



STUDY OF ELECTRICAL WIRING AT SSCET COLLEGE

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ABSTRACT

Electrical wiring in general refers to insulated conductors used to carry electricity and associated devices. General aspects of electrical wiring are used to provide power into buildings and structures commonly referred as building wiring. Electrical wiring whether for residential, commercial or industrial project must be carefully installed and maintained in such a way it will provide safety to person and devices properly this requires good workmanship knowledge of electrical principles and circuitry familiarity with electrical wiring accessories is an important provision beside an awareness of and strict adherence to the provisions.

Keywords- Electrical wires

1. INTRODUCTION

- Electrical wiring is an electrical installation of cabling and associated devices such as switches, distribution boards, sockets, and light fittings in a structure.
- We use Electrical symbols for wiring
- Wiring is subject to safety standards for design and installation. Allowable wire and cable types and sizes are specified according to the circuit operating voltage and electric current capability.
- Associated circuit protection, control, and distribution devices within a home wiring system are subject to voltage, current, and functional specifications. Wiring safety varies by locality.

2. LITERATURE REVIEW

Electric wires and cables played a key role during electrical installation. The conveying ability of electric cable is highly dependent on the installation and environmental conditions. Electric wires type and size are made in armament to the circuit operating voltage and electric current capacity. According to Popava.et.(2012) electric cable specifications are affected by the prevailing environmental conditions, such as: ambient temperature range, moisture levels, and export to sunlight and chemicals.

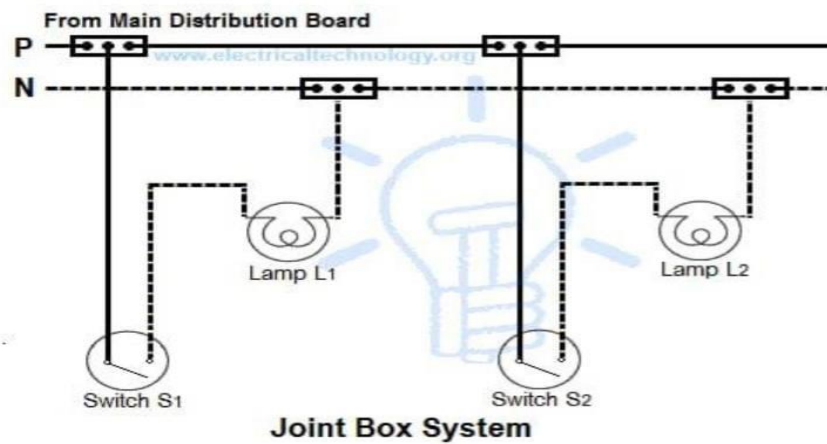
BLOCK DIAGRAM:



3. TYPES OF WIRING

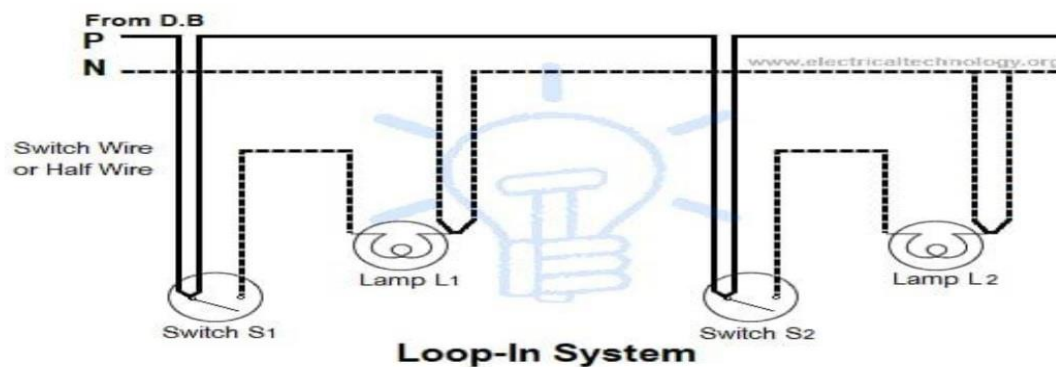
- **Tee System or Joint box System:**

1. In Tee System the appliances connected in wiring.
2. It is ideal for temporary installation.
3. It is cheap wiring.
4. In this wiring less no. of cables are used.



