The A to Z of an Electrical Safety Program

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Have you implemented an Electrical Safety Program (ESP)? If you have, on what did you base the ESP's framework or Table of Contents? Did you consider applicable Occupational Health & Safety Management System standards (e.g. CSA Z1000 or ANSI Z10) for guidance on the content you should have developed in your Electrical Safety Program?

Do the requirements provided in the ESP you developed meet acceptable due diligence requirements? Have you audited your program documentation, or had it audited by a third-party subject matter expert?

This paper will review an example ESP framework and identify where you may have fallen short in developing your ESP. It will identify a project-based approach to execute the development of an Electrical Safety Program, A to Z.

Effective due diligence to OH&S regulations

Effective due diligence against occupational health & safety codes, acts and regulations in Canada and the United States entails the development and implementation of a management system that allows for the identification and quantification of hazard and risk, and the implementation of appropriate preventive and protective control measures to mitigate or reduce risk to workers.

For electrical hazards, this management system is called an Electrical Safety Program (ESP). Based on Occupational Health & Safety Management System Standards, preventive and protective control measures must be prioritized in the following hierarchy:

1. Eliminate the hazard; de-energize is the first choice.
2. Substitute with other materials, processes or equipment.
3. Reduce the risk by design (e.g. engineering solutions, equipment solutions, "safety by design", etc. Note: electrical equipment maintenance must be reviewed).
4. Use safer work systems that increase awareness of potential hazards (e.g. apply safeguards like signage, barriers, red tape to establish and Electrical Work Zone, etc.).
5. Implement administrative controls (e.g. training and procedures).
6. Use electrical-specific personal protective equipment (PPE) as a last line of defence, and ensure it is appropriately used and maintained.

In its framework, the ESP should identify preventive and protective control measures that will be deployed to eliminate or reduce risk of exposure to arc flash and shock to acceptable levels. The CSA Z462 workplace electrical safety standard provides a resource and tools to effectively implement a discipline-specific management system.

An ESP should have a structured framework (e.g. Table of Contents) consistent with the guidance provided in Occupational Health & Safety Management System Standards like CSA Z1000 or ANSI Z10. Some jurisdictions having authority (JHAs) may also provide guidance on their expectations, and may also provide a Worker's Compensation Premium reduction if you have an overall, audited Occupational Health & Safety Management System in place.

In implementing an Electrical Safety Program, the electrical hazards of shock and arc flash must be identified, and processes and systems put into place to mitigate or reduce the risk level of exposure to electrical hazards for workers. An effective ESP is many things, such as a toolbox of resources to apply against eliminating or minimizing the electrical hazards or arc flash and shock.

You may have created a document(s) you feel provide effective due diligence, adequate documented direction and rules for electrical hazard management using applicable standards, like CSA Z462, but did you get it right? Is there room for improvement? Have you audited your Electrical Safety Program?

There may be gaps in your documentation tools, or you may have interpreted CSA Z462 incorrectly.

Example of Electrical Safety Program Table of Contents

Electrical Safety Program

TABLE OF CONTENTS

Management Leadership & Participation, Optional Signature Page

Understanding whether the processes and systems deployed are working properly and effectively while ensuring workers are competent with them is critical to the success of the Electrical Safety Program and exhibiting appropriate due diligence. Did you include Electrical Incident Reporting, Emergency Response and auditing in your ESP's Table of Contents?

Have you interpreted the arc flash hazard analysis Table Method correctly? Have you properly addressed the specification and identification of electrical-specific PPE, tools & equipment, and covered off inventory and performance management? Have you provided risk assessment tools for your electrical workers within the Electrical Safety Program? Have you addressed electrical equipment maintenance requirements that would lead to ensuring incident energy is as low as possible; that the probability of an arcing fault even occurring is low, and that you can still use the Table Method?

