cable design
 O.D. = overall single cable diameter

F factors are given in the following tables 1A, 1B, and 1C for different cable configurations. The appropriate factor and formula must be applied, according to whether a single cable or a cable assembly is being pulled into a duct, or if the cable assembly is simply being trained as single cables at some terminal point.

Table 1A

F Factor for Cables Rated 600 V to 2 kV

Thickness of cable insulation in mils	F for single cable		F for cable assemblies of single cable		
	O.D. of 1" or less	O.D. over 1"	O.D. of 1" or less	O.D. of >1" to 2"	O.D. over 2"
155 or less	4	5	4	5	6
170 to 310	5	6	5	6	7

Notes from the cable manufacturer's representative: (on values from these charts that are to be applied to the formulas in order to arrive at the allowable bend radius of USEB)

We use a value of 2.0 for the parallel 2 conductor construction as opposed to a value of 2.155 for 3 conductor cables. This relates to the smaller circumscribing diameter of USEB cables.

This then can be substituted directly into the formula provided $R_{min.} = F \times (2.0 \times O.D.)$

Keep in mind also that the F factor is 4 for the #2 and 5 for the 1/0, and 4/0.



Agenda item # 2009ag-06

2006 CEC 10-400 series non-metallic watering bowls

Question/enquiry: There are non-metallic watering bowls (for livestock). There are also watering bowls where the heating element is totally enclosed with epoxy. Where would you connect a # 6 bonding conductor?

Recommendation: For discussion

Background information:

10-402 Fixed equipment, specific

(4) Electrical equipment, such as livestock waterers, installed in feedlots and open feeding areas shall be bonded to ground by a separate stranded copper bonding conductor not less than No. 6 AWG terminating at a point where the branch circuit receives its supply.

10-406 Non-electrical equipment

5) In buildings housing livestock, all metal water pipes, stanchions, water bowls, vacuum lines, and other metals that could become energized shall be bonded to ground by a separate stranded copper bonding conductor not smaller than No. 6 AWG except that, where it is necessary to control the effects of stray earth current, a device specifically approved for the purpose, connected in series with the bonding conductor, shall be permitted.

2009 Conference Conclusion: *Note: for details reference 2009 conference minutes*

There are all types of waterers that are fiberglass, concrete, plastic. What are we to do with the ground conductor if there are no metal water lines or non metallic waterers? Rule 10-402 (4) deals with livestock waterers so you can't disregard the ground completely. This needs to be revisited by the Section 10 committee to take a close look at these rules. Suggest a proposal be submitted in writing to section 10.

ACTION: Carried forward to the CECAC and Part 1



2009 Annual Technical Conference

Agenda item # 2009ag-07

Use of non-approved conduit for traffic signals

2006 CEC 12-012 & CEC Section 0 - scope

Question/enquiry: It would seem that some municipalities and contractors continue to use poly tube (polyethylene plastic) as a raceway for underground conductors.

Recommendation: Enforcement of ruling regarding the use of polytube. Reinforce to all municipalities that traffic signal work falls under the CEC and that municipalities are not a utility and therefore Part 3 of the code does not apply.

Background Research Summary:

This is truly 2 questions:

- 1) Does traffic signal wiring fall under the CEC (and permit regulation)
- 2) Is poly tube allowed to be used as an underground raceway or as mechanical protection for direct buried conductors.

Background information: see attached STANDATA

1) Does traffic signal wiring fall under the CEC (and permit regulation)

ELECTRICAL SAFETY Information Bulletin

STANDATA

January 2003

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CANADIAN ELECTRICAL CODE

SUBJECT: Section 0 – Object Scope, and Definitions

Scope

Street-lighting Installations

Electrical power companies have traditionally installed, operated and maintained street-lighting facilities. Due to deregulation, some companies have divested themselves of the street-lighting portion of their operations. Other organizations such as municipal and/or provincial transportation departments are taking over these installations. This situation has raised the question as to whether or not street-lighting installations fall within the scope of the CEC.

The scope of the CE Code tells us the code applies to “electrical installations for buildings, structures, and premises...” Street-lighting installations on rights of way and public thoroughfares do not appear to fit into the categories of “electrical installations for buildings, structures, or premises”.

Furthermore, the scope of the CE Code exempts “installations or equipment employed by an electric utility in its function as a utility”. The term “utility” is not a defined term so the dictionary definition would apply.

