JOB ROLE – **Consumer Energy Meter Technician**

Sector: Power
(Qualification Pack Code : PSS/Q0107)

PSS Central Institute of Vocational Education
Shyamla Hills, Bhopal – 462013, Madhya Pradesh, India

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Unit 2: Handling of tools and equipment

Session 2: Tools & equipment used for various Electrical Activities

Content

Session Objectives

1. The student will be able to understand tool and equipment use for laying a cable.
2. Understand tools used for erection and mintenance.

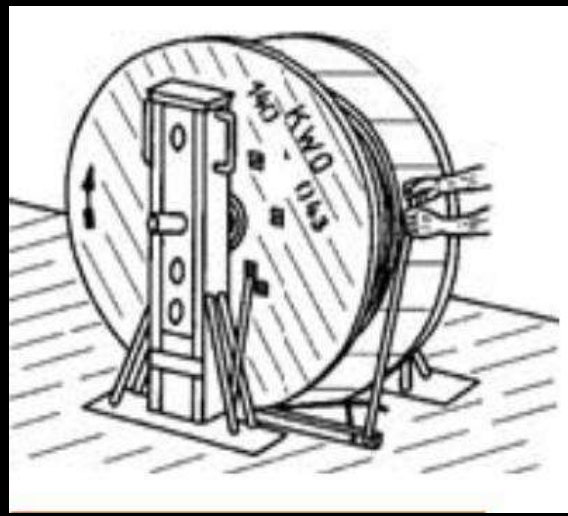
Introduction

Tools & equipments are used for various electrical activities. The electrician should take proper care while handling the electrical tools for laying the electrical wire and cables. We will study the important tools and equipment used for laying electrical wire laying works.

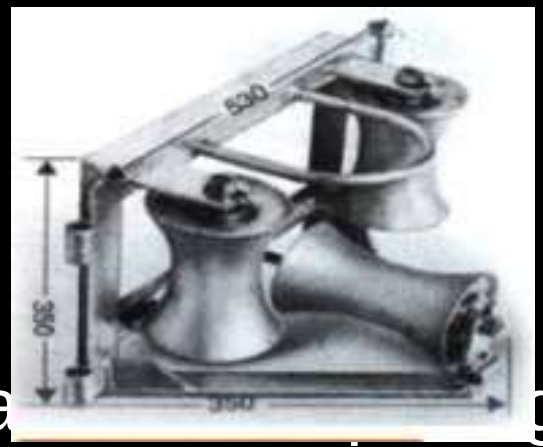
Equipment used in cable laying

11kV cable laying from cables drums using erection stools & pulling pulleys.

While laying the cables necessary precautions and health & safety practices for power related work as covered in detail under (PSS/N 2001) must be observed.



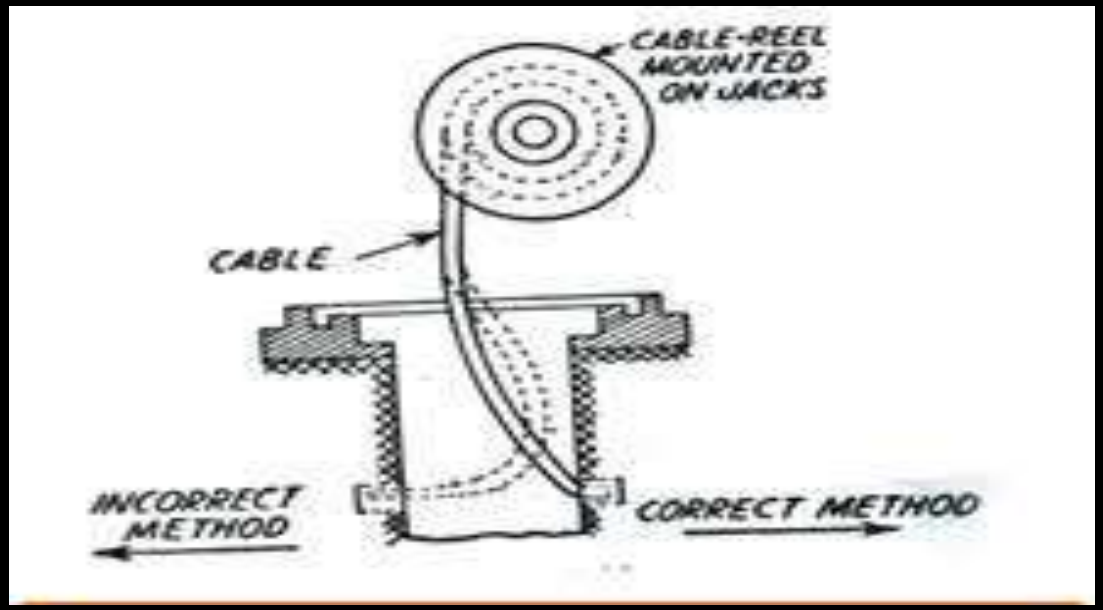
Preparations of equipment for cable laying activities