If you have developed, or are considering developing an Electrical Safety Program, make sure you consider the framework requirements that comprise a management system for occupational health & safety. If you have missed categories and content, you may not be providing adequate direction to your workers, nor ensuring that you address such elements as incident reporting and investigation, electrical incident emergency response, and change management.

Take a project management approach

A project management approach is recommended for developing an Electrical Safety Program, A to Z (or more):

A. Plan, Do, Check, Act. Do you have an execution plan (with a schedule), defined deliverables, and a budget approved by management? An ESP will justify and validate the money you have spent to-date, and make it easier to obtain budget funding through its life cycle.

B. Do you have management commitment and leadership in place?

C. Do you have a champion and ESP manager? Have you structured a formal ESP steering committee? Did you create an organization chart of your Electrical Safety Program?

D. Did you define and document roles and responsibilities in the beginning of your ESP? It is critical that this get done, or else the ESP may fail.

E. Did you review, with the electrical safety steering committee, specific policy requirements that will be defined in the ESP?

F. Have you communicated to your workers with documented meetings or information bulletins what you will be doing to address arc flash and shock risk, and your policy with respect to CSA Z462 and energized electrical work? Remember, de-energizing is the first choice.

G. Have you reviewed the work completed to date? Do you have a database of completed engineering arc flash studies? Do you have an inventory of the electrical-specific PPE, tools and equipment purchased to-date? Do you have a procurement specification for arc flash-protective clothing? Have you established a two-level arc-rated clothing system, and do you have consistent ATPV-rated (arc thermal protective value) arc flash suits?

H. Do you have a specification for engineering arc flash hazard analysis studies so you—not the engineering consultant—control the scope and cost? You need to define the maximum working incident level target, mitigation target and the specification for the detailed Arc Flash & Shock Warning label. You need to control the installation of the label.

I. Do you understand the arc flash performance of non-rated PPE, tools and equipment?

J. Have you had all existing PPE, tools and equipment

tested to current acceptable frequencies? Do you understand the requirements for temporary protective grounds?

K. Have you defined a training matrix for the roles in your Electrical Safety Program?

L. Do you have documented training records for any arc flash and shock training workers have received to-date? Did supervisors attend? Did supervisors follow up with workers afterward to identify any required corrective actions?

M. Have you addressed your Contract for Services and OH&S pre-qualification requirements with your electrical contractors? Have you addressed electrical safety via ISNetworld, CanQual, or PICs Auditing?

N. Have you defined a specification for your detailed Arc Flash & Shock Warning label? Is it too late? As the employer, you—not the engineering consultant—must control the label.

O. Have you reviewed, and do you understand, the "arc flash hazard"? Normal versus abnormal conditions; probability of an arcing fault occurring and risk related to the work task?

P. Do you have a clear understanding of "hazard" versus "risk"?

Q. Have you defined the limitations for rules for non-electrical workers with respect to energized electrical equipment, and normal versus abnormal conditions?

R. Have you provided electrical hazard awareness training to your non-electrical workers?

S. Do you have any written electrical safe work procedures?

T. Have you defined your Working Alone policy for energized electrical work?

U. Have you assessed the risk of arc blast and established a maximum working incident energy level? Has it been documented?

V. Did you document your electrical incident reporting & management requirements?

W. Have you covered off electrical incident emergency response in your Electrical Safety Program? Is it covered by the training you have provided to-date? Do you plan on having mock electrical incident exercises?

X. If you already have an Electrical Safety Program, have you completed a formal internal audit?

Y. Has the supervisor of the qualified electrical workers validated their electrical safety competency and followed up on corrective actions?

Z. Have you measured the performance provided by all of the money and time you have invested in arc flash and shock hazard management by having an audit completed? Did you prioritize corrective actions and implement them?

By ensuring you have a comprehensive Electrical Safety Program consistent with accepted Occupational Health & Safety Management System Standards and CSA Z462, you will maximize your due diligence with respect to management of the electrical hazards of arc flash and shock. Have you covered all the elements A to Z? EB

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