- Webster's Ninth New Collegiate Dictionary defines utility as:
a service (as light, power, or water) provided by a public utility.
- The Dictionary of Canadian English – The Senior Dictionary defines utility as:
a company that performs a public service.

Based on these definitions, the provider of street-lighting services could be considered a “utility” as referred to in the exemption in the scope of the CEC.

To clarify this issue, the Electrical Technical Council (ETC) has submitted requests for interpretation to the Canadian Standards Association. Until the interpretation has been reviewed, the ETC and Municipal Affairs offer the following guidelines.

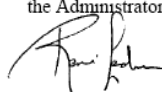
- Installation requirements for street-lighting systems located on rights of way and public thoroughfares are not considered to fall within the Scope of the Canadian Electrical Code (Part I and Part III). They are considered unregulated as far as installation requirements.
- Owners of street-lighting systems installed on rights of way or public thoroughfares are responsible for using appropriate industry recognized standards in compliance with the safety principles of the Safety Codes Act. In establishing industry practices, consideration should be given to the parties responsible for maintaining the system.

The Canadian Electrical Code continues to apply to outdoor lighting on premises such as parking lots, private roads, or walkways.

Issue of this STANDATA is authorized by
the Administrator



SAFETY CODES COUNCIL


René Leduc

Alberta
MUNICIPAL AFFAIRS

Alberta Municipal Affairs – Safety Services, 16th floor, Commerce Place, 10155 – 102 Street, Edmonton, Alberta, Canada, T5J 4L4
Safety Codes Council, Suite 800, 10707 – 100 Avenue, Edmonton, Alberta, Canada, T5J 3M1

- 2) Is poly tube allowed to be used as an underground raceway or only as mechanical protection for direct buried conductors?

ELECTRICAL SAFETY Information Bulletin



October 2006

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CANADIAN ELECTRICAL CODE

SUBJECT: Section 12 – Wiring Methods

Rule 12-012 Underground Installations

Mechanical Protection for Direct Buried Conductors

The Appendix B Note on Rule 12-012 indicates that polyethylene water pipe in conformance with CSA Standard B137.1, Polyethylene Pipe for Cold Water Services is considered acceptable for mechanical protection of conductors or cables used for direct earth burial.

Although acceptable for mechanical protection of conductors or cables installed underground, this material is not approved as a wiring material and should not be installed as a raceway inside buildings.

Table 19

Conditions of Use and Maximum Allowable Conductor Temperature of Wires and Cables Other Than Flexible Cords, Portable Power Cables, and Equipment Wires

Conditions of Use	Trade Designation	CSA Type Designation	Maximum Allowable Conductor Temperature °C	Reference Notes
For direct earth burial (with protection as required by inspection authority)	Armoured Cable	ACWU90 TECK90	90 90	4, 9, 10 4, 9, 10
	Nonmetallic Sheathed Cable	NMWU	60	4, 21
	Rubber (Thermoset-) Insulated Cable	RWU75 RL90, RWU90	75 90	4, 9, 10 4, 9, 10
	Aluminum-Sheathed Cable	RA75 RA90	75 90	4 4, 8, 9
For direct earth burial (with protection as required by inspection authority)	Mineral-Insulated Cable	MI, LWMI	90	1, 4, 19
	Thermoplastic-Insulated Cable	TWU TWU75	60 75	4, 5 4
	Airport Series Lighting Cable	ASLC	90	20
	Tray Cable	TC	90	26

2009 Conference Conclusion: *Note: for details reference 2009 conference minutes*

Question 1: does traffic signal wiring fall under the CEC (and permit regulation) - YES

- All provinces require traffic light installations to follow CE Code.
- It was suggested we could have a separate section in the code to cover this subject.
- Municipalities were polled on requirements for permits in their areas and requirements varied, but generally most are asking for permits unless the installation is owned by a Utility.

Question 2: is poly tube allowed to be used as an underground raceway or as mechanical protection for direct buried conductors.

Answer – Poly tube can be used as mechanical protection only for conductors or cable suitable for direct earth burial. It is not a raceway.

ACTION: Information only. Item closed.