- **Loop in System:**

1. In this system all appliances are parallelly connected.
2. So, the devices are connected individually.
3. This is easy to find fault.



- **Cleat Wiring:**

1. VIR & PVC insulated wires are used for cleat wiring.
2. Porcelain cleats are used mainly to act as clamps for holding the wires to the walls.
3. Other than porcelain wood and plastic claps are also used for cleat wiring.



- **Batten Wiring:**

1. Batten wiring is done with single, double and three core TRS cables.
2. These cables are water steam and chemical proof.
3. It is cheap as compared to other wiring.



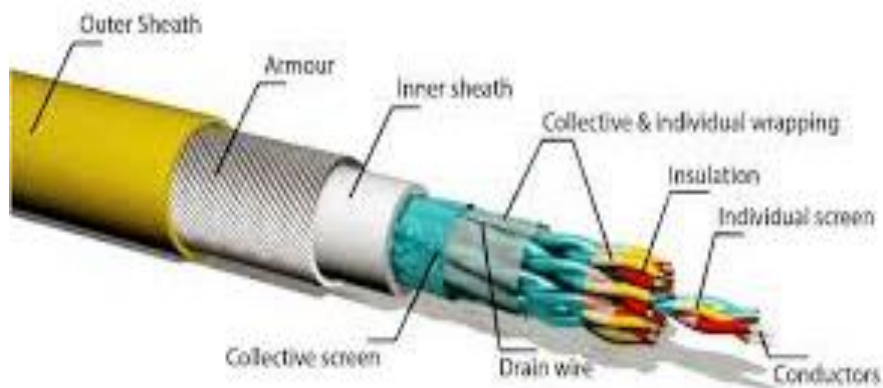
- **Casing capping wiring:**

1. In casing and capping wiring VR cables or conductors are enclosed in PVC casing and capping.
2. The casing is bolted into the wall with the help of bolts and after the conductors are laid inside of the casing and then with the help of capping.
3. It is enclosed for protection from dust, dirt and water or moisture.



- **Lead sheath wiring**

1. In Lead sheath wiring conductors are used in which the outer surfaces of conductors are made up of Al which contains 95% lead in it.
2. It helps the conductor's protection from corrosion, mechanical damage, etc.



- **Conduit Wiring**

1. In conduit wiring the PVC pipes or conduits are placed inside the wall and are placed inside the wall and are hidden with the help of plaster the wires are placed through them and made available to various outlets.
2. This is a very attractive type of wiring because the wires are not visible outside but the maintenance is very hectic in this type of wiring.



4. SYSTEM OF WIRING

A Set of wires connect various appliances to distribute the electrical energy from the meter board to the various energy consuming appliances. Ex-lights, fans and other household appliances through controlling and for safety of appliances is called a system of wiring.

The system of wiring is done by two systems. Which are (1) Tree system or (2) Ring system.

1. The Tree system-In tree system, various bough lines are taken from the panel board to the various parts of the house. Its diagram or circuit looks like a tree with different branches. Single cough line is taken to a room through a fuse in a live wire.
2. Ring System-In Ring System, sockets and panel board points are connected in a ring. In which panel points are attached in a line with the panel point at one end.

5. SELECTION OF WIRING

White selection electrical wiring for any industrial, commercial, purpose some factors we need to know

- 1) Nature of supply: - AC or DC supply required for consumers.
- 2) Types of supply: - Single phase or Three phase supply required for consumers.
- 3) Total connection load: - Total No. of load connected in KW or Watt.
- 4) Total current: - If we know how much load is connected from that we easily final total current of the system and also help to final gauge of the wire which is required for electrical connection.

6. RULES OF WIRING

Before the erection of wiring the following general rule should be kept in view:

1. According to ISI the total lightning load of a sub-circuit should not be more than 80 watt or 10 points, whichever is less. For estimating the load, the following value should be considered for individual points:
 - (a) Fluorescent tube-40 W each
 - (b) Socket outlet ceiling fan lamp - 60 Weach and
 - (c) Mercury vapor lamp 80 W each.
2. According to ISI, the maximum power load of a sub circuit should not be more than 2000 W or two points, whichever is less.
3. The current rating of the main switch's distribution box should be calculated according to the load on the circuit.
4. In domestic wiring, the wall socket used must have an earth point connected with the earth continuity conductor.
5. A live wire must be protected by a fuse current reading depending on requirement of the load. Further it should be controlled through the switch.

