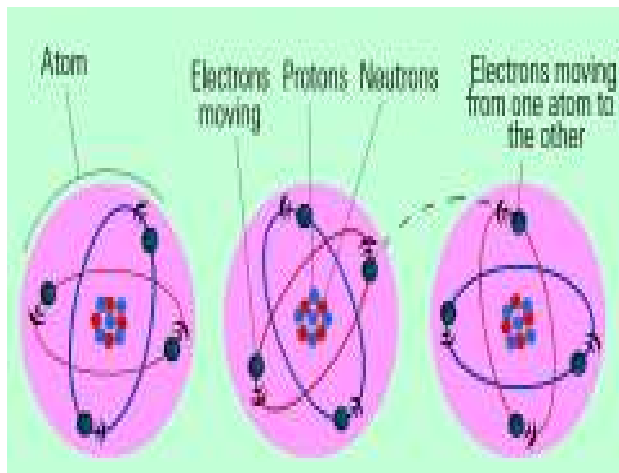


Electrical Fire & Safety



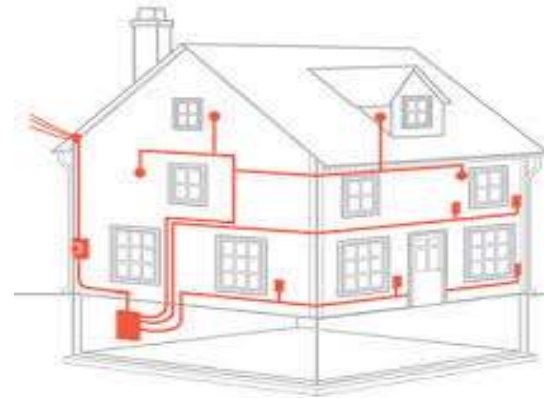
What is Electrical Energy?

- ❑ Electrical energy is energy that is caused by moving electric charges.
- ❑ Since the electric charges are moving, this is a form of kinetic energy.
- ❑ The faster the electric charges are moving the more electrical energy they carry.



Usage of Electrical Energy

1. **During Construction : Generators, Extension of Electric boards, Cutters, Digging etc.**



2. **After Construction : i.e. : Once the Building is Occupied. (House hold equipment's, Industrial machineries, Club House Equipment's etc.**



