JOB ROLE – **Cable Jointer Electrical Power System**

Sector: Power
(Qualification Pack Code : CON/Q1002)

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

www.psscive.ac.in

Unit 4: Installation of the Cable

Session 2: Laying of AB cables

Content

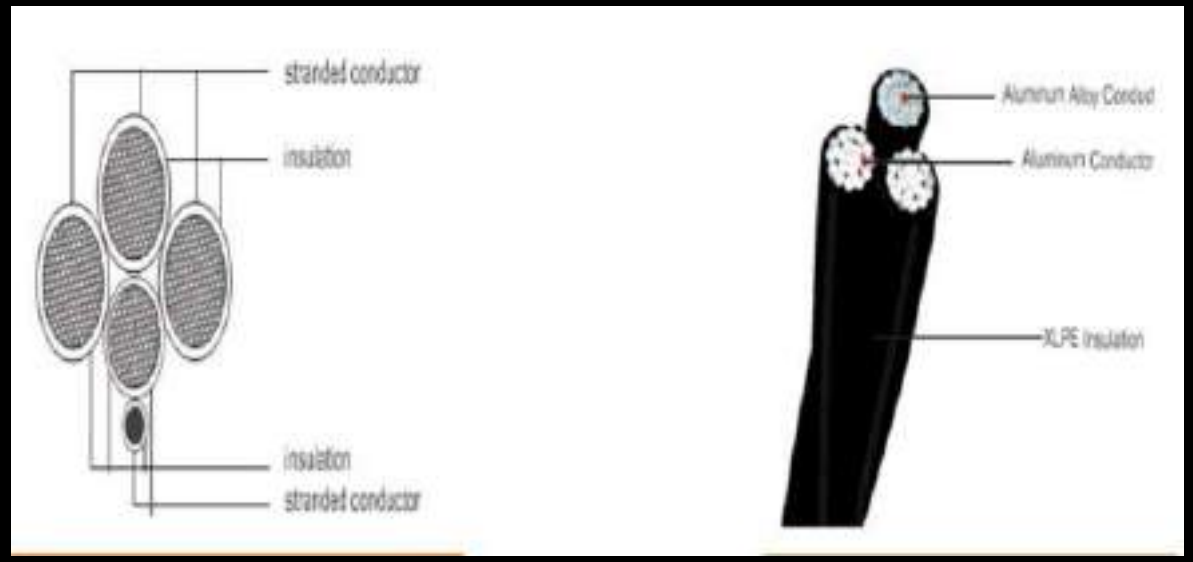
Session Objectives

1. The student will be able to illustrate the importance of various cable joints.
2. compare the advantages and disadvantages of aerial bundled cables.

Aerial Bundled Cables

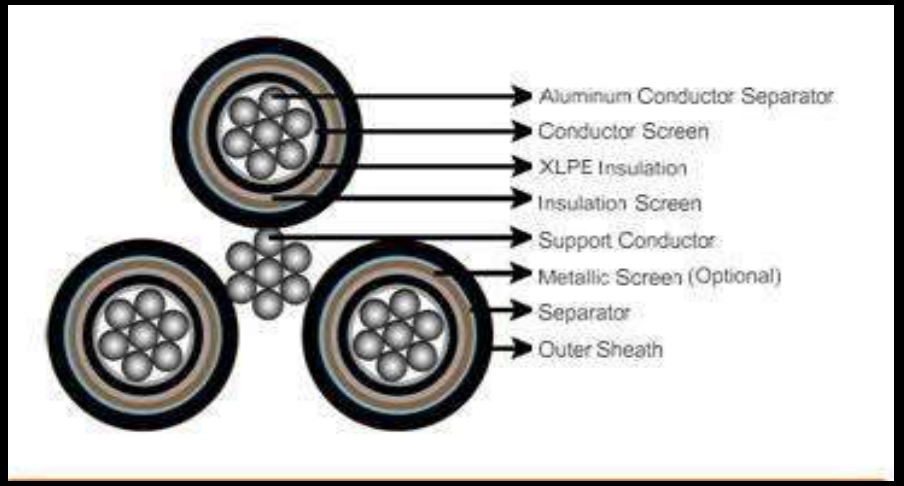
Aerial Bundled Cables should not be confused with bundle conductors used in high-voltage power transmission. Aerial bundled cables are overhead power lines using several insulated phase conductors bundled tightly together, usually with a bare neutral conductor. This contrasts with the traditional practice of using un insulated conductors separated by air gaps. The main objections to the traditional design are that the multiple conductors are considered ugly, and external forces can cause them to touch and short circuit. The resultant sparks have been a cause of bushfires in drier climates. This is a potentially dangerous fault condition.

With ABC, a simultaneous disconnection of all conductors is more likely. In moister climates, tree growth is a significant problem for overhead power lines. Aerial bundled cables will not arc over, if touched by tree branches. Although persistent rubbing is still a problem, tree trimming costs can be reduced. Areas with large trees and branches falling on lines are a problem for aerial bundled cables as the line degrades over time. Due to the very large strain forces cracking and breaking insulation can lead to short circuit failures which can then lead to ground fires due to dripping of molten insulation.