2009 Annual Technical Conference

Agenda item # 2009ag-08

2006 CEC 12-500 - NMSC installations

Question/enquiry: In central Alberta, it is the common practice to staple 2-3 wire cables under one staple or 1- 2wire (on edge) and 1- 3 wire under one staple. I have spoken with the electricians and contractors. They both tell me that it is common practice and that they have been doing it that way for years and have never been called before.

Recommendation: For discussion

Background Research Summary:

- Staples are designed to “support” the cable, not “secure” the cable.
- Devices used to support NMD90 are to be approved
- Manufacturers make “suggested application” for each type of staple (vs capacity statements)
- Author of a widely used electrical guide suggests one staple per cable is all that is allowed
- Staples are designed to be driven into the built in stop (not under driven, not over driven)
- As long as the staple is driven in properly and is not damaging the conductors or outer case, is there an issue with numbers under a staple or whether the some of the cables are on edge?
- Code is clear that two conductor cable is not to be stapled on edge – doe this code article need to change if the cable can be safely secured under a staple on edge?

Background information:

12-506 Method of installation

(6) Two-conductor cable shall not be stapled on edge.

12-508 Bending and stapling of cable

The cable shall not be bent, handled, or stapled so that the insulated conductors or outer covering is damaged

12-510 Running of cable between boxes and fittings

- (1) Where the cable is run between boxes and fittings, it shall be supported by straps or other devices located within 300 mm of every box or fitting and at intervals of not more than 1.5 m throughout the run.
- (2) Cables run through holes in joists or studs shall be considered to be supported.

From Electrical Code Simplified - P.S. Knight:

Rules 2-026, 2-108 & 12-508 – Be sure to use the correct size staple or strap for each size cable. It is not correct to use a 2 wire cable strap on a 3 wire cable or visa versa unless the staple or strap is specifically approved for both sizes, nor is it correct to put two cables under a single strap or staple (you may get away with two cables under a strap if they are very carefully installed).

From Brian MacDonald @ T&B:

On the topic of an inspector who was refusing (or questioning) the use of a CIS-2 staple on 14/2 cable. The important thing here to note is that staples, nailing staples and cable straps are not designed nor required to "secure" the cable in place but only to "support" it.

The Canadian Electrical Code was modified several years ago. A critical word was changed regarding the definition under rule 12-510 (1) - Running of Cable Between Boxes and Fittings.

The new code reads: "Where the cable is run between boxes and fittings, it shall be supported by straps or other devices

The old code read: "Where the cable is run between boxes and fittings, it shall be secured by straps or other devices

This change was championed by the cable manufacturers who were working with different raw materials in order to reduce the material content of the cables. It was realized that with new technologies, no two cable manufacturers would have the same sized cable. This was a welcomed change for staples and accessory manufacturers since it would have been a nightmare to try and have a staple for every cable that could possibly come to market.

The staples are designed to support the cable and not to secure the cable. They should never be driven further than the built in stops that have been designed to that the staple does not damage the cable.

2009 Conference Conclusion: *Note: for details reference 2009 conference minutes*

The staples are designed to support the cable and not to secure the cable. Manufacturers have charts with suggested application for cables used with each type of staple but the charts do not state the staples are designed for one cable only. Be sure to use the correct size staple or strap for each size cable. Code is clear two conductor cables cannot be stapled on edge. Staples should never be driven further than the built in stops so that the staple does not damage the cable.

ACTION: Information only. Item closed.



2009 Annual Technical Conference

Agenda item # 2009ag-09

2006 CEC 26-712 Porch receptacle

Question/enquiry: A porch receptacle is required to be installed as per CEC rule 26-712 (b). A porch is defined as a structure that overhangs a building. Can the same receptacle also be used as the outdoor receptacle if it is on a dedicated circuit and GFI protected and accessible from ground or grade level? Should a definition of porch be included in the CEC.

Recommendation: For discussion.

Background Research Summary:

- The term "Porch" is not a defined term in the electrical code (or the ABC) so the dictionary definition would apply
- A porch requires a receptacle
- It would most likely need to be GFI protected when <2.5m from ground and weatherproof
- Ontario has a bulletin that indicates if the outside receptacle on a dedicated circuit has been provided elsewhere, the porch receptacle can be fed off a general circuit.
- The first question is ... can a porch receptacle meet both the porch and outdoor receptacle requirements?
- The second question is ... what circuit can a porch receptacle be on? Must it be on the outside receptacle circuit or can it be fed from a general circuit?

