

**Special Technical Criteria for Electrical work**  
**(For less than 50 Lakh)**

The Bidder Should have valid Electrical Contractor License issued by Govt. or in case the bidder intends to execute complete electrical portion through subletting then the concerned subcontractor or executing agency from which the electrical work is to be executed should have valid Electrical Contractor License issued by Govt. If valid (as on date of opening of tender) Electrical Contractor License is not submitted along with Bid then the offer will be summarily rejected.

**Special conditions pertaining to Electrical portion of work**

- 1 The contractor shall take all safety aspects into consideration & will be responsible if accident occurred and the liability arising out will be contractor's account.
- 2 Railway will provide all sites for erections.
- 3 The work shall be supervised by Sr. DEE (G) or his authorized representative.
- 4 Released materials should be handed over to Railway with joint receipt note if any.
- 5 The contractor shall carry out the electrical work as per IE rules and regulation and specification, Relevant IS specification wherever applicant shall be followed.
- 6 The tenderer must fulfill all the legal and statutory requirements prescribed by central or state government from time to time applicable to the contract.
- 7 One railway Electrical Technician / assistant will be deputed time to time for shut down, Jumpering etc. Site in-charge will ensure proper shutdown procedure.
- 8 The tenders shall be evaluated on total offer i.e. combined offer of Civil Work & Electrical Work.
- 9 The execution of electrical work will be under the supervision of Electrical Department and the measurement for the same shall be approved separately by Electrical dept.
- 10 The final payment will be released by the Engineering Department only after receiving NOC from the electrical department for satisfactory completion of Electrical work.

## **SPECIAL TERMS & CONDITIONS OF CONTRACT**

- 1** The Bidder should have valid Electrical Contractor License issued by Govt. or in case the bidder intends to execute complete electrical portion through subletting then the concerned subcontractor or executing agency from which the electrical work is to be executed should have valid Electrical Contractor License issued by Govt. If valid (as on date of opening of tender) Electrical Contractor License is not submitted along with Bid then the offer will be summarily rejected.
- 2** The schedule of rates and quantities enclosed should be read in conjunction with the explanatory notes given in the tender papers.
- 3** Contractor shall offer all reasonable facilities to the authorized representatives of the Railway for various inspections and testing and submit test report jointly signed by the firm and Electrical Supervisor of Railway.
- 4** Water / electricity / transport shall be arranged by the Contractor at his own cost. The Purchaser shall not provide the same under any circumstances. The site for depot / workshop can be provided temporarily to the Contractor on his request.
- 5** The Contractor shall arrange at his own cost, all tools & plants, facilities required for erection, testing and commissioning of all the equipment in compliance with the respective tender specifications.
- 6** During the course of execution of above work electrical fitting, fixtures, wirings etc. needs to be removed and dismantled, shall be done by the contractor and released material shall be transported to store / scrap depot by the contractor for that no extra payment will be done. Any temporary bypass arrangement for continuity of supply if required shall also be done by the contractor under guidance of consignee.
- 7** The work has to be carried out in Railway premises, so every precaution and safety rules shall be taken & followed by firm/contractor to protect their labours, Railway employees, passengers, materials, and structures etc. as per Section-V Safety Precautions (attached).
- 8** The work shall be carried out as per the Indian Code of Practice for electrical wiring and fitting in the building.
- 9** All materials used shall comply with the latest IS/IEC Specification.
- 10** The staff deployed at work site should have proper and adequate tools & tackles & M&Ps to execute the work.
- 11** The contractor has to adopt all required safety measures & IE Rule during the execution of the work.
- 12** The electrical work shall be carried out in accordance with the approved standard of general electrical work in central government buildings.

- 13 The electrical work shall be carried out without interruption of the power supply for carrying out of work, if any power blocks are required, it will be restricted to shortest period as authorized by Sr. Divisional Electrical Engineer or representative authorized by them.
- 14 After completion of Electrical work the contractor will undertake the Civil Engg. Work to repatch the wall plaster and fill up the recesses etc. in the wall occurred during dismantling of old wiring and rewiring/fitting of the same.
- 15 Released material: - All the released material such cables, fittings etc. dismantled by the contractor shall be deposited by him in the office/store of concern depot.
- 16 The work shall be carried out strictly as per latest Indian Electricity Rules.
- 17 The work shall be carried out in best workman like manner and any defect in the work of changes in the design etc. as pointed out by Inspecting authority shall be carried out by the contractor within quoted rates.
- 18 In case of any dispute regarding the lay out and any other electrical technical matter, the decision of Sr. Divisional Electrical Engineer will be final and binding on the contractors.
- 19 Any sample, if necessary, may be sent by Railway's representative to manufacturer/test house for ascertaining originality/parameters as per specifications and cost of test shall be borne by the contractor.
- 20 If any minor alterations are found necessary the contractor will do the same within the quoted rates.
- 21 Connection of earth electrode with earth continuity conductor must be properly secured by providing washer/spring washer of suitable size with nut and bolts (4"x1/2" hexagonal head).
- 22 Grommet & Cable alley: - All the cables and wiring shall be with proper cable alley and grommets etc.
- 23 Warranty: The LED luminaire supply shall be covered by a warranty of 60 months from the date of commissioning or 72 months from the date of supply, whichever is earlier.
- 24 **Price Variation** - Price variation clause shall not be applicable for this tender.