Other tools for cable laying a g winch, Cable guiding device and Cable pulling grip etc.

The cable drum should be mounted on jacks and the cable rolled off the drum gently avoiding kinks and twists. The free end in the case of heavy cables may be pulled with help of a winch. Laying of cable in open trench presents no serious difficulty.

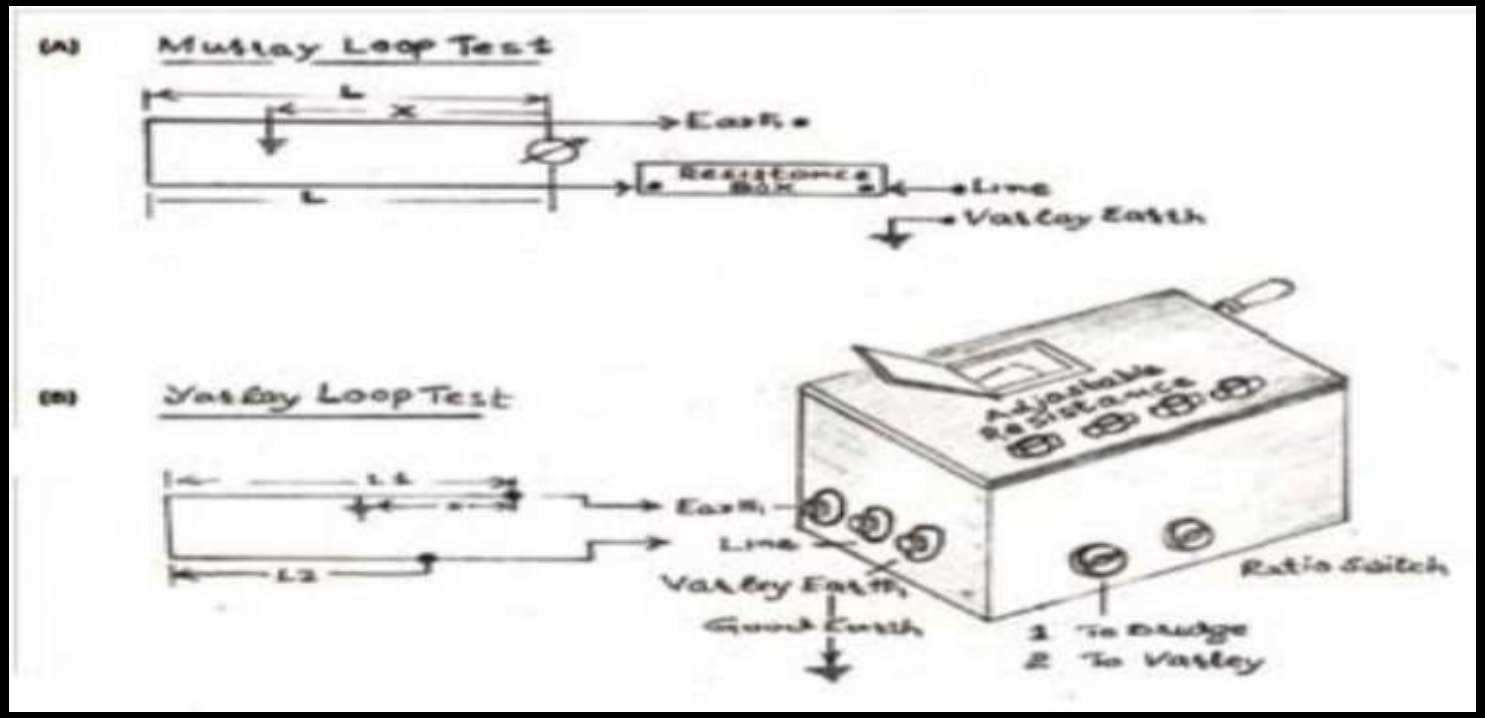
The cable is first placed on rollers layed in the trench or on the ground above, which is then transferred to the bed of the trench. When laying cables in pipes and ducts, care should be exercised so as not to damage them during installation. The correct method of paying out of cable for installation in a duct is shown in fig below.



