

THE *Newsletter for the Members of the EIA of BC* INSPECTOR



Ark Tsisserev — 2008 Canadian Section President of IAEI.

September, 2008



Ark Tsisserev joined the electrical industry in 1961 as a construction electrician in the former Soviet Union. After a four-year stint with the Soviet Army (Ark was drafted during the Cuban missile crisis) and seven years of undergraduate and graduate school (Ark received his Ph.D. degree from the State University in Ukraine in 1972 for research work in stability of HV systems and networks), Ark was working as an electrical engineer in the Soviet Union. In 1977, he and his family (wife and son) left the USSR for Canada as political refugees. In Canada, Ark worked as an electrician, electrical designer and an electrical engineer in Winnipeg for Manitoba Rolling Mills and in Fort

McMurray for Syncrude Canada. Ark Tsisserev obtained his master's degree in electrical engineering from University of Manitoba in 1984, and he was hired by the city of Winnipeg. Ark's career led him to the inspection department, where he became head of Electrical Section. In 1993, he joined the city of Vancouver as chief electrical inspector, where he continues his duties.

Ark is currently chairing the technical committee for the development of the Canadian Electrical Code. Since 1999, he has been actively involved in the CMP-1 of the NEC as non-voting member representing liaison with the CEC. Ark is the Canadian co-chair of the NEC! CEC Liaison Committee. He has been a member of IAEI since 1994 and he contributes to IAEI News through his column "Inspector's Corner — Canadian Perspective."

He also represents Canadian chief electrical inspectors on the UL Canada Technical Committee for development of fire alarm systems codes and standards. Ark chairs Canadian National subcommittee on the TC for IEC 60364. He is a member of the Canadian Advisory Council on Electrical Safety. When he is not busy with his work and with standards development, Ark runs marathons and plays a role of grandfather to his two grandsons.

Message to Canadian members

In business as in life, the results of an activity are often directly proportional to the effort applied. In the case of the Canadian Section, our achievements clearly demonstrate the amount of effort that has gone into improving the IAEI relevance for the Canadian members. These accomplishments could not have been realized, if it were not for the dedication and enthusiasm of the board members of the Canadian Section and for commitment and contribution made by the executive of each local chapter. Although the Canadian Section does not have its own publication, the *IAEI News* has consistently featured (and continues to feature) voice of the Canadian authors who provide the Canadian perspective to the technical requirements of the code and its enforcement.

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Section 68— Pools, Tubs and Spas

When a person is swimming in a pool, the water makes contact with the entire skin surface of the body resulting in a good connection to ground. ie: a circuit is established through the person's body, the water, and the pool structure to earth. If the person in the pool was to come in contact with any energized equipment, or across a potential difference, they would receive a severe electrical shock which could be fatal.

The purpose of the rules contained in **Section 68** is to reduce the risk of electric shock, both in the pool and the areas surrounding the pool. Before we begin our review of this section it is essential to clarify two important points.

The first item is to recognize that **Rule 68-000(2)** deems a pool to include permanent and storable swimming pools, whether they are located indoors or outdoors, as well, hydro-massage bathtubs, spas and hot tubs, wading pools, baptismal pools and decorative pools.

Definitions for the various pool types are included in **Rule 68-050 Special terminology**.

The second item is to understand the layout of **Section 68** which has been carefully subdivided into 5 separate subsections as follows:

68-000 – Scope and general requirements.

68-100 – Permanently installed swimming pools.

68-200 – Storable swimming pools.

68-300 – Hydro-massage bathtubs.

68-400 – Spas and hot tubs.

As is the practice throughout the entire Code, the requirements contained in the "General" subsection, ie: **Rules 68-050 to 68-070** apply to any of the pool types identified in **Rule 68-000(2)** whereas the rules

contained in the other subsections, ie: **Rules 68-100, 200, 300 & 400** either supplement or amend the rules contained in the General subsection.