Background information:

"Porch" - the dictionary definition:

A covered and enclosed entrance to a building, whether taken from the interior, and forming a sort of vestibule within the main wall, or projecting without and with a separate roof. Sometimes the porch is large enough to serve as a covered walk.

A covered platform, usually having a separate roof, at an entrance to a building. An exterior appendage to a building, forming a covered approach or vestibule to a doorway. An open or enclosed gallery or room attached to the outside of a building; a verandah.

Veranda - a large, open porch, usually roofed and partly enclosed, as by a railing, often extending across the front and sides of a house. An open, roofed gallery or portico, adjoining a dwelling house, forming an out-of-door sitting room

26-712 Receptacles for dwelling units

This Rule applies to receptacles for dwelling units (including single dwellings) as follows:

(b) at least one duplex receptacle shall be provided in each area, such as a balcony or porch, that is not classified as a finished room or area in accordance with Item (a);

From: Electrical Contractors Association of Ontario newsletter – assuming it is taken from Ontario ESA Bulletin 26-19-0:

Receptacles Required for a Porch or Balcony

The 2002 edition of the Ontario Electrical Safety Code, which came into effect April 25, 2002, requires that at least one duplex receptacle be provided in each area of a residential property, including balconies and porches.

The word “enclosed” has been deleted from Rule 26-712(b), in the 2002 edition of the Code, so it now reads “At least one duplex receptacle shall be provided in each area, such as a balcony or porch, that is not classified as a finished room or area.

Many dwelling units have attached balconies or porches that may or may not be enclosed from the outside elements. The word “enclosed” was deleted to require that a receptacle be installed in any balcony or porch to eliminate running appliance or extension cords through windows or doorways for various portable electrical equipment, such as rotisseries, radios, TV, etc.

The Electrical Safety Authority is committed to ensuring proper interpretation and application of this rule. To support this goal, the following guidelines shall be used for consistent interpretation and application.

- Receptacle(s) shall be located in a readily accessible location and may be fed from any branch circuit if the requirements of Rule 26-714(a) and 26-724 (a) have been met elsewhere.
- Rule 26-714 (b) requires the receptacle to be GFCI protected if less than 2.5 m above grade and if exposed to the weather; a weatherproof cover shall be installed to comply with 26-702.

Definitions:

A porch is “a covered area adjoining an entrance to a building and usually having a separate roof”, and

A balcony is “a platform that projects from the wall of a building and is enclosed by a parapet or railing”.

- 26-714 (a) is the requirement for one duplex receptacle installed outdoors as to be readily accessible from ground or grade level
- 26-724 (a) is the requirement for at least one branch circuit dedicated for this outdoor receptacle

2009 Conference Conclusion: *Note: for details reference 2009 conference minutes*

- The term “Porch” is not a defined term in the electrical code (or the ABC) so the dictionary definition would apply
- A porch requires a receptacle.
- A porch receptacle located outdoors (for single dwellings) and readily accessible from ground level falls under the terms of 26-724 and is to be on one (or more) dedicated circuits
- A receptacle located on a porch may meet the requirements of an outdoor receptacle
- Porch receptacles located within 2.5m of grade require GFI protection.

ACTION: Information only. Item closed.



2009 Annual Technical Conference

Agenda item # 2009ag-10

2006 CEC – 28-106

Question/enquiry: Industry standard is to use 100% rather than 125% when sizing cables for motors with or run by Variable Frequency Drives This is not up to code. If 100% is used, then how is Table 29 affected?

Recommendation: For discussion

Background Research Summary:

- Motor supply conductors that enter the motor connection box to have 3 basic requirements:
 - 1) the conductors ampacity rating shall be sufficient to handle the motor's full current
 - 2) the conductors insulation rating to be suitable for the motor temperature rating and the ambient temperature surrounding the motor
 - 3) The conductors, to some degree, should act as a heat sink for the motor.
- Using a variable frequency drive with a motor may increase the operating temperature of the motor. This may cause the motor temperature to exceed its temperature code rating. This is of particular concern in proximity to hazardous materials.
- Unable to find any information to indicate sizing to 100% of motor FLA, but have found information about sizing to 100% of the maximum output of the VFD.

