

CHAPTER – IV
EXPLANATORY NOTES OF SCHEDULE

SCHEDULE OF PRICES
SECTION – I – GENERAL

- 1.4.1** Explanatory notes for various items of work in Schedule, Section 1 is given below
- 1.4.2** The basic quantities of components and materials required to make up a unit of work for selected items, are indicated for guidance only. There may be minor variations to suit erection but no adjustment in prices of Schedule (Pt. I, Ch. IVA) shall be made on that account. In estimating the prices for various items of work, provision for loss and wastage in transit and erection should be provided for over and above the basic quantities of components and materials required to make up a unit of work, indicated herein, except where otherwise specified for materials supplied by the Purchaser.
- 1.4.3** In the explanatory notes given in Section IIParticular of this Chapter, the term 'Small parts steel work' is meant to cover fabricated steel work made from rolled steel sections, complete with bolts and nuts and washers where required for fastening the small parts steel work to any structural member. The term "attachment" wherever used is intended to cover castings, forgings, machined or welded components or fittings, which are attached directly to a structural member, or mounted on small parts steel work and shall include bolts and nuts for fastening the attachment to the structural member or small parts steel work.
- 1.4.4** In the explanatory notes given in Section IIParticular of this chapter, the term "bimetallic connection" is meant to cover any connection between a copper conductor and an aluminium conductor. The clamps used for such connections shall be made of a suitable aluminium alloy or copper alloy and the copper/aluminium conductor shall be wrapped with a bimetallic (aluminium copper) strip to prevent direct contact between aluminium and copper.
- 1.4.5** Special notes for measurements are included in Section IIParticular of this chapter under various items, where necessary.
- 1.4.6** Reconciliation of materials supplied by the Purchaser (see para 1.2.20)
- (a) The following procedure shall be adopted for the final reconciliation of the various equipment's, materials, fittings and conductors supplied by the Purchaser in terms of para 1.2.20.1 (see Annexure 4) for OHE.
- (b) All the materials supplied by the Purchaser shall be correctly accounted for and quantities reconciled on completion of the work by the Contractor. On completion of work, all surplus materials supplied by the Purchaser together with the ones found defective or that have become defective or broken on account of defective materials and/or workmanship shall be returned to him by the Contractor.
- (c) (i) **SUPPLY OF STEEL BY RAILWAYS:** In case the Purchaser chooses to supply galvanised, rolled steel masts, gantry masts, fabricated steel works, to the Contractor, the cost of rolled steel masts, gantry masts, fabricated steel work damaged or falling short will be recovered at rates specified in NOTE at the end of para 1.4.6 (f) (Pt. I, Ch. IVA).
- (d) (ii) **SUPPLY OF COPPER CONDUCTORS BY RAILWAYS:** In case the Purchaser chooses to supply copper wires and conductors to the contractor, the procedure to be adopted would be as under:-

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Soon after the approval of layout plan and cross section drawings the Contractor shall assess the quantity of the wires and conductors required for the work and submit his assessment indicating the phased requirement of each type of wires and conductors in total running lengths or in MT for verification by the Purchaser. The Purchaser will supply to the Contractor all wires and conductors required for the work based on unit quantities, inclusive of erection allowances in accordance with column 6, Annexure-6 together with the lengths of finished wires and conductors for new items of work (see para 1.3.2 (j) (Pt. I, Ch. IIIA) and the lengths of wires and conductors under items 31(h) of Schedule (Pt. I, Ch. IVA). Out of the quantity as calculated above, the contractor shall return to the Purchaser wires and conductors in longest possible bits or in the form of scrap, as calculated on the basis of the final quantities of items of work of Schedule (Pt. I, Ch. IVA) and the quantities specified in column 5, Annexure-6. The total length of finished wires and conductors deemed to have been erected will be the difference, viz., as calculated on the basis of the final quantities of Schedule (Pt. I, Ch. IVA) and the bare unit lengths specified in column 4, Annexure-6 together with the lengths of finished wires and conductors for new items of work (see para 1.3.2 (j) (Pt. I, Ch. IIIA) and the lengths of wires and conductors under item 31(h) of Schedule (Pt. I, Ch. IVA).

Notwithstanding the above, it is a general condition that the Contractors shall return to the Purchaser all wires and conductors which have been supplied to him but not utilised on works. Should the Contractor be unable to do so, the Purchaser shall be entitled to recover the cost of such wires and Conductors as specified in NOTE at the end of para 1.4.6 (f) (Pt. I, Ch. IVA). For the purpose of reconciliation the length of wire or conductor deemed to have been supplied by the Purchaser to Contractor will be the length stenciled on the drum and the length deemed to have been returned by the Contractor will be the actual length of cut-pieces and/or the length calculated on the basis of the actual weight of cut pieces scrap and linear density specified in column 2, Annexure-6.

(e) **SUPPLY OF ATs & INTERRUPTERS BY RAILWAYS:** In case the Purchaser chooses to supply Auxiliary Transformers and Interrupters to the Contractor, the contractor shall return the unused equipments to purchaser on completion of the work. The cost of shortages or damages if any, will be recovered at rates specified in NOTE at the end of para 1.4.6 (f) (Pt. I, Ch. IVA).

(f) OTHER EQUIPMENTS, FITTINGS AND COMPONENTS:

The Purchaser will supply the requirement of the various other equipments, components or fittings listed in Annexure-4. If there are any shortages during final reconciliation, their cost will be recovered by the Purchaser from the Contractor at the prices inclusive of all charges as specified in note below:-

NOTE : (1) If there are any shortages during final reconciliation, their cost will be recovered by the Purchaser from the Contractor at the book rate or the last purchase rate or the prevailing market rate, whichever is higher, plus 5% on account of initial freight, 2% on account of incidental charges together with supervision charges at 12.5% of the total cost inclusive of material freight and incidental charges. Freight between the Purchaser's source of supply and the Contractor's depot or RE siding shall be to the Contractor's account.

(2) No recovery/reconciliation shall however, be made as per the preceding paras if the items stated under clause 1.4.6 (Pt. I, Ch. IVA) are made contractor supply by including the respective optional items in the contract.

1.4.7 The contractor shall provide effective network communication facilities for carrying out the work during the period of contract by way of Radio trunking service working on UHF/VHF. 4 Nos of such equipment in activated condition shall exclusively be given to Railway officials at site, from the date the physical work start till 100 % physical works are completed from. The contractor is expected to provide such communication facilities for the total contractual period.

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1.4.8 The contractor shall make sure that all the Labour working on the site shall adhere to following safety instructions:

1. No work shall be done above or with in a distance of 2 meters from the live OHE without a "Permit to Work".
2. Inductive effects occur on large metallic structures such as fencings, structural steel of platforms running parallel to the track. They will have to be earthed suitably to afford safety.
3. Each working party shall be protected by at least two independent earths, one on each side of a working party.
4. If the distance between the working parties exceeds 100 meters, intermediate earth shall be provided in such a manner as to ensure that the distance between earths does not exceed 100 meters.
5. Men shall be posted on both sides of the site of work to warn the working party of any approaching train on the same track and adjacent track.
6. For providing earth on the OHE, fix the earthing clamp securely to a mast at least one span away after making sure that the mast to earth rail bond of this mast is intact.
7. Earthing clamps should always be fixed to the traction rail or mast first and then the top clamp should be hooked to the OHE to be earthed.
8. For removing the earthing, first remove the hook on the OHE and then the clamp fixed to the rail or mast.
9. Two sections of conductors or ends of conductors which may have snapped should be separately earthed at two points after switching off supply to both parts of the OHE. This precaution should also be observed when working or in the vicinity of a sectioning point and cut in insulators.
10. Neutral sections should be treated as live equipment and earthed separately at two points on either side of the work party before commencing work.
11. When work is to be carried out on an isolator, both sides of the isolator should be earthed at two points.
12. No fallen wires shall be touched unless power is switched off and the wire suitably earthed.
13. In electrified track, steel tape or metallic tape or tape with woven metal reinforcement should not be used.
14. Ropes, come along clamps, tirfor should be tested once in a month.
15. All the staff should wear helmets to protect their heads against any tools or equipment which may drop down accidentally.

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16. Staff should protect themselves against an inadvertent fall by wearing a safety belt for supporting themselves by a rope sling.
17. Ropes used with ladders should be cotton or jute. Use of metallic ropes is prohibited. A ladder should be held by one person on the ground to prevent slipping, while the top end should be tied to the supporting structure or conductor to keep it in position and prevent it sliding away.
18. Ladders should never be allowed to fall on or rest against the contact wire.
19. More than one person shall not normally be allowed on a ladder as far as possible.
20. Climbing on a ladder with wet or slippery foot wear is forbidden.
21. A rope should be used to pass tools or any equipment to the men working on a ladder.
22. No one should stand directly below a work spot under a ladder.
23. The strength of the anchoring rope should not be less than of the cable to be anchored.
24. Do not tie the rope on rail without taking traffic block.
25. It is necessary to take traffic block while working on tunnel or bridge.

SECTION – II

ITEM NO. 1 (a) PREPARATION OF DESIGNS AND DRAWINGS FOR OVERHEAD EQUIPMENT AND VERIFICATION OF PURCHASERS ENGINEERING PLANS.

The price shall cover verification of purchasers engineering track plans indicating the layout of new lines with respect to the existing lines, which will be issued by the purchaser in stages. The preparation of lay out plans and other design are to be finalized by the contractor in consultation and in close coordination with purchaser. The contractor may be asked to prepare the layout plans based on the site details if the purchaser is not able to supply the Engineering track plan. The rate shall be per TKM. The price shall include the following.

- i) Preparing a detailed Electrification layout plan indicating the existing track and OHE arrangements with the proposed track and OHE arrangements based on the details given in the existing OHE layout / proposed alignment track plan/ Site details taken from the site. (If existing yard is a major yard and proposed modification is very small then for preparing the existing yard OHE lay out plan if not provided by purchaser, half the rate will be given and for new proposal full rate is eligible).
- ii) Preparation of cross section drawings and structure erection drawings for each structure locations (See para 2.5.6) For the new locations and modified structure/ mast.
- iii) Choice of type and size of foundations to suit soil and loading conditions, except for the ones which are considered as 'Works under other Agencies' (See para 1.2.37.)
- iv) Preparation of long section drawings of overhead equipment where such drawings are required including detailed study of overline structures such as foot over bridges, road over bridges etc. for maintaining this specified height of contact wire and requisite clearances.
- v) Preparation of other designs and drawings including drawings of small parts steel work (other than those for which RDSO standard drawings are available) and detailed designs for booster transformer stations and Aux. transformer station (see para 1.2.23).

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- vi) Supply of requisite number of copies of all drawings including completion drawings specified in Part – II Chapter V. Any additional requirement of copies of LOP & SED's to be supplied by contractor shall be paid at pro-rata basis.
- vii) Bonding Layout Plan : -
 - a) Preparation of Bonding layout plan based on signaling plan and as desired by the Purchaser Engineer as per site condition
 - b) Any change in Bonding arrangements in existing line consequent to the OHE modifications done, shall also to be prepared for the entire kilometer length.
- viii) Preparation of wire run diagram duly incorporating existing tension lengths if any in the same Km of work.

Note : 1) This price shall also cover soil investigation of testing in an approved manner.
 2) All the designs & drawings shall preferably be done in CAD or on any other higher software.

NOTE FOR MEASUREMENTS: For the purpose of payment against this item the length of track shall be measured as under :

1. GENERAL : By the difference in the chainages of the length under consideration as incorporated in the layout plans.
2. TURNOUTS : The track taking off shall be deemed as starting from the SRJ of the switch of the Turnout.
3. CROSS OVERS : The length of track shall be taken as the difference in the chainages of the toes of switches of the two turnouts constituting the crossover.
4. DIAMOND CROSSING WITH OR WITHOUT SLIPS : The two tracks crossing each other shall be measured independently as per note 1 above as though there were no crossing. No extra shall be provided for slip points.
5. DEAD ENDS AND TOPS OF LOOPS : The lengths for payment under this item shall be upto chainage of anchor mast of the terminating OHE.
6. FEEDER AND RETURN FEEDERS FROM GRID SUB STATION TO FEEDING STATION : This item will be also applicable independently in case of feeders/ return feeders/ conductors from grid sub station to overhead equipment feeding stations or in a case of feeders/ conductors running on independent structures (not supporting OHE) along or across tracks.

NOTES FOR MEASUREMENTS: The length of line to be considered for purpose of item 6 shall be measured by the distance between the centre of gantries of the grid sub station and feeding stations, in case of feeder/ return feeders/ conductors line from grid sub-station

OR

by the distance between the center line of the two structures to which the feeders/ return feeders/ conductors are anchored in case of feeders running along the track if such feeder/ return feeder/ conductors are running completely on independent structures OR

by the distance between the centre of the structures supporting the OHE on either side of the first and last independent structure in case of feeders/ return feeder/ conductors running along-with the track support OHE.

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ITEM NO. 1 (b) PREPARATION OF DESIGN AND DRAWINGS FOR SWITCHING STATION.

The price shall cover on a flat rate basis per Switching Station, Survey, Investigation of Soil bearing pressure preparation of cross section drawings, preparation of General arrangement drawings, detailed Layout of equipment, busbar connections cable run layout, detailed designs and drawings for steel work and structural support, suitable concrete plinths, for equipment and drawings for equipments, components, fittings and materials supplied by the contractor. The price shall include supply of requisite number of copies of all drawings, including completion drawings as number of copies of all drawings, including completion drawings as specified in Part – II Chapter V to the purchaser. (See para 1.2.23).

ITEM NO. 1 (c) PREPARATION OF STATION WORKING RULE DIAGRAM AND WORKING INSTRUCTION PERTAINING TO 25 KV AC TRACTION.

This includes preparing of revised station working instructions and drawings based on the revised OHE and signaling plans. This will include preparing / Altering of station working rule diagrams and instructions, pertaining to 25 KV AC Electric Traction. The Drawing size depends on the No. of Loop Lines/ Road in the stations. A minimum of 50 copies of stations rules diagram (ColourCAD print) and 50 copies of station working instructions are to be prepared as directed by the purchaser's Design Engineer. The rate includes supply, painting and Erection of station working rule diagram on a Milky White Decolam Sheet 4 mm thick and Aluminum Framed Board in a neat manner. Generally, one Board per station is to be provided. The Board should be a minimum of 1800 mm x 1200 mm size and if the number of Loops/ Roads are more than size of the Board shall be increased as directed by the Purchaser Engineer. The rate shall also include correction to the existing Sectioning Diagrams available in Sr. SE/ SE/ CTPC/ AEE/ TRD/ SR. DEE/ TRD and at section control rooms. For sections newly electrified, new boards have to be kept in the places mentioned supra at no extra cost. If the works proposed in a contract is done in a phased manner, the contractor is eligible to get payment for each phase at the same rate paid under item 1(c). The new board will be supplied only one time. The rate also includes corrections to be incorporated on either side stations consequent to the changes made in a station.

If the purchaser so desire that if any station have major yard having RRI cabin, Station Manager Room, station master room separately, any other cabins are to be provided with separate station working rule diagram boards, the contractor is eligible to get payment for each board as half the rate paid under item 1(c) extra.