For example, the rules for receptacles and luminaires installed in the vicinity of a spa or hot tub would be found under the "General" subsection in **Rules 68-064 and 68-066** respectively, whereas the rules pertaining to leakage current collectors are located in the subsection specific to spas and hot tubs, ie: **Rule 68-406**. Our review of this section will focus on the following general rules:

Rule 68-054 – Overhead wiring.

Generally, overhead wiring should not be installed above a swimming pool or above the area extending 3m horizontally from the pool edge. However, as noted in **Rules 68-054(3) & (4)**, the Code makes the following exceptions:

- Insulated communication conductors, CATV conductors and neutral supported cables not exceeding 750V shall be permitted to be located over a pool provided that there is a clearance measured radially of at least 4.5m.

- Other conductors operating at not more than 50kV phase-to-phase shall be permitted to be located above a pool provided that there is a clearance measured radially of at least 7.5m.

The clearances identified in Subrules (4) & (5) take into account the use of pool cleaning tools equipped with metallic or conductive handles such as vacuums, skimmers, etc.

An explanatory note, complete with a detailed diagram to further clarify these requirements is located in Appendix "B".

Rule 68-056 – Underground wiring.

In order to reduce the shock hazards that could be created by leakage current following a conductive path through the pool, the Code requires that underground conductors, with the exception of bonding conductors

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CE Code Requirements For Supply And Consumer Services.

By Ark Tsisserev,

Rules 6-102 and 6-104 of the CE Code, Part 1 specify provisions for a maximum number of service boxes permitted to be installed in a building and for a maximum number of services allowed to be run to a building. Inquisitive Code users wonder why these provisions appear to be different for "supply services" and for "consumer services". The Code users also question validity of Rule 6-102 when the "supply authority" that runs the "supply service" happens to be a "utility" (which installs such "supply service" in its sole function as electric "utility").

It should be noted that a "utility" is usually defined in respective provincial/territorial Acts and Regulations, and it is recognized as an electric power "utility" by the AHJ that adopts the CE Code for regulatory purposes. In this case any electrical work done by the "utility" may be exempt from compliance with the CE Code (this should be checked with the AHJ), and therefore application of Rule 6-102 in the body of the Code may be questionable.

But even if a "supply authority" is not a "utility" but an independent power producer, and its work is governed by the Rules of the CE Code, the inconsistencies between the aforementioned Rules are quite obvious. Rule 6-102 does not allow more than one "supply service" of the same voltage to "be run any building from the same system of any one supply authority", unless a number of specific conditions are met.

However, Rule 6-104 (which governs a number of "consumer's services" of the same

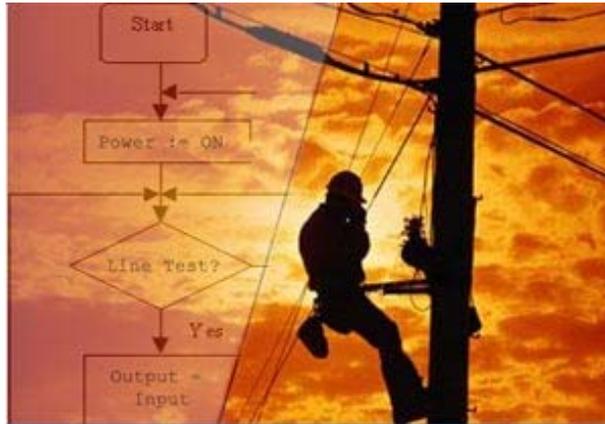
voltage) allows up to four such "consumer's services" to be run to a building, and this Rule appears to allow such number of "consumer's services" without any particular conditions.

In fact, Rule 6-104 even acknowledges that such number of services could be increased under special permission obtained in accordance with Rule 2-030 of the CE Code.

It is extremely important for the Code users to clearly understand intricacies related to the highlighted defined terms, this is helpful in appreciating a demarcation between a portion of installations done by:

(a) a "utility" whose work may not necessarily be regulated by the AHJ, and the equipment used by the "utility" may not necessarily be "approved"; and

(b) by an electrical contractor performing a regulated electrical work under a permit in full compliance with provisions of the CE Code.



