

Electrical Safety

TSM TheSafetyMaster™ Private Limited



What Is Electricity?

Electricity is the flow of electrons through a conductor.

Electrical Safety Audit

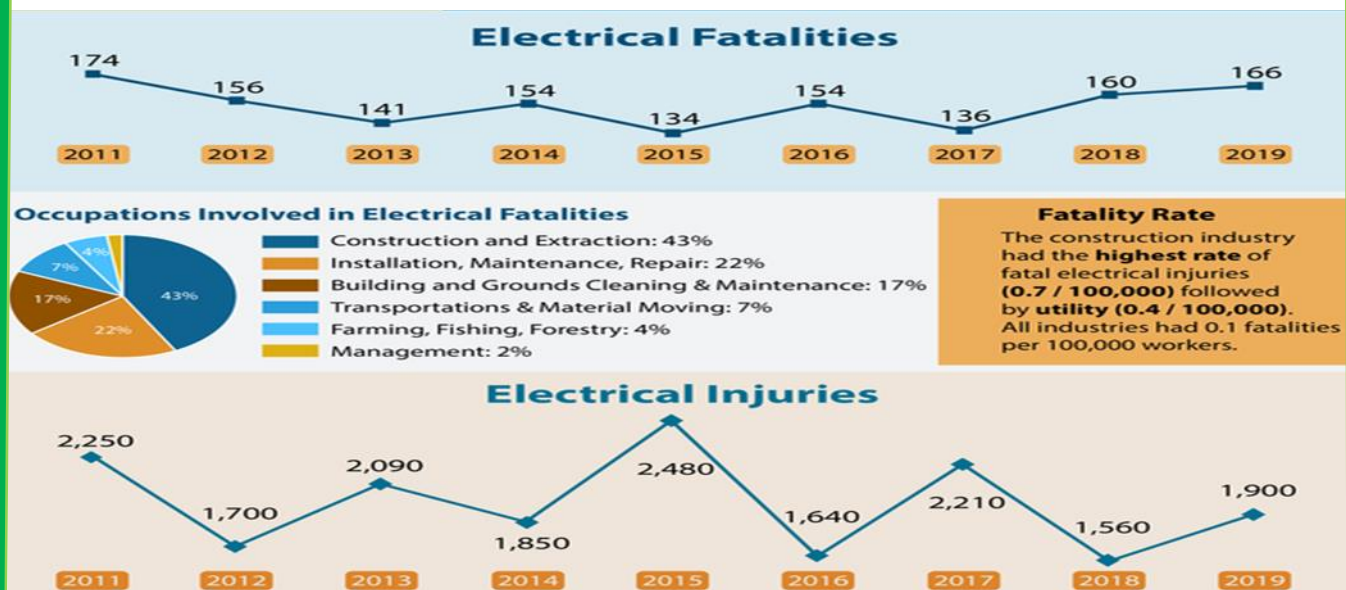


OPTING FOR OUR ELECTRICAL SAFETY AUDIT SERVICES HELPS IN IDENTIFYING THE HAZARDS AND PREVENT INCIDENTS IN THE WORKPLACE.



Hazards Associated with Electric current

Electricity is widely recognized workplace hazard, because exposing employees to electric shock, fires, burns and explosions caused at workplace.



- According to the **Bureau of Labor Statistics**, 2019 had the most recorded fatal electrical injuries since 2011. There was a **3.75%** increase in fatal injuries over 2018.
- There were **1,900 nonfatal electrical injuries** involving days away from work. This was a 22% increase over 2018.

- The human body will conduct electricity. If direct body contact is made with an electrically energized part while a similar contact is made simultaneously with another conductive surface that is maintained at a different electrical potential, a current will flow, entering the body at one contact point, traversing the body, and then exiting at the other contact point, usually the ground.



mA	Effect on Person
0.5 – 3	Tingling sensations
3 – 10	Muscle contractions and pain
10 – 40	“Let-go” threshold
30 – 75	Respiratory paralysis
100 - 200	Ventricular fibrillation
200 - 500	Heart clamps tight
1500 +	Tissue and Organs start to burn

Contact us for inquiry on 1 day to 2 days Electrical Safety Training & Certification Services.

