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अनुसंधान अभिकल्प और मानक संगठन
लखनऊ - 226011
Government of India - Ministry of Railways
Research Designs & Standards Organisation
LUCKNOW - 226011

No. ETI/OHE/CAT/Policy/12

Dated: 27.09.2012

28

The Chief Electrical Engineer,

1. Central Railway, 2nd Floor, Parcel Office Bldg., CST Mumbai-400 001
2. Eastern Railway, Fairlie Place, Kolkata - 700 001.
3. East Coast Railway, B-2, BDA Rental Colony, Chandshekharapur, Bhubaneswar 751 023 (Orissa)
4. East Central Railway, Hajipur -844 101 (Bihar).
5. Northern Railway, Baroda House, New Delhi - 110 001
6. North Central Railway, B-Block, Subedarganj, Allahabad 211 033.
7. North Eastern Railway, Gorakhpur 273 001 (UP)
8. North Western Railway, Jaipur 302 017(Rajasthan)
9. South Western Railway, DRM Office, Hubli-852 024 (Karnataka)
10. Southern Railway, Park Town, Chennai - 600 003
11. South Central Railway, Railnilayam, Secunderabad -500 371.
12. South Eastern Railway, Garden Reach, Kolkata 700 043.
13. South Eastern Central Railway, Bilaspur 495 004
14. Western Railway, Churchgate, Mumbai - 400 020.
15. West Central Railway, DRM Office, Jabalpur-482 001(MP)
16. Central Organisation for Railway Electrification, Nawab Yusuf Road, Allahabad 211 001.

Sub: Special Maintenance Instruction (SMI) for taking precautions while splicing Insulated Cadmium Copper Catenary on 25 kV A.C. Traction System.

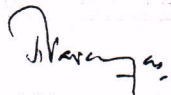
1. Insulated Cadmium Copper Catenary Cable is provided under Overline Structure to avoid flashover due to fall of foreign materials and electrocution of birds/ monkeys etc. on 25 kV A.C. Traction System. Insulated Cadmium Copper Catenary with Catenary splice is provided at both the ends of Cadmium Copper Catenary Wire as per SMI No.TI/MI/0047, Revision-0. While splicing, if proper care is not taken, it results to parting/failure of Catenary Wire.
2. Recently, there had been a case of parting of insulated Catenary Wire under ROB at Location No.329/40-42 between Srirangam - Tiruchchirappalli Town Stations of Southern Railway on 17.08.2012. The Insulated Catenary Wire was provided by Railway Electrification Organisation during initial electrification of Section on 22.03.2009.

3. Examination of failed catenary revealed that while removing the insulation over insulated catenary for splicing, it appears that 9 strands out of 12 in outer layer of catenary wire were damaged/cut. These were not noticeable as the same were covered by removed insulation sleeve and black tapping. The remaining 10 strands (3 from outer layer and 7 in inner layer) on tension got parted due to elongation and contraction cycle daily in the insulated catenary wire.

It is a case of poor workmanship due to which the copper strands of the outer layer stranded catenary wire were cut while cutting & removing the insulation from the insulated catenary wire for splicing and also used cut piece of sheath & insulation of insulated catenary and black tape on bare catenary wire.

4. Keeping above in view, SMI No.TI/MI/0047, Rev.0 for taking precautions while splicing insulated catenary wire on 25 kV A.C. Traction System under Overline Structure is enclosed herewith for information and implementation to avoid such type of failures.

Encl: As stated above.


(Hari Narayan)
For Director General (TI)

Copy to:

The Secretary (Elect.), Railway Board, Rail Bhavan, New Delhi 110 001.

Encl: As stated above.

