

दूरसंचार केबिल विद्यमान हेतु निर्देश INSTRUCTIONS ON LAYING OF TELECOM CABLE



CAMTECH/S/PROJ/13-14/PAM/CABLE/SP-6
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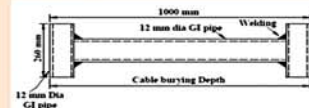


Person Contact
Director (S&T)

Indian Railways Centre for Advanced Maintenance Technology
Maharajpur, Gwalior - 474 005
Email: dirsmcamtech@gmail.com

- ◆ No new OFC/quad cable shall be laid close to existing track. It shall be laid close to Railway boundary as per extant instructions i.e. one meter from the Railway boundary to the extent possible to avoid any interference with future works.
- ◆ Before laying the cable route plan shall be got approved from the engineering department to avoid possible damages in future.
- ◆ The works of excavating trench and laying of cable should be proceed in quick succession, leaving a minimum time between the two activities.
- ◆ The cable will be generally buried underground in a trench of 0.3 metre width and depth of 0.8 metres. (As per drawing no. RDSO/TC:35007) If more than one cable is to be laid in the same trench the width can be increased up to 0.5 metre.
- ◆ When signalling and telecommunication cables are laid in the same trench, a distance of about 100 mm is to be maintained between them by placing bricks between them, at intervals of two metres. HT and LT power cables and telecommunication cables shall not be laid in the same trench.
- ◆ Position of cable joints shall be marked on the nearest OHE mast by painting of an approved legend.
- ◆ In the vicinity of traction sub-stations, the cable shall be laid at least one metre away from any metallic body of the sub-stations, which is fixed in the ground, and at least one metre away from the sub-station earthing. The cables shall, further, be laid in concrete pipes or enclosed brick channels for a length of 300 meter on either side of the sub-station. As far as possible, the cable should be laid on the side of the track opposite the sub-station side.
- ◆ The cable laid parallel to the track shall normally be buried at the depth of 0.8 meter while those laid across the track must be one metre below the rail flanges.
- ◆ While laying, the cables shall not be subjected to sharp bends. The bending radius for the cable shall in no case

- be less than 20 times the diameter of the cable in case of lead sheathed. Exact minimum bending radii for specific cables can be found in the information sheets of the cable manufacturer.
- ◆ Cables for delivery as well as cut cables must generally be protected against moisture penetration. This best occurs through the use of shrink caps with fusible glue. Loose-fitting caps or temporary measures with plastic adhesive tape are not watertight and are unsuitable.
- ◆ Before laying all fibres shall be tested with OTDR. The cable laying is avoided if any event or break is observed.
- ◆ The depth of the trench may be measured by a rule made of pipes as per drawing No. RDSO/TCDO/COP-11 given below:



- ◆ If the surface of the ground where the trench is dug is slanting or uneven, the depth shall be measured with respect to lower edge.
- ◆ Excavation of trench can also be done mechanically by loader backhoe (Escort 710X or similar) equipped with excavating bucket, cleaning bucket, back filling blade and lifting tackle.



- ◆ After digging to specified depth, the bottom shall be levelled by removing the exposed stones or obstacles etc.
 - ◆ Cable shall normally be payed-out by hand. When using winch, tension should be monitored by a tension meter.
 - ◆ For effective and safe cable laying, communication may be provided using portable VHF sets between Cable drum end, Any intermediate manhole/ diversion/track crossing through which the cable will be drawn, The winch/truck operator & incharge of cable laying.
 - ◆ All necessary tools are to be checked before starting the cable laying.
 - ◆ During cable laying care must be taken not to twist cable in any direction. For this purpose, the survival (Rotating hook) shall be attached between pulling line and pulling eye at the end of cable so as to avoid any possible twist during pulling and laying of the cable.
 - ◆ Whenever cable is to be laid in the duct (HDPE pipe or RCC pipe), suitable lubricant on cable may be used to reduce friction and consequently the tension on the cable.
 - ◆ In station yards where the cable is to be laid in zig-zag route it is essential to use cable drums of smaller length.
 - ◆ Split RCC pipes may be use near overhead sub-stations.
- Preparation for Paying out cable**
- ◆ Place the cable jack to support the cable drum on a flat surface.
 - ◆ Put spindle through cable drum and adjust cable jacks so that the drum may be clear 3-5 cm from the ground and the spindle may become horizontal. Remove lags of drum carefully with bar or other means to prevent damage to the cable.
 - ◆ Pullout nails from legs or bend them for safe operation.
 - ◆ Normally both end of the cable is provided with cable grip and pulling eye. In case, it is not already provided, fit the cable grip/pulling eye to the survival and pull the wires by means of shackle.

