



Safety Measures ^{ELECTRICAL}

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

Employees Don't Do What You Expect... They Do What You Inspect!

By Terry Becker, P.Eng.

This is a great quote when it comes to Occupational Health & Safety and the need for ensuring that auditing is a key component of your overall Occupational Health & Safety Management System (OHSMS) and specifically your company's Electrical Safety Program.

In the CSA Z462 Workplace electrical safety Standard 2018 Edition, additional focus was placed on the requirement for audit to be mandatorily included in an Electrical Safety Program and that not only the Electrical Safety Program is required to be audited, but field implementation of it and additionally an established Lockout program and related procedures should also be audited.

My experience in working in industry across Canada is that a bottom up approach to the implementation of the Hierarchy of Risk Control Measures has occurred with respect to arc flash and shock hazards (e.g. PPE, training, and Equipment Labels installed based on incident energy analysis). Electrical Safety Programs have not been implemented and when they have there is no formal Electrical Safety Audit Process included. This leads to a lack of sustainable and measurable performance.

CSA Z462-2018, Clause 4.1.6.11 Auditing includes three requirements: Electrical Safety Program Audit, Field Work Audit and Lockout Program and Procedure Audit.

Clause 4.1.6.11.1 Electrical Safety Program Audit

This is actually a “system” audit. Are the Electrical Safety Program’s requirements e.g. principles, policies, practices, procedures been implemented correctly? Does your Electrical Safety Program include elements to verify newly installed or modified electrical equipment or systems have been inspected to comply with applicable installation Codes? Does your Electrical Safety Program include elements that consider condition of maintenance and its relationship to risk? Has a Risk Assessment Procedure been implemented for energized electrical work tasks? Are all of the Hierarchy of Risk Control Methods utilized to reduce risk and is “Elimination” considered as the first priority? When energized electrical work is authorized and justified is a Job Safety Plan executed and are the individual work task’s Shock Risk Assessment and Arc Flash Risk Assessment documented by the Qualified Electrical Worker before they start work? Are your Qualified Electrical Workers actually “qualified” and “competent” for the energized work tasks they perform? Have the related P.Eng. stamped arc flash incident energy analysis studies been completed correctly; do you have a back-up of the digital file in your possession as the owner of the electrical equipment and are compliant Equipment Labels for Arc Flash & Shock installed on applicable electrical equipment? Has comprehensive and compliant Arc Flash & Shock training been provided to Qualified Electrical Workers, not just “Arc Flash Awareness” training? Is Electrical Specific PPE, Tools & Equipment that is compliant and current available for Qualified Electrical Workers, is it the best available for the Qualified Electrical Worker to wear and use (e.g. True Color Grey lens on arc-rated face shield and arc flash suit hoods, hood ventilation systems on arc flash suit hoods and utilized with an LED)? Did you follow up with third party electrical contractors to ensure they have Electrical Safety Programs developed, implemented and audited and that they have provided comprehensive and compliant Arc Flash & Shock training to their employees and that contract workers have available Electrical Specific PPE, Tools & Equipment to be applied as Additional Protective Measures when Shock Risk Assessments and Arc Flash Risk Assessments require it?

Usually the time period for an Internal Electrical Safety Audit to be completed is recommended to be annual not every three years as documented in CSA Z462. The three year term is too long. This “system” audit could be executed with a defined question set used to validate and verify performance and an assigned audit team comprised of Qualified Electrical Workers in partnership with a Safety Department (if one is in place). They say “a picture is worth a thousand words” this is definitely true when it comes to completing electrical safety audits.

Clause 4.1.6.11.2 Field Work Audit

This is really a Supervisory Level Audit. This should be happening in real time (e.g. daily, weekly, monthly) completed by the Supervisor of Qualified Electrical Workers. This can be checking that applicable documentation the QEW is supposed to be filling out before proceeding with energized electrical work is actually completed and completed correctly. Another aspect of this would be managing any requests for Energized Electrical Work Permits (EEWPs) and ensuring

justification is valid. Additionally, this should include spot checking that Electrical Specific PPE, Tools & Equipment have actually been pre-use checked and worn when required. Are the Qualified Electrical Workers implementing all of the Electrical Safety Program’s requirements?

Clause 4.1.6.11.3 Lockout Program & Procedure Audit

The employer’s overall OHSMS needs to include an overall lockout program for all hazardous energy sources. Specific to energized electrical equipment an active lockout in progress should be checked to ensure it has been completed compliant to the lockout program. Specific requirements shall be validated for any deficiencies in the lockout program and procedures; lockout training and worker execution of the required lockout procedure. Is an “Electrically Safe Work Condition” verified and established before a Qualified Electrical Worker removes Electrical Specific PPE, Tools & Equipment and works on electrical conductors and circuit parts directly?

Why Complete Audits?

My experience is that where Company’s believe they have a compliant Electrical Safety Program developed and implemented that there are several components (e.g. Table of Contents elements) missing and audit is typically one requirement that is not considered and has never been implemented. When I ask employers for the status of electrical safety training, the availability and proper application of Electrical Specific PPE, Tools & Equipment and if they have inventoried where they have completed incident energy analysis studies I receive no immediate answer. This is weak due diligence to ensuring the employer’s and employee’s liability related to OH&S Regulations is minimized if a significant electrical incident or heaven forbid fatal injury occurs.

Please ensure that you have implemented a comprehensive and compliant Electrical Safety Program and that you use audit as a value added tool to guarantee the time and money you have invested in electrical safety is providing the expected returns in elimination of exposure to arc flash and shock hazards or reducing risk to as low as reasonably practicable when energized electrical work task are completed.

As noted “*Employees don’t do what you expect, they do what you inspect!*” This is why you need to ensure your company’s Electrical Safety Program includes a mandatory requirement for both Internal Electrical Safety Audits and third party External Electrical Safety Audits.

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.

Terry Becker, P.Eng., CEMCP, IEEE Senior Member is the first past Vice-Chair of the CSA Z462 Workplace electrical safety Standard and currently a Voting Member and Working Group 8 Leader, Annexes. Terry is also a Voting Member on the IEEE 1584 Technical Committee and a Voting Member of the CSA Z463 Maintenance of electrical systems Standard. Terry is a Professional Engineer in the Provinces of BC, AB, SK, MB and ON. Terry is Senior Vice President, Electrical Safety, Danatec Educational Services Ltd., providing electrical safety consulting, licensed products and training solutions. www.danatec.com.