

# Electrical Safety Audit of Central India Institute for Medical Science (CIIMS), Bajaj Nagar, Nagpur

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**Abstract:** “Safety first and always” should be the motto of every places i.e. buildings, industries & Utility. In long run, this approach helps indirectly in realizing tangible savings for the organization as it prevents accidents, which normally result in loss of man-hours, damage to equipments & sometimes loss of life also.

Safety of personnel and equipment is of paramount importance. The priorities are given below in the order:

- a) Safety of personnel – Self, colleagues and public.
- b) Safety of equipment
- c) Continuity and high quality of power supply.

Electricity constitutes one of the major sources of ignition for fire accidents and explosions. Over 20% of fire world wide and 40% fire in India are due to faulty electric circuits. Besides equipment damage and property loss, electrical hazards also include injuries and fatalities to personnel due to electric shock. Electricity having become an indispensable part of our life, electrical risks are to be managed effectively.

Timely inspection and preventive maintenance of electrical equipment and its connected systems will go a long way in ensuring safer operations, for a longer period of time, of the electrical installations.

## INTRODUCTION

Hospitals have many patients admitted in critical condition. Many people who would have mobility issues and many would not even be alert in case of an emergency. Hence by ensuring Electrical Safety in hospitals, we can prevent Fire Accidents. Hospitals stack a lot of combustible materials like chemicals, Cylinders, Surgical Equipment, etc. And many hospitals also have an inbuilt Kitchen or Canteen. A Fire Accident may have a lot of casualties as the Fire may become uncontrollable in minutes. So, the hospital management should ensure that their buildings are Safe all the times from faulty electric circuits.

## OBJECTIVE

The main objective of Electrical Safety audit is to Study & check electrical Installation from Electrical safety point of view and Identify / point out deficiencies & areas of improvement in the system. Which will helps to reduce

- 1) Electrical Fire accidents
- 2) Loss of Property
- 3) Loss of Life
- 4) To avoid emergencies
- 5) To reduce risk

## INSTRUMENTS & DEVICES USED

<b>Krykard Portable Load Manager ALM 35 kit</b> Suitable for LT, HT Power & Energy, Harmonics, Transient Measurement & Data Logging Facility With 4 Nos. MN93A CT, Measuring Range: 5mA to 100A AC & 4 Nos. Ampflex CT, Measuring Range: 10A to 6500A AC	<b>Thermal Imaging Camera</b> Model: - E4-FLIR Make: - FLIR
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<p><b>Utility /Application:-</b> Measurement of Electrical parameter KW, KWH, KVAH, KVARH, Ampere, Voltage, PF, frequency etc. Suitable for LT, HT Power &amp; Energy, Harmonics &amp; transient measurement with data logging facility.</p>	<p><b>Utility /Application:-</b> Infrared thermometers enable to measure temperature quickly, at a distance, and without touching the object.</p>
	
<p><b>Digital Clamp-On Earth / Ground Resistance Tester</b> Make : MECO Model: 4680B</p>	<p><b>Digital Insulation Tester 500 V</b> Model No: - DIT 99C Make: - MECO</p>
<p><b>Utility /Application:-</b> Measurement Earth / Ground Resistance.</p>	<p><b>Utility /Application:-</b> Insulation Measurement</p>
	
<p><b>Digital Earth Resistance Tester</b> Make: - WACO</p>	<p><b>LUX Meter</b> Make: Kusum MECO</p>
<p><b>Utility /Application:-</b> Measurement Earth / Ground Resistance.</p>	<p><b>Utility /Application:-</b> Measurement of LUX Level /Illumination</p>



## METHODOLOGY

### Approach & Methodology for Electrical Safety Audit

#### Kick Off Meeting

Introductory meeting & Discussions on approach & methodology with reference to the scope of work with Hospital Management & officers.