Testing of Underground Cables

- **The cables are tested for the following faults:-**
- (i) Short Circuiting. (ii)Discontinuity. (iii) Earth fault.
- **Murray Loop Test.** For finding out the exact position of fault, cables to be repaired without digging the whole cable route trench the Murray Loop Test which is based upon the principle of wheat-stone bridge, and bridge megger is used for this purpose.
- **Use:** The Murray Loop Test is used for the location of faults on lines of low resistance such as power cables and telephone cables. The circuit for Murray Loop Test is shown in Figure below to locate that fault in a cable.

- **Operation:** The value of the resistance box (R.B) and resistance dial of the instrument is changed till the galvanometer shows null point i.e. zero defection.(Handle of the meter is rotated at speed of 160 r.p.m.). With this method we will be able to locate the distance of faulty section of the cable ('X' as shown in the figure below)
- **Connections:** The conductors are shorted at its far end by thick wire.
- **Precautions:**
- For carrying out Murray Loop Test the only requirement is that all the core conductors should be of same cross-section.
- If the sound and faulty conductors are of different sizes, it should be taken in account.
- In high voltage cables, a high voltage, D.C. is applied to the bridge net work.



B. Yarlay Loop Test. This test is used to locate the fault of the long length of cables, the connections are shown in the above figure with the Bridge Megger.

(i) The Faulty line is joined at the far end to a good line by any link of negligible resistance.

The faulty line is then joined to “Earth” terminal and the good line to the “Line” terminal. The “Yarlay Earth” terminal is connected to good earth.

The comparatively high resistance of the loop under these conditions allows a similar high resistance of R to be used. This means that the value of 'X' will not be greatly affected by small measuring inaccuracies.

Instructions.

It will be seen that the only difference between the circuits is that the variable resistance R is used to obtain balance in the Yarlaybyh6 Test, but it is omitted from the Murray Test (or more exactly reduced to zero).

Important tools used for erection and maintenance

Linemen are hard workers who cannot do their jobs without their hand tools, which they carry around on a daily basis. Unlike tools used by any other worker, a lineman's tools require proper installation, because they are used with electrical installations. The handles of these tools are coated with rubber to prevent the worker from getting electrocuted.

Tools are very much important to carry out a job. The entire job being carried out by a technician is with the help of tools. The following tools are commonly used for working in distribution system.

Combination Pliers: It is used for cutting, removing insulation, jointing and twisting the electric wires and cables even on live line. A lineman's pliers have special design, which multiplies force through leverage. These pliers usually have grips for better handling than bare metal handles. The grips may also provide insulation for protection against electric shock when working with live circuits. Lineman's pliers are typically machined from forged steel. The two handles are precisely joined with a heavy-duty rivet that maintains the pliers' accuracy even after repeated use under extreme force on heavy-gauge wire.