Construction of insulated overhead power networks with aerial bundled conductors (ABC) in developed industrialised countries today has almost completely superseded the traditional low-voltage network with bare conductors. Due to its advantageous technical, economic and aesthetical aspects, the low- voltage network type with aerial bundle conductors has found wide application.

Particular designs present a segment of standard product designs for suspension sets, tension sets and jointing equipment most commonly used in construction of low voltage(0.4kV)and medium voltage (10kV and 20kV) power lines with ABC accessories.



It is very difficult to tap the AB cables, thus reducing theft of electricity which leads to lower distribution losses.

Advantages and disadvantages of Aerial Bundled Cables

1. Relative immunity to short circuits caused by external forces, unless they abrade the insulation.
2. Can stand in close proximity to trees and will not generate sparks if touched.
3. Simpler installation, as crossbars and insulators are not required.
4. Less cluttered appearance.
5. Can be installed in a narrower right-of-way.
6. At junction poles, insulating bridging wires are needed to connect non-insulated wires at either side. ABC can dispense with one of these splices.

6. Less risk of a neutral-only break from tree or vehicle damage, increasing safety with TNC-s systems.
7. Electricity theft is made harder and more obvious to detect.

Disadvantages of Aerial Bundled Cables

1. Additional cost for the cable itself.
2. Insulation degrades due to sun exposure, though the critical insulation between the wires is somewhat shielded from the sun.
3. Shorter spans and more poles due to increased weight.
4. Can lead to much longer repair times for installations in hilly areas due to much higher line weights requiring bigger and more specialised equipment to repair.

5. Older installations are known to cause fires in the areas where falling large trees or branches regularly cause breaks in lines and or in insulation leading to short circuits which can then lead to burning insulation dripping to ground and starting ground fires.

In moist climates, tree growth is a significant problem for overhead power lines. Aerial bundled cables will not arc over if touched by tree branches. Although persistent rubbing is still a problem, tree-trimming costs can be reduced.

Types of AB Cables

AB Cables for LT lines:

Three Phase Four Wire:

$3x150mm^2+1x95mm^2$ (Neutral conductor) + one messenger wire of $25mm^2$. The messenger wire is also used for earthing purpose. Current carrying capacity of this cable configuration is 210 Amp.

Three Phase Five wire (One additional wire for street light)

$3x150mm^2+1x95mm^2$ (Neutral conductor) + one messenger wire of $25mm^2+1x16/25mm^2$ (used for street light). The messenger wire is also used for earthing purpose.

In addition AB cables of following size are also used for LT lines. Which is $3x95mm^2+1x50mm^2$+one messenger wire of $25mm^2$

AB cables for HT lines (11Kv)

$3x150mm^2$ + one messenger wire of 25mm2 (Current carrying capacity is 210 Amp) $3x95mm^2$ + one messenger wire of $25mm^2$