All the painting works on the White Decolam Sheets should be done with colour Fluorescent Paints as Directed by the Purchaser Engineer. If the purchaser so desires instead of painting in the white Decolam board, the station working diagram shall be taken on flex sheet by the contractor and fixed on the white Decolam Board. For major stations having RRI cabins and SMR rooms/PF SM rooms separately, the number of such boards as required will be decided by the purchaser's Engineer at site.

ITEM NO. 2 (a)I CONCRETE FOR FOUNDATION AND PLINTH IN HARD SOIL**II) CONCRETE FOR FOUNDATION AND PLINTH IN ROCKY SOIL**

The price shall cover excavation, supply and handling of all materials, and accessories, temporary arrangements for excavation in hard soil and concrete/ masonry drains/ walls requiring use of chisel

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and hammer 2 (a) (I) or requiring blasting 2 (a) (ii) shoring where necessary, casting concrete including form work where necessary, casting concrete grouting of masts and finishing the top of concrete foundation or anchor blocks wherever under ground cable or pipes are met with the contractor should arrange to excavate with due care so as not to damage the U.G. cables/ Pipes and arrange for slight deviation of the U.G. cable to the extent necessary to cast foundation and protect the cables using PVC pipes of adequate thickness and length as approved by the Purchaser's Engineer at site. The price also includes dismantling of all connected temporary arrangements back filling with earth and compacting the same to the required height and width as per drawing to ensure safety of foundation confining the exposed height of foundation block to within 10 cm and removal of spoil. The contractor shall arrange for filling up of earth around foundation where the embankment is low and enough shoulder width is not available as directed by Purchaser's Engineers. The price shall also include diverting the tracks side drains if any on account of OHE mast foundation works. The purchaser engineer shall certify where use of chisel and hammer or blasting has been necessary. The contractor shall arrange for supply of explosives and all tools and plants for blasting operations at his own cost. If half or more of the depth or width of excavation is in hard soil/ concrete/ masonry drains/ walls or in rock, the entire foundations shall be paid for under item 2 (a) (I) or 2 (a) (ii) as the case may be. If half of the depth or width of the excavations is in hard soil/ concrete/ masonry/ drains/ walls and the other half is in rock the entire foundation shall be paid under item 2 (a) (ii). The price shall also include the cost of cement. The cement to be used for construction of PCC/RCC should be of ISI branded ordinary Portland cement to IS269 of latest version or Portland Pozzolana cement (fly ash based) as per IS :1489 Pt-I,1991,3rd revision or its latest..

NOTES FOR MEASUREMENT FOR ITEMS 2 (A) i) AND ii)

1. The payable volume of the foundations under item 2 (a) (i) and (ii) shall be the designed one as shown in the drawings for which the whole has been blasted/chiseled irrespective of the actual configuration assumed by the later due to the following.
2. The depth of the excavation shall be measured from the formation level to the maximum excavated point.

ITEM NO. 2 (b) CONCRETE FOR FOUNDATION AND PLINTH IN OTHER THAN HARD SOIL AND ROCKY SOIL. The price shall include all works mentioned in item 2 (a) in all classes of soil except hard soil concrete or masonry drains and walls and rock.

ITEM NO. 2 (c) REINFORCED CONCRETE FOR FOUNDATION AND PLINTH

The price shall cover excavation for reinforced concrete work for foundations, supply of steel for reinforcement and other materials including bending, binding, laying of the reinforcement, shoring where necessary casting concrete including form work where necessary, grouting and finishing the tops of foundation blocks. The price shall also include dismantling of all connected temporary arrangements back filling as required and removal of spoil. The price shall also cover all concrete work for foundation or anchor blocks on bridge piers, irrespective of whether they are actually reinforced or not, and those for cast-in-situ piles foundations and counter weight foundations. Rails and fasteners required for counter weight foundations shall be supplied by the purchaser free at the contractors depot or workshop according to the convenience of the purchaser. The volume of cast-in-situ piles shall be added to the volume of foundation block for the purpose of payment. Dowel bars as may be required for bond with bridge structures shall be supplied and erected free of cost by the purchaser. Dowel bars will not be considered as reinforcement for the purpose of this item.

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For cable trench work in FP/SSP/SP, the angel of suitable size shall be placed for proper resting of cable trench cover (item No.33). No extra payment is admissible for the above steel work. The price shall also cover cable supports trays which is provided on cable trench.

Note : Nominal reinforcement will be necessary in black cotton soil foundations. Such nominally reinforced foundation in black cotton soil will be payable under item 2 (b) and not under item 2 (c).

The steel for nominal reinforcement will be arranged by the contractor and the concrete mixture, in such a case shall be as for normal of foundations 1:2:4 (See para 2.2.4)

ITEM NO. 2 (d) - Deleted –

ITEM NO. 2 (e) EXTRA FOR SUPPLY & SINKING OF CONCRETE SHELLS

The price shall cover extra on items 2 (a) (b) & (c) for supply and sinking of a concrete shell before casting of concrete for traction structure foundations or anchor blocks including pumping of water where necessary. Purchaser's Engineer shall decide whether sinking of concrete shells is necessary.

Note : The above price shall be per concrete shell of standard size specified in para 2.2.7. If more than one concrete shell is used in a foundation the price shall be proportionately augmented.

NOTES FOR ITEMS 2

1. The price under item 2 shall be same for any shape of size on concrete blocks, cable trench or brick wall in calculating the individual volume of concrete and brick work, or a cubic meter beyond the third decimal shall be rounded off to the nearest third decimal.
2. The price under item 2 (A), (B) & (C) shall apply for concreting of all pedestals, plinths and foundations for gantries/ portals and supporting steel work and cable trenches and for other civil engineering work wherever required.
3. For purpose of computation of volume of concrete and brick work under item 2 the volume of steel work embedded in the foundation block of muff shall be ignored.
4. The volume of each muff will be included in the volume of concrete for the respective foundation for purposes of computation of volume of concrete.
5. The prices shall include cost of embedment of drain pipes, conduits for cables or earthing flats where necessary.
6. Dowel bars in special foundations and nominal reinforcement in black cotton soil foundations will be necessary. Such nominal reinforced foundation in black cotton soil will be payable under item 2 (B) and not under item 2 (C). The steel for nominal reinforcement and dowel bars will be supplied by the contractor and the concrete mixture, in such a case shall be as for normal foundation 1: 2: 4.
7. In case, the anchor foundation cast becomes redundant due to reasons beyond the control of Railways, no extra rates are admissible for the Anchor loops embedded in the anchor foundation.
8. Muffing of OHE mast/structures should be done along with grouting in order to ensure homogeneous bonding between Muffing and grouting concretes.
9. For all foundation works in OHE/Feeder/PSI works – M-15 concrete shall be used and for core – M – 20 concrete shall be used with 20mm ballast for both the concrete.
10. For every 50 m³ of concrete casted, three samples of test cubes of size 15x15x15 cm shall be made and tested for crushing strength after 28 days at any government approved agency/colleges. If any sample test cube fails, the performance of the foundations will be observed for a period of one year from the date of casting for any crack or disintegration; if found satisfactory, payment for that batch will be made after the observation period.
11. If any foundation becomes obsolete due to change in track alignment etc during the execution of the work, the contractor may be asked to recast new foundation in lieu of the old. In such cases, the contractor is eligible to get payment for each such location under item .

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ITEM NO. 3 (a) (i) ERECTION OF TRACTION MASTS AND MAIN MASTS OF SWITCHING STATIONS AND LT SUPPLY TRANSFORMER STATIONS BY MANUAL/CRANE

The price shall cover cost for manual/crane erection, alignment and setting before grouting of individual traction mast and main mast of switching post and booster transformer stations, including dwarf mast and mast for L.T. supply transformer stations whether rolled or fabricated including those for headspan. Erection of traction mast also includes painting with cold galvanizing paint in rusted area and also removal of the bends if any in the mast supplied by Railways. The masts released under item no (31 L) may also have to be reused.

ITEM NO 3(a)(ii) Supply only of fabricated mast K,B,T & S series etc excluding S₁ to S₈ masts.

ITEM NO 3 (a) (iii) Supply only of BFB mast 8"x8", 6"x6" and RSJ 8"x6" & S₁ to S₈ masts

Note : For the purpose of payment, the weight of individual traction mast and masts of head span shall be determined for each type on the basis of the payable weights per metre length shown below for standard types. For special type mast the payable weight per metre length will be indicated by the purchaser at the time of approval of designs.

PAYABLE UNIT WEIGHTS FOR STANDARD MASTS

S.No.	Types of Masts	Weight in Kg per metre including Galvanisation.
1.	6" x 6" x 25.15 BFB	38.03
2.	162 X 154 X 27.1 KG BFB	38.00
3.	200 X 200 X 49.9 BFB	51.20
4.	8" X 6" X 35 CBS RSJ	53.39
5.	S 1	53.39
6.	S 3	76.40
7.	S 4	53.39
8.	S 5	111.53
9.	S 6	53.39
10.	S 7	76.40
11.	S 8	111.53
12.	K 100	23.70
13.	K 125	30.30
14.	K 150	38.18

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15.	K 175	43.72
16.	K 200	49.87
17.	K 225	57.50
18.	K 250	66.72
19.	B 100	27.71
20.	B 125	32.47
21.	B 150	38.92
22.	B 175	44.61
23.	B 200	49.92
24.	B 225	61.50
25.	B 250	70.72
26.	S 100	23.72
27.	S 101	19.98

Note for item 3(a)(ii)&3(a)(iii) The purchaser reserve the rights to change the quantities among the item No. 3(a)(ii) and 3(a)(iii) as the rate are equal.

ITEM NO. 3 (b) (i) SUPPLY AND ERECTION OF FABRICATED STEEL WORK OTHER THAN MAST BY MANUAL/CRANE.

The price shall cover cost of supply and erection, alignment and setting before grouting, wherever required, the portals, gantries, 2/3 tracks cantilever structures, booms. The price shall also include supply and erection of galvanized bolts, nuts washers etc. Wherever required as per approved designs and drawings. Drop arms will be paid under item No. 3(c)

NOTE FOR ITEM 3 (a), 3 (b) and 3 (c)

- (I) The price for the item 3 (a) and (b) shall also includes cost of stenciling of location number, contact wire height, stagger, implantation and Rail level including emergency telephone indication. On Mast/ Portal uprights in the manner as directed by the purchaser. The price shall also include the straightening of masts/ portal upright bent during transit and cutting of mast/ portals to suit the site conditions. The mast/structures cut to suit site condition, proportionate weight will only be paid under item 3(aii)/3(a)(iii)/3(b).
- (ii) For erection under items 3 (a) and 3 (b) the contractor can use his own road crane duly transporting the structures to site.
- (iii) The mast/ portals supplied under item 3 shall conforms to the following :
 - i) Quality of steel – ST 42-S of IS 226, IS – 2062
 - ii) Fabricated etc. – IS – 800

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- iii) Electric arc welding – IS – 816.

For galvanization of the mast, zinc confirming to grade ZN 99.99 and as per IS – 209 and 1966 shall be used. The Mast/ Portals shall be Galvanized as per IS 2629 of 1968 and the masts of Zinc coating shall not be less than 610 gms/ sq.m generally and in the case of polluted area, the steel galvanisation shall be 1000 gms/sq.m for all galvanised materials under this contract.

The mast/ portals which are not conforming to the standard mentioned above will be rejected.

- (iv) Temporary bonding of structure by means of 2 nos. of 8 SWG wire shall be done before boom erection, where proper bonding arrangement is not available.
- (v) In case mast erected due to any modifications/alterations and where OHE wiring is not done mast number plate and stenciling of number and other parameters as per RDSO directives have to be provided by the contractor. The cost of such number plates is included in the supply and erection schedules of item No. 3.
- (vi) The quantity schedule for item no 3(a)(ii), 3(a)(iii)&3(b)(i) are prepared based on certain drawings given during preparation of schedule. The purchaser reserves the right to change quantities among item no 3(a)(ii), 3(a)(iii) and 3(b)(i) during execution of works as per site requirements.
- (vii) If the purchase Engineer desires for the mast/ structure erected in between two main lines/yard lines to coat with different color bands for easy identification of elementary section, the contractor shall do so at no extra cost.

ITEM NO. 3 (b) (II) ARRANGING TRANSPORT CAR FACILITIES FOR INSPECTION OF INSPECTING OFFICERS/OFFICIALS.

The exact kilometer run only will be counted for payment purpose whether the transport is arranged from same place or from distance place. The vehicle will be used for inspection of sites by Officers/Engineers of this unit.

ITEM NO. 3 (C) SUPPLY AND ERECTION OF FABRICATED AND GALVANIZED SMALL PARTS STEEL WORK

The price shall cover the cost of supply and erection of the above steel works including fasteners which are to be supplied by the contractor as per the approved designs and drawings.

For standard fabricated steel work for which RDSO's approved drawings are available, the weight of steel work as specified in RDSO's drawing shall be considered for payment. However in case the unit sectional weight of any member indicated in RDSO's drawing is not in conformity with the unit sectional weight as per the latest IS specification the weight of the fabricated steel work, shall be calculated on the basis of latest IS specification and the same will be considered for payment. For the non standard fabricated steel work the calculated weight to be considered for payment under this item shall be included in the relevant drawing based on latest IS sectional weight at the time of submitting the designs for approval of the purchaser. All type of Drop arm with accessories, Pedestal Insulator outrigger (with mast/structure) and feeder super (individual or on portal) mast, 3121/3122 will only be paid under this schedule. Other small parts steels provided if any are considered in the schedule of works other than 3(c).

ITEM NO. 3 (d) Deleted

NOTE FOR ITEMS 3 (a), (b) & (c)

For the purpose of payment against items 3 (A), (B) & (C) weight for structures or fabricated steel work will be calculated according to the weight of black steel given in section books for the lengths of

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various members shown in the approved drawings. There will be no addition for increased weight due to galvanizing or painting or weld material or reduction for holes or skew cuts. If the weight of structure received by the contractor is less than the weights specified for the standard mast, payment shall be made for less weight only.

If purchaser desires to provide For bridge mast, 32mm diagalvanised hard steel bolts or as required – 4 Nos. with necessary washer, nut and check nut, The bolt shall be 32 ϕ x 1110/300 mm or as required by the purchaser. The weight of the same may be got approved by the purchaser. The cost of the bolt, washer, nut and check nut will be paid as per the weight approved by the purchaser under item 3(C). For bridge mast if any angle/channel arrangement is required to be provided as per purchase engineers directive. The same also will be paid under item 3 (C).

If purchaser desires to use stainless steel bolt & nuts for bridge mast, the cost of SS bolt & nut will be paid on mutually agreed rates.

ITEM NO. 3 (e) SUPPLY AND ERECTION OF GUY ROD ASSEMBLY

The price shall cover supply and erection of guy rod assembly of various lengths for traction masts, feeder line towers or supports complete with mast /structure guy rod anchor fittings, guy rod with anchor attachment if any, with mast and part/s be grouted in the anchor block. The price shall not include the cost of supply and erection of a dwarf or stub mast with anchor plates drilled and welded in position. Such location for anchorage, small parts steel work, complete with bolts and nuts etc. If any, for attach in the mast, guy rod fittings to the mast/ structure which is also included in this schedule of work. No extra rates are payable for the small parts steel items used if any.