Background Information:

28-106 Conductors — Individual motors

- (1) The conductors of a branch circuit supplying a motor for use on continuous duty service shall have an ampacity not less than 125% of the full load current rating of the motor.
- (2) The conductors of a branch circuit supplying a motor for use on non-continuous duty service shall have an ampacity not less than the current value obtained by multiplying the full load current rating of the motor by the applicable percentage given in Table 27 for the duty involved, or for varying duty service where a deviation has been allowed in accordance with Rule 2-030 by a percentage less than that specified in Table 27.
- (3) Tap conductors supplying individual motors from a single set of branch circuit overcurrent devices supplying two or more motors shall have an ampacity at least equal to that of the branch circuit conductors, except that where the tap conductors do not exceed 7.5 m in length, they shall be permitted to be sized in accordance with Subrule (1) or (2) provided that the ampacity so determined is not less than 1/3 of the ampacity of the branch circuit conductors.

In order for the motor supply conductors to act as a heat sink and prevent damage to the insulation on the motor, branch cct conductors in 28-104 (2) require:

- 1) motor supply conductors to have a minimum length
- 2) their termination should be a minimum distance from the motor
- 3) the minimum size of the motor supply conductors must be the same size as the motor branch circuit conductors

28-104 Motor supply conductor insulation temperature rating and ampacity

(1) Supply conductors to a motor connection box shall have an insulation temperature rating equal to or greater than that required by Table 37, unless the motor is marked otherwise and their ampacity is based on a 75 °C conductor insulation rating except for Class A rated motors only, where their ampacity shall be permitted to be based on a 90 °C insulation rating, when 90 °C wire is used as circuit conductors to the motor.

(2) Where Table 37 requires insulation temperature ratings in excess of 75 °C, the motor supply conductors shall be not less than 1.2 m long and shall terminate in a location not less than 600 mm from any part of the motor except that for motors rated 100 hp or larger, their terminations shall be not less than 1.2 m from any part of the motor.

Table 29

(See Rules 28-200, 28-206, 28-208, and 28-308 and Table D16)

Rating or Setting of Overcurrent Devices for the Protection of Motor Branch Circuits

Type of Motor	Percent of Full Load Current		
	Maximum Fuse Rating		Maximum Setting Time-Limit Type Circuit Breaker
	Time-Delay* Fuses	Non-Time-Delay	
Alternating Current			
Single-Phase all types	175	300	250
Squirrel-Cage and Synchronous: Full-Voltage, Resistor and Reactor			
Starting	175	300	250
Auto-Transformer and Star Delta Starting:			
Not more than 30 A	175	250	200
More than 30 A	175	200	200
Wound Rotor	150	150	150
Direct Current	150	150	150

Note from Apx for section 18 - Variable frequency motor users are cautioned that combining a variable frequency drive (VFD) with a motor may increase the operating temperature of the motor as a result of the harmonics produced by the drive. This may cause the motor temperature to exceed its temperature code rating. This is of particular concern where the operating temperature of the motor is close to the ignition temperature of hazardous materials that may be in the area.

2009 Conference Conclusion: *Note: for details reference 2009 conference minutes*

Please reference STANDATA CEC-28 which talks about harmonics, motor overheating and voltage dips. It recommends that motors be rated for inverter use and have permanent marking for inverter motors. For new installations, motors intended to be used on VFD's should be designed for use on these specific operations. Motors must be a kind and type rated for this application and compatible for use with the corresponding markings.

Code requires 125% of the full load current as the minimum ampacity of the conductor.

ACTION: Information only. Item closed.



2009 Annual Technical Conference

Agenda item # 2009ag-11

2006 CEC 32-102

Question/enquiry: There is a 90° PVC adapter that when used for fire alarm, violates rule 32-102 which states if conductors of a fire alarm system are installed in electrical non-metallic tubing, it shall be embedded in at least 50mm of masonry or poured concrete. Calgary is asking for 50mm of concrete to be added when this adapter comes from a slab to a ceiling space.

Recommendation: For discussion.