So, let's check out these Code definitions. Although the CE Code does not define a "utility" (as it may be done differently by different provincial/territorial regulations), the Code defines "supply authority", defines "supply and consumer's services". and provides references to the "supply authority" regarding installation of these services.

The Code definitions of "services" and "supply authority" are as follows:

"Service, consumer's, - all that portion of the consumer's installation from the service box or its equivalent up to and including the point at which the supply authority makes connection".

"Service, supply - any one set of conductor run by a supply authority from its mains to a consumer's service".

"Supply authority - any person, firm, corporation, company, commission, or other or-

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ganization supplying electric energy."

For example, installation of a "supply service" by BC Hydro is exempt from the CE Code adopted for regulatory purpose in B.C., as the BC Hydro is an electric "utility" and it

performs such work in its sole function as the "utility". After reading and understanding the above defined terms, the Code users may appreciate that although the requirements for regulated work undertaken by an electrical contractor or a homeowner must be in conformance with the Canadian Electrical Code (or rather with a local Code, as being adopted for regulatory purpose in the applicable jurisdiction), these requirements do not include electrical work done by the "supply authority" when the "supply authority" is the "utility" that is exempt from the Code by jurisdictional regulations.

It should be also noted that an electric "utility" may not have any jurisdiction in respect to regulated work done by an electrical contractor.

It cannot "force an electrical contractor who connects "consumer's service" to the "utility" point of attachment (to the "supply service") to deviate from the installation requirements or to modify an approved service equipment (service metering devices or a service box) to the "utility" specific wishes before the "utility" will connect power to the consumer.

Nevertheless, the CE Code recognizes significance of satisfying a "supply authority" needs in respect of location of a "consumer's service" equipment.

Rules 6-206 and 6-408 of the CE Code state that the location of service boxes, meters, metering equipment and other "consumer, service" equipment must comply with the requirements of the "supply authority".

The Code definitions shown above and requirements of the Code in respect to a location of service equipment clearly indicate to a permit holder that the "supply authority" ("utility") must

be consulted on the following: electrical characteristics of a "supply service" provided by the "utility, (i.e. on a single or three phase supply and on the voltage of the "supply service"),

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Passing of R.J. (Jim) Barker

It is with great sadness that we advise you of the passing of Jim Barker, Chief Electrical Inspector, City of Surrey. This untimely act, resulting from a motor vehicle accident, silenced a strong and focused voice for electrical safety in the Province of BC. Jim was a real gentleman and a pleasure to be around. He always had a smile and a good word to say and was a truly dignified statesman in his profession. No matter where or under what circumstance you met Jim, he was always genuinely glad to see you and was fond of a good laugh. His memory will be cherished by all those fortunate enough to have known him. A tremendous loss for all British Columbians.

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I'm sure that the Canadian perspective will be prominently exhibited in this important journal for years to come. In fact, Canadian voice is prominently represented on the IAEI International Board by Steve Douglas, Dave Clements, Doug Geralde, Daniel Langlois and Shawn Paulsen, and these Canadian representatives on the IAEI board passionately reflect aspirations and needs of the members of the Canadian Section. In fact, two prominent members of the Canadian Section (Doug Geralde and David Clements) have held the honor and privilege of leading the IAEI as the association's international presidents.

Active communication of the board of the Canadian Section with local chapters has been instrumental in revitalization of the IAEI activities throughout the country. Presently, the British Columbia Chapter has elected its new board, and Ivan Pye of the BC Safety Authority has assumed the position of the chapter president. Now each part of Canada is represented by the IAEI members, and the local chapters are "buzzing" with activities. For example, David Pilon of SaskPower is spearheading preparation for a technical meeting/conference of the Prairie Chapter which is planned for mid February.

There have been numerous interesting activities in Atlantic and Quebec Chapters, and the most populous Ontario Chapter is full of exciting initiatives.

