

EASTERN RAILWAY

No.SG.219/9/1

Kolkata, dated 15th June 2017.

Chief Signal & Telecom Engineer/Con,
Chief Signal & Telecom Engineer/Project,
Sr.Divl.Signal & Telecom Engineer,
HWH,SDAH,ASN,MLDT, E . Rly.

Sub : CSTE's Technical Circular No.92 –
Guidelines for Maintenance free Earthing & Bonding System for
Electronic Signalling equipments.

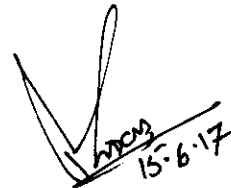
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The above subject CSTE's Technical Circular is enclosed for early implementation so as to achieve effective surge protection and prevent damage to signaling equipments and personnel.

It may please be noted that this Circular is based on RDSO specification (No.RDSO/SPN/197/2014, Version 1.0) which should be followed while executing signaling works including earthing and bonding. Proper test reports on initial earth resistance duly signed by all concerned should be preserved in register.

Sr.DSTEs of the divisions should also ensure that earth resistance is measured by using proper calibrated instruments during inspection of the supervisors and officers and recorded in register. Any deterioration in the value of earth resistance with time should be carefully monitored and suitable action should be taken to ensure that the value of earth resistance is always maintained below 1 ohm.

DA : As above.



(P.K. Das)

Chief Signal & Telecom Engineer/Plg.

EASTERN RAILWAY

TECHNICAL CIRCULAR No.92

SUB : GUIDELINES FOR MAINTENANCE FREE EARTHING AND BONDING SYSTEM FOR ELECTRONIC SIGNALLING EQUIPMENTS.

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1. Provision of good quality earthing and bonding system is a pre-requisite for effective surge protection and to prevent damage to equipment and personnel. Not only supply of material but its proper installation in field is necessary to have a good quality earthing and bonding system. Since, it is a specialized job, earthing and bonding system for signaling equipments should be as per RDSO's specification (No.RDSO/SPN/197/2014, Version 1.0) and the materials should be procured from RDSO recommended suppliers only.
2. List of recommended suppliers have been issued by RDSO for supply and installation of earthing and bonding system materials. All the earthing works should be executed by the recommended firm directly or in case executed by the works contractor by taking material from the recommended suppliers, the authorized representative of the OEM shall supervise each installation and certify that the installation is complying with the requirements of the specification.
3. The resistance to earth of an electrode depends upon the electrical resistivity of the soil. The soil resistivity, in turn, is affected by the moisture content of the soil, by its chemical composition and concentration of salts. Approximately 90% of the resistance between a driven rod and earth lies within a radius of 2 mtrs. from the rod. Hence, in order to achieve overall low resistance to earth of an earthing arrangement, artificial treatment of soil immediately surrounding the earth electrode is necessary to reduce the resistivity of the soil. In order to achieve this, use of earth enhancement material surrounding the earth electrode has been specified in RDSO/SPN/197/2014. It is reiterated that RDSO specification specifies use of 30-35Kg. earth enhancement material per earth pit for this purpose.
4. Minimum precautions to be taken during execution of earthing work are appended below :-
 - i) Typical installation of earth pit for S&T installation Drg.No. SDO/RDSO/E&B001, which is attached with RDSO/SPN/197/2014, Version 1.0, should be strictly followed (copy enclosed).
 - ii) All the materials should be procured as per RDSO/SPN/197/2014,Version-1.0 duly inspected by RDSO.
 - iii) Site location for earthing :-
 - a) Low lying areas close to the building are good for locating earth electrode.
 - b) Dry sand, lime stone, granite and any stony ground should be avoided.
 - c) Earth electrode should not be installed on high bank or made up soil.