## TECHNICAL SPECIFICATION AND OTHER CONDITIONS

- 1.0 Name of work:-** Electrical work in c/w Replacement of old dilapidated type-I & II quarters with Type-II for railway Engg, S&T and operating staff in the jurisdiction of ADEN HMM-II (Type-II 14 unit).
- 2.0 Inspection of material**
  - 2.1** All material shall be procured from RDSO / CORE approved vendors wherever approved sources are available / should be ISI marked of reputed brand and as per technical specifications given in tender document.
  - 2.2** All the equipment, material, fittings etc. shall be subjected to inspection by RDSO / RITES / Railways. The inspection authority (RDSO / RITES / Railways) will be nominated by Sr. DEE (G), normally in accordance with Rly. Bd. letter no. 2000/RS(G)/379/2 dt. 06.09.2017 (Pre-inspection of material by RITES/RDSO – Minimum value of Stores). However, in the event of exigencies, Railway reserves the right to change the inspecting authority from RITES / RDSO to Consignee / Railway representative.
  - 2.3** The contractor will seek nomination of inspecting authority & inspection site from Sr.DEE(G) duly submitting the details of order given to concern vendor.
  - 2.4** RITES / RDSO inspection charges shall be borne by the Railways. However, the process of applying for inspection on online portal of inspecting agency shall be done by firm.
  - 2.5** Inspection of material may be done at manufacturer's premises / manufacturer's test facilities / Contractor's Depot / work site as decided by Sr.DEE(G).
  - 2.6** Contractor shall provide at his own cost all necessary assistance, T&P and bear the cost for carrying out testing of material at nominated location as per requirement
  - 2.7** Any sample, if necessary, may be sent by Railway's representative to manufacturer/test house for ascertaining originality/parameters as per specifications and cost of test shall be borne by the contractor
  - 2.8** The firm shall submit list of items along with make, model, tech specs with catalogue for approval in the office of Sr.DEE/G/BKN. For any items decided by Railways, sealed samples shall have to be submitted by firm to site engineer and it will be approved from ADEE/DEE/Sr.DEE/G/BKN.
  - 2.9** Pre commissioning test if needed on various equipment may be carried out jointly by the contractor
- 3.0 Progress and time of completion**
  - 3.1** The work will commence immediately after receipt of the detail acceptance letter and currency of contract is **(As per Engg work)** from the date of issue of advance acceptance letter.
  - 3.2** The agreement is to be signed within SEVEN DAYS after receipt of detailed acceptance letter.
- 4.0 Completion Test**

On completion of installation, the following tests confirming to the relevant I.S. specification & I.E. Rules shall be carried out.

  - a) Insulation resistance test.
  - b) Polarity test of switches.
  - c) Earth continuity test.
  - d) Earth resistance test.
- 5.0** If any damage is caused to the coach / railway structure as result of execution of electrical work, it shall be the responsibility of the contractor to repair/make good the loss promptly at his own cost to the entire satisfaction of the Electrical Engineer/Supervisor In charge.
- 6.0** All the waste material shall have to be removed on the same day after execution of work, by the contractor.
- 7.0** All the rejected material should be removed from the site immediately by the contractor.
- 8.0** No part of work shall be got executed from any alternative Agency.
- 9.0** Bad workman ship pointed out by the Sr. Divisional Electrical Engineer In charge or his representative shall be rectified by the contractor at his own cost.
- 10.0** The contractor shall sign the site order.
- 11.0 Nomenclature of Equipment/Material**
  - 11.1** Switches, socket, batten holder, ceiling rose, flush type fan regulator etc. electrical accessories should be ISI marked of reputed make with brass or superior metal terminals.

- 11.2 Hard wood plug : These shall be of well-seasoned of size not less than 50 mm long, 25 mm square on the inner 20 mm square on the outer end. PVC gitti of suitable size may be used if required.
- 11.3 All the wooden screws shall be flat hard duly counter shunk and electroplated.
- 11.4 Ceiling Rose: This shall be 3 plate 5/6 Amp. 250 volt, ISI marked.
- 11.5 Connection to ceiling fans : For giving connection to ceiling fans, twisted twin PVC insulated copper conductor flexible cords minimum size 16/0.2 mm shall be used which shall hanged from ceiling rose to points connection on ceiling fans body.
- 11.6 5/15 Amp. Sockets piano type ISI marked.
- 11.7 Top cover on MS board shall be sunmica 3 mm thick.
- 11.8 The wires for concealed wiring shall be ISI marked.
- 11.9 Switch piano type one way, 5/6/15 Amp. 250 volts, ISI marked.

## **12.0 Inspection**

After completion of work, the same shall be inspected by the Sr. Divisional Electrical Engineer, or his representative for the quality, and completion of the work.

## **13.1 SPECIFICATION OF Miniature Circuit Breakers (MCB)**

- The MCB shall comply to IS:8828/IEC 60898.
- The MCB housing shall have unique property of di-electric strength, arc resistance, insulation, flame retardancy and temperature resistance.
- The MCB shall have Minimum Breaking Capacity of 10kA as per IS/IEC 60898.
- The MCB shall be of Minimum Energy Limiting of Class 3.
- The MCB shall have Trip free mechanism.
- The MCB shall have Dual Termination on both sides.
- The MCB shall have True contact position indicator.
- The MCB shall have rated impulse voltage of minimum 4kV.
- The MCB shall have electrical life of 20,000 electrical operating cycles (up to 32A) and 10,000 operating cycles (40A-63A).

## **13.2 SPN MCB DISTRIBUTION BOARD**

- Supply, Fixing SPN MCB Distribution Board Double Door.
- The DBs should have IK- 09, IP 43(double door) for indoor application and IP 54 for outdoor application.
- The DB shall have good quality gasket to provide IP 43 and IP 54 protection.
- Incoming double pole isolator/RCCB and provision of up to 8/12 nos. SP MCB 's ( 6-32 Amp ) in outgoing as required.
- DB should have provision of 40 /63 Amp MCB. It should be sheet steel powder coated fitted with bus bar, neutral link, earth bar & din rail confirming to IS : 8623.

## **14.0 Multistrand Copper Cable**

It should be of voltage grade 1.1 kV conforming to IS: 694-1990 with **FR PVC compound insulation** and electrolytic grade, bright plain annealed copper conductor as per IS: 8130-1984.

## **15.0 Wiring**

No joint in wiring is allowed. Earth wire of 1.5 sqmm PVC insulated & unsheathed multistrand copper cable is to be run in the wiring.

## **16.0 ELECTRICAL WIRING**

Supply of material and wiring of LP/TP/FP/Ex-Fan point wiring shall be done by 3 x 1.5 Sqmm multi stranded copper flexible PVC insulated ISI marked Copper wire 1100 volts grade wire, confirming to relevant IS specifications and make of reference list shall be used for point wiring wire /switches for phase, neutral and earth shall be laid / done in concealed with heavy duty ISI marked PVC Conduit pipe, minimum 19/20 mm dia and thickness 1.5 mm along with bend / junction, inside PVC duct/ conduit as per instruction of site Engineer. One-way piano type modular switch type 5/6A and good quality ceiling rose. Switches shall be provided on phase wire. The entire M.S. box shall have modular plate for switches and 05 Amp. modular plug with required modular design groove cutting for fixing of switches / sockets etc. The wiring shall be done in such fashion that minimum conduit pipes run inside the room as far as possible. Piano type switches, 05amp. Modular Sockets, ceiling rose, batten holder etc. shall be of reference list. The contactor shall dismantle old wiring completely in case it is replaced with new wiring. Samples of all wiring items shall be got approved from Railway before installation. The copper wire used for earthing purpose shall not be less than wire used for wiring. Wire shall be ISI marked confirming to relevant IS specifications and make of reference list shall be used. The sub wiring shall be done in such fashion that minimum conduit pipes run inside the room as far as possible. The contactor shall dismantle existing /old wiring completely in case it is replaced with new wiring.