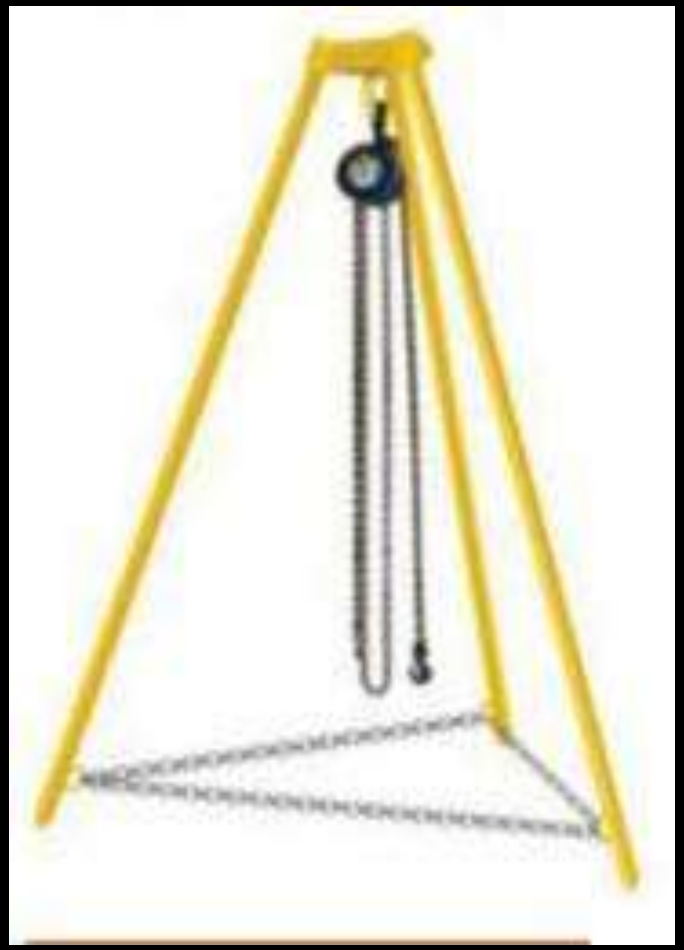
Adjustable Wrench: Adjustable Wrench is used to open and close nuts and bolts in case of proper size spanner not being available. Common sizes are 8” (Inch) to 12” (Inch). Adjustable wrenches are designed to provide a wide range of capacity in a single tool and are a convenient service wrench for distribution linemen. They are not intended to replace fixed opening wrenches for production or general service work. High dielectric insulated handle types are widely used by linemen and other electrical workers.

Pipe Wrench: It is used to open, close conduit, GI pipes and valves. Common size is 10” (Inch) . The design of the adjustable jaw allows it to lock in the frame, such that any forward pressure on the handle tends to pull the jaws tighter together. They are usually made of cast steel. Nowadays, aluminium is also used to construct the body of the wrench, while the teeth and jaw remain steel.

Electric Drill Machine: It is a portable electric powered tool used for drilling the surface. It has a high speed motor to revolve the chuck. It is used to make the hole smooth and easily.

Chain pulley: It is a pulley with depressions in the periphery of its wheel, or projections from it, made to fit the links of a chain. Desired capacity Chain pulley is hooked at centre to lift heavy load for loading and unloading at site.

Tripod: Tripod is a combination of three to four meter long 40 mm GI pipes hinged at upper end for making tripod formation. Tripods are perfect for utility workers as they are portable and lightweight with high-strength anchor.



Come along clamp: It is used while laying of overhead lines. These are mainly used for holding conductors and ground wires in overhead transmission lines and various other industrial maintenance operations. These clamps are available in multiple diameter, weight and design that are ideal to use in electrical works. They are ideal to pull conductors as they are lightweight and compact in structure.

Ratchet Device: It is a device consisting of a bar or wheel with a set of angled teeth in which a pawl, cog, or tooth engages, allowing motion in one direction only. Ratchets are widely used in machinery and tools as well as maintenance works.

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