It is expected that at the next annual conference of the Canadian Section, presidents of each local chapter will be able to personally report on the chapter's activity, on successes in building a strong active membership and in providing excellent educational workshops and seminars to the members on such issues like uniform and consistent application of the requirements of Canadian Electrical Code, on role of the Canadian National Standards System in achieving a harmonized approach to safe electrical installation and to use of "approved" (listed) products, on the new applications that incorporate micro power and nano-technologies, on fight with counterfeiting and on a variety of other exciting technical topics.

I'm certain that the board of directors of the Canadian Section will be able to choose the best local chapter (and its president) based on the chapter's growth in membership and on educa-

tional activities for the members.

Although local chapters provide their own initiative in education of their members, they are welcome to tap into the educational resources of the Canadian Section, where all educational activities at the local levels could be timely facilitated and coordinated. Doug Geralde,

the IAEI international vice-president and chair of the education committee of the Canadian Section has been consistently offering assistance on this subject. It is very re-assuring to acknowledge a growing appreciation of the IAEI across the country.

Local chapters have recognized that the intended certification program contemplated by the IAEI for electrical inspectors will be able to assist in inspectors' mobility through the provinces and territories and in their potential improvements of employment opportunities in the inspection field, when this program is to be adopted by all jurisdictions. -

Relevance of the IAEI has been universally acknowledged by the membership drive among the inspectors, contractors, consultants and manufacturers alike, and I'm sure that the results of this drive will be very transparent in the near future.

I'm confident that the IAEI officers, its staff and the CEO will continue to lend their great support to fostering consistent and productive communication with the Canadian Section.

Membership has, indeed, lots of privileges, and the members of the Canadian Section are proud to be a part of this remarkable group of experts committed to the betterment of electrical safety.

I'm also certain that the Canadian Section of the IAEI has the expertise, talent and necessary commitment to continue achieving results in demonstrating the IAEI relevance in Canada.

Courtesy, IAEI News

Have you paid your 2008 membership dues? Use the convenient form on the back page to renew your membership or to apply for a new membership.

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and conductors supplying equipment associated with the pool, have a horizontal separation between the inside walls of the pool and the underground wiring not less than that specified in **Table 61**. For example, **Table 61** would require a 0.75m separation between the inside walls of a pool and an underground raceway containing conductors installed to supply power for a 120V outdoor lighting system.

Rule 68-058 – Bonding to ground.

The purpose of bonding together all metal components, both in and around the pool is to ensure that voltage gradients in the pool area are eliminated. This reduces the risk of shock hazards which could cause drowning or electrocution. **Rule 68-058(1)** identifies the metal parts and other non-electrical equipment associated with the pool that must be bonded together.

Some of the metallic items that require bonding include:

- all metallic piping systems
- pool reinforcing steel
- ladder and diving board supports
- fences within 1.5m of the pool
- forming shells, etc.

Rule 68-058(8) permits an exception to the requirements identified in subrule 1 provided the electrical equipment associated with the pool is:

- not located within 3m of the pool
- suitably separated from the pool by a fence, wall or other barrier
- approved without a bonding conductor

In order to create an equipotential grid, **Rule 68-058(2)** requires that pool reinforcing steel be bonded with a minimum of four connection points equally spaced around the perimeter of the pool. In situations where the reinforcing steel is encapsulated with a non-conductive compound, **Rule 68-058(3)** requires that an alternate means be provided to eliminate possible

voltage gradients. The note located in Appendix “B” for **Rule 68-058(3)** indicates that a loop around the pool of a minimum of No. 6 copper conductor installed below the normal water level could be used to satisfy this requirement.

Rule 68-058(4) requires that the bonding conductors for permanently installed pools and all in-ground pools to be not smaller than No. 6. The bonding conductor size for all other pools shall be as required by **Table 16**. As noted in **Rule 68-058(7)** the bonding conductors for pools must be copper.

Rule 68-060 – Junction and deck boxes.