The circuit wiring in is to be done by 3 x 1.5 sqmm insulated multi-strand copper wire for phase, neutral and earth inside PVC duct/ conduit 19/20 mm as per instruction of site Engineer. The PVC conduit shall be properly fixed with the help of MS clamps /rawal plugs as per the instructions of site Engineer. The contractor will be responsible for proper plastering and distempering / fixing of tiles to restore the original finish of wall such that it matches with original surface and colour of wall on which conduit pipe has been laid. There should be no loose connections and joints in the wiring circuit. Bends or flexible conduits should be used as per the site requirement. The wiring should be in well dressed up manner.

Any discrepancy occurred in engineering work during the wiring should be restored in the original condition by the contractor, at his own cost. All metallic parts, fittings etc. shall be connected to the earth wire.

### **17.0 5/6 Amp MOULAR SOCKET**

Supply and fixing 5/6A socket 3-pin 230V or above modular type switch socket on existing board and connection with suitable PVC CU cable. A switch for controlling power supply of plug shall be connect in phase wire and earth wire size shall be same size of wiring to flow maximum fault current.

### **18.0 15/16 Amp MOULAR POWER SOCKET**

Supply and fixing modular type 15/16A socket 6 -pin power plug 230V or above and switch modular type with metal box concealed in wall and connection with suitable PVC CU cable. A switch for controlling power supply of plug shall be connect in phase wire and earth wire size shall be same size of wiring to flow maximum fault current.

### **19.0 FAN REGULATOR**

Supply and providing modular type electronic fan regulator 4-step or more suitable for BLDC fan on existing board and connection as per Railway requirement.

### **20.0 FIXING OF CEILING FAN/TL Fitting**

The ceiling fan/TL Fitting shall be fixed and commissioned and connected with cord flexible three core copper wire in PVC flexible conduit pipe properly any discrepancy occurred in engineering work during the fixing of the ceiling should be restored in the original condition by contractor at his own cost.

### **21.0 Metal Box**

Supply and fixing 2/4/6/8/12 module modular plates for fixing of switches and sheet metal box of good quality concealed fixing of MS box.

## 22.0 Wiring of SUB-MAINS

Wiring of sub-main with single core insulated, multi-stranded 3 x 2.5/4/6 Sqmm flexible PVC insulated ISI marked Copper wire 1100 volts grade wire for phase, neutral and earth shall be laid / done in concealed with heavy duty ISI marked PVC Conduit pipe, minimum 25 mm dia and thickness 1.5 mm along with bend / junction, inside PVC duct/ conduit 25 mm as per instruction of site Engineer. Wire shall be ISI marked confirming to relevant IS specifications and make of reference list shall be used. The sub wiring shall be done in such fashion that minimum conduit pipes run inside the room as far as possible. The contactor shall dismantle existing /old wiring completely in case it is replaced with new wiring. Samples of all wiring items shall be got approved from Railway before installation. The copper wire used for earthing purpose shall not be less than wire used for phase wiring. There should be no loose connections and joints in the wiring circuit. The PVC conduit shall be properly fixed with the help of MS clamps/rawl plugs as per the instructions of site Engineer. The contractor will be responsible for proper plastering and distempering / fixing of tiles to restore the original finish of wall such that it matches with original surface and color of wall on which conduit pipe has been laid. Bends or flexible conduits should be used as per the site requirement. The wiring should be in well dressed up manner. Any discrepancy occurred in engineering work during the wiring should be restored in the original condition by the contractor, at his own cost. All metallic parts, fittings etc. shall be connected to the earth wire.

**23.0 12 way double door SPN DB** having suitable IP and IK protection for indoor installation having one No. RCBO of 40A Capacity, Sensitivity 30mA in the incoming & having 3Nos. 16A SP MCB & 3Nos. 32A SP MCB all MCB used should be of 'C' series – 10 kA having 35 Sq.mm incoming and outgoing terminal capacity, insulated sliding shutters at terminals for safety, two position DIN rail clamps & ISI marked (conforming to Legrand Cat. No.603234 & 603237 or similar).

## 24.0 Laying of HDPE Pipe

It involves laying of HDPE pipe minimum at suitable depth. It shall be possible to withdraw the cables for repair or replacement without disturbing the Railway work. The pipes shall be laid with a gradient to facilitate drainage of water and it shall be at right angle to the track.

## 25.0 Earthing

- 25.1 Earthing should be as per I.S. 3043-1987 and should give desired value of resistance as per I.E. Rules.
- 25.2 The location of earth electrode will be such where the soil has reasonable chance of remaining moist.
- 25.3 As far as possible entrenches, permanent and road ways are to be definitely avoided for locating the earth electrodes.
- 25.4 Rail pole will be earthed by drawing a hole at 30 cm above muffing and with proper nut bolts.
- 25.5 Earth wire will not be wrapped over the service pipe and conduit pipe.
- 25.6 As far as possible the earth pit should be provided as a suitable place below the service pole. The connected at the foot of the service pole by shortest route and then from foot to meter then from meter to meter **with 25x5 mm GI strip**.
- 25.7 The earthing of points (like 5/6 Amp. Sockets, 15 Amp. Socket Fan and fan regulator) and all metallic points are included in wiring and rewiring shall be earthed with 1.5 sqmm PVC insulated & unsheathed multistrand copper cable wherever required.
- 25.8 A plate of 14 SWG MS sheet size 150 x 100 mm painted with black enamel paint shall be fixed near the earth and following information shall be indicated (i) Earth No. (ii) Individual value of earth (iii) date of testing. The earth pipe shall be provided with GI cap to prevent blocking of the pipe.
- 25.9 The distance between two electrodes should not be less than eight meter and shall not situated within a distance of 1.5 meter from the building whose installation system is being earthed.
- 25.10 RCC / Cast-iron cover with cast iron frame 3mm thick shall be fixed on earth pit. The cover shall be fixed with 6.5mm thick hinged rod to the frame.
- 25.11 Earth electrode to be put vertically downward. The GI pipe should be tapered at one end. GI strip shall be used and connected from earth to main board / meter board / pole. The depth of strip in ground shall be minimum 30 cms. Value of each earth shall be measured after commissioning of earth.