There are four main types of electrical injuries:

1. Electrocution

(Death due to electrical shock)

- Electrocution occurs when electrical current passes over or through a worker's body resulting in a fatality.



2. Electrical Shock.

- Electric shock is a reflex response possibly involving trauma which occurs when electrical current passes over or through a worker's body. It usually involves burns and abnormal heart rhythm and unconsciousness.



3. Burns

- Electrical burns are the most common shock-related, nonfatal injury. They occur when a worker contacts energized electrical wiring or equipment. Although electrical burns can occur anywhere on the body, they most often occur on the hands and feet



4. Falls

- Electric shock may cause muscles to contract causing a worker to lose his or her balance and fall. An explosion from an electrical incident can also cause a fall.



➤ SAFETY PRECAUTIONS WHEN WORKING WITH ELECTRICITY:



- 1) When working with electricity avoid water at all times.
- 2) If it is safe to work with only one hand, keep the other hand away from all conductive material. This step reduces accidents that result in current passing through the chest cavity.
- 3) Never use equipment with frayed cords, damaged insulation or broken plugs.
- 4) Always turn off the mains before you are working on any electrical equipment.
- 5) Always use insulated tools like insulated rubber gloves and goggles while working on any branch circuit or any other electrical circuit.
- 6) Electrical hazards include exposed energized parts and unguarded electrical equipment which may become energized unexpectedly. Such equipment always carries warning signs like “Shock Risk”.
- 7) Never use an aluminum or steel ladder.
- 8) Never try repairing energized equipment.
- 9) Do not overload sockets and extension cables as this can cause fire.
- 10) Ensure correct training. Everyone who uses electrical equipment in the course of their job should be confident in how to use it safely. Nobody should conduct any kind of repairs on electrical equipment without sufficient skills and training.

Regulations and Standards Relating to Electricity

There are many regulations and standards that address working safely around electricity. The information in this course is based on key OSHA regulations and the National Fire Protection Association's (NFPA) 70E, Standard for Electrical Safety in the Workplace. Below are some of the most important regulations:

Regulation	What it Addresses
OSHA 29 CFR 1910, Subpart I	Personal Protective Equipment. Section 1910.137 specifically addresses electrical protective devices.
OSHA 29 CFR 1910, Subpart P	Safe operation of hand and portable powered tools and other hand-held equipment.
OSHA 29 CFR 1910, Subpart S	Electrical safety requirements necessary for the practical safeguarding of employees in the workplace.
OSHA 29 CFR 1910.147	Lockout/tagout procedures. Describes how to service or maintain equipment that might unexpectedly energize
OSHA 29 CFR 1910.333	. Lockout/tagout procedures. Describes how to service or maintain energized circuits

REFERENCE

1. You can access the entire OSHA Code of Federal Regulations (CFR) at:

http://www.osha.gov/pls/oshaweb/owasrch.search_form?p_doc_type=STANDARDS&p_toc_level=0&p_keyvalue=&p_status=CURRENT.

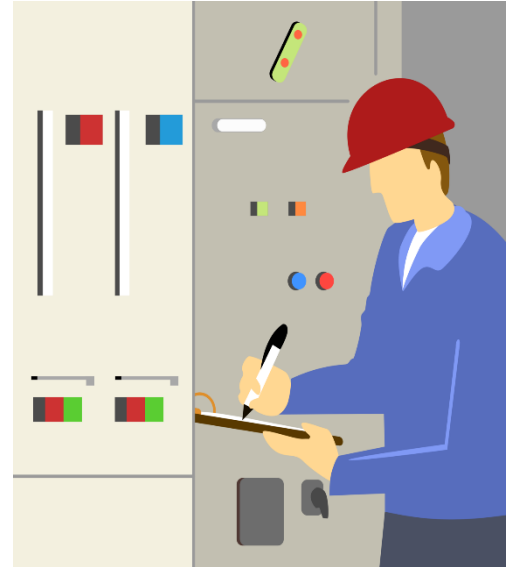
2. The NFPA 70E Standard for Electrical Safety in the Workplace can be purchased from the National Fire Protection Association's website:

<http://www.nfpa.org>.