7. ISSUES WITH ELECTRICAL WIRING

Following are the issues with electrical wiring.

1. Too many extension cords.
2. Dimming or flickering lights.
3. Sparking.
4. Hot outlets or switch plates.
5. Frequently blown fuses or tripped breakers.
6. Buzzing. .
7. The wrong outlets in the kitchen or bathroom.

ADVANTAGES:

1. It is a safe wiring system.
2. Safe from chemical effects, humidity and other external factors.
3. No risk of shock.
4. It is aesthetically appealing.
5. No risk of wear and tear, fire or damaged cable insulation.

6. Quite reliable.
7. Renovations can be easily performed as you can replace old wires easily.

DISADVANTAGES:

1. No risk of shock.
2. Risk of cable damage is reduced.
3. Longer life
4. Quite reliable
5. Replacement of any cable is easily done in case of any fault occurring in it.

TECHNICAL CHALLENGES FACING IN ELECTRICAL WIRING:

Technical issue due to poor circuit protection If in a circuit residual current circuit breaker (RCCB) is not used there is current leak in a circuit. Grounding issues happen when there is no ground fault circuit interrupter (GFCI) installed in a circuit. Without GFCI shocks, burns, electric fire, overheating of electric wire.

Technical issues due to lightning bulbs can burn due to high voltage and bad wiring in the circuit.

Due to bad wiring connection risk of electric shocks.

Sometimes high voltage occurs in a circuit and it damages the electric equipment connected to load.

8. SPECIFICATION OF ELECTRICAL WIRING

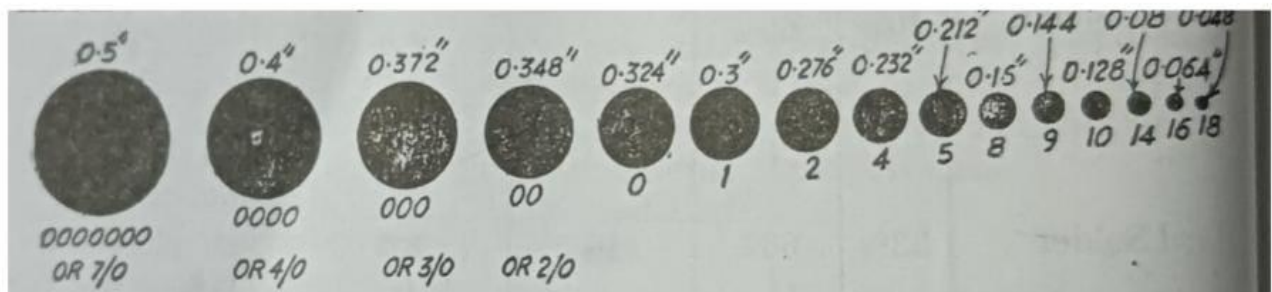
1. Electrical wiring is an electrical installation of cabling and associated devices such as switching distribution boards ,sockets and lighting fitting in a structure.
2. Materials for wiring electrical systems intended use and amount of power demand on the circuit.
3. Wires and cables are rated by the circuit voltage temperature rating and environmental conditions.
4. The amount of current a cable on wires can safely carry depends on the installation condition.

Various systems by which power is distributed to the domestic consumers:

The part of the power system that distributes electric power for local use is called a distribution system. Generally, a distribution system is the electrical system between the substation fed by the transmission system and the consumer's meters.

9. SIZE OF WIRES

1. It has been mentioned earlier for conduction of electric power.
2. Insulated aluminum conductors are used.
3. There is a limit to the current capacity of the aluminum conductor.
4. The current flowing through a wire causes heat which is proportional to the square of the current.
5. Again there is a limit to the degree of heat which is particularly insulated and can withstand safely.
6. According to the standards laid down there is a particular value of maximum current which can be safely carried by the wire of different size and different insulation and if the rules are not adhered to there is a possibility of damage to insulation which may cause fire.



10. CONCLUSION

In this project we have studied various types of wiring used in commercial as well we have studied the detailed wiring and connections in the SSCET premises. This project leads to full analysis of every aspect related to wiring and their uses.

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