## **26.0 Cable Laying Specification (General)**

The cable shall not bent sharp to small radius. The minimum safe radius of all type of cables shall be taken as 12 times of overall dia meter of cable. The bending radius of individual cores of a multi core cable shall not be less than 15 times its overall diameter. As far as possible a larger radius should be adopted while deciding the route of cable shortest practical route fixed structures such as road, foot path are to be considered. The future widening of road, future maintenance identification etc. are also kept in mind. Cross country run to shorter the route length is not desirable as it would be create problems during later developed of area etc. Quality of soil, sewage effluent present and future requirement of other utilities cables of different voltage grade shall be kept in separate trenched unless space is limited. Higher voltage cable shall be laid in lower tier during the initial stage of laying of cable. Joint position shall be decided after consideration of carry way, permanent, proximity to telephone cable, water mains, inaccessible place, ducts, pits etc. Before laying of cable it should be tested for continuity and insulation.

Cable drum shall be properly mounted on the jacks or on a cable wheel at a suitable location making sure that spindle, jacks etc, are strong enough to carry the weight of drum. The cable shall be pulled over rollers in trench steadily and uniformly without jerks and strain. After the cable has been uncoiled and laid in the trench over rollers. The cable shall be lifted slightly over the rollers beginning from one end by helpers standing about 10m a point and draw straight. The cable should be taken off the rollers by additional helpers lifting the cable and laid in reasonably straight line. For short run and size upto 50 sqmm of cable any other suitable method of direct handing and laying can be adopted with consent of site engineer. The cable laid in trench in a single tire formation shall have a covering of clean, dry sand of not less than 10 cms, as base cushion of sand before protective cover is laid at the time of laying cable app. 3M cable at the ends and each side of underground joints left surplus for future use. The cable shall be protected by HDPE pipe.

Where more than one cable is to laid in same trench. Horizontal formation of the cables laying more than one cable should be increased such that inter-axia distance between the cables must be 20 cm at least. There should be a clearance of at least 15 cm between axis of the end cable of side of the trench. Cable coming out from underground should be in GI pipe and GI must be clamped either on pole or wall by at least two clamps. Cable route tracers should be provided at each 10 mtr. distance and at the turns also.

Wherever it is necessary to lay the cable in air/open space the same should be done by providing proper cable alley/grommets etc.

## **27.0 Trenching**

The minimum width of trench for laying single cable shall be 0.4 m x 0.8 m in case of LT cable. The depth of trench is increase to 1.2 M in case of cable above 1.1 KV. Adequate precaution should be taken not to damage any existing cable, pipe or other such installation in the proposed route during excavation. The bottom on trench shall be level and free from stones, bricks bats etc. The trench shall then be provided with a layer of clean dry sand cushion of not less than 10cm in depth. The trench shall be than back filled in with excavated earth free from stone and other sharp edged debris and shall be rammed in successive layers not exceeding 30 cm up to top.

The cable shall be protected by HDPE pipe as a protection cover.

Where more than one cable is to be laid in same trench. Horizontal formation of the cables laying more than one cable should be increased such that interaxia distance between the cable must be 20 cm at least and brick is to be laid. There should be a clearance of at least 15 cm between axis of the end cable of side of the trench.

In case of more than one cable in a trench additional brick layer is to be laid between cables to maintain interaxia distance.



## **28.0 Octagonal Pole:-**

Supply, erection, testing and commissioning of 5 Mtrs.(as per schedule) Height made with 3 mm thick GI sheet with single/double arm hot dip galvanized steel octagonal Poles with galvanized base plate. Foundation (as recommended by pole manufacturer) & bolt size 4x16 mm dia x 600 mm length in position including excavation of pit and filling the same with concrete. The size of foundation as per attached drawing as Annexure-II. The pole shall be galvanized internally & externally by single dipping method. The allied accessories such as single/double cross arms, Bakelite sheet with MCB and stud terminals, clamping, etc. are included. Single/double arms of 500 to 1500 mm length are to be provided as per the site requirement and the instructions of railway site engineer. The Bakelite sheet with MCB & stud terminals shall be provided in the base compartment of the poles. All the connecting terminals shall be properly tightened and crimped in order to avoid any loose connection. Earthing of pole through armored of XLPE LT cable shall be done in proper manner as per the direction of site supervisor. GI Octagonal pole shall be confirming to latest relevant IS Specification / code of practice

## **29.0 Tools and Plants**

During the period of erecting, testing and commissioning the contractor shall make his arrangement for necessary tools and plants required for transportation, handling, erecting, testing and commissioning of various equipment at site of work covered under the contract.

## **30.0 Standard Specification**

Wherever a reference to any I.S. or D.S. specification appears in this tender paper, the same shall be taken as a reference to the latest version of the said specification.

## **31.0 Standard Makes**

31.1 All items endorsed by BEE under star rated labeling scheme should be of 5 star rated of BEE approved make.

31.2 Items for which RDSO specifications are available at the time of issue of NIT and mentioned in NS item of schedule, such items will be taken as per clause by clause compliance of RDSO specification.

31.3 Items not covered in above para should be ISI marked of reputed brand and as per technical specifications given in tender document.

## **32.0 Contractor shall also employ following Qualified Engineers during execution of the allotted work:**

32.1 One Qualified Graduate Engineer when cost of work to be executed is Rs 200 lakh and above.

32.2 One Qualified Diploma Holder Engineer when cost of work to be executed is more than Rs 25 lakh, but less than 200 lakh.

32.3 GST/Sales tax octroi, Royalty, Toll Tax or any other taxes levied/leviable by the central or State Govt. Local Bodies shall be borne by the contractor. No such other taxes on contractor's labour or material will be paid by Railway. This should be kept in view while tendering.

32.4 The quantities given in annexure 'H' are approximate and are subject to variation plus/minus as per variation clause mentioned in GCC applicable at the time of opening of tender.

## **33.0 Warranty: -**

Items for which the warranty offered by manufacturer is more than one year, contractor will submit the warranty card of the item duly filled in all respect to consignee.

A The contractor shall warranty that all materials & equipments to be supplied and installed as per this tender shall be free from defects and faults in design, material, workmanship and manufacture and shall be of the highest quality and consistent with the established and generally accepted standard for materials of the type ordered and in full conformity with the contract specifications.

