



# Safety Measures ELECTRICAL

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

## Interpretation & Validation Of Electrical Incident Data

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How often does an electrical incident occur in Canada, the United States or other countries? Did the electrical incident result in a reversible injury or a fatality related to electric shock or arc flash? Specific to arc flash what was the work task that was being completed, what electrical equipment was being worked on, what was the voltage of the electrical equipment (low voltage,  $\leq 1000\text{VAC}$  or DC or high voltage  $>1000\text{VAC}$  or DC) and why did the arcing fault and arc flash occur?

Workplace electrical incident data in Canada is difficult to find where you can review and interpret the raw data yourself. Provincial or Territorial Governments will only release

electrical incident data one year (lagging) after the electrical incident occurred. When you review the data the incident description may have limited content, may be cryptic and in most cases doesn't list the voltage of the electrical equipment that was worked on. There may be nothing in the description that can inform you why the electrical incident occurred.

The CSA Z1002 Occupational health and safety – Hazard identification and elimination and risk assessment and control Standard specifies requirements for the identification of OHS hazards, their elimination where practical, and assessment and control of risk associated with remaining hazards. Within the

Annexes, Annex A.2 Severity provides three severities classified as Minor, Major or Permanent Injury or Death. It also equates the severity based on anticipated medical treatment. This information can be used when reviewing and classifying electrical incident data (see Table 1).

Here are some sources you can check for electrical incident data for Canada:

**Technical Safety British Columbia (TSBC) State of Safety:**  
[www.technicalsaftybc.ca/annual-state-of-safety/2022/data-trends/injuries](http://www.technicalsaftybc.ca/annual-state-of-safety/2022/data-trends/injuries)

**Electrical incidents data in Alberta Updated to 2022:**  
<https://open.alberta.ca/publications/statistics-electrical-incidents-in-alberta-date>

In Ontario the **Electrical Safety Authority** issues an **Annual Ontario Electrical Safety Report (OESR)** highlighting electrical incidents and related data, the 2022 OESR is available. This is the most comprehensive report issued from across Canada:  
<https://esasafe.com/2022-ontario-electrical-safety-report/>

With respect to the United States, historical electrical incident data is available from a report issued by the **Fire Protection Research Foundation (FPRF)**, **“Occupational Injuries from Electrical Shock and Arc Flash Events.”**  
<https://www.nfpa.org/News-and-Research/Data-research-and-tools/Electrical/Occupational-Injuries-from-Electrical-Shock-and-Arc-Flash-Events>

More recently I became aware of the following Occupational Safety Health Administration (OSHA) website for severe injury and fatality data from January 1, 2015, and January 1, 2017, respectfully. Where a severe injury resulted OSHA has released detailed raw data for each electrical incident.

**OSHA Severe Injury Reports:**  
<https://www.osha.gov/severeinjury>

For the OSHA severe injury data there were 82333 severe workplace injuries reported from January 1, 2015, to April 30, 2023. When the search words “arc flash” are used in the “Final Narrative” field of the OSHA report thankfully only 433 (0.0053% of the total) arc flash incidents have resulted for the seven-year, four-month period of the reported data. Interpreting the listed data can be a valuable reference when completing a work task based qualitative risk assessment procedure.

From the 433 electrical incidents that resulted in an arc flash, ten (10) were randomly selected and have the following descriptions provided in Table 2.

A more detailed review of the electrical incident data listed in Table 2 (and for all 433 electrical incidents recorded in the OSHA data) for arc flash incidents can shed light on the most frequently performed work task descriptions: are more arc flash incidents occurring on low or high voltage electrical equipment, what portion of the human body received a burn injury and what were typical severities, was the worker working alone, what other injuries were recorded besides burn to the skin from the ac flash and were any human performance issues recorded that increased likelihood of occurrence?

The good news is arcing faults and arc flash incidents occur infrequently relative to other workplace hazards. Electrical

**Table 1 – CSA Z1002 Table A.2 Severity**

Severity	Quantification	Injury Description
S0	Minor (reversible injury)	Injuries that could require first aid treatment.
S1	Major (reversible injury)	Injuries that could require medical treatment (more than first aid).
S2	Permanent Injury or Death (irreversible injury)	Injuries that could result in permanent injury or death.

**Table 2 – OSHA Severe Injury Data Final Narrative Arc Flash**

OSHA Inspection #	Final Narrative Description
101776	Employee was testing a meter with an 8-ft shotgun stick in an energized zone and encountered an arc flash. This incident occurred at approximately 8:00 AM on January 12, 2015. The employee was hospitalized with 2nd and 3rd degree burns. The employee was authorized to be in the energized zone and was wearing flame retardant clothing, a hard hat, safety glasses and a high-visibility vest.
Not Listed	On 8-18-2015, at about 8:40 a.m., three employees were de-energizing and locking out a 480 VAC circuit breaker. The breaker did not open properly. When the cubicle door was opened, an arc flash occurred, injuring the first employee with 2nd and 3rd degree burns to his face, arm, and chest. Another employee had no injuries, and the last suffered minor burns to the face and arms. The first employee was hospitalized.
Not Listed	An employee was taking electrical measurements from a battery interface board when it caused an arc flash. The employee suffered second degree burns to the left hand and first degree burns to the right hand.
1341843	An employee was working near newly installed electrical panels when the panels were energized, causing an arc flash that burned the employee.
Not Listed	An employee had been doing an infra-red scan of an uncovered electrical switchgear panel (600 volts, 4,000 amp). As the employee replaced the cover on the panel, an arc flash fire occurred, causing second degree burns to the employee's legs, wrist, and neck.
1404726	An arc flash occurred while an elbow was being removed from a transformer, and an employee suffered third-degree burns on the face, hands, and belly. The employee was hospitalized.
1491988	An employee was replacing a damaged air break switch at a distribution circuit. A surge arrester connected to the air break switch failed and an arc flash caused burns to the employee's face.
1593603	An employee was screwing screws in the cover of a 440-volt electrical panel. An arc flash caused burns to the right side of the employee's body.
Not Listed	An employee was changing an electric motor when an arc flash occurred. The employee suffered burns to the hands and face.
Not Listed	An employee was working with a crew to troubleshoot voltage problems at a business. While testing for current, the employee experienced an arc flash and sustained first-degree burns to the face and neck. The employee was hospitalized.

incident data in Canada is available but may not be as detailed as electrical incident data from the United States. This article did not explore electrical incident data for other countries, more detailed research is required. Mining the electrical incident data with further classification can be a valuable resource when completing your company’s energized electrical work task qualitative risk assessment. A future article will further expand on the information presented.



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