Background information:

32-102 Wiring method

- (1) All conductors of a fire alarm system shall be
 - (a) installed in metal raceway of the totally enclosed type;
 - (b) incorporated in a cable having a metal armour or sheath;
 - (c) installed in rigid non-metallic conduit, where embedded in at least 50 mm of masonry or poured concrete or installed underground; or
 - (d) installed in electrical non-metallic tubing, where embedded in at least 50 mm of masonry or poured concrete.
- (2) Notwithstanding Subrule (1), conductors installed in buildings of combustible construction in accordance with the Rules of Section 12 shall be permitted to be
 - (a) non-metallic-sheathed cable;
 - (b) fire alarm and signal cable; or
 - (c) installed in a totally enclosed non-metallic raceway.

2009 Conference Conclusion: *Note: for details reference 2009 conference minutes*

ACTION: Information only. Item closed.



Agenda item # 2009ag-12

2006 CEC 46-400

Question/enquiry: Small occupancy commercial buildings often install exit/emergency light combination units at the exits. The emergency lights are a building code requirement but the exit signs typically are not required by the building code. If they wish to place other loads (such as night lights) on the same 120V circuit as the exit/emergency light units, the existing CEC rule will not allow that practice.

Recommendation: Revise rule 46-400 to match the National Building Code to read:

(1) Where illumination of exit signs required in the National Building Code of Canada is provided by an electrical circuit, that circuit shall serve no equipment other than emergency equipment.

Background research summary:

- The existing CEC rule is more restrictive than the building code requirement which would allow this type of circuit layout when exit signs are installed above the requirements of the NBC.
- Scope of CEC Section 46 does mention “where required by the NBC” but only for emergency systems and unit equipment, exit signs are a separate line in the scope.

Background information:

CEC Section 46 — Emergency systems, unit equipment, and exit signs 46-000 Scope

(1) This Section applies to the installation, operation, and maintenance of emergency systems and unit equipment intended to supply illumination and to emergency systems intended to supply power, in the event of failure of the normal supply, where required by the National Building Code of Canada.

(2) This Section applies to the wiring of exit signs.

What we are noting here is sub-rule (2) does not indicate, as in sub-rule (1), “where required by the NBC”.

CEC 46-400 Exit signs

(1) Where exit signs are connected to an electrical circuit, that circuit shall be used for no other purpose.

(2) Notwithstanding Subrule (1), exit signs shall be permitted to be connected to a circuit supplying emergency lighting in the area where these exit signs are installed.

(3) Exit signs in Subrules (1) and (2) shall be illuminated by an emergency power supply where emergency lighting is required by the National Building Code of Canada.

2006 ABC 9.9.10. and 3.4.5.1 Exit Signs

9.9.10.7. Illumination

2) Where illumination of *exit* signs required in Article 9.9.10.3, is provided by an electrical circuit, that circuit shall serve no equipment other than emergency equipment.

Note 1 - 9.9.10.3 describes where exit lights are required in a part 9 building.

Note 2 – this rule is being interpreted as meaning if an exit light is installed that is NOT required by the building code, the wiring method restrictions do not apply

3.4.5.1. Exit signs

6) If illumination of an exit sign is provided from an electrical circuit, that circuit shall serve no equipment other than emergency equipment and be connected to an emergency power supply ...

2009 Conference Conclusion: *Note: for details reference 2009 conference minutes*

CEC 46-400 may conflict with the building code requirement for exit sign circuit layout. The way building code is written for Part 9 buildings, it could be interpreted to allow use of an exit sign circuit to feed other loads when the circuit feeds exit signs that are not required exit signs. An important point was made about an installation that involves similar issues – if a fire alarm is installed, even though it may not be required by code, the installation still must meet all the requirements of the CEC and the ABC. There seemed to be a consensus that this is how SCO's would apply rules for exit sign circuits (this was not taken to vote).

ACTION: Carry forward to the AEICTC. Research the 2009 CEC to see if this item has been changed as part of the Section 46 re-write. Research the Alberta Building Code for intent and to review for possible conflict.

New information:

- 2009 CEC scope for section 46 has not changed when dealing with exit signs. Scope does not indicate “when required by the National Building Code” for the application of section 46 wiring methods for exit signs as it does for emergency systems and unit equipment in the top lines of the scope.
- Post conference comparison of CEC and Parts 3 & 9 of the ABC will revise the code change recommended. This will be discussed at AEICTC in June 2009.



Agenda item # 2009ag-13

2006 CEC Section 52 and 12

Installation of Teck cable on communication towers for communication and radio antenna

Question/enquiry: Concern over no inspections of the electrical installation on communication towers as they are low voltage and did not require electrical permits.