Bad Practices



Over loading



Loose wire connection
using match stick



Wire Jungle



Additional
Connection

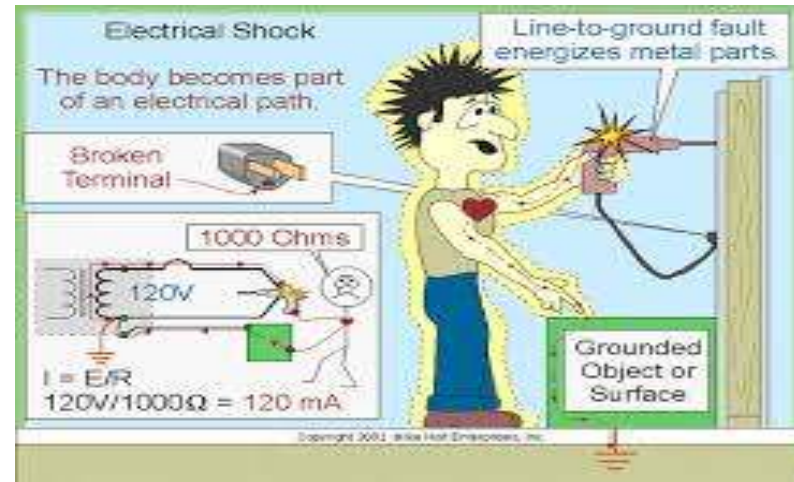


Improper loose
connection



Various types of Hazards due to Electrical Energy

1. Shock



2. Burn - Partial

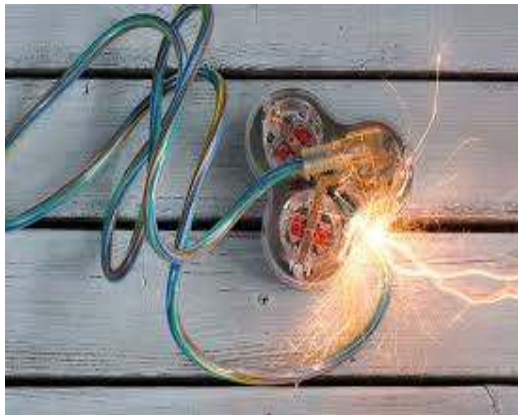


Various types of Hazards due to Electrical Energy

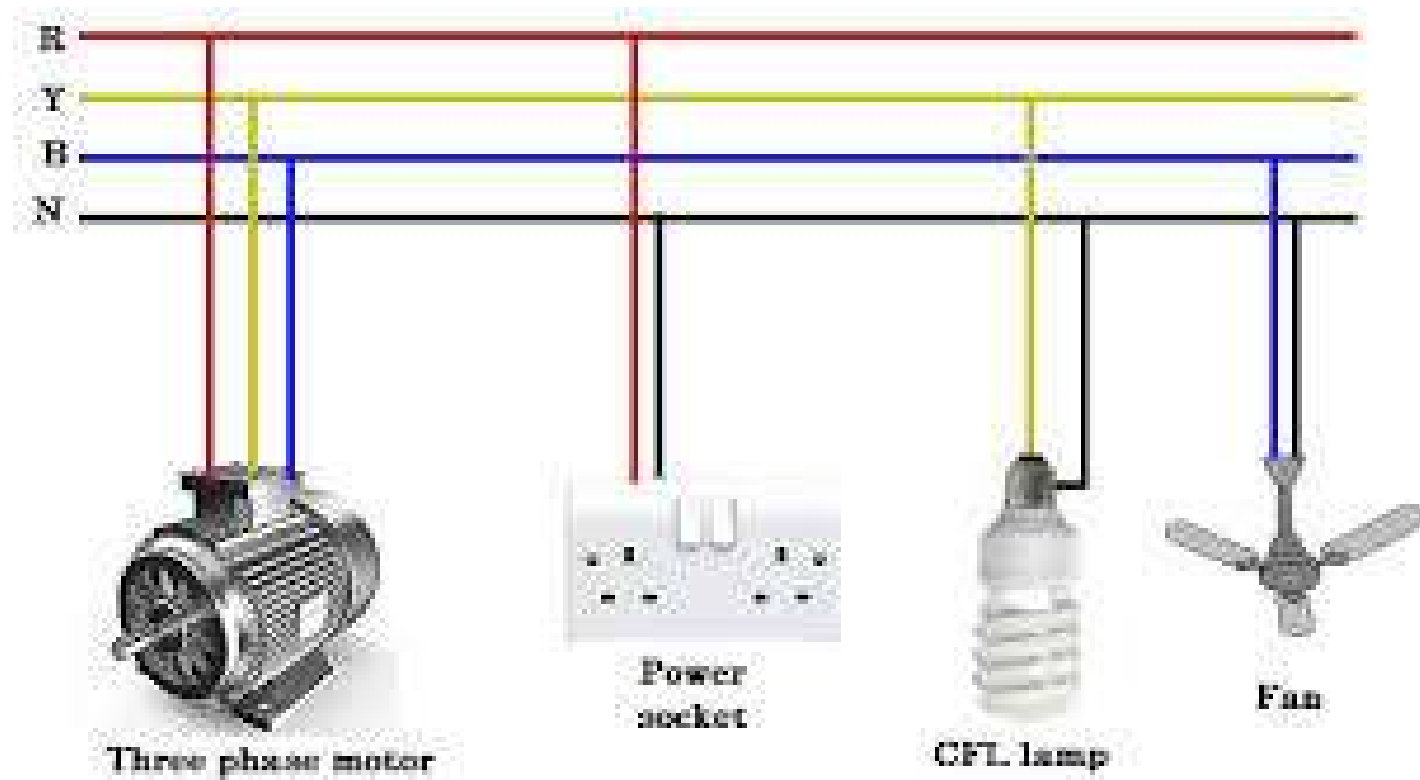
3. Death.