COMPONENTS REQUIREMENT

Rly Id No.	Description of Components	Qty per unit	
3232 or suitable Mast guy rod fitting (welded) complete with attachment with mast/structure as the case may be	4 short bolts nuts lock nuts and washers for attachment to masts/ SPS including appropriate fittings for portal structures of various designs.	1	Off
5001/ 5001-1/ 5001-3	Anchor Bolts (complete with nuts lock nuts and split pint)	1	Set
5002	Guy rod stirrup	1	Off
5004 or 5005 or 5006 – 1	Guy rod with nut washer and split pin	1	Off
5007-1	Anchor 'V' bolt	2	Off
5008	Anchor loop	2	Off
5220	Guy rod double strap assembly	1 Off or 2 Off (as required)	

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Note : 1. In case the contractor desires to adopt a different design for guy rod assembly, the same shall be indicated by him in the Tender and the components required should be clearly listed under this item as deviation.

2. Supply and erection of guy rod assembly at anticreep, portals will also be paid for under this item.

ITEM NO. 4 (a) (I)(a) SUPPLY AND ERECTION OF A SINGLE BRACKET ASSEMBLY (INCLUDING STAY AND BRACKET INSULATORS)

The price shall cover on a flat rate basis any bracket assembly on a traction mast or support or drop arm, and shall include those of high/ low level platform, in the vicinity of turnouts, over bridges or overlaps and at locations with reduced encumbrance or terminating wires. The price shall include cost of supply of all components galvanized steel tubes, 5 mm dropper wires including adopter small parts steel work complete with bolts and nuts etc. if any. The price shall cover erection of all components including solid core insulators, dropper wires and small parts steel work excluding MCC i.e., 3121/3122 in the case of multiple cantilever locations. This include the anticreep centre arrangement at masts/ structures. The price shall include:

Rly Id No.	Description of Components	Qty per Unit
3020	Mast fitting for hook insulator with 2 of bolts, nuts, locknuts washers of 16 mm	1 set or as required.
2400	Tubular stay arm assembly (including description of components galvanized steel tube)	1 set or as required
2110/2130	Catenary suspension bracket assembly or hook	1 Off
2380 1160/2120	Bracket Suspension clamp	1 Off (as required
2040	Bracket tube assembly complete with tube cap or	1 set
2080	and sleeve where required (including galvanized steel tube).	
3070-1/2	Mast Bracket fitting assembly including 2 off bolts, nuts locknuts and washers of 16 for attachment to structure or to small part steel work.	1 set
2150-1/ 2160-1	Register arm hook assembly complete with bolts, nuts and locknuts.	1 Off
6000-1	Stay arm insulators –	1 Each or as required
6030-1	Bracket insulators -	1 Each or as required
2420 2430	Register arm assembly or raised register arm assembly (including galvanized steel tube).	1 Set
2270-4 or 5 2460	Register arm dropper assembly including 5 mm style dropper wire, complete bolts, nuts etc.	1 Set
2390/2540 2520	BFB steady arm or bent steady arm (where required)	As required

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2360/2490-2	25 mm steady arm drop bracket/ clamp	do
3131 & 3076	Adoptors & Backing angle	do
1220/	Contact wire swivel clip or raised register	1 off
1370/-1(Mod-F)	arm clamp	
<u>2550-1/2</u>	<u>antiwind clamp</u>	<u>as required</u>

ITEM NO. 4 (a) (I)(b) SUPPLY AND ERECTION OF A SINGLE BRACKET ASSEMBLY WITHOUT ISULATORS

The price shall cover on a flat rate basis any bracket assembly on a traction mast or support or drop arm, and shall include those of high/ low level platform, in the vicinity of turnouts, over bridges or overlaps and at locations with reduced encumbrance or terminating wires. The price shall include cost of supply of all components galvanized steel tubes, 5 mm dropper wires including adopter small parts steel work complete with bolts and nuts, SS bolts and nuts required for fixing the insulators etc. if any except for the Insulators. Insulators will be supplied by the Purchaser. The price shall cover erection of all components including solid core insulators, dropper wires and small parts steel work excluding MCC i.e., 3121/3122 in the case of multiple cantilever locations. This include the anticreepcentre arrangement at masts/ structures. The price shall include :

Rly Id No.	Description of Components	Qty per Unit
3020	Mast fitting for hook insulator with 2 of bolts, nuts, locknuts washers of 16 mm	1 set or as required.
2400	Tubular stay arm assembly (including description of components galvanized steel tube)	1 set or as required
2110/2130	Catenary suspension bracket assembly or hook	1 Off
2381	bracket	
1160/2120	Suspension clamp	1 Off (as required)
2140		
2040	Bracket tube assembly complete with tube cap	1 set
2080	and sleeve where required (including galvanized steel tube).	
3070-1/2	Mast Bracket fitting assembly including 2 off bolts, nuts locknuts and washers of 16 for attachment to structure or to small part steel work.	1 set
2150-1/	Register arm hook assembly complete with bolts,	1 Off
2160-2	nuts and locknuts.	

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2420 or Register arm assembly or raised register arm		1 Set
2431 assembly (including galvanized steel tube).		
2270-4 or 5 Register arm dropper assembly including 5 mm		1 Set
2460 style dropper wire, complete bolts, nuts etc.		
02 or 2470		
style – 022390/2540 BFB steady arm or bent steady arm		As required
2360/2490-2 25 mm steady arm drop bracket/ clamp		do
3131 & 3076 Adoptors & Backing angle		do
1220/ Contact wire swivel clip or raised register		1 off
1370/-1(Mod-F) arm clamp		
2550-1/2 antiwind clamp		as required

Note: If the area falls under polluted zone, long creepage insulator of 1600 mm to be used.

Wherever cantilevers are supported in drop arms with track centre more than 4.72 m, drop arm cantilevers shall be with 2.35 m setting distance. The cantilevers provided on drop arm assemblies and individual mast shall invariably be provided with large bracket tube. This is applicable to all types of bracket assemblies under item no. 4. For track centre less than or equal to 4.72m, drop arm cantilevers shall be with a minimum of 2.15 m setting distance.

ITEM NO. 4 (a) (II) EXTRA ON 4(a)(I) FOR SUPPLY AND ERECTION OF ADDITIONAL FITTINGS ON A SINGLE BRACKET ASSEMBLY FOR SUPPORTING TWO OHES

The price is applicable as an extra to item 4(a)(i)(a) or 4(a)(v) for the provision of additional fittings required to support an additional OHE on a single bracket assembly payable under item 4(a)(i)(a) or 4(a)(v). The price shall include supply of all extra fittings including the double contract wire swivel clip, if any.

ITEM NO. 4(a)(III)(a) SUPPLY & ERECTION OF A SINGLE BRACKET ASSEMBLY SUITABLE TRAMWAY TYPE OVERHEAD EQUIPMENT (REGULATED) INCLUDING STAY AND BKT INSULATORS.

The price shall cover on a flat rate basis any bracket assembly on a traction mast or support on drop arm and shall include those on high level platform in the vicinity of turnouts over-bridges or overlaps and at locations with reduced encumbrance or terminating wires. The prices shall include the cost of supply of all components including dropper galvanized steel tubes, including wires small parts steel work complete with bolts and nuts etc. If any. The price shall cover erection of all components including solid core insulator, dropper wires and small part steel work excluding MCC i.e., 3121/3122 in the case of multiple cantilever locations. This include the anti creep arrangement at masts/ structures. The price shall include:

Rly Id No.	Description of Components	Qty per unit
3020	Mast fitting for hook insulator with 2 of bolts, nuts, locknuts washers of 16 mm	1 set or as required.

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2400	Tubular stay arm assembly (including description of components galvanized steel tube)	1 set or as required
2110/2130	Catenary suspension bracket assembly or hook	1 Off bracket
1160/2120	Suspension clamp	1 Off (as required)
2040 2080	or Bracket tube assembly complete with tube cap and sleeve where required (including galvanized steel tube).	1 set
3070-1/2	Mast Bracket fitting assembly including 2 off bolts, nuts locknuts and washers of 16 for attachment to structure or to small part steel work.	1 set
2150-1/ Register 2160-3	arm hook assembly complete with bolts, nuts and locknuts.	1 Off
6000-1	Stay arm insulators –	1 Each or as required
6030-1	Bracket insulators -	1 Each or as required
2420 or Register 2432	arm assembly or raised register arm assembly (including galvanized steel tube).	1 Set
2270-4 or 5 2460 style 02 or 2470 style – 02	Register arm dropper assembly including 5 mm dropper wire, complete bolts, nuts etc.	1 Set
2390/2540 2520	BFB steady arm or bent steady arm (where required)	As required
2360/2490-2	25 mm steady arm drop bracket/ clamp	do
3131 & 3076 1220/ 1370/-1(Mod-F) 2550-1/2	Adaptors& Backing angle Contact wire swivel clip or raised register arm clamp antiwind clamp	do 1 off <u>as required</u>

ITEM NO. 4(a)(III)(b) SUPPLY & ERECTION OF A SINGLE BRACKET ASSEMBLY SUITABLE TRAMWAY TYPE OVERHEAD EQUIPMENT (REGULATED) WITHOUT INSULATORS.

The price shall cover on a flat rate basis any bracket assembly on a traction mast or support on drop arm and shall include those on high level platform in the vicinity of turnouts over-bridges or overlaps and at locations with reduced encumbrance or terminating wires. The prices shall include the cost of supply of all components including dropper galvanized steel tubes, including wires small parts steel work complete with bolts and nuts etc. If any, except for Insulators. Insulators will be supplied by the purchaser. The price shall cover erection of all components including solid core insulator, dropper wires and small part steel work excluding MCC i.e., 3121/3122 in the case of multiple cantilever locations. This include the anti-creep arrangement at masts/ structures. The price shall include:

Rly Id No.	Description of Components	Qty per unit
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3020	Mast fitting for hook insulator with 2 off bolts nuts, locknuts and washers of 16 mm	1 Set
2400	Tubular stay arm assembly (including tubular stay sleeve and tubular stay adjuster)	1 Set
2380	Hook bracket	1 Set
2140/1160	Large catenary direct clamp/Suspension clamp	1 Set
3131 & 3076	Adopter & Backing angle	As required
2160-1	Large register arm hook	1 Set
2080	Large bracket tube assembly complete with tube cap and sleeve (including galvanized steel tube) (40/49 mm)	1 Set
3070-1/2	Mast bracket fitting assembly including 2 off bolts, nuts, locknuts and washers 16 mm	1 Each
2540-1	BFB steady arm assembly	1 Each
2550-3	Standard antiwind clamp	1 Each
1220	Contact wire swivel clip	1 Each

**ITEM NO. 4 (a) (IV) EXTRA ON ITEM 4 (a) (III) FOR SUPPORTING TWO TRAMWAY
TYPE OHE (REGULATED)**

The price is applicable as an extra to item 4 (a) (iii) for the provision of additional fittings required to support an additional OHE on complete bracket assembly payable under item 4 (a) (iii). The price shall include supply of all extra fittings, including the contact wire swivel clip.

**ITEM NO. 4 (a) (V) SUPPLY AND ERECTION OF SINGLE BRACKET ASSEMBLY FOR
COMPOSITE OVERHEAD EQUIPMENT**

SAME AS 4 (A) (I)

**ITEM NO. 4 (b) (I) SUPPLY AND ERECTION OF PULL OFF ARRANGEMENT FOR ONE
OHE**

The price shall cover supply for all components required for a pull off arrangement to pull one equipment only including headspan mast fittings, complete with M.S. angle equilibrating plate assembly steady arm catenary, dropper clip, contact wire swivel clip and fittings, conductors, small jumper (50) wire. The price shall cover supply and erection of all components including solid core insulators small jumper wire and conductors as required.

ITEM NO. 4 (b) (II) EXTRA FOR EACH ADDITIONAL EQUIPMENT PULLED

The price shall cover as an extra to item 4 (B) (I) or 4 (B) (iv) supply and erection of additional fittings required in case of the pull off to pull more than one equipment. The price is applicable for each extra equipment pulled.

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ITEM NO. 4 (b) (III) SUPPLY AND ERECTION OF A PULL-OFF ARRANGEMENT FOR REGULATED TRAMWAY TYPE OHE.

The price shall cover supply of all components required for a pull off arrangement to pull one equipment only complete with steady arm, contact wire ;swivel clip and fittings, conductors. The price shall cover erection of all components including solid core insulators, small jumpers and conductors as required.

ITEM NO. 4 (b) (IV) - Deleted –

NOTE : No extra payment shall be admissible under item No. 4 for bracket assemblies on platform structures with extra insulators to support cantilever assemblies,

ITEM NO. 5 (a) (I) SUPPLY AND ERECTION OF MOUNTING ARRANGEMENT FOR SPAN WIRE

The price shall cover supply of all components including adjusters, terminal fittings and mast attachments required to attach a span wire of a head span wire or a cross span wire or a steady span wire or a support span wire for supporting contact wire only at both ends to traction masts/ structures or special brackets. The price shall not include the cost of small parts steel work if any. The price shall cover erection of all components including mounting arrangements for span wire and including solid core insulators but excluding small parts steel work if any.

ITEM NO. 5 (a) (II) SUPPLY AND ERECTION OF A SPAN WIRE.

The price shall cover supply and erection of a span wire per metre. The payable length shall be the horizontal distance between the inner faces of all traction masts/ structures on which the mast attachments are mounted.

No extra length shall be provided for Sag. The price is applicable for all types of span wires including head span wires. Erection of a metre beyond the first decimal shall be rounded off to the nearest first decimal.

ITEM NO. 5 (b) SUPPLY AND ERECTION OF SUSPENSION OF ONE CONVENTIONAL OHE/ FROM HEADSPAN

The price shall cover supply of a suspension assembly to carry complete all copper OHE on head spans inclusive of all dropper assemblies inclusive of dropper wire and from head span, cross span, steady wire attachment, steady arm/ rod catenary suspension clamps and other fittings required to make complete suspension arrangements for copper OHE/ composite OHE on head span. The prices shall cover the erection of all components, fittings and droppers for suspension of OHE from head span.

ITEM NO. 5 (c) SUSPENSION/ REGISTRATION FOR CONTACT WIRE ONLY

The price shall cover supply and erection of all fittings required for suspension/ registration of a contact wire only whether under head spans carrying other types of OHE or not or on any bracket for carrying contact wire only. The price shall include the followings.

Vee clamp or double vee clamp with adjuster or steady arm with steady wire clamp. Contact wire swivel clip.

ITEM NO. 6 (a) SUPPLY (excluding supply of copper contact wire and catenary wire) AND ERECTION OF OVERHEAD EQUIPMENT ONLY BY MANUAL.

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The price for above shall cover erection of (19/2.5 sq.mm) 95 sq. mm pure copper/65 sq. mm cadmium copper Catenary , Hard drawn 107 sq. mm copper contact wire and 130 sq.mm feeder tail wire if any and supply and erection of 5 mm dropper wire, and components including dropper clips, parallel clamps for PH/F/H/Cjumping and splices (where their use is approved) dropper wire, PH/F/H/C jumper wire and terminating wire/s and including small parts steel works complete with bolts and nuts etc for attachment of number plates to mast/ structure. The price shall cover erection of all components and wires and conductors including contact wire, catenary, droppers, PH/F/H/C jumpers and terminating wires including small parts steel work, if any.