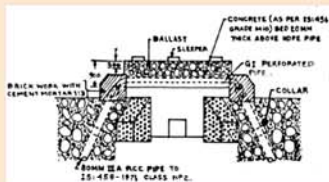
- ◆ Ensure that the cable should not get kinked while laying in trench or in ground
- ◆ Site should have wireless, flag etc for proper communication.
- ◆ While bending/rolling the cable, the bending radius should not be less than 200mm.
- ◆ Attenuation and splice loss should be measured with OTDR.

After laying OFC cable

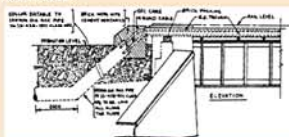
- ◆ In case cable is damaged, take necessary preventive and remedial steps for removal of defects.
- ◆ While laying one piece of cable, when the work is to be put off till the following day, keep the remaining portion of the cable wound on the drum. Reduce as much as possible the distance of the drum from already laid cable considering cable bending radius and general traffic safety. Ensure that drum is prevented from tumbling down or rolling away. Already laid cable shall be fully covered to avoid outside interference.

Cable markers

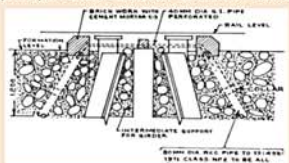
- ◆ The cable markers are normally be provided at the distance of every 50 meters on the cable route and also at places or corner wherever the route of the cable changes. Joint indicators are provided at all types of cable joints.
- ◆ Protection of cable crossing culverts with high flood level shall as per RDSO/TCDO/COP-17 as shown below:



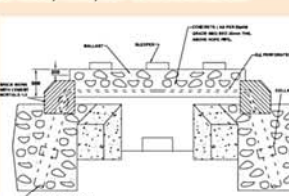
- ◆ GI perforated pipe shall be laid near parapet wall.
- ◆ Drawing of crossing major culverts (high flood level and normally blocked by water) and major bridges by steel troughs at rail level as per RDSO/TCDO/COP-14 is shown below:



- ◆ Drawing of crossing of railway bridges by perforated GI pipe as per RDSO/TCDO/COP-15 is shown below:



- ◆ Drawing of crossing culverts/box with low flood level as per RDSO/TCDO/COP-16 is shown below:



Measure against theft of steel troughs

- ◆ As per drawing RDSO/TCDO/COP-12, steel troughs are to be provided on the channels for major culverts and bridges.
- ◆ In order prevent theft of OFC steel troughs with optic fibre cable should be filled up by bitumen compound. The cover of the trough to be effectively secured.
- ◆ Bitumen filling job should be supervised by SSE.
- ◆ In order that the temperature of the cable does not increase beyond 55 C, bitumen compound should be poured in the early hours/late hours of day when the ambient temperature is around 18 C or less.
- ◆ While pouring the heated bitumen compound, steel trough covers should be removed throughout the bridge to permit fast cooling.
- ◆ Before pouring bitumen compound its temperature should be accurately measured to ensure that the pouring temperature is not more than 140 C.
- ◆ The bitumen compound should be filled up to a height of approximate 60-mm.