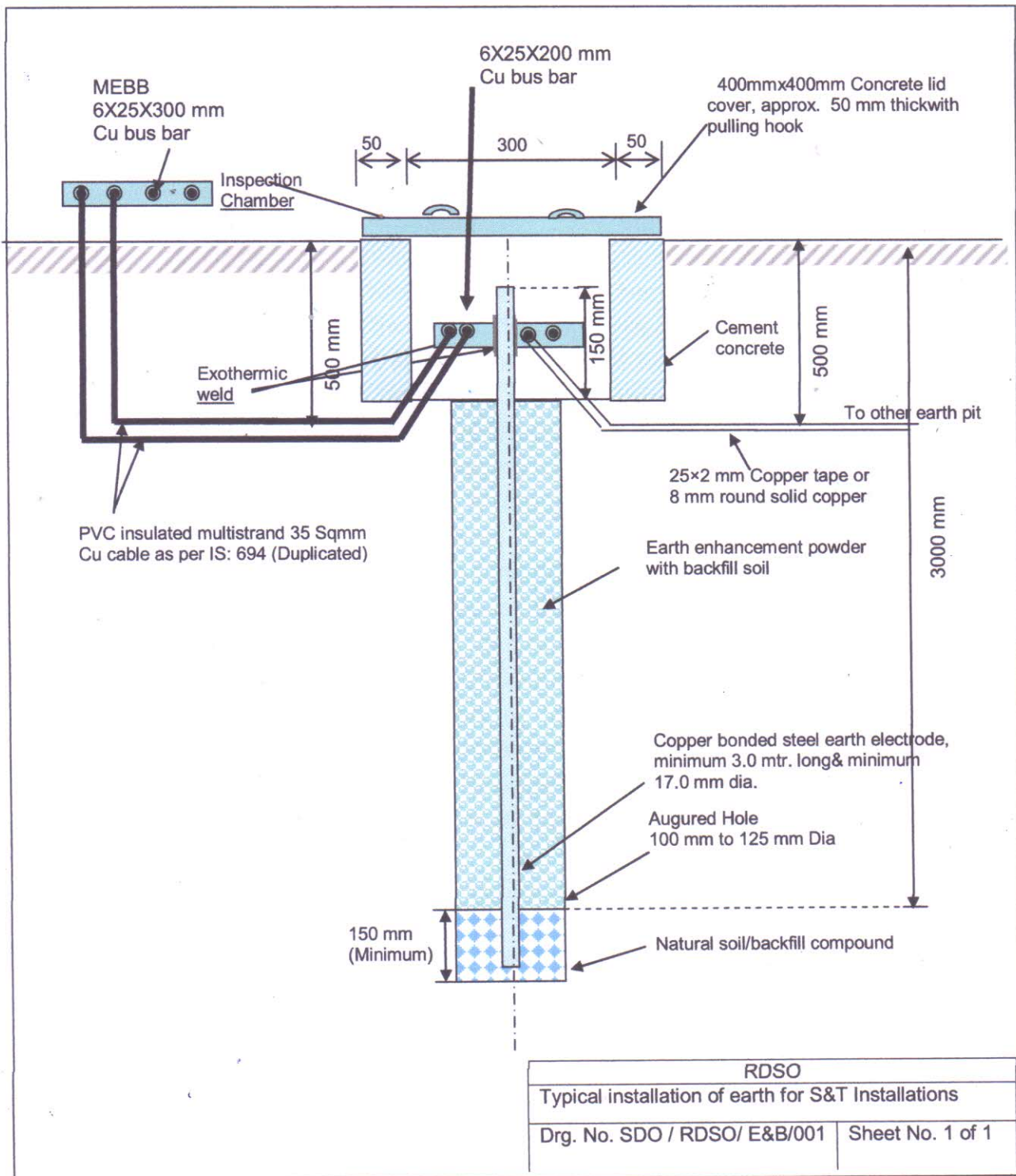
- iv) The copper coating on earth electrode should not be cracked due to damage during storage/transport and should be free from corrosion.
 - v) The packing bags of earth enhancement compound should be in sealed condition.
 - vi) For the earth pit, a hole of 100 – 125 mm diameter should be augured to a depth of 3.0 mtrs. (approx) and the earth electrode is placed in the hole with about 150 mm of bottom part inserted in natural soil.
 - vii) Earth enhancement material (minimum 30 - 35 Kg.) shall be filled into the augured hole in slurry form such that it spreads evenly around the electrode covering entire length of the hole.
 - viii) In order to achieve earth resistance of less than 1 ohm, multiple earth pits should be provided depending upon soil resistivity. However, earth resistance of every earth pit should be carefully measured and recorded prior to action for provision of multiple earth pit.
 - ix) The distance between two earth electrodes shall be minimum 3 mtrs. and maximum upto 6 mtrs.
 - x) The 25 x 2 mm copper strip interconnecting the earth electrodes shall be buried at a depth not less than 500 mm below ground level and this copper strip should also be covered with earth enhancement compound.
 - xi) Proper size of cable should be used for connection of equipments to equipotential bus bar, SPDs to equipotential bus bar, equipotential bus bar to earth electrode as indicated in the RDSO's specification.
 - xii) The length of cable connection between SPDs and equipotential bus bar and between equipments and equipotential bus bar should be as short and as direct as possible and preferably without bends.
 - xiii) Authorised representative of the RDSO recommended supplier should supervise each installation and certify that the installation is complying with the requirements of this specification.
5. Adequate precautions should be taken for exothermic welding connections for earthing and bonding system as per RDSO's specification and this work should be carried out only by well trained staff of the supplier.
 6. The details of earth resistance measured at the time of installation and afterwards at every station should be maintained in a Register and any deterioration in the value of earth resistance with time should be carefully monitored and suitable action should be taken so as to ensure that the value of earth resistance is always maintained below 1 ohm.

A. K. Halder
CSTE 15.6.17

Eastern Railway

Docket No.SG.219/9/1

Kolkata, dated 15th June 2017.



Prepared by: SSE/Signal	Checked by: DD/Signal	Issued by: .Dir/Signal
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