

Study of Safety Rules and Regulations for Precautions of Electrical Hazards Like Fire and Accident

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Abstract - : Electrical hazards pose a significant risk to both individuals and property. Electrical accidents and fires can occur due to various reasons such as improper installation, use of sub-standard materials, lack of maintenance, and disregard for safety regulations. The Centre Electricity Authority (CEA) of India has formulated several regulations to ensure the safety of individuals and property from electrical hazards. This paper presents a study of the rules and regulations for precautions of electrical hazards like fire and accident, including CEA 2010 regulations. The paper aims to create awareness among professionals, stakeholders, and the general public regarding the importance of following these regulations to prevent electrical hazards.

Key Words:-, Electrical fires. Electrical hazards, CEA regulations, electrical accidents

1. INTRODUCTION

Electricity is an essential part of modern life, and its use is widespread in almost every sector. However, electrical hazards are a significant concern for the safety of personnel working with electrical equipment. Electrical hazards can cause accidents, injuries, and even fatalities. Therefore, it is essential to take necessary precautions to prevent such hazards.

The Central Electricity Authority (CEA) is responsible for regulating the electricity sector in India. In 2010, the CEA issued regulations for the safety of electrical installations. These regulations aim to ensure the safety of personnel working with electrical equipment and prevent accidents caused by electrical hazards.

This paper focuses on the study of rules and regulations for precautions of electrical hazards, such as fire and accidents. It discusses the regulations put forth by the CEA in 2010, the causes of electrical hazards, and the measures that can be taken to prevent them.

2. LITERATURE REVIEW

Electrical hazards can result from various factors, including electrical installations, equipment, and systems. The consequences of electrical hazards can be fatal and lead to property damage, financial loss, and legal consequences. Regulations are essential to ensure that workers and the public are safe from electrical hazards. The CEA 2010 regulations are designed to prevent electrical accidents by providing guidelines for the installation and maintenance of electrical systems. The regulations specify the requirements for electrical installations, electrical equipment, and electrical systems. These regulations also provide guidelines for the design, installation, testing, and maintenance of electrical installations.

Other regulations for electrical safety include the Occupational Safety and Health Administration (OSHA) regulations in the United States. These regulations provide guidelines for electrical safety in the workplace. They specify the requirements for electrical installations, equipment, and systems. These regulations also provide guidelines for the training of workers and the maintenance of electrical systems.

3. METHODOLOGY

The study uses a qualitative research design to analyze the safety rules and regulations for precautions of electrical hazards. The research involves a review of relevant literature, including academic articles, government regulations, and industry standards. The study also involves interviews with electrical safety

experts to gain insights into the best practices for electrical safety.

4. TYPES OF ELECTRICAL HAZARDS

There are several types of electrical hazards that can be encountered in various settings. Some common types of electrical hazards include:

- **Electric shock:** This occurs when an electrical current passes through the body and can cause injuries ranging from minor burns to cardiac arrest.
- **Electrical burns:** Burns caused by exposure to electrical current or heat generated by electrical current.
- **Arc flash:** A sudden release of electrical energy caused by an electrical arc, which can cause severe burns, injuries, or even death.
- **Electrical fires:** Fires caused by electrical equipment or systems that can lead to property damage, injuries, or fatalities.
- **High voltage hazards:** Exposure to high voltage electricity can cause severe injuries or death.

It is important to be aware of these electrical hazards and take appropriate precautions to prevent accidents and injuries.

5. CEA 2010 REGULATIONS (CENTRAL ELECTRICITY AUTHORITY)

The CEA 2010 regulations cover various aspects of electrical safety, including installation, operation, maintenance, and testing of electrical systems and equipment. The regulations also specify the qualifications and training requirements for personnel involved in electrical work. The key provisions of the regulations include:

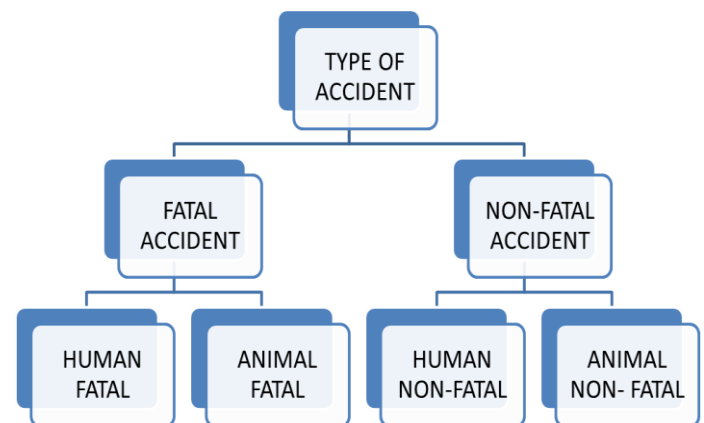
Mandatory compliance with Indian Standards (IS) and the National Electrical Code (NEC) for installation and maintenance of electrical systems and equipment. Identification and labeling of electrical systems and equipment to ensure safe operation and maintenance. Training and certification of personnel involved in electrical work. Regular inspection and maintenance of electrical systems and equipment to ensure their safe operation. Provision of personal protective equipment (PPE) for personnel working with electrical systems and equipment.