The Code refers to junction boxes that connect to a conduit that extends directly to a pool lighting forming shell as *Deck boxes*. The Code requires that deck boxes:

- be specifically approved for the purpose
- have provisions for independently terminating at least three bonding conductors inside the box and one No. 6 bonding conductor outside the box
- not contain conductors of any circuit other than those supplying the underwater equipment
- provide electrical continuity between every connected metal conduit and the bonding terminals

The installation requirements for deck boxes are identified in **Rule 62-060(6)**.

Rule 68-064 – Receptacles.

To reduce the risk of persons coming in contact with energized equipment while using a pool, the Code does not permit receptacles to be located within 1.5m of the inside walls of a pool. Receptacles located between 1.5m and 3m of the inside walls of a pool must be GFCI protected.

Rule 68-066 – Luminaires and lighting equipment.

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Rule 68-066 identifies the requirements for both underwater pool lighting and lighting located above the pool area. Special attention should be given to the following items:

- wet niche luminaires must be mounted in forming shells
- unless specifically approved and marked for submersion at a greater depth, wet niche luminaires shall not be submersed at a depth greater than 600mm measured from the normal water level to the center of the luminaire lens
- unless separated by a suitable barrier, luminaires installed below or within 3m of the pool surface or walls must be GFCI protected
- standards or supports for luminaires shall not be installed within 3m of the inside walls of a pool unless the luminaires are GFCI protected

Rule 68-068 – Ground fault circuit interrupters.

The main function of a GFCI is to provide protection against electric shocks due to leakage current flowing to ground from defective circuits or equipment. When ground fault circuit interrupters are required by **Section 68**, they shall:

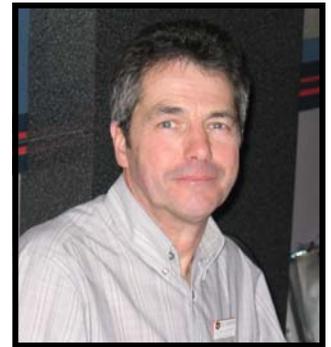
- be of the Class A type
- be permanently connected
- be permitted to be applied to a feeder, branch circuit or an individual device
- be tested regularly. To ensure the testing is performed, Rule 68-065(5) requires that a warning sign be located adjacent to switches that control GFCI protected circuits.
- not be located closer than 3m to the pool water
- not be located closer than 3m to the pool water in a spa or hot tub and not closer than 1.5m to a hydro-massage tub. However, the Code will allow exceptions for factory built equipment that incorporates GFCI

protection. Refer to **Rule 68-068 (6)(c)** for details.

The following equipment shall be protected by a ground fault circuit interrupter:

- electrical equipment placed in the water in the pool
- electrical equipment within 3m of the pool and not suitably separated from the pool area by a fence, wall or other permanent barrier
- receptacles or appliances located in wet areas of buildings associated with the pool such as change rooms, etc.

Ted Simmons, is Chief Instructor, Electrical Apprenticeship Program at the British Columbia Institute of Technology, Ted can be reached by e-mail a Ted_Simmons@bcit.ca.



Brian McHugh Retires



We would like to wish Brian McHugh a very Happy Retirement. Brian was the former Certification & Licensing Administrator for the B.C. Safety Authority. One of his responsibilities was to prepare the examinations for Electrical Contractors and Inspectors to pass so they would qualify for their License or Certification Certificate. Best Wishes!

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location of overhead point of attachment, location of a "consumer, service" box and metering equipment, and types of underground "consumer's service" raceways when such raceways are intended for the installation of "supply service" conductors (conductors installed by the "utility").

Such confirmation with the "utility" will facilitate efficient power connection by the "utility" provided that all other electrical safety requirements of the Code are met by the permit holder, and the installation has been accepted by the AHJ for service connection.

