

FIELD OF THE INVENTION:

The present invention relates to high voltage electrical conductors, and
5 more particularly to an assembly for an insulated and covered conductor for high
voltage application.

BACKGROUND OF THE INVENTION:

Electricity is the basic rather a primary need for all human beings. With
10 increase in population the demand for electricity supply have also gone up. To
meet this increasing demand existing arrangement for transmission of current /
electricity need to be upgraded so as to sustain additional supply of voltage.
However hurdles like right of way constraints, safety issues of hutments and
nearby structures prevent this up gradation. The option of underground cabling is
15 also not feasible because of the structures along the paths prevent the digging of
trenches and laying of underground cables. Also laying of additional underground
power cables to transmit additional power through a thickly populated and
congested city area through the existing receiving stations is virtually impossible
and also hazardous. Recently human life loss was reported due to lack of safety
20 measures for high voltage cables in the crowded area of city.

The existing corridors for transmitting power through bare overhead lines
at either 66KV or 110/132KV which cannot be widened to increase the voltage to
the next higher level like up to 132KV or 220KV to approximately double the

transmitted power since building constructions and security aspects would not permit the increased corridors required for the laying cables.

The other method of resolving the problem is the substantial increase in height of the existing transmission lines and the increase in height of the cross arms. But this option is not applicable because of the site constraints and it may cause very long supply interruption. The method is also very expensive.

There is also a need of an assembly for conductors that facilitates transmission of extra high voltages without sagging of the conductors and thereby adding safety features for said transmission of extra high voltages.

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BRIEF DESCRIPTION OF DRAWINGS:

FIG. 1 is a cross sectional view of an extra high voltage insulated and covered conductor in accordance with a preferred embodiment of the present invention; and

15 FIG. 2 is a cross sectional view of a second embodiment of the extra high voltage insulated and covered conductor of FIG. 1.

DESCRIPTION OF THE DRAWINGS:

Referring to FIG. 1, an assembly (100) for extra high voltage insulated and covered conductor constructed in accordance with a preferred embodiment of the present invention is described. The assembly (100) for the extra high voltage insulated and covered conductor includes a conductor (102), a semiconductor material/conductor screen (104), an insulating layer (106), a rope/messenger

(108), a filler material (110), a sheath (112) and a tape (114). The conductor (102) is having a circular cross section that is surrounded by the semiconductor material (104). The semiconductor material (104) has an outer surface that is coated with an insulating layer (106).

5 The rope (108) is preferably positioned in close proximity with the conductor (102). The outer surface of insulating layer (106) and the rope (108) are in physical contact with each other. The rope (108) and the conductor (102) are strapped together with at least two to three layers of the tape (114) so as to form a strapped assembly. However, it is understood here that number of layers of the
10 tape (114) may vary in other alternative embodiments of the present invention. The rope (108) and conductor (102) are held together with the sheath (112). The sheath (112) is made of non tracking, non- erosive and weather resistant compound known in the art. The strapped assembly is filled with suitable filler (110) such that that the filler (110) fills a space defined between the tape (114)
15 and an inner surface of the sheath 112. The sheath (112) in this preferred embodiment forms an outer most layer of an assembly (100) to provide extra high voltage insulated and covered conductor.

 The rope (108) in this one preferred embodiment is preferably tensioned to 19,400 pounds (8.800 Kgs) which is only 20% of the breaking strength of the rope
20 108. The insulating layer (106) is having thickness of approximately 11 mm. The tape (110), in this preferred embodiment is, for example, a fiber glass tape or nylon tape. The sheath (112) in this preferred embodiment is preferably having thickness of approximately 2.5 mm which form an outer most layer of the

assembly (100). The filler (110) in this preferred embodiment is polypropylene ether (PPE) fiber.

In an alternative embodiment, the rope (108) and insulating layer (106) are helically twisted together with an adequate lay. The rope (108) and conductor (102) are held together with the sheath (112). The sheath (112) is made of non tracking, non- erosive and weather resistant compound in this alternative embodiment. The sheath (112) is applied around the rope (108) and conductor (102) by an extrusion process. Now referring to FIG. 2, another embodiment of an assembly (200) for extra high voltage insulated and covered conductor is described. The assembly (200) for the extra high voltage insulated and covered conductor includes a rope (208) and a conductor (202) that are separately strung one above the other and supported with two part clamp (210a) and (210b). The two part clamp (210a), (210b) are defined by at least two halves that are having indentations on each half to respectively accommodate the rope (208) and the conductor (202). The clamps (210a), (210b) are placed around the two at a defined separation distance and the two halves of the straps. The assembly (200) has a first sheath (212) and a second sheath (214). The first sheath (212) is applied around the conductor (202). The second sheath (214) is applied around the rope (208). The sheaths (212), (214) are preferably made of non tracking, non- erosive and weather resistant compounds. The clamp (210a) and (210b) in this embodiment is, for example, a glass reinforced polymer. The assembly (200) includes at least a pair of nut bolts (216a), (216b). The nut bolts (216a), (216b) connect the clamp

parts (210a) and (210b) in the assembled form.. In this embodiment, the bolts are preferably made of nylon material.

In the context of the present invention, the conductor (102) is preferably of 570 sq mm All Aluminum Alloy Conductor (AAAC) conductor type. The insulating layer (106) is made of cross-linked polyethylene (XLPE) type. The rope (108) is of ARAMID make of about 25 mm in diameter. The support provided by rope (108) assists in achieving the required control of the sag which would otherwise be excessive on account of the same tower to tower spacing having to be maintained. It is understood here that a stress control layer (semi conductive layer) is advantageously eliminated in the present invention and each such conductor (102) is made self supporting with the help of the rope (108).

The rope (108) is tensioned separately at the dead ends to the required tension of 8,808 Kgs and the conductor (102) is tensioned as per the requirement. The tensioning of the conductor (102) is optional, however, the tension maintained in the conductor (102), prevents it from falling on the ground. The tensioned rope (108) supports the weight of the conductor (102) respectively along with minimum sag. The rope (108) which is placed over the insulated conductor (102) can sustain temperatures up to 300°C. The rope (108) is exposed to a temperature which is a minimum of 10°C lower than that of the conductor. The tension on the rope (108) being of the order of 8,800 Kgs and remains unaffected by temperature changes or creep, the sag of the 570 sq mm, XLPE insulated, AAAC conductor is controlled to a very small value.

ADVANTAGES:

1. The extra high voltage insulated and covered conductor (102) of present invention provides transmission of high voltage current with maximum safety.
- 5 2. The conductor (102) of present invention provides with minimum sag which reduces the possibility of falling on ground.
3. The installation of the conductor (102) is done without alteration or modifications of existing structure.

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FOR RAYCHEM RPG PVT. LTD.

By their Agent



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(Girish Vijayanand Sheth)

Patent Agent No.: IN/PA 1022

KRISHNA & SAURASTRI ASSOCIATES