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2023 →

Safety Measures ELECTRICAL

“Elimination is the first priority!
Ensure a risk assessment is completed before energized work tasks are completed.”

Electrical Safety: A Look Back at 2022 and a Look Into 2023

By Terry Becker, P.Eng., CESC, IEEE Senior Member

I thought I would revisit electrical safety for 2022 and provide some information and thoughts on what 2023 holds for us. The mission continues to be to “Save Lives” and ensure we “Get it Right” with respect to our interpretation of the potential for abnormal arcing fault likelihood and arc flash exposure to electricians and other task qualified trades.

Electrical incident statistics prove that the electric shock hazard leading to electrocutions is still occurring at a high frequency for all workers where thankfully burns related to arc flash are not occurring at a regular frequency and there are no fatalities in Canada in the last fifteen years. The potential

long-term effects (e.g. sequelae) due to exposure to electric shock(s) is real!

CE Code Part I, 2021 Edition

The latest edition of the Canadian Electrical Code Part I (CE Code Part I) was adopted into law across Canada and as the updated Ontario Electrical Safety Code in Ontario. One item of note is the definitions of low voltage and high voltage changed from $\leq 750V$ to $\leq 1000V$ and $\geq 751V$ to $\geq 1001V$. Just a reminder that two key rules related to electrical safety, Rule 2-304 Disconnection and Rule 2-306, did not change. Make

sure you correctly interpret Rule 2-304 – it is not against the law to perform energized electrical work tasks.

NETA PowerTest Conference, Denver, Colorado, February 28 to March 4, 2022

Finally conferences and workshops were back to being held in person. I attended the NETA PowerTest Conference (<https://www.powertest.org/home>) and presented in the Electrical Safety Track on electric shock sequelae, “John Knoll’s Story.” This year I was also a panelist in the Electrical Safety Panel sessions, two four-hour sessions allowing attendees for ask questions related to NFPA 70E or CSA Z462 and related topics (e.g. Articles/Clauses and specific interpretation, arc flash and shock PPE, arc flash and shock equipment labeling, etc.). NETA PowerTest is the only conference in North America that provides best in class presentations, tutorials, panel sessions and exhibits related to electrical equipment maintenance. It will be held Mach 8-12, 2023 in Orlando, Florida.

IEEE Electrical Safety Workshop, Jacksonville, FL, March 8-11, 2022

I have been attending, presenting and exhibiting at the IEEE IAS, Electrical Safety Workshop (<https://electricalsafetyworkshop.com/>) since 2006 – my first conference was in Denver, Colorado when I was working for EnCana Corporation. Again in 2022 the workshop was held in person in Jacksonville, Florida. This conference highlighted electrical safety presentations across all topics, not only with respect to the application of NFPA 70E and CSA Z462, but IEEE 1584, arc flash and shock PPE, risk assessment, incident statistics, human performance, case studies, electrical hazard classification and much more. John Knoll and I provided a “Poster” presentation and paper on electric shock sequelae. As it turned out, the keynote speaker was Dr. Lee from the University of Chicago, Chicago Electrical Trauma Research Institute (CETRI, <https://cetri.org/electrical-injury/>). This was a great opportunity to further increase awareness with attendees related to the potential long term effects of receiving electric shock injuries. You can reference several other articles I have written in Electrical Safety Measures over the past two years with more detailed information related to electric shock sequelae. It was great to attend in person again. The IEEE ESW will be held from March 13-17, 2023, in Reno, Nevada.

IEEE 1584.1 2022 Edition, August 2022

This is the second edition, the first edition actually published in 2013. Unfortunately not many consulting Electrical Engineers were, or are, aware of this companion document to IEEE 1584. The scope of IEEE 1548.1 is: *This standard provides guidance for the specification and performance of an arc-flash hazard analysis, in accordance with the process defined in IEEE 1584 Std., IEEE Guide for Performing Arc-Flash Hazard Calculations. It provides the minimum scope and deliverables for an arc-flash study.* IEEE 1584.1 can be quoted by a facility owner as the minimum performance technical specification. I do recommend that a facility owner uses the information in IEEE 1584.1 to establish a complete power system study and arc flash hazard incident energy analysis scope of work and technical specification to ensure the consulting engineer is held accountable for specific parameter selection, delivering a quality report and examples of a compliant arc flash and shock equipment label to which facility owners control the specification. This will also ensure related costs are controlled, limiting any extras.

NFPA 70E 2024 Edition

The second review draft meetings were held from August 22-24, 2022. I attended virtually. The good news is there will not be that many changes to NFPA 70E, 2024 Edition. Many of the submissions related to changes proposed for CSA Z462 were not accepted, so yes we will see some divergence between NFPA 70E and CSA Z462, 2024 Editions.

