



Safety Measures ^{ELECTRICAL}

"All electrical incidents are preventable!
Keep employees safe with an up to date
Electrical Safety Program and appropriate training."

CSA Z462 And Risk Assessment

By Terry Becker, P.Eng.

CSA Z462-2018 published January 8, 2018 – Now in its fourth edition, CSA Z462 – Workplace electrical safety Standard aims to help workers install, operate and maintain energized electrical equipment safely and provide for the application of defined risk control methods to mitigate or reduce risk to those workers. The Standard provides details on the implementation of an Electrical Safety Program that will document methods to identify electrical hazards related to energized electrical work tasks, and for completing risk assessments. Among other things, it outlines electrical safety training and practices related to de-energizing as a priority, but provides requirements for energized work when it is justified. **Purchase your copy at: <http://shop.csa.ca/en/canada/c221-canadian-electrical-code/z462-18/inv/27029372018>.**

The CSA Z462 Workplace electrical safety Standard, both the 2015 Edition and now the 2018 Edition, require that a mandatory Risk Assessment Procedure be completed for discrete energized electrical work tasks. This fact may not be known, or may be misinterpreted by the employer who is applying CSA Z462 as a basis for due diligence with respect

to OH&S Regulations. During training, the information provided to supervisors and Qualified Electrical Workers may not have covered the topic, described what the required risk assessment process is, or explained that the process shall be documented in order to comply with the mandatory CSA Z462 Risk Assessment Procedure.

Risk assessment is not hazard analysis. It is not enough just to identify that Qualified Electrical Workers are exposed to shock and/or arc flash hazards and get them to wear PPE! You need to consider both the potential for injury or damage to health as well as the likelihood of occurrence. In reality we want to prevent exposure before we protect.

So what are the important aspects of the Risk Assessment Procedure that need to be communicated?

First, the important definitions, then the procedure's steps.

Important Risk Assessment Definitions:

In CSA Z462 the following definitions are provided related to risk:

Risk – a combination of the likelihood of occurrence of injury or damage to health, and the severity of injury or damage to health that results from a hazard.

Risk Assessment – an overall process that identifies hazards, and estimates the likelihood of occurrence of injury or damage to health that results from a hazard.

Note: As used in this Standard, “arc flash risk assessment” and “shock risk assessment” are types of risk assessments, each dealing with a different hazard.

These definitions apply when using the CSA Z462 Clause 4.1.6.8 Risk Assessment Procedure.

Risk Assessment Procedure Steps:

Three key steps are required:

- 1. Identify** if the assigned discrete energized electrical work task(s) will expose the Qualified Electrical Worker to shock and arc flash hazards. The work task may expose the worker to just one of them, or to both. Examples of discrete energized electrical work tasks are voltage measurement, current measurement, energized repair or alteration, racking in or out power circuit breakers, and installing temporary protective grounds. Remember: testing for the absence of voltage is energized electrical work!
- 2. Assess** the inherent or initial risk level for the energized electrical work task. (Note that “inherent risk” or “initial risk” is the risk level present without assessing any additional risk control methods such as engineering controls, work procedures, PPE, etc.). Assessing inherent risk can be completed by using a defined risk register table and electrical hazard risk assessment matrix (examples will be provided later). You will also be required to complete separate shock and arc flash risk assessments as components of the overall risk assessment process.
- 3. Implement** risk controls according to the hierarchy of risk control methods to achieve a residual risk level that is as low as reasonably practicable. (Note that “residual risk” is the risk level remaining after all of the required risk control methods are implemented.) If the inherent risk level is High, then apply all available risk control methods to reduce the

residual risk level to Low or Medium. In the field it is critical that the Qualified Electrical Worker documents (in their Job Safety Plan) the risk control methods which must be applied to drop the residual risk level to Low or Medium.

It is important to note that CSA Z462 Clause 4.1.6.8.3 in the 2018 Edition places specific emphasis on human error and the impact it can have with respect to residual risk. Human error must be managed by the Qualified Electrical Worker in real time in the field just before completing the assigned energized electrical work tasks.

It is also noted that the Risk Assessment Procedure and its related process shall be documented in the employer's Electrical Safety Program.

How Do I Implement a Risk Assessment Procedure?

I am often asked, “What is the Risk Assessment Procedure, and how do we implement it?” In the end, detailed information and a qualitative process were provided in Annex F of the 2015 Edition of CSA Z462. This content was removed from the CSA Z462 2018 Edition and a more simplified description was provided in Annex F (so don't throw away your copies of the 2015 Edition yet). Additionally, for a detailed review of generic risk assessment processes, you can also refer to the CSA Z1002 Standard, which is the basis for the content in CSA Z462 2015 Edition Annex F.

Implementing a comprehensive and documented qualitative risk assessment process is not complicated. It is a simplified

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process that fulfills the CSA Z462 Risk Assessment Procedure requirement. Yes, there is a subjective element, and this has to be acknowledged and managed when performing the risk assessment.

Some of the factors influencing the risk assessment outcome include:

- the experience of the people involved;
- the quality, applicability, and interpretation of documented statistics, and/or history and experience with past incidents;
- confirming you have qualified workers and they are competent for the work tasks being assessed;
- ensuring human error and behaviours are managed;
- reviewing your electrical equipment maintenance practices and understanding the condition of your equipment;
- knowing how often your Qualified Electrical Workers may be exposed;
- ensuring that the Qualified Electrical Worker is familiar with the specific electrical equipment to be worked on; and
- understanding what elements of the Hierarchy of Risk Control Methods are available to be applied to minimize the residual risk level.

Where Do I Begin?

It is a matter of being trained on the process and working as a team to implement the process for individual discrete energized electrical work tasks. The new CSA Z462 2018

Edition Table 2 gives us the starting point with a comprehensive list of energized electrical work tasks for AC and DC electrical equipment. Each individual work task can have a risk assessment completed for it proactively by an employer's Electrical Safety Steering Committee (ESSC). Meetings can be scheduled, minutes and action items created, and proactive committee-based risk assessments completed. The results of this process can then be provided to Qualified Electrical Workers to apply in the field before they proceed to complete a discrete energized electrical work task. After the initial risk assessments are completed, the ESSC can meet on an annual basis to review and revalidate the determined residual risk levels and take into consideration any changes.

As mentioned earlier, the individual shock risk assessments and arc flash risk assessments completed for each discrete work task are in fact individual risk assessments that are completed within the overall risk assessment process. For the energized electrical work task the applicable task/hazard pairs are defined, and the individual shock risk assessment and/or arc flash risk assessment is completed for each task/hazard pair. The highest residual risk level of all of the work task/hazard pairs is the job's "overall risk level." A defined risk register table and electrical hazard risk assessment matrix can be used to complete and document the overall risk level.

Obviously, more detailed training and explanation is required than can be offered in this article. The intent is to open a dialogue, clarify what the CSA Z462 Risk Assessment Procedure requires to be completed, and ensure you are aware.

I encourage you to ensure that you review and document the risk assessment process that you will be applying in your company's Electrical Safety Program. If you have a safety department, work with the HSE professional in your company. Ensure that you organize scheduled meetings and retain meeting minutes documenting the participants, the discussions that occurred, the proceedings of the risk assessment process, the decisions which were made, and the final results of the committee-based risk assessments. Supervisors can then work with Qualified Electrical Workers to apply the documented policies and practices in their company's Electrical Safety Program, including implementing the Risk Assessment Procedure.

Please submit any questions or comments to Kevin Buhr and Terry Becker, P.Eng., CEMCP, IEEE Senior Member via email, kevinb@electricalline.com and tbecker@danatec.com.

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