The price shall cover adjustment of OHE height and stagger at the specified rail level and any further adjustment of OHE height and stagger along with track packing/ permanent way works as and when required till the final track position by Engineering branch and will be paid under item No. 31(a).

Rly Id No.	Description of components	Qty per Unit
1040-2	Contact wire parallel clamp small	As required
1180	Contact wire dropper clip (107)	- do –
1192	Catenary dropper clip complete with bolts, nuts etc. Retro reflective/Enamel Structure no. plates complete with 2 S.S. bolts dia 10 x 35/30 nuts and rubberWasher for dia	- do – -do- 10 bolts
ETI/OHE/76	Contact wire 107 Sq. mm	will be supplied by railways
ETI/OHE/3 (2/94)	Annealed standard Copper jumper wire for PH/F/H/C jumpers with PG clamps	As required
ETI/OHE/50	Cadmium Catenary Wire 65 Sq. mm/95 sq. mm By railways.	will be supplied

ITEM NO. 6 (b) SUPPLY (Excluding supply of copper contact wire) AND ERECTION OF CONTACT WIRE ONLY.

The price shall cover erection of contact wire only. The price shall exclude termination which will be paid for under item 8. The price shall include the supply of small part steel works complete with bolts and nuts for attachment of Enamel number plates to masts/ structures.

Rly Id No.	Description of components	Qty per Unit
	Hard drawn copper contact wire (107 sq. mm) (As per RDSO's Spec. Np. ETI/OHE/76 (6/97) with A & C Slip no. 1,3&4 Enamel number plates complete with	To be Supplied by Railways As required

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Fastenings.

ITEM NO. 6 (c) SUPPLY (excluding supply of copper contact wire) AND ERECTION OF TRAMWAY OHE WITH CONTACT WIRE ONLY (REGULATED WITH CATENARY WIRE BY MANUAL MEANS).

The price shall cover erection of Tramway OHE with catenary and contact wire. The price shall exclude termination, which will be paid for under item 8. The price shall include provision of Catenary with clamps and two droppers including clips, Enamel number plates on traction masts/ structures. **The price shall also include the supply of Catenary wire**, small part steel works complete with bolts and nuts for attachment of enamel number plates to masts/ structures. The hard-drawn copper contact wire and bridle wire used shall confirm to RDSO's latest specification.

ITEM NO. 6 (d) SUPPLY AND ERECTION OF COMPOSITE OVERHEAD EQUIPMENT ONLY

Deleted

Special Note for items under 6 a, 6 b, 6 c

1. All bolts and nuts below 14 mm dia on current carrying parts of OHE shall be stainless steel.
2. The rate for supply and erection of all materials for providing a false catenary/Insulated catenary (in the conventional OHE as also in anti-creep wire) together with contact wire/Insulated Catenary, contact wire ending clamp, catenary ending clamp, double strap etc including profiling of OHE under ROBs, FOBs as prescribed by purchaser's Engineer shall be paid under Item No. 6(b), 15(a), 31(a), 31(d) extra as required.
3. All type of insulators shall be tested at site for Mechanical Proven test before erection.
4. All sizes of contact wire shall be drawn out of continuous cast copper rods only shall be procured.
5. Jumpers like PH, H, C and F jumpers in the IOL's/NS included under this schedule of work, shall be of 50 sq. mm flexible jumper wire. 'G' jumper to be paid under item 10(a), (b) & (c) which are not included in the scope.
6. Where proper bonding is not available, temporary bonding of mast/structures shall be done by means of two nos. 8 SWG GI wire, before wiring is done.
7. The rate also includes supply and erection of 25 kV restricted clearance and power block working limit caution boards as required by the purchaser. The rate includes supply and erection of fabricated/small parts steel required to erect the caution boards.
8. Insulated catenary wire shall be provided under the over line structures, where long time clearances is less than 320 mm .
9. The number plate so provided under this schedule of work shall be 4 nos of retro reflective type and balance of enamel paint type for a km. Two nos each retro reflective type number plate shall be provided in the starting and ending of km mast/structure

NOTE FOR MEASUREMENTS

For the purpose of measurement against Item 6 (a), (b), (c) & (d) the length of over head equipment which shall include terminating wires shall be measured from the centre lines of the traction masts/ structures at which the two ends of each tension length of over head equipment are anchored.

The length shall be the difference between the actual chainages of the two traction masts/ structures which the ends of each tension lengths are anchored or by the sum of the actual spans between the same two points which ever is higher is include in the "as erected" layout plans. For purpose of progress payment reference to layout plans as approved shall be made.

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The price under items 6 (a), 6 (b), 6 (c) and (d) does not cover the cost of supply and erection of insulator if any, which shall be paid for under item 11.

In the case of splicing and extension of anchored OHE / OHE, the actual length of wire used at site from ending clamp/splice to the splice/ending clamp will be reckoned for measurement purpose under item no. 6.

ITEM NO. 7 (a) SUPPLY AND ERECTION OF ALL ALUMINUM RETURN CONDUCTOR (SINGLE SPIDER)

The price shall cover supply and manual erection of a return conductor made of single all aluminum bare, hard drawn conductor 19/3.99 mm (SPIDER). The price shall not include the cost of suspension assembly (which will be paid for under item 11) and termination (which will be paid for under item 8) but includes small parts steel work, complete for anchoring with bolts, nuts etc if any. The price shall also cover on a flat rate basis the cost of supply of splices to the extent required.

ITEM NO. 7 (b) Deleted

ITEM NO. 7 (c) SUPPLY AND ERECTION OF EARTH WIRE

The price shall cover supply and erection of earth wire made of 7/4.09 mm steel reinforced aluminium conductor (RACCOON) excluding termination which will be paid under item 8 and shall include cost of fittings on structures for supporting the earth wire including bonding of the earth wire to the structure by suitable jumpers and 40 x 6 mm bond with structure to earth electrodes or a non – track circuited running rail or impedance bond which will be provided by the purchaser. The price shall include erection of disc insulators; cut in insulators to isolate sections of earth wire and the cost of small parts steel works complete with bolts and nuts to attach the earth wire mast clamp to masts/structures, if any. The rate includes the cost of provision of flat armour tape used at the mast/structure support as per standard length with end ferrules.

ITEM NO. 7 (d) SUPPLY AND ERECTION OF 25 KV FEEDER (INCLUDING 150 SQ. MM WIRE)

The price shall cover supply and erection of a 25 kV feeder along or across track made of a 150 sq. mm copper wire (37/2.5 mm) Drop jumpers/Jumpers from this wire shall be of 160 sq.mm wire with 1050-3 PG clamps which will be paid under 15 (A)

NOTES FOR MEASUREMENTS

1. THE PRICE UNDER ITEMS 7 (A), (B), (C) & (D) SHALL NOT INCLUDE Termination which will be paid for under item 8

The connection (a) between feeders, or return conductors and (b) of feeders or return conductors to a bus bar, overhead equipment or which will be paid for under item 15 and Cut-in-insulators and suspension insulators which shall be paid for under item 11.

2. For the purpose of payment against Item 7 (A),(B), (C) and (D) the length of feeders, return conductors or earth wire shall be measured from the centre lines of the mast/ structure at which the two ends of each length of feeder or conductor run are anchored by adding actual spans. In case of feeder return conductors crossing a track, the length shall be measured between the faces of traction masts/ structures at which the two ends of the cross feeder or return conductors are anchored as indicated in the as erected structure erection drawings for

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traction masts/ structures. For purposes of progress payment reference to “as approved drawings” shall be made.

ITEM NO. 8 (a) (i) SUPPLY AND ERECTION OF A REGULATING EQUIPMENT (WINCH TYPE WITH NORMAL COUNTER WEIGHT ASSEMBLY)

-- DELETED --

ITEM NO. 8 (a) (ii) EXTRA FOR REGULATING EQUIPMENT WITH TRAPEZODIAL COUNTER-WEIGHTS

-- DELETED --

ITEM NO. 8 (a) (iii) SUPPLY AND ERECTION OF REGULATING EQUIPMENT (WINCH TYPE) WITH COUNTER WEIGHT ASSEMBLY (LIGHT) FOR TRAMWAY TYPE OHE (REGULATED).

-- DELETED --

ITEM NO. 8 (a) (iv) SUPPLY AND ERECTION OF REGULATING EQUIPMENT WITH CEMENT CONCRETE COUNTER WEIGHT

-- DELETED --

ITEM NO. 8 (a) (v) SUPPLY AND ERECTION OF REGULATING EQUIPMENT (3 PULLEY TYPE) MODIFIED WITH COUNTER WEIGHT ASSEMBLY FOR CONVENTIONAL/ COMPOSITE OHE.

The price shall cover supply of regulating equipment, SS wire rope, anti falling rod of suitable length, counter weight and small part steel required for fixing with mast /structure for regulating equipment and anti falling rods . Suitable forged clevis as approved by RDSO for fixing with mast/structures to be used.. In case of old type of regulating equipment, the same is to be replaced by new type of regulating equipment consequent to any modifications/request by the purchaser. The rate includes above also. The price shall cover supply and erection of all items given above including 665 kg of counter weight. The price shall also cover adjustment of the entire regulating equipment. The price shall not include supply and erection of termination which will be paid for under item no. 8 (b). The price shall also includes for marking 15°, 35° and 45° deg temperature marking on the BWA mast and colour band including the half tension lengths as required by the purchaser for items under 8(a)

ITEM NO. 8 (a) (vi) SUPPLY AND ERECTION OF REGULATING EQUIPMENT (3 PULLEY TYPE) MODIFIED WITH COUNTER WEIGHT ASSEMBLY FOR TRAMWAY TYPE OHE (REGULATED)

Same as 8 (a) (v) above but with counter weight assembly confirming to style 01 of the relevant termination arrangement drawing No. ETI/ OHE/G/04212 or latest.

ITEM NO. 8 (b) (i) SUPPLY AND ERECTION OF MATERIALS FOR TERMINATION OF SINGLE CONDUCTOR OF OVERHEAD EQUIPMENT

The price shall cover supply of all material necessary for the termination of single conductor of overhead equipment on traction mast or structure, including appropriate mast anchor fittings including suitable attachment with mast/structure, backing angle, cleaves assembly, adjuster, anchor double

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straps, ending clamp for the catenary or contact wire or terminating wire and fitting including 9 tonne porcelain insulator assembly but excluding terminating wire if any. The price shall cover erection of all materials including the 9 tonne conventional porcelain insulator assembly and except terminating wire if any.

Note : In case if 'V' type anchorage is adopted for terminating a single conductor such an arrangement would be counted as two off under item 8 (b) (I) for the purpose of payment.

ITEM NO. 8 (b) (ii) SUPPLY AND ERECTION OF MATERIALS FOR TERMINATION OF DOUBLE CONDUCTOR (CONVENTIONAL/COMPOSITE OHE)

The price shall cover supply of all materials necessary for the yoked termination of two overhead equipment conductors on a traction mast or structure including appropriate mast anchor fitting including attachment with mast/structure, Backing angle, cleaves – assembly three adjusters, ending clamps for catenary and contact wire anchor double strap assembly, equalizing/ compensating plate and fittings including 9 tonne conventional porcelain insulator assembly in a FTA/RE location but excluding the termination wire if any. The price shall cover erection of all materials including the 9 tonne conventional porcelain insulator assembly. When anchoring of a OHE (Both catenary and contact wire) through large span wire (130 sq. mm) is done, supply and erection rate for termination will be paid under this schedule of work.

ITEM NO. 8 (b) (III) SUPPLY AND ERECTION OF MATERIALS FOR TERMINATION OF RETURN CONDUCTOR (SINGLE SPIDER)

The price shall cover supply of all materials required for the termination of all aluminum return conductor (SPIDER) including appropriate mast anchor fittings including attachment with adjuster, strain clamp end fitting 9 tonne conventional porcelain insulator assembly and Backing angles if any. The price shall cover erection of all materials including the 9 tonne conventional insulator assembly.

ITEM NO. 8 (b) (IV) SUPPLY AND ERECTION OF MATERIALS FOR ANTICREEP TERMINATION (ONE END)

The price shall cover supply and erection of all materials required for termination of Anticreep wire alone on one side. This includes appropriate mast Anchor fittings including attachment with mast/structure, Backing angle if any, clevis assembly, adjuster, distance Rod if any, 9 tonne conventional porcelain insulator, wire ending clamp Double straps etc. The wire used for extension of anti creep wire shall be paid under schedule-3. Payment for the terminations of anti creep wire -2 nos and wires provided on bridge mast if any shall be paid under this schedule

ITEM NO. 8 (b) (V) SUPPLY AND ERECTION OF MATERIALS FOR TERMINATION OF AN EARTH WIRE (RACCOON)

The price shall cover supply and erection of all materials required for the termination of an earthwire Raccoon including appropriate mast anchor fittings including attachment with mast/structure, adjuster, terminal clamp end fittings, and backing angles.

ITEM NO. 8 (b) (VI) SUPPLY AND ERECTION OF MATERIALS FOR TERMINATION OF TRAMWAY TYPE OHE (REGULATED)

The price shall cover supply and erection of all materials required for the termination of a single contact wire (Regulated) including 9 tonne conventional insulator and will exclude the parts covered under item 8(a)(iii)/ (vi).

ITEM NO. 8 (b) (VII) SUPPLY AND ERECTION OF MATERIALS FOR TERMINATION OF DOUBLE CONDUCTORS FOR COMPOSITE OHE.

Deleted –

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ITEM NO.8(b) (VIII) SUPPLY AND ERECTION OF MATERIALS FOR TERMINATION OF AN ALUMINUM CONDUCTOR OF THE COMPOSITE OVERHEAD EQUIPMENT.

Deleted –

ITEM NO.8 (b) (IX) SUPPLY AND ERECTION OF MATERIALS FOR TERMINATION OF 25 KV TERMINATING WIRE (150 SQ.MM) COPPER CROSS TRACK/ ALONG TRACK FEEDER.

The price shall cover supply of all materials necessary for termination of terminating wire 150 sq. mm Copper on a structure for cross track or along track including appropriate anchor fittings, Backing angle, Cleaves assembly, adjuster anchor double straps, ending clamp for 150 sq. mm Copper wire and fitting including 9 tonne conventional porcelain insulator assembly and but excluding terminating wire (150 sq. mm Copper) if any. The price shall also cover erection of all materials including 9 tonne conventional insulator assembly and excepting terminating wire if any.

NOTES TO ITEM 8

1. Anchor fittings including suitable attachment for mast/structure and backing angle complete with bolts and nuts wherever required is included in this item.
2. The price under item 8 (b) (iii) shall not include the cost of jumper connection (i) between feeders or return conductors and (ii) or feeders or return conductor to a busbar, Overhead equipment which will be said for under item 15.
3. The price under items 8 (b) (i) to 8 (b) (vi) shall also include the cost of double eye distance rod (Id. No. 5183) if proved for any type of terminations.
4. Supply and erection of materials for terminations of catenary wire on either side of the portal at anticreep locations or at bridge face will also be paid for under this item.
5. As per site requirement if the termination 9 tonne insulator is to be shifted to mid span of Anchor span no extra rate for shifting at the time of erection is admissible.
6. The price including provision of spacer pipes to be provided in anti-falling device as per tension length and marking of 15⁰ C, 35⁰ C and 45⁰ C marks on the mast/structures as per standard width and colour code in vogue.
7. Due to some reason or other OHE and guy rods are provided with two separate anchor fittings, no extra rates are admissible for any of the materials provided extra.
8. In regulating equipment, SS wire rope the manufacturers identification mark ferrules should be kept on cast iron weight side.