A communication tower had been installed in the Lloydminster area. The Teck cable was run along the building and up 60 feet of tower with ty-wrap cable ties. Other non-electrical deficiencies were also noted.

The cable installer is a company that has worked on installing similar systems over the past 20+ years. When the strapping of the cables was questioned the response was "this is the industry standard for installing cables on towers and that every body uses tie-wrap straps".

The tower is installed on public property and is used by RCMP, City and school authorities.

Recommendation: For discussion

Background Research Summary:

- This is 3 questions
- Does the CEC apply to this type of installation?
- If the CEC does apply, is a permit required?
- Are tie-wraps approved as support for vertical runs of teck cable?
- There is a Standata 12-120 regarding ty-wrap for support.

Background Information: 1) Does the CEC apply?

Section 54 — Community antenna distribution and radio and television installations

54-000 Scope

- (1) This Section supplements or amends the general requirements of this Code and applies to
 - (a) community antenna distribution;
 - (b) equipment for the reception of radio and television broadcast transmission; and
 - (c) equipment employed in the normal operation of a radio station licensed by the Government of Canada as an experimental amateur radio station.
- (2) This Section does not apply to equipment and antennas used for broadcast transmission and for coupling carrier current to power line conductors.
- (3) In Subrule (2), "broadcast" means one-way communication other than by community antenna distribution.

Section 0 Scope (of the CEC)

This Code covers all electrical work and electrical equipment operating or intended to operate at all voltages in electrical installations for buildings, structures, and premises, including factory-built relocatable and non-relocatable structures, and self-propelled marine vessels stationary for periods exceeding five months and connected to a shore supply of electricity continuously or from time to time, with the following exceptions:

(a) installations or equipment employed by an electric, communication, or community antenna distribution system utility in the exercise of its function as a utility, as recognized by the regulatory authority having jurisdiction, and located outdoors or in buildings or sections of buildings used for that purpose;

Background Information: 2) If the CEC does apply, is a permit required?

Electrical - permit regulation

- 8** (1) A permit in the electrical discipline is required to install, alter or add to an electrical system.
- (2) Despite subsection (1), a permit is not required for the following:
- (a) communication systems;
 - (d) extra low voltage, Class 2 electrical circuits unless they are for any of the following:
 - (i) safety control;
 - (ii) locations described as hazardous in the Electrical Code;
 - (iii) electro-medical purposes;
 - (iv) lighting;

Background Information: 3) Are Ty-wraps adequate support?

Rule 12-120 Supporting of Conductors

Vertical Runs of Cable

Conductors in vertical runs of cable may settle after installation and the conductor terminations are subject to strain and tension resulting in an unsafe condition.

Although Rule 12-120(2) specifically references conductors in vertical raceways, Subrule (1) is intended to cover all cases where conductors may place strain on the terminations when not properly supported. Please ensure that all conductors are properly supported in compliance with Rule 12-120(1).

Use of Cable Ties

The Provincial Code Advisory Committee has questioned the use of cable ties (TY-RAPS). The code mandates the use of approved (see Rule 2-024) straps and other devices to support cables and conduit or EMT. However, cable ties used for *securing* need not be approved. "Securing" should not be confused with "support" (i.e., TECK cable in a horizontal run of cable tray is supported by the tray and may be secured to the tray with cable ties). Another application where cable ties need not be approved is when conductors or cables are permitted to be bundled.

The need to exercise good judgement is necessary in certain situations. A cable in a vertical run of cable tray may be interpreted as requiring support in long runs but only need to be secured where the length of run is relatively short.

12-120 Supporting of conductors

- (1) Conductors shall be supported so that no damaging strain is imposed on the terminals of any electrical apparatus or devices or on joints or taps.
- (2) Conductors in vertical raceways shall be supported independently of the terminal connections and at intervals not exceeding those specified in Table 21 and such supports shall maintain the continuity of the raceway system without damage to the conductors or their covering.

Handbook note on (2) Because of their construction, some types of single- or multi-conductor cables, when run vertically, present problems similar to those of conductors installed in vertical raceways. The cable manufacturer should be consulted to determine the maximum vertical run between conductor supports or the requirements for cables specifically designed to be run vertically. One method to overcome this problem is to run the cable assembly horizontally when the prescribed vertical length has been reached.