B The contractor shall give warranty / provide maintenance for satisfactory working of all the equipments & installations erected & commissioned by him in this tender, for a period of ONE YEAR from the date of commissioning.

C During the period of Warranty, the contractor shall keep available experienced engineer & technician and necessary equipment to attend to any defective installation. The Contractor shall bear the cost of all modifications, additions or substitutions that may be considered necessary due to faulty material, decision regarding this shall rest with the Sr.DEE/NWR/Bikaner.

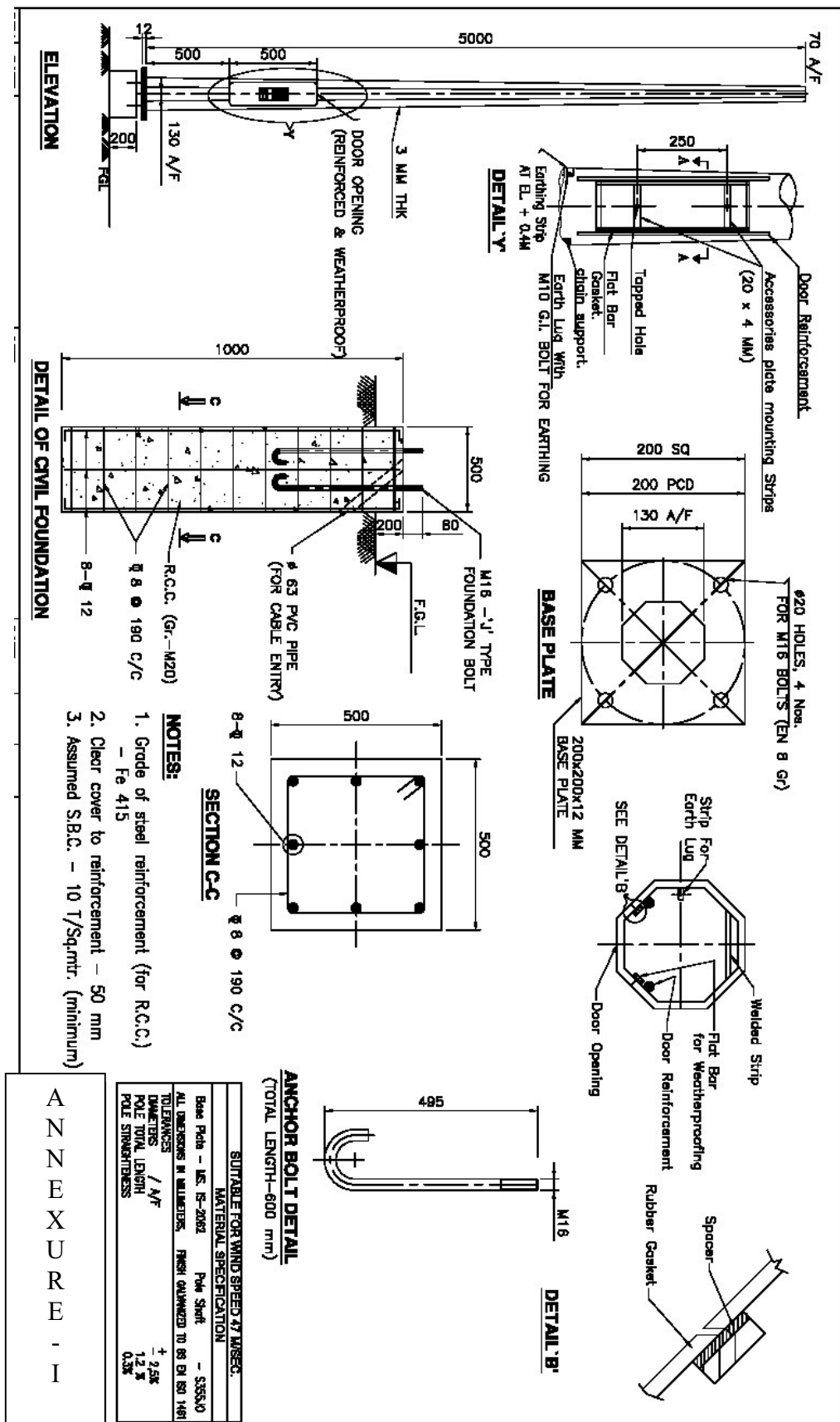
- D During the period of Warranty, the contractor shall be liable for the replacement of any equipment & any parts which may be found defective, whether such equipment be of his own manufactured or those of his sub-contractor, whether defect arising from faulty design, material, workmanship or negligence in any manner on the part of the Contractor, at his (Contractor's) own expenses. In case of defect of similar type detected in contractor's equipment & components during the warranty period, the contractor shall replace complete lot of the items irrespective of the fact that whether all such items have failed or not. The Contractor shall bear the cost of repair carried out on his behalf by the Purchaser at site due to urgent requirement. In such a case, the Contractor shall be informed in advance of the repair proposed to be carried out by the Purchaser.
- E If it becomes necessary for the contractor to replace or renew any defective portion/s of the system under this clause, the provisions of this clause shall apply to the portion of equipment/component/system so replaced for further period of 12 months from the date of such replacement or renewal or until the end of the warranty period whichever may be later. If any defect is not remedied within reasonable time, the Railway may proceed to do the work at contractor's risk and expense, but without prejudice to any other rights, which the Railway may have against the contractor in respect of such defects.
- F The repaired or renewed part shall be delivered and erected on site free of charge to the purchaser.
- G The Railway shall have right for acceptance, rejection of materials at site if the same are not in accordance with the specifications.
- H The terms and conditions of this contract shall also be governed with G.C.C. of Railways.