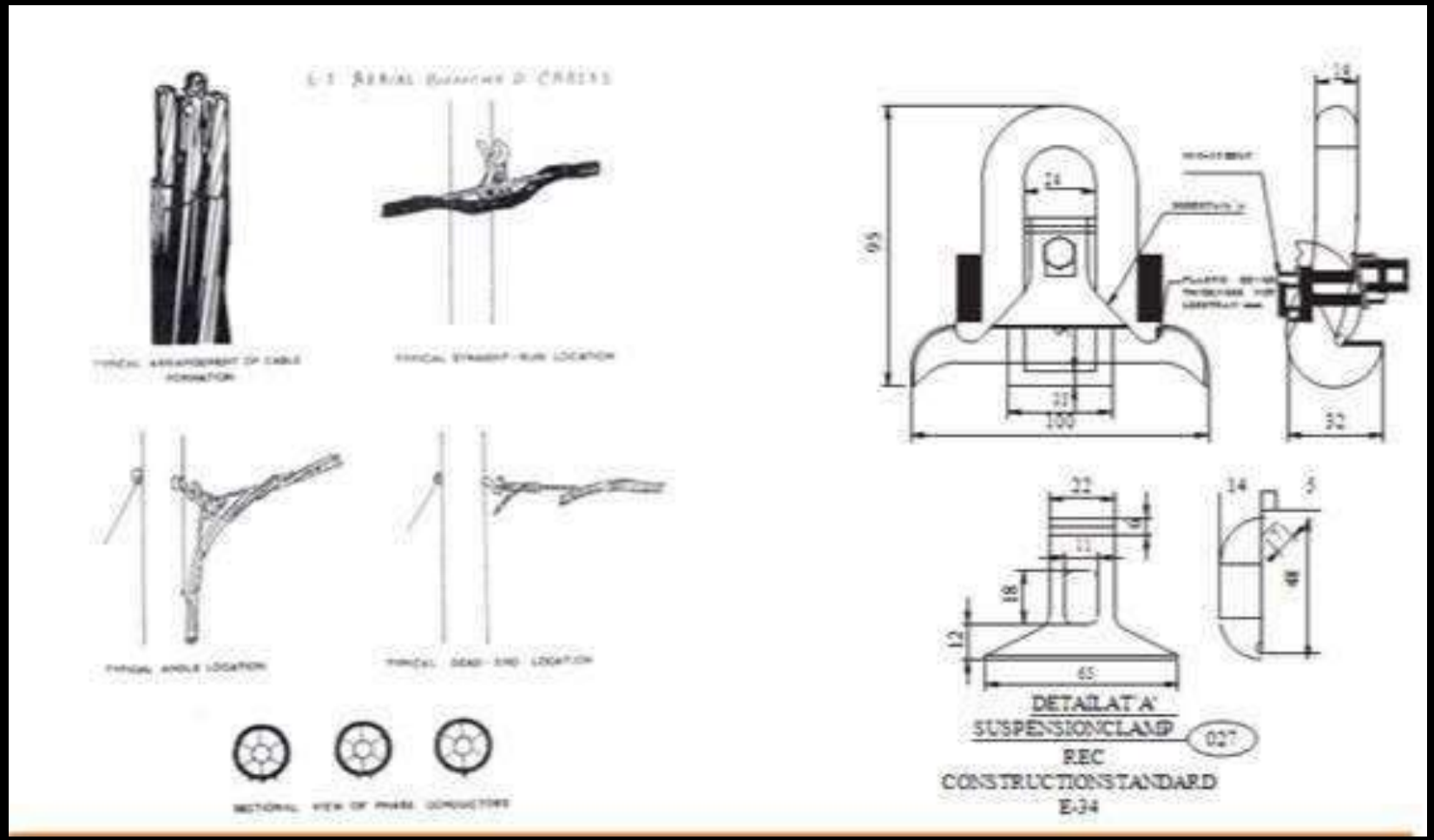
Stringing and Jointing

Stringing:

No difficulty is envisaged during stringing of Aerial Bunched Cables in the conventional method but care shall be taken that insulated conductors do not get damaged during installation. Dragging the ABC on the ground is to be avoided. Tension to be applied during stringing shall be 25% of the breaking load of the messenger wires. This will allow line to have sag within specified limit of 1.5% of the span at the lowest ambient temperature.

Jointing:

While mid-span jointing permissible for LT ABC system by conventional technique, it is recommended to joint in such a way as to bring the joints at the supports. Mid-span joining is not at all recommended in the case of HT lines. Under unavoidable circumstances, line tapping at the support points may be allowed through suitably designed clamp connectors/ PG clamps. These miconducting screen continuity shall be maintained at all joints as far as possible to avoid fluctuations during system disturbances. The 3-phase screens may be shorted and earthed through suitable non-liner surge arrestor. Attempting to make a tap off from power conductors in the region where catenaries are under tension in not recommended.


DETAIL AT A'
SUSPENSION CLAMP
027
REC
CONSTRUCTION STANDARD
E-34

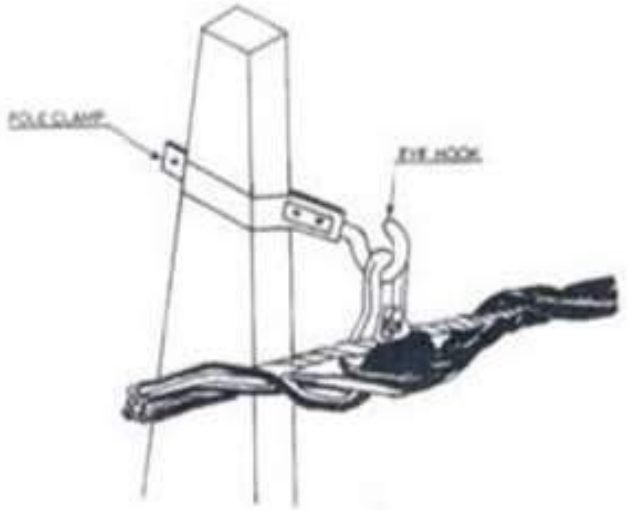


FIG. 2(a)

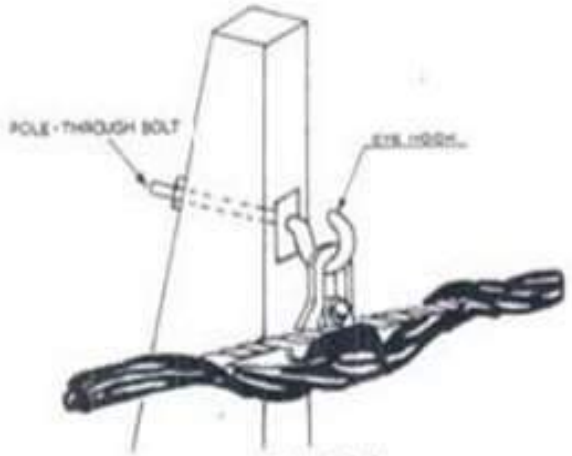


FIG. 2(b)

दो तरह के आई हुकों सहित सस्पेंशन क्लैम्प की
स्थिति चित्र 2(क) और चित्र (ख) में दर्शित

FIG. 2(a) AND 2(b) SHOWING THE SUSPENSION CLAMP
IN POSITION WITH TWO TYPES OF EYE HOOKS.

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