12-618 Running of (armoured) cable between boxes, etc.

Armoured cable shall be supported between boxes and fittings in accordance with Rule 12-510.

12-510 Running of cable between boxes and fittings

- (1) Where the cable is run between boxes and fittings, it shall be supported by straps or other devices located within 300 mm of every box or fitting and at intervals of not more than 1.5 m throughout the run.

2009 Conference Conclusion: *Note: for details reference 2009 conference minutes*

Question 1 – does the CEC apply to this type of installation – Yes

Question 2 - If the CEC does apply, is a permit required – No unless electrical work is done.

Question 3 - are tie-wraps approved as support for vertical runs of teck cable? – Reference Standata 12-120.

If the tower is strictly communications, the Permit Regulation states an electrical permit is not required. This does not mean that they do not have to follow the CEC for wiring methods. If it is communication work only, then a permit is not required but the code should be followed. If electrical work is done, then a permit is required. There were concerns expressed over methods used to secure cables and the lack of inspections.

ACTION: Forward to the communication task force to review.



Agenda item # 2009ag-14

2006 CEC 76-016

Question/enquiry: Electrical services installed on basement walls with receptacle for construction power. Are these services “temporary services”? The contractors in our area are saying that these services are permanent installations therefore they do not come under CEC 76-016 requiring 15 and 20 amp receptacles to be GFI protected.

Recommendation: For discussion

Background Research Summary:

- The EIAA sent to Part 1 for interpretation on outlets. If receptacles that are part of the permanent wiring (such as the fridge) are energized for construction, do they fall under 76-106 – the answer was no.
- We did not ask if the 2 receptacles installed at the panel when the service is installed at an open residential foundation falls into this category.
- These receptacles did come under discussion at the 2008 conference and a majority was asking for at least these 2 receptacles to be GFI protected, as we considered them installed for construction purposes and the panel is not yet in a dry location.
- B.C.’s position on this could be adopted – it states “For equipment utilized in dry locations fed from a permanent power service located in a dry location, the wiring is not considered temporary, so the provisions of this section will not apply. For residential construction, this would be at lock-up.”

Background Information:

From minutes of 2008 EIAA annual technical conference:

Agenda Item# 2006aqSafetyM temporary construction receptacles

Discussion: Rule 76-016 2006 CE Code, Part 1. Does the rule apply to receptacles in a house under construction? The conference agreed to enforce the rule unless a Standata item provides other guidelines.

Action: Subject was submitted to CSA-CEC Part 1 for an interpretation. The reply from Part 1 is: If the outlet is part of the permanent installation, e.g. fridge plug, a GFCI is not required. Most continue to require receptacles installed at the panel when the service is installed at the foundation stage to be GFI protected.

Note – much more on this topic and how it is viewed in other Provinces in 2008 conference “unfinished business” available online at EIAA2004.com

2009 Conference Conclusion: *Note: for details reference 2009 conference minutes*

Some contractors, particularly in NE Alberta are refusing to install GFI protected receptacles at the panelboard (installed at the foundation stage of a single family dwelling construction). The wording in the code is subjective and we are trying to get Part 1 to change the wording to have a GFCI on any 15/20A receptacle used for construction. The current interpretation is these receptacles installed at the foundation stage require GFI protection. If the contractor does not comply, write an order and they could appeal it. It would be difficult to prove due diligence on the part of a contractor if an incident occurred and these receptacles are not GFI protected. It was suggested this could be communicated over the ECAA web site.

ACTION: Information only. Item closed.



2009 Annual Technical Conference

Agenda item # 2009ag-15

2006 CEC Section 80

Question/enquiry: Are municipalities/agencies seeing permits for and inspecting the DC side of Cathodic protection systems?

Recommendation: For discussion

Background Information:

Section 80 — Cathodic protection

80-000 Scope

- (1) This Section applies to the installation of impressed current cathodic protection systems.
- (2) The requirements of this Section supplement or amend the general requirements of this Code.

2009 Conference Conclusion: *Note: for details reference 2009 conference minutes*

A permit is required on both the AC and DC side of Cathodic Protection and a letter will be going out to industry from Alberta Municipal Affairs that permits are required and if not an order will be written.

ACTION: Information only. Item closed.