**However SD will be release to tenderer after completion of warranty period of 1 year.**

**34.0 Payment Terms:-**

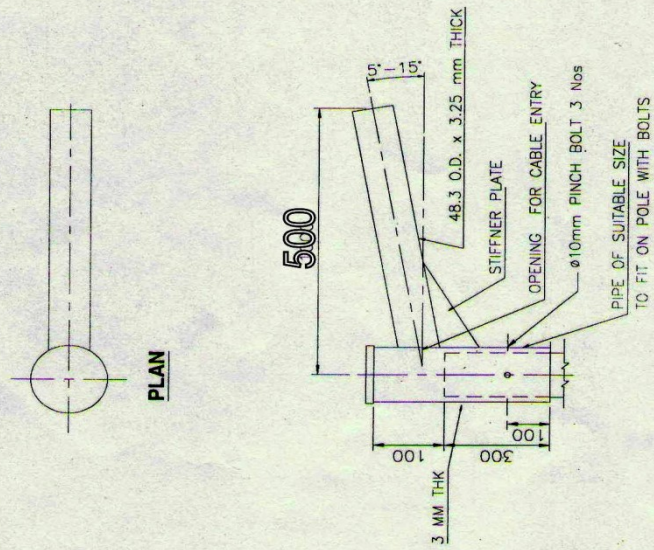
- 1. No supply of material payment will be given.**
- 2. 90% payment will be made after receiving , acceptance & successful installation of material.**
- 3. Final 10% payment will be made after successful completion of work.**

**Sr. Divisional Electrical Engineer/G  
N.W. Rly / Bikaner**



TOLERANCE IN DIMENSIONS ARE AS PER IS-2102 EXCEPT FOR BENDING RADIUS.

ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE MENTIONED



MATERIAL: M.S HOT DIP GALVANISED AS PER BS EN ISO 1461

may not be re-coded or lent without our authority in writing

## SECTION-V

### SAFETY PRECAUTIONS

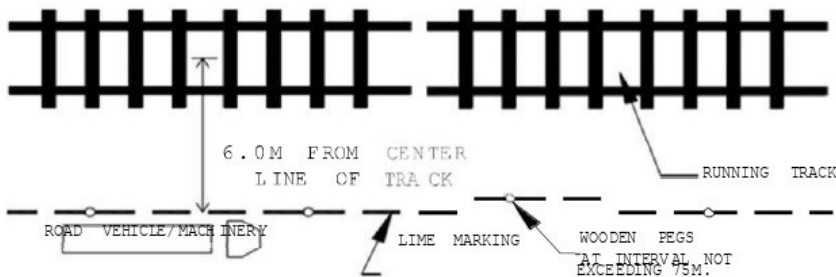
#### (Safety Precautions to be Taken during execution of work)

**1.0 Safe working of contractors (Extract of para 826 of IRPWM) :-** A large number of men and machinery are deployed by the contractors for track renewals, gauge conversions, doublings, bridge rebuilding, railway electrification etc. It is therefore essential that adequate safety measures are taken for safety of the trains as well as the work force. The following measures should invariably be adopted.

- (i) The contractor shall not start any work without the presence of railway supervisor at site.
- (ii) Wherever the road vehicles and/or machinery are required to work in the close vicinity of railway line, the work shall be so carried out that there is no infringement to the Railway's schedule of dimensions. For this purpose, the area where road vehicles and/or machinery are required to ply, shall be demarcated and acknowledged by the contractor. Special care shall be taken for turning/ reversal of road vehicles/machinery without infringing the running track. Barricading shall be provided wherever justified and feasible as per site conditions.
- (iii) The look out and whistle caution orders shall be issued to the trains and speed restrictions imposed where considered necessary. Suitable flagmen/detonators shall be provided where necessary for protection of trains.
- (iv) The supervisor/workmen should be counseled about safety measures. A competency certificate to the contractor's supervisor as per Performa annexed shall be issued by Engineer or his authorized representative, which will be valid only for the work for which it has been issued.
- (v) The unloaded materials for tender work after unloading from track should be kept clear off moving dimensions and stacked as per the specified heights and distance from the running track.
- (vi) Supplementary site specific instructions, wherever considered necessary shall be issued by the Engineer in Charge.

#### **PLYING OF ROAD VEHICLES AND WORKING OF MACHINERIES CLOSE TO RUNNING TRACKS**

- (i) Normally, the road vehicles shall be run or machinery shall be worked so as not to come closer than 6.0m from centre line of nearest running track.
- (ii) The land strip adjacent to running tracks, where road vehicle is to ply or machinery is to work, shall be demarcated by lime in advance in consultation with the Railway's Supervisor. Wooden pegs at interval not exceeding 75mts shall be provided along the line marking as permanent marks. The road vehicles shall ply or machinery shall work so as not to infringe the line of demarcation.



- (iii) If a road vehicle or machinery is to work closer to 6.0m due to site conditions or requirement of work, following precautions shall be observed.
  - a. In no case the road vehicle shall run or machinery shall work at distance less than 3.5m from centerline of track.
  - b. Demarcation of land shall be done by bright colored ribbon/nylon chord suspended on 75cm high wooden/bamboo posts at distance of 3.5 m from centreline of nearest running track.
  - c. Presence of an authorized Railway's representative shall be ensured before plying of vehicle or working of machinery.
  - d. Railway's Supervisor shall issue suitable caution order to Drivers of approaching train about road vehicles plying or machineries working close to running tracks. The train drivers shall be advised to whistle freely to warn about the approaching train. Whistle boards shall be provided wherever considered necessary.
  - e. Lookout men shall be posted along the track at a distance of 800m from such locations who will carry red flag and whistles to warn the road vehicle/machinery users about the approaching trains.
  - f. On curves where visibility is poor, additional lookout men shall be posted.
- (iv) **If vehicle/machinery is to be worked closer to 3.5m from running track.**



Under unavoidable conditions, if road vehicles or machinery is to work closer to 3.5m due to site conditions or requirement of work, following precautions shall be observed:

- a. Plying of vehicles or working of machinery closer to 3.5m of running track shall be done only under protection of track. Traffic block shall be imposed wherever considered necessary. The site shall be protected as per provisions of Para No. 806 & 807 of P-Way Manual as case may be.
  - b. Presence of a Railway's Supervisor shall be ensured at worksite.
  - c. Railway's Supervisor shall issue suitable caution order to Drivers of approaching train about road vehicles plying or machineries working close to running tracks. The train drivers shall be advised to whistle freely to warn about the approaching train.
- (v) **Precaution to be taken while reversing road vehicle along side the track.**  
The location where vehicle will take a turn shall be demarcated duly approved by Railway's representative. The road vehicle driver shall always face the Railway track during the course of turning/reversing his vehicle. Presence of an authorized Railway representative shall be ensured at such location.
- (vi) Road vehicle shall not be allowed to run along the track during night hours generally. In unavoidable situations, however, vehicles shall be allowed to work during night hours only in the presence of an authorized Railway's representative and where adequate lighting arrangements are made and where adequate precautions as mentioned earlier have been ensured.
- (vii) Road vehicles/machinery/plant etc. when stabled near running tracks shall be properly secured against any possible roll off and always be manned even during off hours.