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9. Erection rates under item No. 8 also includes the temporary termination of OHE/Feeder/RC wires on structures/mast during modification also during the wiring works, where temporary termination is done. – For such terminations supply rates are not admissible.
10. The insulator provided for terminations in normal zone and for polluted and red zone, shall be 9 tonneporcelain insulator (1050 mm creepage).
11. Anti falling device rod shall be fixed on mast/structure as per RDSO drawing No.TI/DRG/OHE/ATD/RDSO/00009/06/0.and no extra payment is admissible for the above arrangement.

ITEM NO. 9 (d) SUPPLY (excluding supply of copper conductor) AND ERECTION OF ANTICREEP WITH PURE/CADMIUM COPPER CATENARY WIRE

The price shall cover the supply of all materials for anticreep including adjusters, mast anchor fittings at its terminations on either side of structure, ending clamps including 9 tonneporcelain insulator, mast anchor fitting and backing angle as required. The price shall cover erection of all materials including pure/cadmium copper catenary wire, 9 tonnepoecelain insulators assembly and small parts, steel work if any.

Rly Id No.	Description of Components	Qty per Unit
	Pure/Cadmium copper catenary wire (65 sq. mm)	Will be supplied By Railways
6020-1	9 tonne insulator assembly	
6020-2	–Polluted zone	- 2 Nos.
6020-3	type for Polluted area	
1120	Catenary ending clamp (65)/ 1360	As required
5020	9 tonne adjusters	as required
5030	Anchor double strap assembly	As required
5040	Clevis assembly	2 Off
3231	Mast anchor fitting including suitable attachment for mast /structure with bolts nuts and backing angle	2 Sets
1170	Double suspension clamp	1 Off
5183	Double eye distance rod	As required

Anti creep provided on single bridge mast shall be paid under item No. 8(b)(iv)

ITEM NO. 9 (e) SUPPLY (excluding supply of copper conductor) AND ERECTION OF ANTI CREEP WITH PURE/CADMIUM COPPER CATENARY WIRE SUITABLE FOR TRAMWAY TYPE OHE (REGULATED)

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Same as item 9 (d) with the following changes. Id. No. 2140 large catenary contact clamp to be used in place of Id. No. 1170.

Notes for Item No. 9:

No extra rate is admissible for double eye distance rod provided if any. As per site requirement if the termination insulator is to be shifted in the same wire to any other place, no extra rate is admissible.

Wherever Portal structures are provided, the anti-creep wire shall be terminated on uprights crossing number of tracks as required.

In case the anti-creep extends beyond one span on either side of anti creep center, payment for the extra spans shall be made on pro-rata basis.

Wherever anti-creep wire passes through underneath the over-line structures as desired by the purchaser, contact wire shall be provided in lieu of anti-creep wire for suitable length.

Anti-creep termination insulators shall be of normal porcelain type 9 – tonne insulators for normal zone and polluted 9 – tonne insulator for polluted and Red zone areas.

Where 65 sq.mm cadmium copper catenary wire is used for conventional /tramway OHE, the anti creep wire shall also be of 65 sq.mm cadmium copper catenary wire. In case 95 sq.mm pure copper catenary wire is used for conventional /tramway OHE, the anti creep wire shall be of 95 sq.mm pure copper catenary wire.

ITEM NO. 10 (a) EXTRA ON ITEM 6 (a), 6 (b), 6 (c) AND 6 (d)

(B) FOR SUPPLY AND ERECTION OF ADDITIONAL FITTINGS

(C) REQUIRED AT A TURNOUT, DIAMOND CROSSING FOR OVERLAP.

The price shall cover on flat rate basis supply of additional components and fittings required at turnouts, crossings or overlaps (un-insulated overlaps) knuckle or crossing equipment at a turnout, or a diamond crossing and parallel clamps/ bimetallic parallel clamp for jumper connections between two sets of overhead or equipment conductor at a turnout, diamond crossing, Insulated and Un-Insulated overlaps or neutral section including jumper wire. The price shall cover erection of all materials including jumper wire and all adjustments required at turnouts, diamond crossing, overlaps and neutral section.

The price shall not include extra bracket assemblies overhead equipment, termination of overhead equipment and cut-in-insulators in the case of insulated overlap and neutral section which will be paid for under items 4, 6, 8 and 11 respectively.

Note : A cross over shall be paid for as 2 off of Item 10, special configuration of OHE commonly known as overlap shall be paid for as 1 off under this item. This shall apply in case of the overlap used in changing over from regulated to unregulated equipment or unregulated to regulated equipment.

ITEM NO. 11 (a) (I) SUPPLY AND ERECTION OF PORCELAIN CUT-IN-INSULATOR.

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The price is applicable to the provision of an additional 9 tonneporcelain cut-in-insulator on a flat rate basis such as in a headspan, cross span or in span wire or an overhead equipment conductor at an insulated overlap, in anti-creep any additional insulators provided. The price shall cover supply of all components required for the cut-in-insulators assembly, including appropriate terminal end fittings for the conductor and the 9 tonne porcelain insulator. The price shall cover erection of all components, including the 9 tonneporcelain insulator. This price shall also be applicable as an adjustment price for non-provision of insulators under items 8 (b) (I) to 8 (b) (viii).

ITEM NO. 11 (a) (II) SUPPLY AND ERECTION OF A PORCELAIN SUSPENSION INSULATOR.

The price is applicable to the provision of a 9 tonne porcelain suspension insulator (Polluted zone type for polluted area) assembly for suspension of an all aluminum 25 KV feeder (single or double SPIDER) 150/130 sq. mm or 65 sq. mm overhead equipment conductor or 19/2.79 mm all aluminum catenary or any other similar type of suspension. The price shall cover supply of all components, required for the suspension assembly including the appropriate suspension clamp and the 9 tonne porcelain insulator assembly but excluding small parts steel work with bolts and nuts etc if any. The price shall cover erection of all components including the 9 tonne porcelain insulator assembly but excluding small parts steel work, with bolts and nuts etc. for fixing if any. The price shall include the cost of provision of a flat armour tape to be used in connection with suspension of SPIDER conductor.

ITEM NO. 11 (b) SUPPLY AND ERECTION OF A 25 KV POST INSULATOR

The price is applicable to the provision of a 25 kV post insulator to support copper or aluminum jumper/ busbars. The price shall cover supply of all components and fittings/ angle iron (outrigger) to support the jumpers including supply of Post insulator but excluding supply of small parts steel works with bolts and nuts etc for fixing with mast/structure if any. The price shall cover erection of all components required for the assembly, including post insulator but excluding small parts steel work with bolts and nuts etc for fixing with mast/structure if any.

ITEM NO. 11 (c) SUPPLY AND ERECTION OF A 3 KV DISC INSULATOR

The price is applicable to the provision of a 3 KV disc insulator for suspension of an all aluminum return conductor or earth wire or any other similar type of suspension. The price shall cover supply and erection of all components required for the assembly, including 3 kV Disc insulator and appropriate suspension clamp, but excluding small parts steel work with bolts and nuts etc., if any. The price shall include the cost of provision of a flat armour tape to be used in connection with the suspension of SPIDER conductor.

ITEM NO. 11 (d) SUPPLY AND ERECTION OF A 11 KV POST INSULATOR

The price shall cover on a flat rate basis, supply and erection of a 11 KV post insulator with necessary fittings to support return conductor, aluminum or copper busbars or return conductor jumper connections excluding small parts steel work with bolts and nuts etc if any.

ITEM NO. 12 (a) SUPPLY AND ERECTION OF A SECTION INSULATOR ASSEMBLY

The price shall cover supply of all components required for a standard section insulator assembly (serving both the overhead equipment conductors) including special droppers for supporting the equipment and all terminal end fittings for conductors, the section insulator assembly and the 9 Tonneconventional porcelain insulator assembly on the catenary and dropper wires as required. The price shall cover erection and adjustment of all components including section insulator assembly 9

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tonne porcelain insulator on the catenary and droppers. Stiffener rod of requisite length to be provided on both ends with contacts wire pieces.

Rly Id No.	Description of the Components	Qty per Unit
1120/ETI/OHE SK/436/1360	Catenary ending clamp	2 Off
1192/ETI/OHE/ SK/333	Catenary dropper clip assembly	As required
6170	Parallel clamp for double contact wire	12 Off
6180	Section insulator dropper assembly	3 Sets
6100	Section insulator assembly	1 off
6020	Section Insulator	1 off
	9 – Tonne porcelain	
	cut – in – insulator	1 off

ITEM NO. 12 (b) SUPPLY AND ERECTION OF A DOUBLE WIRE SECTION INSULATOR ASSEMBLY - Deleted -

ITEM NO. 12 (c) SUPPLY AND ERECTION OF A SECTION INSULATOR ASSEMBLY SUITABLE FOR TRAMWAY TYPE OHE (REGULATED)

The price shall cover supply of all components, required for a standard section insulator assembly including special arrangements for supporting the equipment and terminal fittings for conductors and the section insulators assembly as required. The price shall cover erection and adjustment of all components including sectioning insulator assembly. The cantilever assembly at this location will be paid under item no. 4 A(iii)

NOTE : Whenever 9 tonne porcelain insulators are provided on the contact wire for bifurcation /isolation of supply, or before providing section insulator assembly erection works, erection rate for provision of 9 – tonneporcelain insulators will be paid under item No. 11(A)(i), as the work is to be done for sectioning purpose.

**ITEM NO. 12 (d) ERECTION OF A CERAMIC BEADED GLASS FIBRE
TYPE SHORT NEUTRAL SECTION ASSEMBLY :**

The rate includes erection of Ceramic beaded glass fibre type short neutral section of Imported make as per RDSO spec. No. TI/SPC/OHE/SNS/0000. Ceramic beaded glass fibre type short neutral section will be supplied by Railways. The contractor shall make his own arrangements for transporting the

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same from Railway Stores to the site. The tenderer shall only quote for erection. For erection of Neutral section ,any droppers are to be modified , no extra payment are admissible

ITEM NO. 13(a) SUPPLY AND ERECTION OF 25 KV S.P. ISOLATORS WITHOUT EARTH CONTACT ASSEMBLY

The prices under sub-items (a) and (b) shall cover supply and erection of isolator switches of approved make complete with arcing horns, operating rods, operating rod guides operating rod insulator, Pedestal Insulators, mounting base, integral lock and 6 lever navtal lock. The provision of 160 sq mm jumper wires of required length to be paid under item 15(a), with 2 nos of terminal connectors . (RI – 1009) bolted type to be paid under item No. 26(b) is not included in the scope. The price shall also include flexible copper earth connection between isolator handle and mast/structure.

The price shall also cover supply and erection of all small parts steel with bolts and nuts required for erection of Isolator on the mast/ structure supporting pedestal insulators, supporting operating Rods, Handle, Jumpers, number plate of approved design etc. Any other pedestal insulator fixed for Jumper with/ without rigger shall be paid under item 11 b and 3 c respectively.

**ITEM NO. 13 (b) SUPPLY AND ERECTION OF 25 KV GANG OPERATED ISOLATORS.
-- DELETED --**

ITEM NO. 13 (c) SUPPLY AND ERECTION OF 25 KV DOUBLE POLE ISOLATOR.

The price shall cover supply and erection of a double pole isolator of approved make complete with mounting base operating rod and operating rod guides operating rod insulator pedestal insulator, 6 lever navtal lock.

The price shall also include 3 /4 numbers of terminal connectors to be provided on isolators for OHE/SSP as the case may be and flexible copper earth connection between isolator handle and mast/structure.

The price shall also cover supply and erection of Alcu Strip, number plate of approved design, small parts steel structure, supporting operating Rods, Handle, Jumpers etc. If any other items supplied and erected like outrigger, pedestal insulator which will be paid under item 3 (c) and 11(b).

ITEM NO. 13 (d)EXTRA FOR SUPPLY AND ERECTION OF AN EARTH CONTACT ASSEMBLY IN AN ISOLATOR

The price shall be payable as extra for supply and erection of an earth contact assembly in an isolator. The price shall also includes the cost of supply and erection of 3 x 25 mm copper connections between the earth contact assembly and the structures.

ITEM NO.13 (e) EXTRA ON ITEM NO. 13 (A), (B)& (C) FOR AN INTERLOCKING DEVICE.

The price shall cover supply and erection of an inter locking mechanism on an isolator along with small parts steel if any, to permit working of two or more isolators.

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Note for item 13 : All Isolators are to be supplied with Insulators and with complete accessories and small parts steel. Isolator key box of appropriate size shall be provided for at each station on the section, one number of such isolator box shall be provided at the nearby OHE depot in charge of the section and one number at SSP/SP, as desired by the purchaser engineer at site.

ITEM NO. 14 SUPPLY AND ERECTION OF CONNECTION BETWEEN RETURN CONDUCTOR AND THE RAIL.

The price shall cover supply fabrication and erection of connections between all aluminum return conductor to cross rail/impedance bond and 2 no. of Bonds from Buried/cross rail to the Running track in an approved manner (rail which is required will be supplied by the purchaser free of cost at the Contractor's Depot) excluding the aluminum jumper connections from the return conductor to the steel flat which will be paid for under item 15 (b) and any 11 KV post insulator for supporting the jumper which will be paid under item 11 (d).

The price shall include the cost of necessary supports, [Galvanised items with mast/ structure and wooden items with flat] terminal connections and covering the mild steel flats with two coats of rod oxide Zinc Chromate Primer to IS: 2074, CNSL based and finished with 2 coats of Bitumen 85/25 blow grade etc.

ITEM NO. 15 (a) SUPPLY AND ERECTION OF A COPPER JUMPER

The price shall cover on a flat rate basis the supply of all components and fittings required for providing a flexible copper jumper connection, including parallel grooved clamps, bimetallic and aluminum copper ALCU strips, wherever required and terminal or tee clamps at either end including jumper wire of appropriate length.

The price shall also cover the erection of the complete jumper assembly including jumper wire of appropriate length, The price shall not however be applicable for jumper connections already included under items 6 and 10 but shall be applicable for any jumper connections in any combination between feeders, Isolators, L. T. Transformers dropout switches, Lightning arrestors for overhead equipments and outgoing busbars for switching stations booster stations. Continuity jumper as Boom anchor anticreep will be payable under this item. For continuity jumper across the ending clamps under OLS, the supply of all components and fittings including catenary wire for erection under the over line structure as per Drg. No. ETI/OHE/SK-529 will also be payable under this item. The jumper wire shall be of RDSO's approved supply. (including aluminum jumper wire of appropriate length). If the purchaser desires to go in for fit & forget type PG clamps, it will be informed to the contractor at the time of execution. The jumpers provided for continuity of supply at Feeding Post/SSP/SP and along track feeder continuity shall be of 160 sq.mm jumper of suitable length as required at site.