Electrical Injury Day of Recognition, October 6, 2022

Thanks to John Knoll’s continued efforts to tell his story related to electric shock sequelae, and through the sponsorship of the Electrical Contractors Association of Alberta (ECAA), Canadian Electrical Contractors Association (CECA) and the National Electrical Trade Council (NETCO), the profile of the electric shock injury and the potential long term sequelae effects will now have an annual “*Electrical Day of Recognition*” (<https://ceca.org/electrical-injury-day-of-recognition>) in Canada every October 6th. We need to increase the profile of the electric shock hazard and change the narrative in industry away from arc flash. All workers on a worksite are exposed to the electric shock hazard. Electrical incident statistics for Canada, the USA and Internationly prove that the frequency

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Power Distribution Units
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Indoor & Weatherproof Outdoor Designs
Stackable Designs



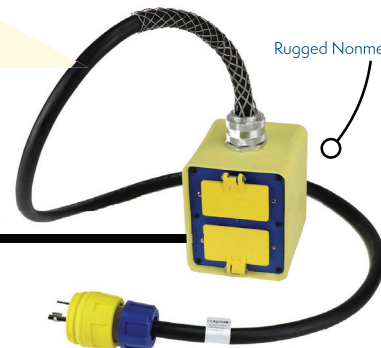
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Compact Distribution Unit
20 - 30-Amp

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of electric shock and electrocutions is still unfortunately high. We need electricians and other task qualified workers that complete energized electrical work tasks to ensure they document a work task's shock risk assessment as required by CSA Z462 and are wearing the correct Class # of rubber insulating gloves with leather protectors when their hands go inside the Shock Protection, Restricted Approach Boundary identified in CSA Z462 as established by the work task's Shock Risk Assessment.

CSA Z462 2024 Edition

The CSA Z462 Technical Committee met on May 3-4, 2022, and on November 8-9, 2022, to review submitted dockets by committee members for potential changes to CSA Z462, 2021, 5th Edition. During the second meeting, submitted dockets received final review and voting for inclusion. In 2023, most likely April or May, the "Public Review Draft" of CSA Z462, 2024, 6th Edition will be available. I encourage you to review the draft and provide feedback on the suggested changes. Specifically, significant changes are proposed to Clause 4.1, Clause 4.3 – most significantly Clause 4.1.6 Electrically safe work condition, Clause 4.3.2 Energized electrical work permit, Clause 4.3.5 Arc flash risk assessment and Table 2, Clause 4.3.7.3.15 Arc flash PPE category method and several of the Annexes. More on the significant changes that will most likely be approved will be reviewed in a 2023 article. We need more public input for CSA Z462 submitted in the future.

What Does 2023 Look Like?

We need to continue to ensure that electrical hazards are identified in the workplace for all workers, not just electrical workers and task qualified workers. Electric shock is a hazard that impacts all workers who use portable cord-and-plug-connected electrical equipment and extension cords. Safety professionals specifically need to ensure that safety bulletins and communication from supervisors emphasizes the importance for pre-use inspections to ensure there is no damage to the equipment, the cord and plug ends and advise non-electrical workers that when working in outdoor or indoor wet environments that they need to plug into a GFCI and make sure they test and reset the GFCI before use.

In general, the narrative needs to move away from arc flash

and focus more attention on the electric shock hazard. Unfortunately, myths and misinformation continue to propagate with respect to the likelihood of an abnormal arcing fault occurring resulting in an arc flash. Fear and anxiety-based marketing from vendors/trainers, non-compliant training and information published in P.Eng. authenticated arc flash hazard incident energy analysis reports continues and non-complaint arc flash and shock equipment labels have still been installed on electrical equipment. Employers need to take more control of the narrative related to arc flash through the development and implementation of compliant Electrical Safety Programs and ensure a detailed scope of work and technical specification is used to control how the P.Eng. Electrical Engineer interprets IEEE 1584. With the updated edition of IEEE 1584.1, it can be used in lieu of a detailed scope of work and technical specification to hold the P.Eng. Electrical Engineer Accountable.

The next editions of NFPA 70E will be published by October 2023 and CSA Z462 in January of 2024. Significant changes will be coming with respect to CSA Z462, 2024, 6th Edition.

I will continue my efforts to communicate information in Electrical Safety Measures and share the knowledge and experience I have in an effort to "Get it Right!!" My electrical safety journey and mission will continue!!



Terry Becker, PEng, CESC, IEEE Senior Member is the first past Vice-Chair of the CSA Z462 Workplace electrical safety Standard Technical Committee and currently a Voting Member and Working Group Leader for Clause 4.1 and the Annexes. Terry is also a Voting Member on the CSA Z463 Maintenance of electrical

systems Standard and a Voting Member of the IEEE 1584 Guide for Performing Arc-Flash Hazard Calculations. Terry has presented at Conferences and Workshops on electrical safety in Canada, the USA, India and Australia. Terry is a Professional Engineer in the Provinces of BC, AB, SK, MN and ON. Terry is an Electrical Safety Specialist, Management Consultant, and can be reached at 587.433.3777 or by email terry.becker@twbesc.ca.

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