(Hari Narayan)
For Director General (TI)

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TI/MI/0047



सत्यमेव जयते

GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS

SPECIAL MAINTENANCE INSTRUCTION (SMI)
FOR
PRECAUTIONS WHILE SPLICING INSULATED
CADMIUM COPPER CATENARY
ON 25 kV A.C TRACTION SYSTEM

SPECIAL MAINTENANCE INSTRUCTION NO.TI/MI/0047

SEPTEMBER, 2012

ISSUED BY

Traction Installation Directorate
RESEARCH DESIGNS & STANDARDS ORGANISATION,
MANAK NAGAR,
LUCKNOW-226011.

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**SPECIAL MAINTENANCE INSTRUCTION (SMI) FOR PRECAUTIONS
WHILE SPLICING INSULATED CADMIUM COPPER CATENARY ON
25 kV A.C. TRACTION SYSTEM**

1. OBJECTIVE

Insulated Cadmium- Copper Catenary Cable in place of bare Cadmium-Copper Catenary Wire is provided under overline structure to avoid flashover due to fall of foreign materials and electrocution of birds/monkeys etc. An adequate length of Insulated Cadmium Copper Catenary with Catenary splice (RI No. 1090) is provided at both ends of Cadmium-Copper Catenary Wire, as per Standard Maintenance Instruction (SMI) No. TI/MI/0036 Rev.0. While splicing, if proper care is not taken, it results to parting/ failure of Catenary Wire.

2. BACK GROUND

On 25 kV A.C. Traction System, failures of Insulated Catenary, under Overline structures are being reported. It is due to poor workmanship. While cutting & removal of sheath as well as insulation from insulated Catenary Wire, for making the provision of the splice at both ends, the copper strands of the upper layers of Stranded Catenary wire are being cut inadvertently due to poor workmanship. With the passage of time, there is an elongation & contraction cycle daily in the insulated Catenary Wire which results in parting of Insulated Catenary Wire in the long run.