ITEM NO. 15 (b) SUPPLY AND ERECTION OF AN ALUMINUM JUMPER

The price shall cover on a flat rate basis the supply and erection of an aluminum jumper complete with all components and fittings required for providing jumper connection, including parallel clamps, bimetallic ALCU strips wherever required and terminal or tee clamps at either end. The price shall be applicable for any aluminum jumper/ connections in any combination between feeders, return conductors, overhead equipments, and outgoing busbars or switching stations and

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booster stations. Jumper connections for 25 KV feeders at angle tower traction sub-stations or at feeding stations will also be paid under this item.

ITEM NO. 16 (a) SUPPLY AND ERECTION OF A STRUCTURE BOND

The price shall cover supply of all materials including mild steel flat required to be provided in a structure bond connecting a traction mast or structures to the nearest non-track circuited rail, or (locations other than earth wire) earth electrode, including all fasteners at both ends, bonding should have suitable insulation sleeve in an approved manner. The price shall include shaping and drilling and paint of all materials including the bond. The price shall also include provision of heat shrinkable PVC sleeve of minimum length of 40cm for structure bond under track circuited rail. This would also cover connections or earthing terminals of equipments like L.T. transformers with structures and then to Rails as per relevant drawing. The rate will be per bond.

ITEM NO.16 (b) SUPPLY AND ERECTION OF LONGITUDINAL BOND

The price shall cover the supply of all materials including mild steel flats, fasteners etc. required to be provided in a longitudinal bond connecting 2 rails at the rail joint at the locations specified by the Purchaser. The price shall include shaping and drilling and painting of the bond and erection of all components including the Bond. The rate will be per bond. In Feeding post area Longitudinal bonds shall be provided as per RDSO design. 'U' shaped bonds which are provided in the points and crossing will be paid under this item.

ITEM NO. 16 (C) SUPPLY AND ERECTION OF TRANSVERSE AND SPECIAL BOND

The price shall cover supply of all materials including mild steel flats, fasteners insulation sleeve etc required to provide Impedance bonds / Transverse Impedance bond connecting rails of the same/adjacent tracks at the locations and specified by the Purchaser. The price shall also cover the supply of all materials including mild steel flat to provide special bonds at a level crossings, foot over/road over bridge/protective screen etc for which the location will be specified by the Purchaser. The price shall include shaping and drilling of the bond, painting and erection of all materials including the bond. This will be paid per bond. The price shall also include provision of heat shrinkable PVC sleeve of minimum length of 40 cm. Whenever it is required.

NOTE for ITEM No. 16.

1. The OHE traction bonds should be fixed to the rail and connected in such a way that they do not interfere with tamping tools during tamping as shown in drawing No. CE/570. The traction bonds shall be connected to the rail at a distance of not more than 80 mm from the adjoining sleepers.
2. Drilling of holes in the rails shall be done only with prior approval of authorized Railway official and drilling should be done in the presence of nominated Railway official..
3. All holes drilled to the rail shall be chamfered soon after drilling.
4. Drawing No. CE/570 showing the fixing arrangement of traction bonds to be followed strictly.
5. If any bonds provided and got damaged by the packing machine during track alignment work etc, the same shall be replaced for which payment shall be made at the rates given under item No. 16 and the contractor shall set right/replace the same before handing over the assets to maintenance.
6. In case of yard remodeling & signalling work being done in stages during doubling, the bonding works of the concerned yard will have to be modified at each stage as per the requirement. At each stage the payment will be made at the rate specified for that particular item.

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7. Jointing of flats by welding is only permitted except in platforms where it is inevitable.
8. If old structure bonds, cross bonds/polarity bonds, longitudinal bonds from the existing line is to be released, for any purpose so desired by Railway engineer at site, erection rate under structure bond (16(a)) will be paid to the contractor. The bolt, nut and bond so released is to be accounted properly and handed over to the purchaser.

ITEM NO. 17 (a) SUPPLY AND ERECTION OF SINGLE EARTH ELECTRODE

The price shall cover supply and erection of an earthing stations with a single pipe embedded into the ground complete with protective concrete box and lugs suitable for directly connecting two mild steel flats of minimum size 40 mm x 6 mm. The earth resistance shall be measured and stenciled in the concrete box. The concrete Box shall be, as per RDSO's Design and may not be possible to remove unless otherwise bond fasteners are removed. The rate includes provision of Charcoal and Salt to a minimum size of 0.3 x 0.3 x 2.0 mts. in alternative layers irrespective of Soil Condition at Site.

ITEM NO. 17 (b) SUPPLY AND ERECTION OF EARTH BUS

The price shall cover the supply of all materials including 50 mm x 6 mm mild steel flats for providing earth bus. The price shall also cover erection of earth bus either buried at a depth of 300 mm below ground level painted with 2 coats of red oxide zinc chromate primer and 2 finishing coats of bitumen as per the particulars specified in para 2.1.49 or fixed on wooden gutters on wall. It shall include connecting the earth bus to earth electrodes and to various floor-or- wall mounted equipments or structures to be earthed and also connections to non-track-circuited rails, wherever required. It shall also cover the cost of making recesses in concrete foundation blocks or floor or cubicles and covering them up. Welding shall make the connection of earth strips to each other. The connections of earth strips to various equipments structures of fencing post shall be made with G.I. bolts and nuts and spring washers/locknuts. This will be paid per metre length.

ITEM NO. 17 (c) SUPPLY AND ERECTION OF COPPER STRIPS FOR EQUIPMENT EARTHING

The price shall cover supply and erection of 25 mm x 3 mm copper strips to connect the earth terminals of equipments like potential transformers, lightning, arrestors, L. T. supply transformers and booster transformers to the main masts of the gantries on which they are mounted. The price shall cover all fastenings required for fixing the copper strip along any structure member of the gantry. The flat shall be painted with suitable paint to avoid theft.

ITEM NO. 17 (d) SUPPLY AND ERECTION OF 8 SWG G.I. WIRE FOR EARTHING

The price shall cover supply and erection of a 8 SWG G.I. Wire per metre, used for earthing at remote control cubicles and LT panels

ITEM NO. 18 (a) SUPPLY AND ERECTION OF VACUUM TYPE 25 KV INTERRUPTERS

The price shall cover supply ,erection, testing and Commissioning of vacuum type interrupter of indigenous, RDSO's approved make complete with supporting framework and terminal connectors. The price for erection shall include alignment and grouting of the interrupters on its foundation block and mounting of accessories if any in their respective positions. The price shall also cover supply and erection of enameled number plates. All necessary tools, equipment, instruments including power supply required for carrying out necessary checks, tests and commissioning shall be arranged by the contractor. The rate includes supply and erection of interlock to be provided between Isolator and interrupter and one number pad lock of 6 lever Navtal for each Interruptor.

The price for item 18 (a) is inclusive of 2 distinct flexible solid copper earths to be provided between Mechanism Box and the frame/ earth if any. The rate also includes supplying of 1 No.

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each of closing coil, Tripping coil, drum contact (auxiliary contact) for each interrupters etc. and 6 copies of operating manual and wiring diagram.

In case Railways supply interruptor/circuit breaker ,the same has to be erected by the contractor for which erection rate only will be paid.

SPECIAL INSTRUCTION FOR THE INTERRUPTER IF INSTALLED AT TSS.

In addition to the condition mentioned above ,the rate also includes providing a T-N-C switch of English Electric (or) Recon or Siemens make and indication lamp holder with lamp mounted on a separate sheet metal box duly painted with enamel paint on a separate sheet metal box duly painted with enamel paint of appropriate colour (as existing) in TSS.

ITEM NO. 18 (b) SUPPLY, ERECTION, TESTING & COMMISSIONING OF OHE TENSION MONITORING HEIGHT, STAGGER AND IMPLANTATION RECORDING DEVICE. – NOTEBOOK TYPE -

The price shall cover supply and commissioning of OLIVIR-G Overhead line spark detection system for Indian Railways - GPS based automatic spark detection system as per RDSO specification-TI/SPC/OHE/OLIVIR/0050 with amendments if any.

It should be able to locate the spark. OLIVIR-G system facilitates automatic spark location. Automatic spark detection and location has become possible with latest technological advancement in digital video processing and Global Positioning System(GPS). OLIVIR-G system shall be of 5 main components:

- ▶ A web camera (more than 10 Mega Pixel) to capture the spark images.
- ▶ A GPS (Global Positioning System) to capture the location coordinates (longitude, latitude and altitude).
- ▶ A laptop computer to store the spark images and location information. It also shows the location coordinates and images in real time while recording. Compares the recorded location information with the previously stored mast locations and gives exact location of the spark with reference to two masts.
- ▶ Data collection unit to record and store mast location information along a particular train route. This is a very compact hand held unit that is easy to carry on the route.
- ▶ Digital Video Processing software to analyze the image information.

Once the system is located inside the train, it should be able to record sparks and location while the train is running. After recording, the computer shall be able to give the exact locations of the sparks with reference to mast numbers. It should also give the intensity of all the sparks with a facility to filter out sparks of low intensity.

Likely suppliers : M/s. 3 Q Magnetics, Bengaluru, M/s. Total Solutions, Gwalior

ITEM NO.18(C) SUPPLY, ERECTION, TESTING & COMMISSIONING OF OHE TENSIONMONITORING HEIGHT, STAGGER AND IMPLANTATION RECORDING DEVICE – HANDHELD TYPE

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The price shall cover supply and commissioning of Thermal imaging camera to detect hotspot by using an infrared camera which is a non-contact device that detects infrared energy (heat) and converts it into an electronic signal, which is then processed to produce a thermal image on a video monitor and perform temperature calculations. Heat sensed by an infrared camera to be very precisely quantified/ measured, to monitor thermal performance, identify and evaluate the relative severity of heat-related problems. The equipments shall consists of

Camera shall be of :

Field of view/min focus distance	29° x 29°/0.6 m
IR Resolution	140 x 140 pixels
Measurement modes	Center Spot, box with max./min. temp., isotherms above/below selected temperature interval
General specifications	
Imaging performance	
Spectral range	7.5 - 13 μ m
Spatial resolution (IFOV)	3.7 mrad
Image Frequency	9 Hz
Focus	Fixed
Focal Plane Array (FPA)	Uncooled microbolometer

Image Presentation

Display	2.8" color LCD
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Measurement

Object range	temperature-20°C to +250°C
Accuracy	± 2 °C or $\pm 2\%$ of reading

Measurement analysis

Emissivity correction	Variable from 0.1 to 1.0 or selected from list of materials
Reflected apparent temperature correction	Automatic, based on input of reflected temperature

Setup

Color palettes	Iron, Rainbow and Black/White
Set-up controls	Local adaptation of units, language, date and time formats; automatic shutdown

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Image Storage

Type	MiniSD card
File format	Standard JPEG - 14 bit measurement data included

Power

Battery Type	Li-Ion rechargeable
Battery operating time	5 hours , display shows battery status
Charging system	In camera, AC adaptor; 3 hours to 90% capacity
AC operation	AC adaptor 90-260 VAC input
Power management	Automatic shutdown (user selectable)
Adaptor voltage	5 VDC out

Environmental specifications

Operating range	temperature 0°C to +50°C
Storage range	temperature -40°C to +70°C
Humidity	Operating and storage IEC 60068-2-30/24 h 95% relative humidity
Shock	25G, IEC 60068-2-29
Vibration	2G, IEC 60068-2-6
Encapsulation	Camera housing and lens: IP43

Physical characteristics

Dimensions	223 x 79 x 83 mm
Weight	365g, including battery
Shipping size	120 x 400 x 320 mm
Shipping weight	2.8 kg

Standard package shall consists of thermal imaging camera, hard transport case, PC software download card, printed getting started guide, printed important information guide, warranty extension card, user documentation CD-ROM, calibration certificate, battery (inside camera), power supply/charger, USB cable, mini SD card, with SD card adaptor :The model shall be similar to 'FLIR i7' Thermal imager/Fluke Ti10 Thermal Imager

ITEM NO.19 SUPPLY AND ERECTION OF 25 KV POTENTIAL TRANSFORMER

The price shall cover supply , erection, testing and commissioning of a 25 KV potential transformer type-I complete with all fittings and accessories as per relevant specifications, including terminal connector and fixing bolts at the PT terminals. The price for supply and erection shall include proper alignment of the transformer in position. The price shall also cover the supply and erection of an enameled number plate and fixing bolts. The price shall also include the cost of any small parts steel work.

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ITEM NO.20 (a) SUPPLY AND ERECTION OF 42 kV LIGHTNING ARRESTOR (STATION CLASS)

The price shall cover supply ,erection, testing and commissioning of 42 kV lightning arrestors complete with all fittings and accessories as per relevant specifications including terminal connectors if any in LA top. The cost of erection shall include proper alignment of the lightning arrestor in position. The price shall not cover supply and erection of copper jumper (65/160) which will be paid under Item 15. The price shall include the cost of the small parts steel work.

ITEM NO. 20(b) SUPPLY AND ERECTION OF LIGHTNING ARRESTOR 7.5 KV.

The price shall cover supply ,erection, testing and commissioning of 7.5 KV lightning arrestor complete with all fittings and accessories. The cost of supply and erection shall include proper alignment of the lightning arrestor in position. The price shall not include the cost of any small parts steel work.

ITEM NO.21 SUPPLY AND ERECTION OF TERMINAL BOARDS IN CONTROL CUBICLES

The price shall cover supply and erection of a wall mounted terminal board made out of teak wood and well finished with two coating of varnish paint and have six numbers of two way terminal blocks for connecting the cables from the outdoor equipment of a switching station as per Railway Drawing given in List `A' Annexure – I.

ITEM NO. 22 (a) SUPPLY AND ERECTION OF AN IRON CLAD 110 V.D.C. FUSE BOX

The price shall cover supply and erection of a 32A, 110 V iron clad two way fuse box on the wall inside the SSP/FP control room . The fuse box shall be complete with two fuse carriers and bases

ITEM NO. 22 (b) SUPPLY AND ERECTION OF IRON CLAD 230 V.A.C. FUSE BOX

The price shall cover supply and erection of a 15 A, 230 VAC iron clad 6 way fuse box on the wall inside the SSP/FP control room for heater supply of interrupters. The fuse box shall contain six fuse carriers and bases.

ITEM NO. 23 SUPPLY AND ERECTION OF LEAD ACID BATTERIES 110 V 40 AH AS PER LATEST RDSO SPECIFICATION.

The price shall cover supply ,erection ,testing and commissioning of 110 V 40 AH Lead acid Battery as per latest RDSO specification, indigenous and RDSO approved make with suitable stand, accessories and tool board etc. The price for erection shall include initial charging and discharging cycle to make the battery suitable for commissioning /installation and connecting up of the Battery, but exclude the cost of connecting cables the supply and erection of which will be paid under item no. 25.

ITEM NO. 24 SUPPLY AND ERECTION OF BATTERY CHARGER AS PER LATEST RDSO SPECIFICATION.

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The price shall cover Supply , erection, testing and commissioning of a battery charger suitable for 110 V, 40 AH battery complete with connecting lead and plug for connection to 230 V A.C. supply as per latest RDSO specification. The price for erection, shall include mounting of the charger in position and connecting it upto the 230 V A.C. Distribution board, which will be provided by the contractor, in the control cubicles. The price shall not include supply and erection of any cable for connecting the charger to the 110 V battery which shall be paid for under item 25.