4. Fire



Good Practice for wiring using Three Phase



Basic Precautions to be taken care During Building Wiring & Connections

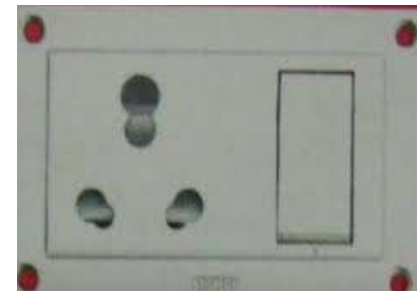
1. Use certified tested Cables with respect to Load requirement.
 - ISI mark with applicable standard numbers and CM/L number. (India).



- Applicable Safety Marking.



2. Use Proper socket with respect to load.



Way forward.....

System Health Analysis

- Power Quality
- Thermography
- Earthing Systems
- Lightning protection systems
- Surge Protection System

• Standards Followed

- IEEE-519
- IEC 61000-2-4
- IEC 61000-3-X
- IEEE standard 142-2007
- IS 2309 : 1989
- BS 7430:1998.
- IS 2689:1989 (Reaffirmed March 2010)

Design Review

- Electrical Hazard identification
- Electrical infrastructure review
- Fire & Safety Review
- Safety audit

• Standards Followed

- ASHRAE
- NBC, 2005
- TIA 942
- IEC
- IEEE
- ISO
- NEC: National Electrical Code
- NFPA: National Fire Protection Association
- UL: Underwriters Laboratories

Energy Assessment

- Demand side management
- Air conditioning system
- UPS
- Other Utility performance

• Standards Followed

- ANSI/ASHRAE Standard 62.11
- ANSI/ASHRAE Standard 552
- BEE Standards
- IS 6685:2005
- ASHRAE 55 – 2010



- To evaluate the integrity of a power system to maximize availability of the mission-critical infrastructure
- Identifying possible single point of failures of the Critical Facilities and eliminating the chances of failures to ensure smooth functioning



- To validate the existing design and compare it for compliance to certain standards and norms
- Design validation review will enable to correct parts of design to avoid potential non-compliance with applicable standards avoiding unforeseen breakdowns



- Assessment determines if the system capacity is adequate both now and in the future
- To evaluate the present performance levels for optimizing the energy consumption



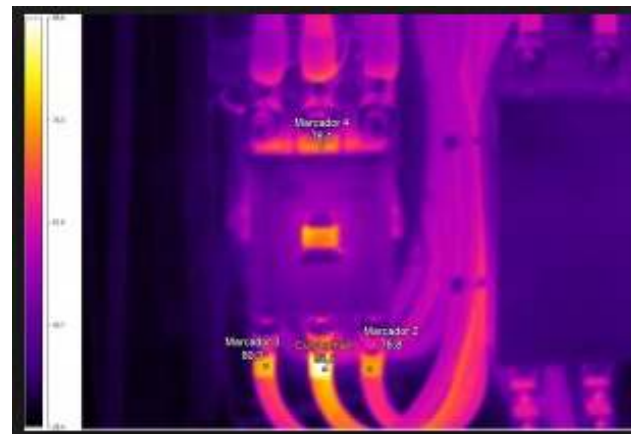
System Health Analysis - Power Quality

- ❑ **Power Factor study** - Used to analyze the running Power factor in the facility at main incomer and identify the ways to improve power factor
- ❑ **Load Unbalance Study** - Measurement of input current and voltage, Variation of current and Voltages between phases.
- ❑ **Dips & Swells** - Records Dips, Interruptions, Rapid Voltage Changes, and Swells which may indicate a weak power distribution system
- ❑ **Harmonics Study** - Measures and records harmonics and inter harmonics up to the 50th. Related data such as DC components, THD (Total Harmonic Distortion), and K-factor are measured.