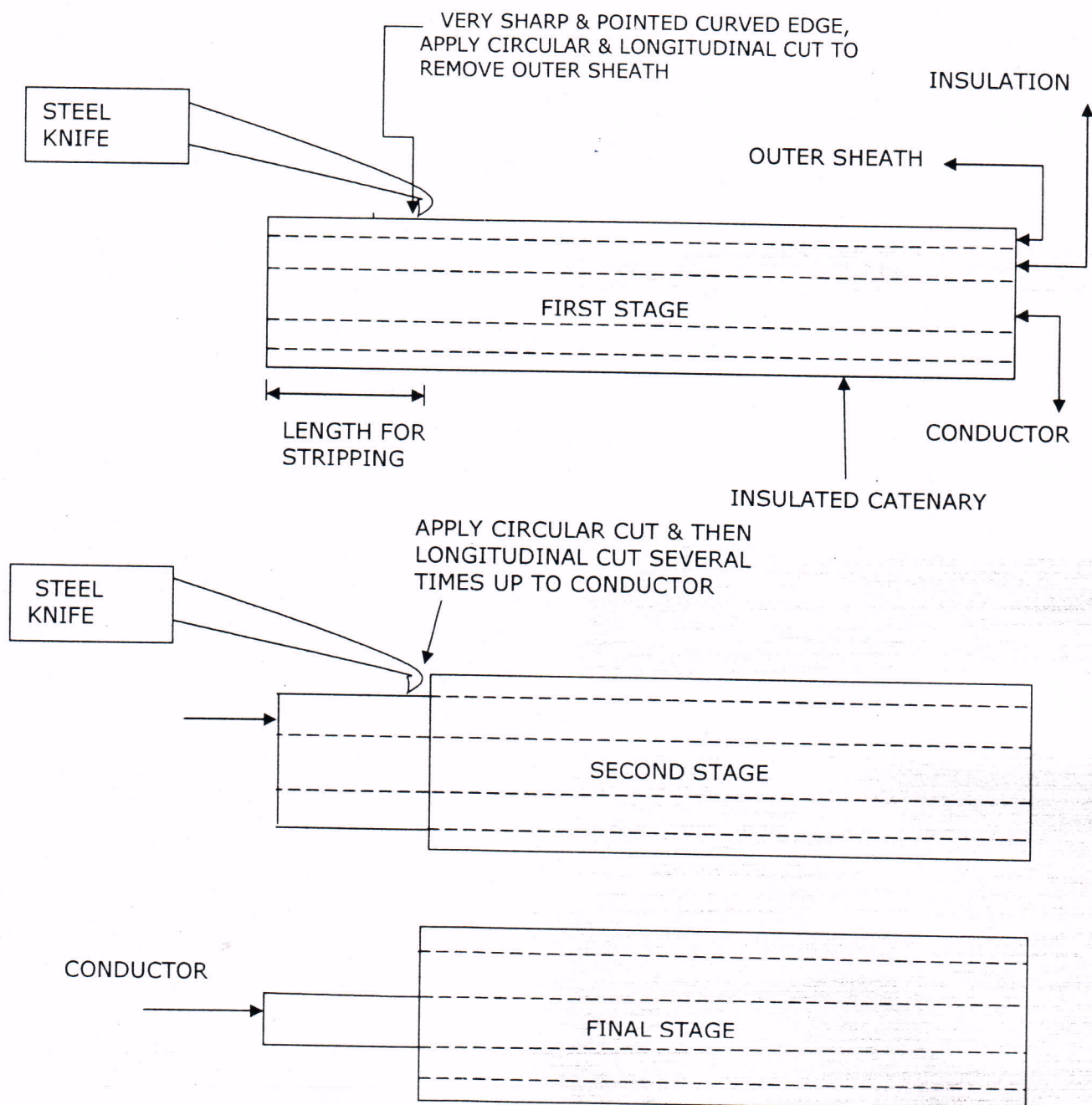
3. PROCEDURE

To make sure that the splicing of Insulated Catenary Cable is provided properly, the procedure as detailed below is to be followed. The arrangement/procedure for Stripping Sheath & Insulation of Insulated Catenary Cable is mentioned as under with sketch:

- i) Select the portion of a length properly from which outer sheath and insulation to be stripped off.
- ii) Apply a round cut over the sheath by a sharp knife. Do not use hacksaw blade for insulation and sheath cutting.
- iii) Apply longitudinal cut over the sheath from the circular cut to the end of the length. A knife with sharp curved tip is very effective for this job.
- iv) It may require to apply the longitudinal cut several times to pierce through the sheath depending upon the sharpness of the knife.
- v) After the cut, remove the sheath with ease.

- vi) Apply similar process to remove the insulation also.
- vii) Special care shall be taken while applying both circular and longitudinal cut on the insulation that the knife does not scratch the conductor. This can be avoided by leaving about 0.5 mm thickness of insulation near to the conductor without cut.

This much of insulation thickness tear off easily during removal of insulation already slitted by hand pressure.



SCHEMATIC DIAGRAM FOR STRIPPING OF SHEATH & INSULATION OF INSULATED CADMIUM-COPPER CATENARY WIRE

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Note: i) The above procedure is to be repeated for stripping of sheath and insulation at other end of insulated Catenary Cable also.

ii) Insulation of Insulated Catenary Cable is quite soft. Therefore, hacksaw machine should not be used while cutting the insulation as due to hand pressure it would either wholly or partially cut the strands of first layer of Catenary wire or will damage them resulting continuous discharge at point of cut.

4. MATERIAL SPECIFICATION

- i) The insulated Cadmium Copper Catenary Wire shall be as per RDSO Specification No. TI/SPC/OHE/INSCAT/0000 with A & C Slip No. 1
- ii) The Cadmium Copper Catenary Wire shall be as per Specification No. ETI/OHE/50(6/97) with A & C Slip No. 1 to 3 or latest.
- iii) The Catenary Splice (RI-1090) to be provided for joining the Insulated Cadmium Copper Catenary Cable and Cadmium Catenary Wire.
