



Safety Measures ELECTRICAL

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

CSA Z463 Maintenance Of Electrical Systems Standard

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

I was reviewing previous articles in Electrical Safety Measures, and I was certain I had published an article with respect to the CSA Z463 Maintenance of electrical system Standard. It turns out that I may have mentioned it in other articles related to CSA Z462, but I had not devoted an entire article just to CSA Z463.

The CSA Z463 Maintenance of electrical systems Standard was first published as a Guideline in 2013. As a CSA Guideline CSA Z463 did not include prescriptive language. CSA Z463 was developed as a direct outcome of the development of the CSA Z462 Workplace electrical safety Standard. The

CSA Z462 Technical Committee recognized that there was a need to publish a separate document that provided industry in Canada guidance and recommendations for electrical equipment maintenance with a focus on “maintenance for safety.” With respect to an arc flash hazard occurring on energized electrical equipment a risk assessment would recognize the need to consider condition of maintenance relative to likelihood of occurrence (reference CSA Z462, Clause 4.1.7.8.4 (b) and Note 1, Clause 4.3.5.2 (b) and Note 1, Table 2 and Clause 5) if an abnormal arcing fault occurs due to lack of maintenance or as a result of a qualified person’s interaction

based on the work task performed what is the impact on incident energy resulting from the arc flash due to condition of maintenance?

Following the publishing of the 2013, 1st Edition of CSA Z463 the Technical Committee recognized the need for significant updates and in consultation with CSA a decision was also made to move CSA Z46 from a Guideline to a Standard, which would include prescriptive language (e.g. the use shall instead of should). This changed the context of CSA Z463 and also positioned it that as a Standard all or part of CSA Z463 could be adopted into law. Currently to my knowledge there is no jurisdiction in Canada, Provincially, Territorially or Federally considering adopting CSA Z463 into law.

I think it is important that I quote Clause 0.1 Purpose and Application from CSA Z463, 2018 Edition:

This Standard has been developed to improve safety for workers and protection of property through the adoption and systematic application of maintenance strategies for electrical equipment. It specifies basic requirements for maintenance programs and provides guidance on preferred practices for maintenance of electrical equipment.

The maintenance necessary for electrical equipment and systems that are critical to electrical safety for workers can be different than the maintenance required for uptime production or other business objectives. This Standard defines methods of identifying equipment and systems that directly impact worker electrical safety and the reliability necessary for the safe operation of electrical equipment.

Organizations can use this Standard to optimize the integration of other programs and systems, such as hazardous energy lockout control programs and workplace electrical safety programs, into their business management systems for critical equipment maintenance strategies.

Also from CSA Z463, Clause 1.2 Purpose:

The purpose of this Standard is to facilitate the safe, reliable, and cost-effective operation of electrical equipment and systems through the application of consistent maintenance practices.

The requirements of this Standard are intended to address worker and public safety as a primary objective and the protection of property and the environment as secondary objectives.

Historically electrical equipment maintenance was completed based on criticality of service and some valuation of “uptime” related to guarantee of service or loss of revenue due to unpredictable breakdowns and unscheduled costs. With CSA Z463 it changes the priority to the impact on safety as the number one priority related to the need and justification for electrical equipment maintenance.

Of note the NFPA 70B Recommended Practice for Electrical Equipment Maintenance, 2019 Edition (referenced in CSA Z462) has now been updated and published as a Standard, NFPA 70B Standard for Electrical Equipment Maintenance, 2023 Edition. This moves NFPA 70B to include prescriptive language as noted above CSA Z463 went through the same process from the 2013, 1st Edition as a Guideline to the 2018, 2nd Edition as a Standard. Of interest was the refocusing of the 2023 Edition of NFPA 70B to “maintenance for safety” as a priority similar to CSA Z463. If you were not aware of the NFPA 70B Standard for Electrical Equipment Maintenance I would encourage you to also purchase a copy (<https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=70B>) and use it in conjunction with CSA Z463. NFPA 70B will include similar content, but also includes additional content that we do not have included in CSA Z463.

Some important highlights from CSA Z463, 2018 Edition:

1. A documented Electrical Maintenance Program (EMP) shall be established, implemented and maintaining. This is similar to the CSA Z462 requirement that an Electrical Safety Program (ESP) shall be documented and implemented. The EMP shall address:
 - a. Worker and public safety;
 - b. Prevention of losses and property damage;
 - c. Electrical system performance and reliability;
 - d. Reduction of risk; and
 - e. Compliance will applicable Federal, Provincial or Territorial regulation.
2. The EMP shall include electrical equipment asset management requirements.
3. The EMP shall include a risk management process.

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4. The electrical manufacturer’s recommendations for electrical equipment maintenance shall be considered and followed.
5. Preventive and protective risk control methods applied to mitigate or reduce risk shall be selected and implemented.
6. The EMP call include safety objectives and shall be integrated into the occupational health and safety management system.
7. Electrical maintenance activities shall be performed on electrical equipment and systems to retain them in, or restore them to, a state in which they were designed to function safely.
8. The electrical maintenance plan for the safety of electrical equipment and systems shall include frequency of inspections and the electrical maintenance activities and tasks critical for worker safety.
9. The organization shall establish a risk assessment process to identify electrical equipment and system failures with the potential to cause harm.
10. Electrical hazard identification and risk assessment shall be completed for the qualified persons that will complete energized electrical equipment maintenance.

11. Equipment age call be factored in establishing the appropriate maintenance frequencies, inspections and task to be performed.

The items listed above are summarized from Clause 0 to Clause 5 in CSA Z463, relative to Clause 6 to Clause 9 I will reserve providing specific comments to future articles. It is noted that CSA Z463 is very detailed and comprehensive Standard similar to CSA Z462. There are also an extensive list of valuable Annexes that provide supporting information referenced in some Clauses. Specifically I often reference industry to review Annex M Equipment-specific types of maintenance and maintenance priority levels to establish test frequencies.

I encourage your company to purchase a copy of CSA Z463 and use it complementary to CSA Z462 and the CE Code Part I to establish what I have quoted as the “Electrical Safety Tri-fecta” of Standards to be used to ensure effective management of electric shock and arc flash hazards, elimination or risk reduction to as low as reasonably practicable.

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!!

If you are interested in discussing the information presented in this article do not hesitate to contact me at terry.becker@twbesc.ca or 587.433.3777.



Terry Becker, PEng, CEng, 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, MB 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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