The Central Electricity Authority (CEA) is an organization in India that is responsible for the development and regulation of the power sector in the country. In 2010, the CEA issued a set of regulations for the precautions of electrical hazards. Some of the key regulations include:

1. **Electrical Installations:** Electrical installations should be designed and constructed in accordance with relevant codes and standards, and should be maintained in a safe condition.
2. **Earthing:** All electrical installations should be properly earthed to ensure that in case of a fault, the current flows to the earth and not to any person or equipment.
3. **Overcurrent Protection:** Electrical circuits should be protected against overcurrent by using fuses or circuit breakers.

6. TYPES OF ACCIDENT

There are different types of accident .they are shown in below:



Fatal accident:- Fatal accidents may result in death, permanent total disablement, permanent partial disablement, or fatal injuries.

Non fatal accident:- On the other hand, are those accidents that don't have a high probability of death. In such cases, the employee or the workman survives. However, they have to suffer disabilities or any type of personal injury.

7. CASE STUDY OF COOLER ACCIDENT

From the investigation of the place of occurrence and recorded statement, it is revealed that village - Bazargaon, Tt. Nagpur Rural, Distt. Nagpur Mrs. Sindhutai Tarachand Bajanghate has a slab house.

The house is equipped with 1 phase 3 wire low pressure residential electrical supply. The power supply is connected to the switchboard in the hall of the house from the cut-outs fuse and main switch mounted in the wooden board of the load meter. Permanent wiring in the house is earthed. An iron cooler is installed outside the house near the window to the hall through the said switchboards. In the said cooler, the earthing wire was coming from the container of the cooler. On 31.03.2022 Mrs. Sindhutai Tarachand Bajanghate was shocked when he was pouring water into the cooler with a steel bucket. The said cooler motor was found to be in good condition during inspection and when the power supply was connected to the motor, it was found that the motor body was electrified. Therefore, at the time of the accident, the fan-motor connected to the power supply was running, so the cooler must have been electrically charged for a few seconds. Due to the contact of the cooler body with electric charge Electric shock to Sindhutai Tarachand Bajanghate.

There must have been a fatal accident. Notes taken during inspection :-

- Sindhutai Tarachand Bajanghate House Names 1 Phase 3 Wire Low Pressure Residential Electrical Connection Outside Hall of House | It is connected to a electric meter on a wooden board mounted on the wall. Customer no. It is 410020167355.
- 6.0 sq. mm of said electricity connection. of W.P.T.C. Service Cable House opposite LT pole. It was found connected to the electric meter of the house from the pole.
- Phase wire from power meter is 16 amp cutout fuse and then both phase and neutral 16 amp I. C. D. P. (Main) Switch / S.F.U. is connected to and from there the power supply is connected to the house wiring. During the investigation, it was found that the fuses did not melt during the accident. The customer's earthing was found near the meter. Also, the earthing done in the house wiring was found to be non-functional during the inspection.
- A neutral-to-earth voltage in the house wiring was found to be 08 volts.
- RCCB in house wiring not found to be connected.

- During the investigation, it is understood that the power supply is being connected to the iron cooler outside the house from the wiring switchboard in the hall of the house.
- Megger test of cooler as well as motor (by Megger K. 200467, 2500 Volt, Model Sou. IE 444, IS 2992-1987, Scale 0-2000 Mega Ohm Megger) 100 megohms found with cooler body Leakage current was detected in the motor body when the power supply was connected to the motor. But the ground wire in the cooler is the bond of the cooler
- Earth wire found broken/broken.
- Regulations 2010 relating to Accidents RuleNo.12, 49 and 42.

The accident victim himself is responsible for the said accident./ State the exact cause of the accident

Based on the investigation of the incident site and the recorded statement, the following conclusions are drawn.

Village Bazargaon, Nagpur Rural, Distt. Nagpur The earth wire of iron Body's cooler in the house of Mrs.Sindhutai Tarachand Bajanghate is broken from the body of the cooler. Also, the fan motor of the cooler is faulty and when the power supply is connected to the motor, the motor body is momentarily charged. On 31.03.2022, the body of the cooler must have been electrified as the faulty fan motor connected to the power supply of the said cooler was running. Having come in contact with him, Mrs. Sindhutai Tarachand Bajanghate may have met with a fatal accident.

8. PRECAUTIONS

Electrical hazards such as fire and accidents can be dangerous and potentially life-threatening if not taken seriously. Here are some precautions you can take to minimize the risk of electrical hazards:

- 1) Keep electrical appliances and cords away from water and damp areas. Water is a good conductor of electricity and can increase the risk of electrocution.
- 2) Do not touch electrical appliances or cords with wet hands, and do not handle electrical equipment when standing on a wet surface.
- 3) Inspect electrical cords and plugs for signs of wear or damage, such as frayed wires or cracked plugs, and replace them immediately if necessary.

- 4) Turn off and unplug electrical appliances before cleaning or making repairs.
- 5) Use of ELCB is must for proper earthing.

9. CONCLUSION

Electrical hazards are a significant risk in the workplace, and it is essential to have strict safety rules and regulations in place to prevent accidents and injuries. The CEA 2010 regulations are significant in this regard. These regulations specify the requirements for the design, installation, and maintenance of electrical equipment, electrical safety procedures, and training requirements for workers. The regulations have had a significant impact on electrical safety in the workplace by reducing the number of electrical accidents and fires and improving the safety of workers. It is, therefore, essential to continue to adhere to these regulations to ensure that people are safe when working with electricity.

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