ITEM NO. 25 SUPPLY AND INSTALLATION OF CABLES

(a) **CONTROL AND INDICATION:** The price shall cover supply, installation and connecting up of cables for control and indication from the interrupters to the terminal board. The price shall include supply and erection of terminal connectors at both ends, if required and conduits where necessary.

(B) HEATER SUPPLY

The price shall cover supply installation and connecting up of heater supply cable from interrupter to interrupter or from interrupter to the 230 VAC fuse box mounted on wall inside the control cubicle and from this fuse box to L.T. distribution board provided by the Purchaser inside the control cubicle. The price shall include cost of supply and erection of terminal connectors and each end if required and conduit if any at the interrupter end.

(C) CATENARY INDICATION

The price shall include supply, installation and connecting up of cable for catenary indication, between potential transformer Type - I and the terminal board inside the control cubicle. The price shall include supply and erection of terminal connectors at both the end if required and conduit to be embedded between the steel work base and the cable trench and shall include all fastenings on masts and structural members to support them.

(D) L. T. POWER SUPPLY

The Price shall cover supply, installation and connecting up of L.T power supply cable between the L.T supply transformer at switching station and L.T distribution board, inside the control cubicle. The price shall include supply and erection of suitable cable boxes, if required, and connectors at the both ends.

(E) 110 V.D.C. SUPPLY

The price shall cover supply installation and connecting up of cable between 110 V battery charger and battery, between battery and the D. C. fuse box and between the D.C. fuse box and terminal board. The price shall include terminal connectors wherever required.

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- Note
1. The length of cables shall be the actual distance measured along the lengths of the cable between the starting and terminating points of each cables.
 2. For purposes of payment fraction of a metre in the total length of cable of each type used at a switching station shall be rounded off to the next higher metre when it is 0.5 and above only.
 3. Prices under item 25 do not include cost of concrete cable trenches which will be paid for under item 2 (c).

(F) SUPPLY & LAYING OF 70 SQ MM XLPE INSULATED PVC SHEATHED ALUMINIUM CABLE

The price shall cover supply and laying of XLPE insulated PVC sheathed aluminium conductor armoured power cable of aluminum cable of size 2 core x 70 sq. mm as per ISS: 7098 heavy duty, 1100 V with IS markings for signal purpose as per latest RDSO directives. The cable shall be laid from L. T. signalling AT to the station building AT control panel or part thereof. The cable should be of RDSO approved make. The cable should be properly clamped on walls and GI pipe of required size and length is to be provided where ever cable is taken out from the earth to surface level. The price shall include testing, connecting/jointing and commissioning of cable and it will be paid / metre length. Suitable cable indicators are to be supplied and placed at 50 meters interval in an approved manner. No intermediate joint is permitted, whatever be the length of cable used. If lower[5 kVA] capacity L. T auxiliary transformers, are to be erected, then the payment is made for the supply and laying of XLPE insulated PVC sheathed aluminium conductor armoured power cable of aluminum cable of size 2 core x 25 sq. mm as per ISS: 7098 heavy duty, 1100 V with IS markings will be paid at half the rate per metre under this item. The price shall also cover supply and erection of suitable cable glands and connectors at both ends.

(G) CABLE TRENCH CUTTING

For laying the 2 x 70 sq mm XLPE cable trench to be excavated to a depth of 3 feet and suitable width. After laying the cable sand to be filled to a depth of 20 cm and Bricks to

be placed crosswise through out the length the trench to be covered with excavated mud. The mud should be kept with a heap for future settlement. The price shall inclusive of concreting of platform area to its original shape. The rate will be paid per metre length. . The same rate is applicable for 2 x 25 sq. mm XLPE cable also.

ITEM NO. 26 (a) SUPPLY AND ERECTION OF BUS BARS

- (i) ALUMINUM BUS BARS 50/39 mm-The price shall cover supply and erection of aluminum busbars 50/39 mm (OD/ID) including bending, shaping and clamping on to insulators, connectors or equipment terminals.

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(ii) SOLID COPPER BUSBAR 18 MM

The price shall cover supply and erection of solid copper busbar 18 mm including bending and shaping.

Note: The price under item 26 (a) (i) (a) (ii) does not cover the cost of terminal connectors on the jumper and which will be paid for under item 26 (b) or (c) as applicable. The cost of terminal connector provided on Isolator end is included in the Isolator.

ITEM NO. 26 (b)(I) TO (VII) SUPPLY AND ERECTION OF**ALUMINUM BUSBAR CONNECTORS**

The price shall cover supply and erection of busbar junctions and connectors of various types specified, including bolts, nuts etc., required at junctions or terminations of busbars.

ITEM NO. 26 (c)(I) TO (IV) SUPPLY AND ERECTION OF SOLID COPPER BUSBAR CONNECTORS

The price shall cover supply and erection of solid copper busbar junctions and connectors of various types specified including bolts, nuts etc., required at junctions or terminations of solid copper busbars.

ITEM NO. 27(a) SUPPLY AND ERECTION OIL FILTRATION, TESTING AND COMMISSIONING OF 10 KVA L.T. SUPPLY TRANSFORMER (OIL TYPE)

The price shall cover supply and erection of 10 KVA L.T. supply transformer complete with terminal connectors on a mast or gantry. The price shall be applicable for transformers mounted on steel pedestals at switching stations also. The price shall also cover supply and erection of an enameled number plate of approved design. The price shall also cover oil filtration and pre - commissioning tests as approved by the Railways. The Contractor shall make his own arrangement for oil filtration equipments as well as power supply required for the same. All necessary tools equipments instruments required for carrying out oil filtration/checks/tests for commissioning shall be arranged by the contractor. The price also includes the cost of L.T. fuse box with 63 Amps to be mounted on the Aux. Tr. Mast.

ITEM NO.27 (b) SUPPLY AND ERECTION TESTING AND COMMISSIONING OF DRY TYPE L.T. SUPPLY TRANSFORMERS

– (DELETED) -

ITEM NO. 27(c) SUPPLY AND ERECTION OF LT CONTROL BOARD FOR AT LOCATION AS PER RDSO SPEC. NO. TI/SPC/PSI/ CLS/0020 WITH A&C SLIP NO. 4 (7/2010) or latest

The price shall cover supply, erection, testing and commissioning of LT control and distribution panel for colour light Signaling suitable for 10 kVA with automatic changeover supply facility as per RDSO specification No. TI/SPC/PSI/CLS/0020 with A & C Slip No. 4 (7/2010).

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The price also shall include provision of suitable cable termination box 63 Amps for terminating the LT cable of AT & local EB supply and out going cable to signal equipment at Cabin/Station building. The price shall also cover provision of 16 sq. mm copper leads for connecting terminal board to the LT control and distribution panel.

The price shall also include supply of necessary cable glands, fasteners, grouting bolts and clamps required for fixing/grouting of panel board.

ITEM NO. 28 - SUPPLY AND ERECTION OF 25 kV DROP OUT FUSE SWITCH

The price shall cover supply and erection 25 kV Drop out fuse (5 amps/1 amp) switch complete with all mounting accessories and terminal connectors as required including the supply of 25 kV solid core insulator. The price shall include supply and erection of small parts steel work, fuse element and mounting base channel. The D.O fuse switch of 5 amps shall be provided for 100 kVA/50 kVA auxiliary transformers and 1 amp for 10 kVA auxiliary transformers. No extra rate is admissible for the fuse element whether 5 Amps or 1 Amps fuse element is provided.

ITEM NO. 29 ERECTION, OIL FILTRATION, TESTING AND COMMISSIONING OF BOOSTER TRANSFORMERS

--Deleted--

ITEM NO 30 (a) (I) SUPPLY AND ERECTION OF FENCING PANELS AT SWITCHING STATIONS

The price shall include supply and erection of fencing panels painted with two coats of red oxide zinc chromate primer to IS 2074 and finished with two coats of aluminum paints. The price shall include the cost of fasteners and the price shall be for a metre length of the panel of 2.4 m height (I.e, rate is per 2.4 sq.m area). The price shall also include 8SWG GI wire to be provided interconnecting Fencing panels / Fencing up rights/ Earth pipe/ Earth bus.If the fencing panel of reduced height is provided, rate will be paid on pro rata basis

ITEM NO. 30 (a) (II) SUPPLY AND ERECTION OF FENCING UPRIGHTS

The price shall cover supply and erection of fencing UP rights painted with two coats of red oxide zinc chromate primer to IS 2074 and finished with two coats of aluminum paints. The price shall be on the basis of block weight of steel. Any other block steel work done also will be admissible under this rate.

ITEM NO. 30 (a) (III) SUPPLY AND ERECTION OF PROTECTIVE SCREEN FOR FOB / ROB.

The price shall cover supply and erection of protective screen for one line on either side of the FOB / ROB in an approved manner as per RDSO drawing No. ETI/C/0068. The protective screen shall be painted with two coats of red oxide zinc chromate primer conforming to ISI and finished with two coats of aluminum paint.

ITEM NO. 30 (b) (I) SUPPLY AND ERECTION OF ANTI-CLIMBING DEVICE AT SWITCHING STATIONS.

The price shall cover supply and erection of anti-climbing device consisting of galvanized steel fixtures mounted on the fencing panels as per approved design. The price shall be per metre length of

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the panel.

ITEM NO 30 (b) (II) SUPPLY AND ERECTION OF ANTI-CLIMBING DEVICE FOR B.T. STATIONS

--Deleted--

ITEM NO. 30 (b) (III) SUPPLY AND ERECTION OF ANTI-CLIMBING DEVICES FOR L.T. SUPPLY TRANSFORMER STATIONS

The price shall cover on lump-sum basis the supply and erection of anti climbing device consisting of galvanized steel fixtures mounted on each mast below the transformer. The price shall be for each mast provided with the Anti climbing device. For mast/structure erected out side the Railway premises shall also be paid under this item.

ITEM NO. 30 (b) (IV) SUPPLY AND ERECTION OF CAUTION BOARDS ALONG WITH SUITABLE FIXING CLAMPS.

The price includes the supply and erection of Enamel caution board with suitable clamps for fixing in the Mast/ structure/wall including suitable bolt and nuts as per RDSO specification.

01	Public Caution Board (Regional Language/Hindi/English)	20 Nos.
02	Staff Caution Board (Regional Language/Hindi/English)	20 Nos.
03	Caution unwired Track Ahead board (English/Hindi)	10 Nos.
04	Caution unwired Turnout board – (Enamel) (English/Hindi)	10 Nos.
05	Electric Engine Stop Board (English)	6 Nos.
06	LC danger Board (Regional Language/Hindi/English) with picture of skull & bone	10 Nos
07	OHE Restricted clearance board (Enamel) (English/Hindi)	20 Nos
08	Power Block Working Limit Board (Enamel) (English/Hindi)	20 Nos
09	Caution 25 kV (Retro Reflective Type) (Regional Language/Hindi/English)	20 Nos.
10	Danger 25 kV (Retro Reflective Type) (Regional Language/Hindi/English)	20 Nos

The rate will be paid as total lump sum for all the Boards as against the quantity mentioned above.

ITEM NO. 31 MODIFICATION TO ERECTED EQUIPMENT

The price under this item shall cover various modifications required to be carried out in a section of completely erected overhead equipment energized or fit to be energized certified as such

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by Purchaser's Engineer provided such modifications are not on account of non complaint of specifications, approved drawings and instructions given by the Purchaser for the execution of the work from time to time during the progress of the work. All the prices are on a flat basis and cover only the important and most frequent type of modifications required to compensate the Contractor for additional work involved. No payments shall be admissible for other minor modification which may be necessary in the course of the work. All works originally done shall be paid for at normal rates for Item 1 to 30 of Schedule , as applicable.

In all the following cases the dismantled equipment, shall be handed over by the Contractor to the Purchaser's Engineer at the Contractor Depot/nearest station/ Purchaser/OHE maintenance Depot as convenient as desired by Purchaser's Engineer. The contractor shall make his own arrangements to transport the released materials and masts from the nearest station/Purchaser/OHE maintenance depot or to any place as required by the purchaser for which transportation charges shall be made as per the contract under Non SOR item. Further the released materials /conductor are to be cut in to smaller lengths as required by the purchaser. Before taking up any releasing/Dismantling work inventory of materials to be taken jointly by the contractor with Railway representative of stores branch and executive department.

ITEM NO. 31 (a) TRANSFER OF EQUIPMENT FROM ONE MAST OR SUPPORT TO ANOTHER

The price shall cover transfer of overhead equipment to a bracket assembly on a new mast or support, and dismantling of the erected bracket assembly from the old mast or support and releasing of SPS DA etc. The dismantled equipment shall be returned to the purchaser along with steel works like MCC DA and consequent adjustment to overhead equipment required such as changing the droppers leveling etc. No extra rates are payable for providing new dropper wires, catenary / contract wire clips if any. The foundations and steel work and bracket assembly for the new mast or structure will be paid for under appropriate Item 2, 3 and 4 respectively. Where ever changing of winch type regulating equipment by modified 3 pulley type regulating equipment is carried out, in addition to supply and erection of 3 pulley type RE, transfer of OHE shall be paid for transferring OHE from old RE to new RE.

ITEM NO. 31 (b) PROVISION OF AN ADDITIONAL BRACKET ASSEMBLY/ ASSEMBLIES ON A MAST OR SUPPORT

The price shall cover dismantling of an existing bracket assembly/assemblies/ along with the steel works like MCC DA and provision of a multiple cantilever cross arm SPS wherever required and erection of bracket assemblies on the multiple cantilever cross arm/SPS. The price shall include any consequential adjustments to traction overhead equipment such as re-spacing of droppers, leveling etc. This price shall not include the price for supply and erection of any additional bracket assembling which will be paid for under Item 4.

ITEM NO. 31 (c) RE-ADJUSTMENT OF A HEADSPAN

The price shall cover the re-adjustment of the head span polygon to enable the additional equipment/s to be suspended from the head span. Payment for the suspension of an additional overhead equipment shall be made for under Item 5 as extra to Item 31 (c)

ITEM NO. 31 (d) DISMANTLING OF OVERHEAD EQUIPMENT

The price shall cover cost of dismantling of OHE equipment including terminations, tensioning devices, section insulators guy rod assemblies at the termination and Anti creep, bracket, assemblies and associated small part steel work (excluding components embedded

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in concrete) the dismantled equipments shall be returned to the purchaser. This item includes releasing of Earth Wire and its termination, cut in insulator, Anticreep wire also if any. The released catenary wire to be coiled in drums or cut into pieces for disposal as desired by the purchaser. If anti-creep wire alone is released at any location, half the length of Anticreep wire will be paid under this item. The rate is inclusive of Guy Rods. Terminations and SPS to be released from either end of Anticreep anchor and OHE.

The rate is also inclusive of pedestal Insulators to be released from OHEs/ Anchor Locations/ Return conductors as the case may be. The rate includes for releasing of Isolators and section insulator assembly released alongwith OHE if any.

ITEM NO. 31(e) DISMANTLING OF FEEDER/RETURN CONDUCTOR

The price shall cover dismantling of feeder, return feeder or return conductor including guy rods, terminations, suspension assemblies, insulators super masts and associated small part steel work. Whenever feeder wire is released and transferred to new location, dismantling and erection shall be paid. The length of the feeder wire so released/erected is reckoned duly calculating half the length of the span on either side of the location.