System Health Analysis - Thermography

- Thermography analysis in electrical and electronic equipment are conducted for preventive maintenance such as
 - ✓ Poor connections/ wiring mistake
 - ✓ Lose or Corroded connections
 - ✓ Harmonics (3rd harmonics current in Neutral)
 - ✓ Mechanical failure
 - ✓ Overloaded systems/excessive current etc.



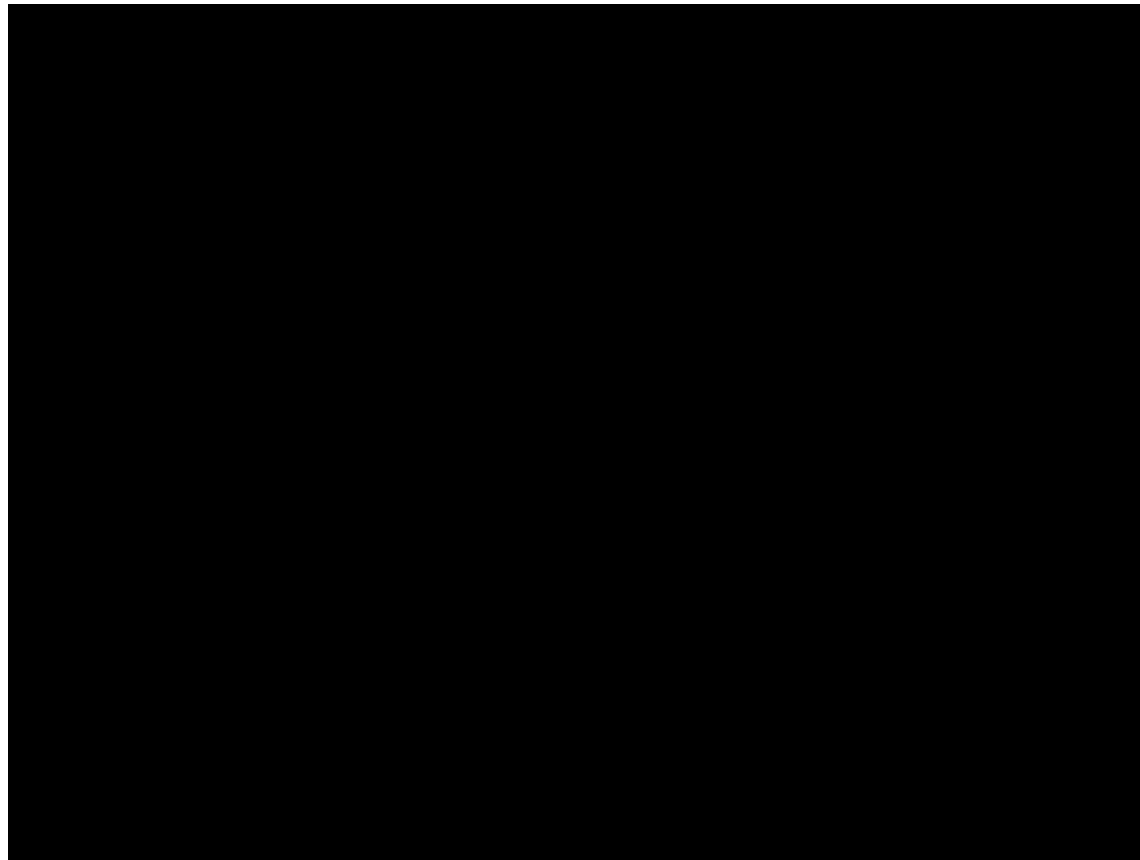
System Health Analysis-Earthing & Lightning System

- ❑ **Earth pit physical check** - Inspection of physical condition of earth pits and verification of maintenance of earth pits.
- ❑ **Lightning Protective System** - To check whether existing Lightning Protective System is sufficient to withstand the lightning current
- ❑ **Surge Protective Device Selection** - Selection of Surge Protective devices based on standard



Science behind Cause & origin of Fire

Fire Forensics CFFP



THANK YOU.