The tools to identify electrical hazards and controls are:

1. Electrical Safety Audit

- An Electrical Safety Audit (ESA) is a systematic approach to evaluate potential hazards and to recommend suggestions for improvement. It is an important tool for identifying areas of risks, hazards and potential accidents in plants, deterioration of standards, for determining actions to minimize hazards.



- This auditing is something that must take place at intervals not to exceed three years.

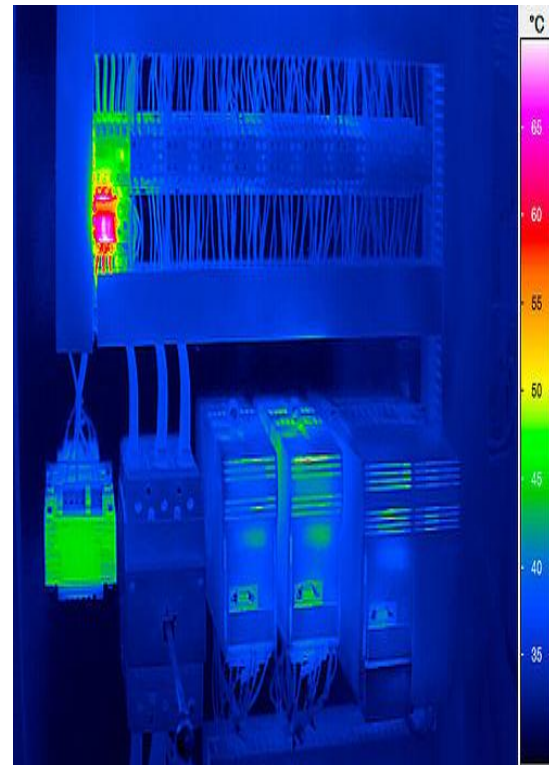
2. Electrical Safety Training

- Electrical safety training is a great way to ensure employees understand how to safety work with electricity.
- Training employees to work safely around electrical hazards is a critical requirement for maintaining worker safety.



3. Thermography Inspection

- Faults in electrical systems are highlighted by hot spots. Hot spots are often the result of increased resistance in a circuit, overloading or insulation failure. Thermography helps in getting results without interrupting operational system.
- Thermography is a non-destructive test method which is used as predictive maintenance fault finding technique in electrical equipments and helps in identifying potential electrical safety hazards and fire accidents.



4. Electrical Safety Risk Assessment

It must ensure an assessment has been made of any electrical hazards, which covers:

- Who could be harmed by them
- How the level of risk has been established
- The precautions taken to control that risk



Risk assessment should take into consideration the type of electrical equipment used, the way in which it is used and the environment that it is used in.

5. Lock-out/Tag-out

- **Lock-out** is the isolation of energy from the system (machine or equipment), which physically locks the system in a safe mode when a machine is under servicing or maintenance. This prevents unexpected start-up or release of stored energy.
- **Tag-out** is a labelling process that is always used when lock-out is required. The process involves attaching or using an indicator that includes items such as:

1. Why the lock-out was required
2. Time of application of tag-out
3. Name of authorized person who attached the tag and lock on system



6. Arc Flash Analysis

- The Arc Flash Analysis is needed to help identify the electrical risk levels and to assist in applying appropriate safety practices in place in order to minimize the risk of burns and injuries to employees, contractors, and vendors.



TSM TheSafetyMaster Private Limited

**SAFER INDIA
BETTER WORLD**

- Consulting
- Training
- Products