#### **EXECUTION OF WORKS CLOSE TO OR ON RUNNING LINES**

- (i) Any work close to or on running tracks shall be executed under the presence of a Railway's Supervisor only.
- (ii) **Precaution to be taken to ensure safety of trains while execution of work close to the running line or on running lines.**
  - a. Such works shall be planned and necessary drawings particularly with regard to infringement to moving dimensions shall be finalized duly approved by competent authority before execution of work. The work shall be executed only as per approved procedure and drawings.
  - b. All temporary arrangements required to be made during execution of work shall be made in such a manner that moving dimensions do not infringe.
  - c. Suitable speed restriction shall be imposed or Traffic block shall be ensured as required.
  - d. The site shall be protected as per provisions of Para No. 806 & 807 of P-Way Manual as case may be
  - e. Necessary equipment for safety of trains during emergency shall be kept ready at site.
- (iii) **Precaution to be taken to ensure safety of electrical/signal/ telephone cables while excavating near tracks.**
  - a. Particular care shall be taken to mark the locations of buried electrical/signal/telephone cables on the plans jointly with S & T/Electric supervisor and also at site so that these are not damaged during excavation.
  - b. Copy of the cable plan should be given to the contractor's authorised representative before handing over the site to start the work.
  - c. Due care shall be taken to ensure that any part of the equipment or machinery or temporary arrangement does not come close to cables while working.  
(Ref: JPO issued by Railway Board vide letter no. 2003/Tele/RCIL/1 pt. IX dated 24.06.2013 (Telecom circular no. 17/2013) for undertaking digging work in the vicinity of signaling, electrical and telecommunication cable will be followed during the execution of work. )
- (iv) **Precaution to be taken during execution of works requiring traffic blocks.**
  - a. Any work, which infringes the moving dimensions, shall be started only after the traffic block has been imposed.
  - b. Before closing the work, the track shall be left with the proper track geometry so that the trains run safely.
  - c. After completion of work the released sleeper and fittings should be properly stacked away from the track to be kept clear of moving dimensions.
  - d. Block shall be removed only when all the temporary arrangement, machineries, tools, plants etc. have been kept clear of moving dimensions.
- (v) **Precaution to be taken during execution of works during night.**  
The work close to running line, generally, shall be carried out only during day hours. At locations, however, where night working is unavoidable, proper lighting arrangement should be made and all safety aspects should be strictly observed. The engineering indicator

boards shall be lightened during night hours as per the provisions of P-Way Manual. The staff deputed for night working should have taken adequate rest before deploying them in night shift. We can specify duration of night shift from 20.00 hrs to 04.00 hrs. All other safety precautions applicable for daytime work should be strictly observed during night working.

**(vi) Precautions to be taken to ensure safety of workers while working close to running lines.**

- a. Necessary lookout men with red flags and whistles shall be provided to warn the workmen about the approaching train.
- b. Railway's supervisor shall issue suitable caution order to Drivers of approaching train for whistling to warn the workers about the approaching train. Whistle boards shall be provided wherever considered necessary.
- c. A "First aid kit" shall always be kept ready at site.

**(vii) Precaution shall be taken for safety of public or passengers, while executing works at locations, used by passengers and public..**

The worksite shall be suitably demarcated to keep public and passengers away from work area. Necessary signage boards such as "Work in progress. Inconvenience is regretted" etc. shall be provided at appropriate locations to warn the public/ passengers. Adequate lighting arrangement of worksite wherever required shall be done to ensure safety of public/passengers during night.

**(viii) Precaution to be taken before stacking materials alongside the track to ensure that safety of trains is not affected.**

The following precautions shall be taken before stacking the materials along the track for stacking of Electric poles, Cables, OHE masts, Contact wires, Catenary wires etc.

- a. The sites for material stacking should be selected in advance in such a manner to ensure that no part of the material to be stacked is infringing to the Standard Moving Dimensions. A plan of proposed stacking locations be made and signed jointly by an authorized Railway's representative and contractor's representative.
- b. The selected locations shall be marked by lime in advance.
- c. Presence of an authorized Railway's representative while unloading and stacking shall be ensured.
- d. The materials shall be stacked in such a height so as to not to infringe SOD in case of accidental roll off.

(IX) Precautions to be taken during working in RE areas – Necessary precautions to be taken during working in electrified / under electrification sections by contractor or his representative/staff (Ref: Elect. HQ office letter no. EL/Safety/2/power/Pt. III dated 20.11.2013.

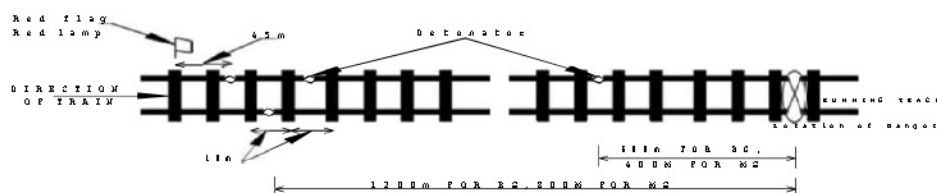
## PROTECTION OF TRACK DURING EMERGENCY

**(i) Action to be taken when a contractor's supervisor or vehicle operator apprehends any unusual circumstances likely to infringe the track and endanger safe running of trains.**

At any time if a contractor's supervisor or vehicle operator observes any unusual circumstances likely to infringe the track and apprehend danger to safe running of track, he shall take immediate steps to advise a Railway official of such danger and assist him in protection of track.

The track shall be protected as under. One person shall immediately plant a red flag (red lamp during night) at the spot and proceed with all haste in the direction of approaching train with a red flag in hand (red lamp during night) and plant a detonator on rail at a distance of 600m from the place of obstruction of BG track (400m for MG track) after which he shall further proceed for not less than 120 0m from the place of obstruction from BG track (800m for MG track) and plant three detonators at 10m apart on rails. After this he shall display the red flag (red lamp during night) at a distance of 45m from the detonators.

Attempts shall also be taken to send an advice to nearest Railway station about the incident immediately.



**(ii) Action to be taken if train is seen approaching to site of danger and there is no time to protect the track as per guidelines mentioned above?**

In such a case the detonators shall be planted on rails immediately at distance away from place of danger as far as possible and attention of driver of approaching train shall be invited by whistling, waving the red flag vigorously, gesticulating and shouting.

