SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

COURSE NAME : 19EE01 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

I YEAR /II SEMESTER - COMPUTER SCIENCE AND DESIGN

Unit 3 – WIRING, GROUNDING AND SAFETY

Topic 4 : Conduit wiring

NEED FOR WIRING

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Types of wiring

- Cleat Wiring System
- Wooden casing – caping wiring system
- Tough Rubber sheath wiring system
- Lead sheathed wiring system
- Conduit wiring system

Cleat wiring system - Cleats with groves are used to hold the cable. It is a temporary wiring system so not used in typical house constructions

- Conductors are supported by porcelain cleats.
- Very cheap and can be done easily
- It has base and a cap.
- Life is very less so not suggested for permanent wiring.
- Types
  - Having one
  - Two or three groves for receiving one, two or three wires respectively.

USES:

- Industries and workshops for temporary wiring.

Points to be remembered

- Distance between cleats – 30cm to 60 cm.
- Wires should not run near water and gas pipe lines.

Wooden casing capping wiring system

•Though its costly , commonly used in residential buildings.

•Casings are made of seasoned teak wood.

•Casing are covered – rectangular strips of wood of same width known as capping and its screwed to it.

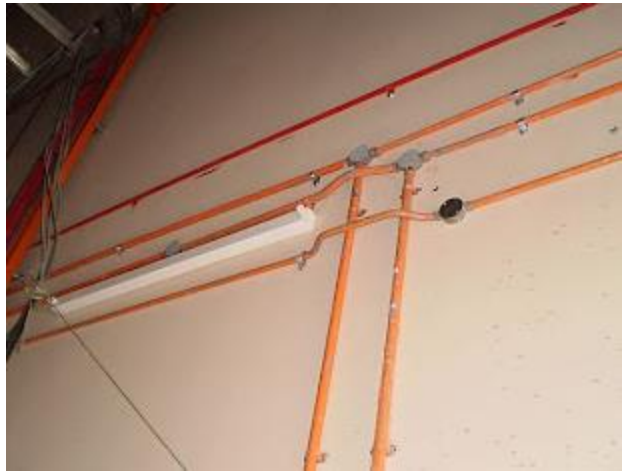
•It is available in pieces of 3 to 6 meters length.

Points to be remembered:

- To avoid white ants – seasoned wood should be used.
- Casing should be properly fixed at the wall

Tough Rubber Sheath Wiring

- PVC or TRS or CTS cables are used.
- The cables are placed on wooden batten - Batten wiring system
- Battens – clips and then screweed.
- Distance – 6cm to 15 cm.



Lead sheathed wiring system

- Similar to TRS.
- Cable – Lead sheathed cable.
- Longer life but costly.
- Avoids mechanical injury- Properly moulded.
- Earthed.

CASING WIRING

Casing and Capping Electrical Wiring

Open wiring system where the wires are run through casing enclosure and capping is used to cover the casing.

BATTERN WIRING

Single or a group of wires are laid over a wooden batten. The wires are hold to the batten using a brass clip, which is attached to the wooden battens at an interval of 10-15 cms

SURFACE CONDUIT WIRING

Surface Conduit Wiring

PVC or GI conduits are laid on the surface of the wall or ceiling. These conduits are attached to the walls with a 2-hole strap and base clip at a regular certain distances. Electrical wires are laid inside the conduits

CONCEALED CONDUIT WIRING

Concealed Conduit Installation in Slabs and Walls

PVC conduit pipes are placed inside the chiselled brick/block wall before plaster. The wall is later completely plastered and painted. Electrical wires are laid inside the conduits. This type of wiring are aesthetically appealing since they are no electrical wires/conduits seen on the top of the wall.

General Rules For Wiring

The general rules, which are to be kept in mind in execution of internal wiring work, are:

1. Every installation is to be properly protected near the point of entry of supply cables by a two-pole linked main switch and a fuse unit. In a two-wire installation if one pole is permanently earthed, no fuse, switch or circuit breaker is to be inserted this pole. A 3-pole switch and fuse unit is to be used in 3-phase supply.

2. The conductor used is to be of such a size that it may carry load current safely.

3. The conductors installed are to be safe in all respects.

4. Every sub-circuit is to be connected to a distribution fuse board.

5. Every line (phase or positive) is to be protected by a fuse of suitable rating as per requirements.

6. A switch board is to be installed so that its bottom lies 1-25 metres above the floor.

7. (a) All plugs and socket-outlets are to be f 3-pin type, the appropriate pin of socket being connected permanently to the earthing system.

(b)Adequate number of socket-outlets is to be provided at suitable places in all rooms so as to avoid use of long lengths of flexible cords.

(c)Only 3-pin, 5 A socket-outlets are to be used in all light and fan sub-circuits and only 3-pin, 15 A socket-outlets are to be used in all power sub-circuits. All socket outlets are to be controlled by individual switches, which are to be located immediately adjacent to it. For 5 A socket-outlets, if installed at a height of 25 cm above the floor level, the switch may, if desired, be installed at a height 1-30 metres above the floor level. In situations where a socket-outlet is accessible to children, it is recommended to use shuttered or interlocked socket outlets.

(d) In case an appliance requiring the use of a socket outlet of rating higher than 15 A is to be used, it is to be connected through a double pole witch of appropriate rating. In no case a socket-outlet of rating higher than 15 A is to be installed.

(e) Socket-outlets are not to be located centrally behind the appliances with which these are used. Socket-outlets are to be installed either 25 cm or 1.30 metres above the floor level as desired.

(f) No socket-outlet is to be provided the bath room at a height less than 1.30 metres.

(g) Depending on the size of the kitchen, one or two 3-pin 15 A socket-outlets are to be provided to plut-in hot plates and other appliances. Dining rooms, bed rooms, living rooms, and study rooms, if required, each is to be provided with at least one 3-pin, 15 A socket-outlet.