Arrangement across culverts

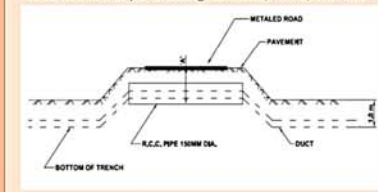
- ◆ Most of the culverts are generally dry and as such the arrangement as shown in RDSO/TCDO/COP-16 can be adopted.
- ◆ For culverts which are normally filled with water or which are having high flood level, the protection arrangement as shown in RDSO/TCDO/COP-17 can be adopted.

Arrangement for laying of OFC across girder bridges

- ◆ Girder bridges upto span length of 12 meter
- ◆ Girder bridges of upto 6 meter span can crossed with perforated GI pipe as shown in RDSO/TCDO/COP-15.
- ◆ The same arrangement can be followed for girder bridges of span length between 6 to 12 meter where an intermediate support to GI pipe can be provided.
- ◆ Girder bridges of span length more than 12 m.
- ◆ The crossing of girder bridges of more than 12meters length can be done as shown in No. RDSO/TCDO/COP-14.
- ◆ Separate trough for laying 4 quad cable should be used.

Cable crossing tracks and level crossing gates

- ◆ In such cases the cable shall be laid in HDPE pipe keeping the depth same as in normal routes.
- ◆ In case of cable crossing the LC gates, HDPE pipe may be laid on the road and for a distance of at least 2 meters from the either side of the road.
- ◆ Minimum depth at any track crossing shall not be less than 1.0 meter with RCC/Steel / HDPE pipe. In case of cable crossing the track, it may be ensure that cable should not be bent less than 600 mm radius. Suitable fixture with HDPE pipe should be provided to ensure the proper binding radius to be used at each end.
- ◆ Arrangement of RCC pipe under metal road is shown below as per drawing no. RDSO/TCDO/COP-20.



Back filling of trenches

- ◆ At least 120 mm from the surface of the last cable, cable should be covered with riddled earth. This portion of the of the earth should be rammed properly so that the earth is not loose. This will also prevent entry of rodents and other insects.
- ◆ For the remaining portion of the trenches, the released earth may be used. However, after filling up the trench, the earth shall be consolidated by ramming.
- ◆ Re-filling of trench and ramming shall be supervised by a responsible supervisor and also at officer level for the specified percentage of the section.
- ◆ It shall be ensured that before the start of monsoon session, all open trenches are properly back filled to avoid water logging of the trench.

गुणवत्ता नीति

रेल में यात्री और माल यातायात की बढ़ती मांग को पूरा करने के लिए गुणवत्ता प्रबंध प्रणाली में अनुसंधान, डिजाइनों और मानकों में उत्कृष्टता तथा सर्वोत्तम सुधारों के माध्यम से सांख्यिक और नियामक अपेक्षाओं को पूरा करते हुए सुरक्षित, आधुनिक और किफायती रेल प्रौद्योगिकी का विकास करना।

QUALITY POLICY

To develop safe, modern and cost effective Railway technology complying with Statutory and Regulatory requirements, through excellence in Research, Designs & Standards and Continual improvements in Quality Management System to cater to growing demand of passenger and freight traffic on the Railways.

गमरा उद्देश्य

अनुसंधान प्रौद्योगिकी और कार्यप्रणाली को उत्कृष्ट बनाना तथा उद्यमकता और रेलों की परिसम्पत्ति एवं जनसंचार के विकास में सुधार करना जिससे अन्तर्विषयों में विश्वसनीयता, उपयोजिता और दक्षता प्राप्त की जा सके।

OUR OBJECTIVE

To upgrade Maintenance Technologies and Methodologies and achieve improvement in Productivity and Performance of all Railway assets and manpower which inter-alia would cover Reliability, Availability and Utilisation.

If you have any suggestion & any specific comments, please write to us.

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It is clarified that information given in this pamphlet does not supersede any existing provision laid down in "Signal Engineering Manual", Railway Board publications and RDSO publications. This document is not statutory and instructions given in it are for the purpose of guidance only. If at any point contradiction is observed, then SEM, Railway Board and RDSO guidelines or Zonal Rly. instructions shall be followed