**(iii) What action shall be taken if more than one track is obstructed?**

- a. In case of single line protection as above shall be done in both the directions from place of danger.
- b. In case of double line or multiple lines, if other tracks are also obstructed, the protection as above shall be done for other track also.
- c. The protection shall be done in that direction and on that track first on which train is likely to arrive first.
- d. The Contractor's Supervisors, Operators and lookout men shall be properly explained about the direction of trains on running tracks.

**(iv) Equipment required for protection of track.**

Minimum complement of protection equipment i.e. 10 detonators, 4 red hand flags, 4 red hand lamps, 4 banner flags and whistles etc. shall always be kept ready at worksites for use in case of emergency. Railway will arrange to provide detonators, whereas Contractor shall arrange other equipment at his own cost.

**(v) Arrangement of lookout men and competency required for lookout man to warn labour about approaching train.**

- a. Contractor will provide lookout men.
- b. The lookout men shall be properly trained in warning to staff at worksite about approaching train.
- c. Only those lookout men shall be provided at site who have been issued with a competency certificate by the Railway's Supervisor.
- d. In case, it is felt necessary to provide lookout men by Railway, the charges for the same as fixed by Railway Administration shall be recovered from Contractor.

**Training to Supervisors and Operators of Contractor.**

The Supervisors and Operators of the contractor proposed to be deployed at work site, which is close to the running track, shall be imparted mandatory training by the Railway at site free of cost about the safety measures to be adopted while working in the vicinity of running track. Engineer-in charge of the work shall decide the scale, extent & adequacy of training. In case training is imparted at a recognized Railway training institute, the charges for the same, as decided by Railway, shall be recovered from contractor. A competency certificate to this effect to the individual Supervisor/Operator shall be issued as given below, by a Railway Officer not below the rank of Assistant level. No Supervisor/Operator of the Contractor shall work or allowed to work in the vicinity of running track who is not possession of valid competency certificate.

All the labour, materials, tools, plants etc. except detonators, required for ensuring safe running of trains shall be provided by Contractor at his own cost. Wherever lookout men are provided by Railway, charges at the rate of Rs. 500/- per man day shall be recovered from Contractor.

**Competency Certificate**

Certified that Shri \_\_\_\_\_ Supervisor/Operator of M/s. \_\_\_\_\_ has been trained and examined in safety measures to be followed while working in the vicinity of running railway track for the work \_\_\_\_\_. His knowledge has been found satisfactory and he is capable of supervising the work safely. This certificate is valid only for the work mentioned in this certificate only.

**Signature and designation of the officer**

**2. JOINT PROCEDURE ORDER FOR UNDERTAKING DIGGING WORK IN THE VICINITY OF UNDERGROUND SIGNALLING, ELECTRICAL & TELECOMMUNICATION CABLES**

Following joint procedure shall be followed while carrying out any digging work near to existing signaling & telecommunication and electrical cables so that the instances of cable cut due to execution of works can be controlled and minimized.

Before taking up any digging activity on a particular work by any agency, concerned Sr. DSTE and Sr. DEE/.../Dy.CEE/... of the section shall be approached in writing by contractor for permitting to undertake the work. Sr. DSTE and Sr. DEE/.../Dy.CEE/..., after ensuring that the concerned executing agencies (contractor) have fully understood the S&T and Electrical cable route plan, shall permit the work in writing within 7 days of the request made for the same.

After getting the permission from S&T and/or Electrical department as the case may be, the relevant portion of the cable route plan shall be attached to the letter through which permission is issued to the contractor for commencement of work and ensuring that the contractor have fully understood the cable route plan and precautions to be taken to prevent damage to the underground cables. The contractor shall be asked to study the cable plan and follow it meticulously to ensure that the safety of the cable is not endangered.



On receiving the above information from contractor, SE/Sig. or SE/Tele or SE/ Electrical (Const., TRD or G) shall visit the site on or before the date of taking up the work and issue permission to the contractor to commence the work after checking that adequate precautions have been taken to avoid the damage to the cables. The permission shall be granted within 3 days of submission of such request.

The name of the contractor, his contact telephone number, the nature of the work shall be notified in the Electrical & S&T control as soon as the concerned S&T / Electrical officials issue the letter authorizing commencement of work to the contractor. Control / Test room shall be given copies. Control/Test room shall collect any further details from the Engineering control and shall pass it on to S&T/Railtel& Electrical officials regularly. In case the supervisors of concerned departments do not turn up on the days advised in terms of Para 39.3 above, the work of contractor shall not be stopped on this account.

In all the sections where major projects are to be taken up/going on, Electrical department shall deploy their officials to take preventive/corrective action at site of work. As regards other departments, the officials may be deputed on need basis.

The works of excavating the trench and laying of the cable should proceed in quick succession, leaving a minimum time between the two activities.

In case damage is caused to OFC/Quad cable/Electrical cable/Signaling cable during execution of the work, the contractor is liable to pay a penalty for damaging the cable. Penalty shall not be levied in case of the following:-

- (i) Detailed cable route plan is not provided by concerned department or cable is not protected as per laid down procedures.
- (ii) The alignment of the cable does not tally with the information provided to the contractor.
- (iii) The cable depth is found to be less than 800 mm from normal ground level.
- (iv) No representative of S&T/Electrical department was available at site guarding the cables on the fixed pre determined date and time.

Penalty to be imposed for damages to cable shall be as under:-

Cable damaged	Penalty per location
Only Quad cable or Signaling cable	Rs. 1.0 Lakh
Only OFC	Rs. 1.25 Lakh
Both OFC & Quad	Rs. 1.5 lakh
Electrical Cable	Rs. 1.0 Lakh

In case of damage to OFC, RailTel should be paid 5/6<sup>th</sup> of the penalty recovered. RailTel shall raise demands on the S&T department in this regard.

All types of Signaling & OHE bonds i.e. rail bond, cross bond and structure bond shall be restored by the contractor with a view to keep the rail voltage low to ensure safety of personnel.

S&T cable and Electrical cable route plan should be prepared by the concerned S&T and Electrical officers respectively and go to approved before undertaking the work. The completion cable route plan should be finalized block section by block section as soon as the work is completed.

2.12. All cable laying works shall be executed as per laid down technical specifications, such as protection measures/ protective cover, compaction of refilled material etc.

(Ref: JPO issued by Railway Board vide letter no. 2003/Tele/RCIL/1 pt. IX dated 24.06.2013 (Telecom circular no. 17/2013) for undertaking digging work in the vicinity of signaling, electrical and telecommunication cable will be followed during the execution of work)