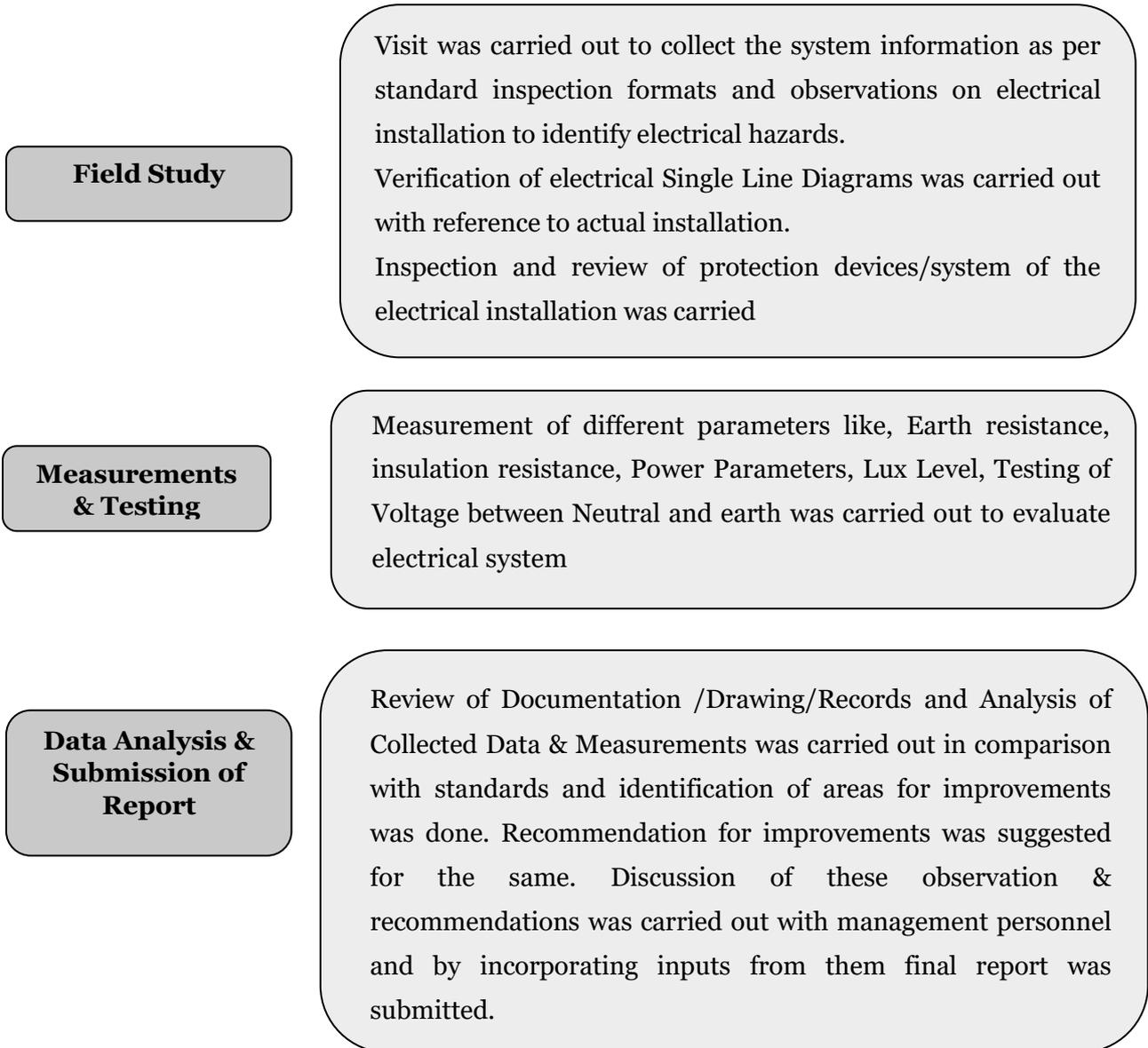
#### Standard Data Collection Sheet for Field Study

List of required data/drawings were submitted to the concerned officers, for

- ❖ Various test reports for Earth pits, Transformer, Motors and Cables
- ❖ Different Drawings
- ❖ Statutory Compliances
- ❖ Electricity Bills
- ❖ Maintenance & Failure Records

#### Data Collection for Review of Documentation /Drawing/Records

Standard data collection sheet were used as per applicable IS to be filled-in at site keeping in mind to collect the data related to the improvement in System from electrical safety point of view.



**Identifications**

- To provide protection device like ELCB / RCCB at DB Incomer
- To make disable protection devices enable (Protection devices are found bypassed)
- To improve effectiveness of earthing system
- To provide Interlocking between GOD/AB Switch handle & Outgoing ACB for transformer.
- To provide safety requirement like Rubber mat, CO2 fire extinguishers, Proper lighting arrangement, Fire fighting bucket, Shock treatment chart, Discharge rod of proper voltage rating, at substation.
- To carry out transformer oil test for BDV and Acidity
- To update Electrical Single line diagrams
- Testing of provided Relay / releases to be carried out.
- To provide Labeling on the sub panel & DB's for the identification of circuits
- To provided Cable glands / Flexible conduits glands for mechanical support to cables.
- To provide concealed type wiring.

**CONCLUSION**

Identified deficiencies are categories into Low, Medium and High risk analysis. It is found that the installation is in Medium risk.

**REFERENCES (STANDARDS ADOPTED)**

To the extent possible the Electrical and Fire Safety audit will follow all applicable standards (national and international), such as:

- CEA (measures relating to Safety and Electrical Supply) Regulations 2010
- IS 14489, Code of Practice of Occupational Health & Safety Audits .
- Good engineering practices followed in similar establishments.
- National Building Code, 2015
- NFPA (applicable codes to Fire Safety)
- Various Indian Standard (BIS)-Electrical.