8. (a) All incandescent lamps unless otherwise required, are to be hung at a height of 2.5 metres above the floor level.
(b) Unless otherwise specified, all ceiling fans are to be hung 2.75 metres above the floor.

9. (a) Lights and fans may be wired on a common circuit. Each sub-circuit is not to have more than a total of ten points of lights, fans and socket outlets. The load on each sub-circuit is to be restricted to 800 watts. If a separate circuit is installed for fans only, the number of fans in that circuit is not to exceed ten.

(b) The load on each power sub-circuit is to be normally restricted to 3,000 watts. In no case more than two outlets are to be in a power sub-circuit.

10. No fuse and switch is to be provided in earthed conductor.

11. Every circuit or apparatus is to be provided with a separate means of isolation such as a switch.

12. All apparatus requiring attention are to be provided with means of access to it.

13. In any building, light and fan wiring and power wiring are to be kept separate.

14. In 3-phase, 4-wire installation the load is to be distributed equally on all the phases.

15. No additional load is to be connected to an existing installation unless it ahs been ascertained that the installation can safely carry the additional load and that the earthling arrangements are adequate.

16. Lamp holders used in bath rooms are to be constructed or shrouded in insulating materials and fitted with protective shield and earth continuity conductor is not to be of size less than 7/0.915 mm.

17. The metal sheaths or conduits for all wiring and metal coverings of all consuming apparatus or appliances is to be properly earthed in order to avoid danger from electrical shock due to leakage or failure of insulation.

18. Each sub-circuit is to be protected against excessive current (that may occur either due to overload or due to failure of insulation) by fuse or automatic circuit breaker.

19. All live conductors are to be insulated or otherwise safe guarded to avoid danger.

20. After completion of work the installation is to be tested before energisation

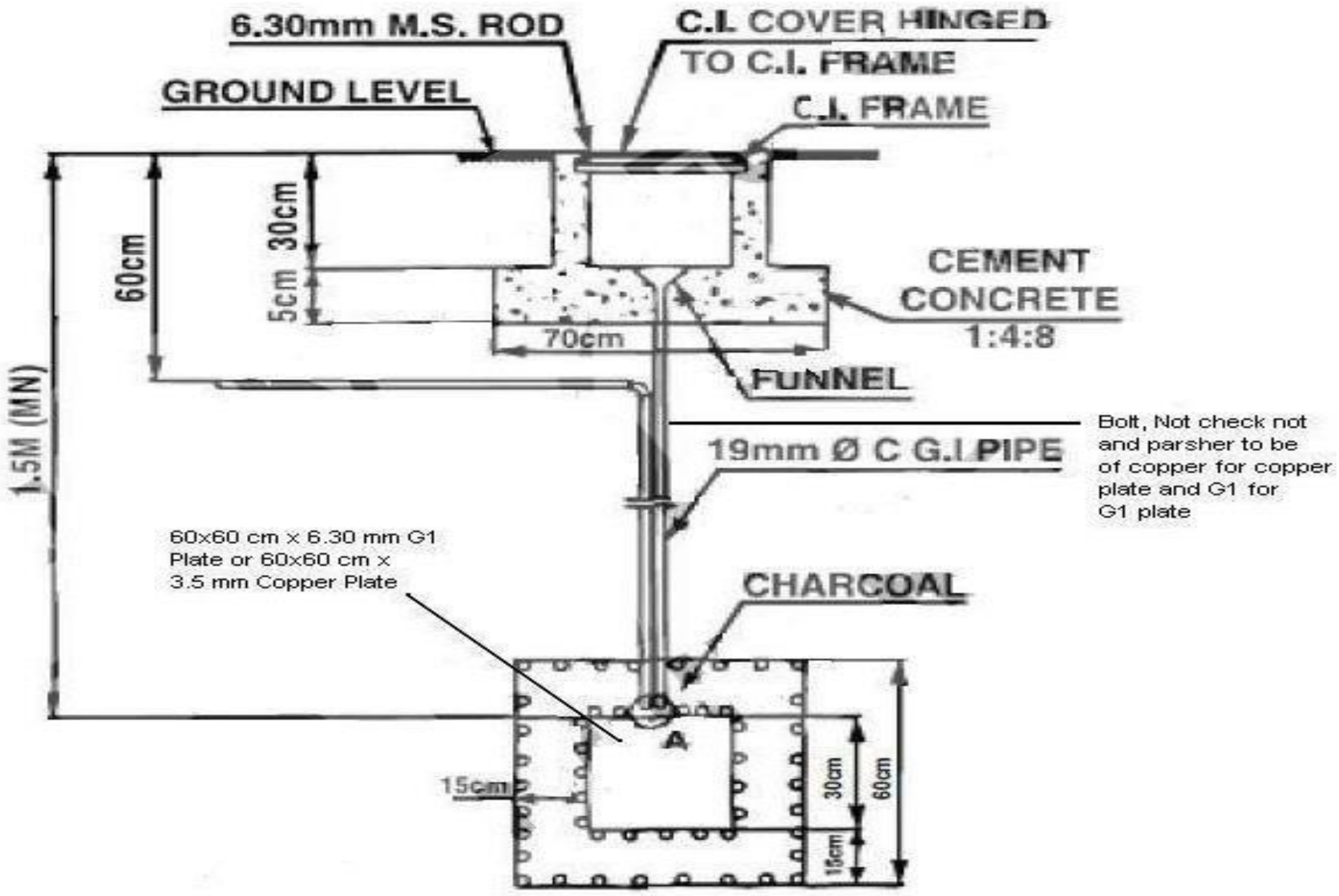


Plate Earthing

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THANK YOU