It is interesting to note that although the installation of "consumer's service" raceways is regulated work (i.e. it is done by an electrical contractor under a permit in accordance with applicable provisions of the Canadian Electrical Code adopted in a particular jurisdiction), conformance with condition (d) above is intended to ascertain that the particular "utility" requirements for installation of its "supply service" conductors are met by the contractor in addition to compliance with the Code.

Some "utilities" (for example BC Hydro) might allow the installation of its "supply service" conductors only in a specific type of raceway (i.e. - in a rigid metal conduit, etc.).

However, let's return to our Rules 6-102 and 6-104 and ask ourselves about the reasons for their differences.

A long time ago a majority of "utilities" agreed that from the point of mechanical integrity, performance and reliability not more than four "consumer's services" should be permitted to be attached to a single "supply service" (to a single point of attachment provided by the power "supply authority"). Thus, the present requirement of Rule 6-104 took place, and it had been in the Code for many Code cycles. But why the conditions specified by the "supply au-

thorities" in respect to a maximum number of "consumer, services" being terminated at a single "supply service" have been extended to a number of allowable service boxes in a building?

And why a number of "consumer's services" run by a contractor to a building is allowed to be four, and an allowable number of "supply services" run by a "supply authority" is limited to one only? Unfortunately, there are no apparent answers.

Of course, the CE Code is not a perfect document, and it continuously evolves via a consensus based development process by the participating stakeholders.

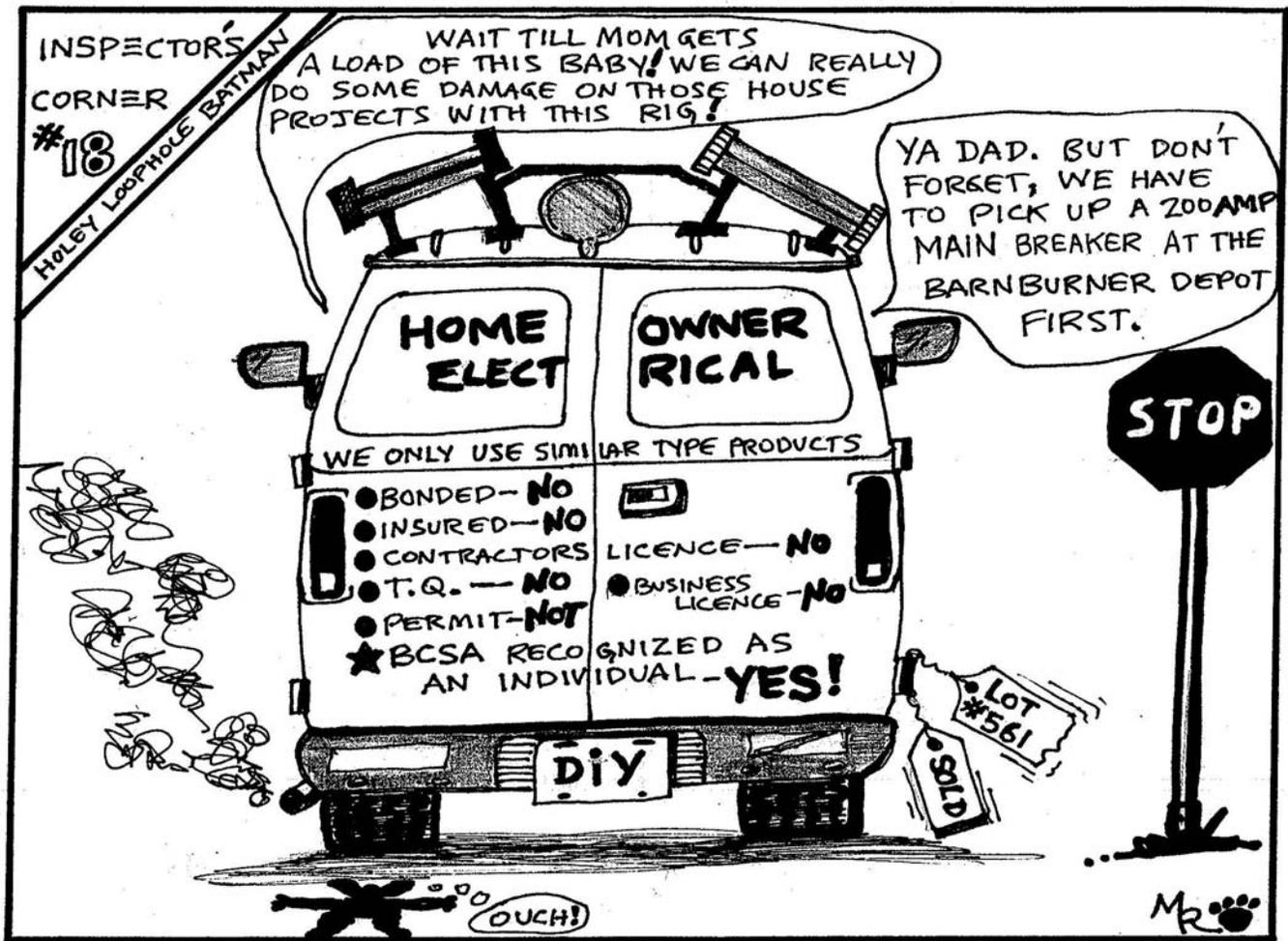
In fact, this particular inconsistency (and its adverse safety impact) has been already noted by the Code users, and a proposal is presently being deliberated by the members of Section 6 S/C - to correlate provisions of Rule 6-104 with Rule 6-102.

Meanwhile, the Code users should consult the relevant electrical inspections authority on any questions and concerns related to a specific issue with the application of the Code requirements.

Arkady (Ark) Tsisserev is the Electrical Safety Manager/Chief Electrical Inspector for the City of Vancouver. He is a registered Professional Engineer with a Master's degree in electrical engineering. Ark is the Chair of the Technical Committee for the CE Code, Part I. He can be reached at: arkady.tsisserev@vancouver.ca.

What's New

Do you have any technical information or letters to the editor, please mail or email : info@eiabc.org



ELECTRICAL CONTRACTORS ASSOCIATION OF BC announces the ap-

pointment of **Deborah Cahill** as its new Executive Director. Deborah was formerly with the Greater Toronto Electrical Contractors Association where she was assistant to the Director, the department head of Human Resources, and was responsible for OH&S and educational training for the membership. She brings a wealth of experience that will be of benefit to the association and to stakeholders at large in today's ever-changing industry. Serving on a number of committees, Deborah is no stranger to the national electrical scene and she is committed to working with all associations in the industry for the betterment of all.



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ELECTRICAL INSPECTOR'S ASSOCIATION of B.C. GENERAL MEETING

Monday, September 22, 2008

"Cheers Restaurant"

**125 — East 2nd Street, North Vancouver, B.C.
(just off Lonsdale Avenue)**

SOCIAL HOUR: 5:15 — 6:00 p.m.

DINNER: 6:00 — 7:00 p.m.

MEETING: 7:00 — 9:00 p.m.

Dinner: \$25

AGENDA

- *Update by The B.C.S.A.* Presenter is Stephen Hinde, Electric Safety Manger for the B.C. Safety Authority.
- Elec-Tec Sales Ltd. Presentation

Most Important for Reservations: Please Phone Dwayne Askin
(604) 660-0885 or Email: Dwayne.Askin@safetyauthority.ca

Membership Application & Renewal Form

Please accept my application for membership in the EIA of B.C.

- | | |
|---|-----------|
| <input type="checkbox"/> For 1 year (Jan 1, 2008—Dec. 31, 2008) | \$ 50.00 |
| <input type="checkbox"/> For 2 year (Jan 1, 2008—Dec. 31, 2009) | \$ 100.00 |
| <input type="checkbox"/> For 3 year (Jan 1, 2008—Dec. 31, 2010) | \$ 150.00 |

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Name (Please Print) _____

Renewal

Address _____

Inspector

City _____ Postal Code _____

Associate

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Email _____

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