ITEM NO. 31(f) SPLICING AND EXTENSION OF ANCHORED OVERHEAD EQUIPMENT

The price shall cover splicing of terminated overhead equipment for extension and consequent adjustment of the affected equipment. The dismantled equipment shall be returned to the Purchaser's Engineer. The cost of dismantling of overhead equipment would be paid for under Item 31 (d). The extended overhead equipment shall be deemed as starting from the centre line of the splice to the extended overhead equipment and shall be paid for under Item 6(a) or 6(b) or 6(c) as applicable. Half the rate shall only be paid if and only catenary or contact wire alone is spliced and extended. In case of splicing and extension of AC wire, half the rate shall be paid. The length of the AC wire spliced will be paid based on Schedule – 3 rates applicable to the tender. The splicing of catenary wire with contact /insulated catenary wire using ending clamp/splice under the ROB will be paid under this item and half the rate shall be paid for each such splicing.

ITEM NO. 31 (g) DISMANTLING OF A SECTION INSULATOR

The price shall cover cost of dismantling of a section insulator assembly and also if required splicing of catenary and contact wires and the necessary adjustments to droppers. The dismantled equipment shall be handed over to the Purchaser's Engineer at the spot of dismantling or at the Contractor's / Purchaser's depot's, as required by Purchasers Engineer.

ITEM NO. 31 (h) SLEWING OF EQUIPMENT

The price shall cover for temporary slewing or lowering of erected OHE adjusted and/or unadjusted to ground for special works, at the request of the purchaser and restoration and readjustment of the equipment after completion of special work. Slewing of OHE shall be paid for the OHE slewed near to the new OHE to be spliced during modification work. The price shall be per location/span or part thereof including anchoring spans. This is inclusive of RC wire and earth wire if any.

Additional components or materials used during such restoration of re-adjustment shall be paid

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on schedule 3 provided such use has, in the opinion of the Purchaser, become necessary due to reasons beyond the control of the contractor.

ITEM NO. 31(i) DISMANTLING OF AN ISOLATOR

The price shall cover cost of dismantling of an isolator including dismantling of isolator single pole or double pole or gang operated including dismantling of pedestal insulators, operating rod insulator, operating rod and connection to the overhead equipment and associated small parts steel work in isolated cases.

ITEM NO. 31 (j) DISMANTLING OF A PIN/PEDESTAL INSULATOR

The Price shall cover cost of dismantling of a pedestal/ pin insulator including dismantling of jumper connection, if any and associated small parts steel work.

ITEM NO. 31(k) DISMANTLEMENT OF OHE MAST/STRUCTURE BY CUTTING

The price shall also cover the cutting and retrieving of the old steel structure as directed by the purchaser. The price shall cover the cutting and retrieving of Old mast of any type including TTU's as directed by the purchasers Engineers at site. While releasing such TTU's proper care shall be taken in such a way that no damage occurred to the Booms. However, the dismantling of the TT boom will be paid under item 31(p). The OHE foundation must be chipped or broken to a depth of 670mm from the tip of the foundation. All the retrieved mast shall be stacked at the places to the nearest OHE maintenance depot as decided by the purchaser in the section. On completion of cutting site clearance shall be done duly back filling if there any need be. Any small part steels available in the mast/structure shall released safely and handed over to the purchaser. No extra rate is admissible for the same.

ITEM NO. 31(l) DISMANTLEMENT OF OHE MAST/STRUCTURE BY BREAKING THE FOUNDATION.

The price shall cover retrieving of steel mast/structure from the foundation after retrieving the OHE mast the mast hole may be filled with enough soil and as directed by purchaser's engineer. During the time of dismantling operation any deformation occurred it should be set right. The rate shall also applicable for retrieval of TTUs. All the retrieved mast shall be stacked at the place/ depot decided by the purchaser in the section. All the retrieved mast shall be stacked at the place to the nearest OHE maintenance depot as decided by the purchaser in the section. The deformation of mast, occurred either during the retrieval or during transport shall be removed by the contractor. If it is not removed or the mast was cut and removed by the contractor due to other reasons, then the payment will be made only under item No. 31(k).

Note : All the dismantlement equipment, fittings SPS steel work shall be returned to the purchaser.\

ITEM NO.31(m) DISMANTLEMENT OF BOOSTER TRANSFORMER

The price shall cover cost of dismantling of a Booster Transformer with bus-bar arrangements and other accessories and handing over item at contractor's depot as directed by Purchaser.

Note: The erection of booster transformer for the shifted location will be paid to the contractor under item No. 29 A.

ITEM NO.31(n) DISMANTLEMENT OF GUY ROD ASSEMBLY

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The price shall cover dismantlement of guy rod assembly including Guy Rod mast fitting with V-bolt/loop in an isolated cases where guy rod alone needs to be removed.

ITEM NO.31(o) ERECTION OF TEMPORARY MAST INCLUDING CANTILEVER ASSEMBLY, TRANSFER OF OHE TO NEW MAST AND RELEASING THE TEMPORARY MAST UNDER POWER/NON-POWER BLOCK

The price includes the rate for insertion of 16 feet long sleepers below to the rail and erection of temp mast (Mast and sleepers will be supplied by Railways), erection of Bracket, supporting of OHE. On completion of work transfer of OHE to new mast and releasing of Temp Mast and sleepers are also included in the scope of work. The rate given includes for the work done under power block also. The Transportation, Loading, unloading with or without crane shall be paid extra under transportation of OHE material

ITEM NO.31(p) RELEASING OF PORTAL BOOMS

The rate includes releasing of portal booms, TTB's, dismantling of booms and handing over of released materials to the purchaser as decided by the Purchase Engineer in charge. The rate given includes for the work done under power block also. If the contractor desires to use road crane for releasing work, he can do so and no extra payment is admissible for the crane.

ITEM NO.31(q) SPlicing AND EXTENSION OF RC WIRE/FEEDER WIRE

The price shall cover splicing of terminated RC wire/Feeder wire or cut and splicing through RC wire/Feeder wire with the new RC wire/feeder wire for the purpose of proposed alignment. For the Dismantled Portion of RC wire/feeder wire, will be paid under item (31E). The price shall include releasing of termination if any.

ITEM NO. 31(r) RELEASING OF AUX. TRANSFORMER INCLUDING RELEASING OF DROP OUT FUSE AND LIGHTNING ARRESTOR FENCING PANELS, SPS IF ANY AND RELEASING OF JUMPERS FROM OHE

The price for releasing of plinth/pole mounted. Aux. Transformer from Location which includes releasing of Drop out fuse and Lightning Arrestor fencing panels, SPS if any and releasing of jumpers from OHE. The released materials are to be handed over safely to the purchaser's Engineer.

ITEM NO. 31(s) RELEASING OF SSP/ SP EQUIPMENTS:

The price shall cover dismantling of old interruptor, PT, Busbar, Pedestal Insulator, small parts steel. Fencing Up rights and Fencing panels from outside the SSP Building and also include releasing Electrical Equipments, Battery charges, Old wirings etc from inside the Released SSP/ SP. All the released equipments are to be handed over to the purchaser as decided. The Gantry mast/ mast released from SSP area will be paid under item 31 L, 31 K as the case may. The rate quoted shall be Lumpsum per SSP/ SP. The dismantling of Isolators, AT's & Drop out fuse switch shall be paid under item 31(i) & 31(r) respectively

ITEM NO. 31(t) SPREADING OF 20 MM BALLEST IN THE SSP/ SP SWITCH YARD.

The price shall cover supply and spreading of uniformly graded 20/25 mm Ballast stone size in the SSP yard duly leveling the area as soon as cable trench, work, Fencing work, Interruptor, Mast/ Gantry erection is over. The Ballast stone shall be of good quality and

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free from any dust/ dirt/ muck. Prior approval shall be obtained from the purchasers engineer for the ballast stone sample. The ballast stones shall be spread out uniformly to a depth of 10 cm or 20 cm as directed by purchaser's Engineer/ Design Engineer.

ITEM NO. 33 SUPPLY AND ERECTION CABLE TRENCH COVERS.

The price shall cover casting of cable trench covers in reinforced concrete as per the standard drawings approved by the purchaser engineer. The cable trench covers shall be fabricated and cast in an iron frame angle of size 45x45x6 mm. The price shall include supply of steel for reinforcement, angle iron frame etc., The price shall include the cost of materials for concrete mixture including cement. The price shall also include positioning, leveling and dressing up of the trench covers, as required.

ITEM NO.34 ADDITION/ALTERATION TO THE EXISTING REMOTE TERMINAL UNIT AT FP/SSP/SP LOCATION INCLUDING SOFTWARE AND HARDWARE MODIFICATION/ALTERATION IN THE MASTER STATION COMPUTER AT REMOTE CONTROL CENTRE AS WELL AS RTU FOR ACCOMMODATING ADDITIONAL INTERRUPTORS AND RELEVANT INDICATIONS

The price includes addition/alteration (Hardware and software) required for the existing RTUs at switching stations and master station equipment including diagram board at remote control centre for incorporating additional interruptors/ circuit breaker and relevant indications.

Note:

The work done under power block shall be paid 100 percent extra charges over and above erection rates of item 3 to 15 and 18 to 31 of Schedule for erection of equipment in the vicinity of energized overhead equipment and feeders or erection of equipment with joints equipment already energized or on energized equipment which calls for a power block (shut off of traction power). The price payable under this item shall be 100% extra over the erection rates of the item referred to above, provided such work is not called for on account of non-compliance with specifications, approved drawings and instructions given by the Purchaser from time to time.

The extra erection rate under this item will not be payable, if power block is given for a total duration of a 4 hour or more in a day. Where the prices under this item are applicable, the Contractor shall finalise the quantities of various items of work to be done under a power block, jointly with the Purchaser's Engineer prior to taking the work in hand.

EXPLANATORY NOTES FOR SCHEDULE E**Item no. 35. Transport of OHE material.**

The tenderer shall quote the rate per MT-KM for transporting of OHE mast/structure/materials/Contact wires/Catenary and equipments supplied by Railways. The rate quoted will be applicable whether the materials transported are full load or part load of the vehicle. The distance in KM from the place where the transportation to be carried out to the place of unloading will be based on actual Road route KM. The price shall cover loading, leading of OHE structure/mast from Railways stores/premises as directed by Railway officials and unloading of materials at contractor's depot or at site. For safe loading and unloading of heavy and lengthy materials, contractor has to arrange cranes. The rate under this item is inclusive of loading/unloading by cranes. If the contractor fails to supply materials specified in 3(a)(ii), 3(a)(iii) and 3(b)(i) and requested the Railways materials, no transportation charges will be payable under this item.

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Item no. 36. Supply and Erection of automatic change over LT control panel for 25 KVA -AT (Specification: TI/SPC/PSI/CLS/0020 at A and C slip no 4 (7/2010) or latest)

The price shall cover supply, erection, testing and commissioning of LT control and distribution panel for colour light Signaling suitable for 25 kVA with automatic changeover supply facility as per RDSO specification No. TI/SPC/PSI/CLS/0020 with A & C Slip No. 4(7/2010).

The price also shall include provision of suitable cable termination box 155 Amps for terminating the LT cable of AT & local EB supply and out going cable to signal equipment at Cabin/Station building. The price shall also cover provision of copper leads for connecting terminal board to the LT control and distribution panel.

The price shall also include supply of necessary cable glands, fasteners, grouting bolts and clamps required for fixing/grouting of panel board.

ITEM No. 37: Supply, Erection, oil filtration, testing and commissioning of 25 kV/240 V,25 kVA L.T. supply transformers.

The price shall cover Supply of 25kV/240V 25 kVA LT supply transformers, at site, as per the RDSO's specification indicated in Annexure-1 of Part-IV of this tender paper, and erection of the same completewith terminal connectors on a mast or gantry. The price shall be applicable for transformers mounted onsteel pedestals at switching stations also. The price shall also cover supply and erection of an enamelednumber plate of approved design. The price shall also cover oil filtration and pre- commissioning tests asapproved by the railways. The contractor shall make his own arrangement for oil filtration equipments, aswell as power supply required for the same. All necessary tools, equipments, instruments required for carrying out oil filtration/checks/tests and commissioning shall be arranged by the contractor.

ITEM No. 38: Fabrication and supply of heavy duty emergency OHE mast made of MS RAW materials as per SCR/SC sketch no. TRD/SC/S014/289 (Approx weight 650 KG).

The price shall cover Fabrication, Supply and Transportation to Contractor / Railway Depot of heavy-duty emergency OHE mast as per drawing no SCR/SC sketch no. TRD/SC/S014/289.The Loading and unloading with or without crane for erection at site shall be paid under item no.34.The erection and dismantling shall be paid under item no 31(o).

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**PAYMENT FOR OHE, SWITCHING STATIONS , BOOSTER TRANSFORMER
STATIONS AND LT SUPPLY TRANSFORMER STATIONS**

PAYMENTS AND RECOVERIES:

Subject to any deduction or recoveries which the Purchaser may be entitled to make under the contract, the Contractor shall, unless otherwise agreed to, be entitled to get the following payments subject to the conditions stipulated in subsequent paragraphs:

- i) Payment for designs.
- ii) Progress payments for supply and erection.
- iii) Payments for additional supplies.
- iv) Payment for surplus materials taken over.

PAYMENTS FOR DESIGNS :

Payments for designs shall be made on the basis of prices included in item 1, Schedule, Section-D. The amount payable shall be based on assessed quantities against items 1(a) and 1(b) of Schedule, Section-D. 90% of payment for corresponding TKM drawn will be made on first and part bills and balance 10% payments shall be made after the work is completed (Not applicable for this work)

PROGRESS PAYMENTS FOR SUPPLY AND ERECTION GENERAL:

(a) FOUNDATIONS

(i) Payment will be made on casting of foundation blocks, with or without Core holes, to the extent of 90% of the Prices contractors quoted rate and on the total volume of foundation blocks inclusive of muffs, as included in the approved cross-section drawings or as installed at site with permission of the Purchaser's representative. For this purpose, the entire section to be equipped with Traction overhead equipment under contract will be divided into convenient Sub-section as may be mutually agreed to. In case the Contractor is unable to cast all the foundation blocks on a particular Sub-section, due to reasons accepted as justified by the purchaser, payments will be made to the extent of work done in the Sub-section. One more supplementary payment may be made in respect of left-over work when the work is completed.

(ii) On completion of entire work the Contractor shall receive balance 10% payment for bills claimed and full payment against the rest of the said Schedule,

(b) MAST AND PORTALS

(i) On completion of erection of masts and portals of each agreed sub-section, the Contractor shall receive payments to the extent of 90% of the prices for erection of masts and portals

(i) On completion of erection of SPS and Brackets, the Contractor shall receive payment to the extent of 90% against the said item of Schedule, Balance 10% payment will be done on successful completion of work

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(c) OTHER ITEMS OF SUPPLY AND/OR ERECTION

(ii) On completion of erection of other items Section-A to Section-E, on each agreed sub-section, the Contractor shall receive payments to the extent of 90% of the erection prices included in schedule, Section-A to E. Balance 10% payment will be done on successful completion of work

(iii) On completion of stringing of catenary and contact wire the contractor shall receive payment to the extent of 90% against respective item of Schedule, Section-A to D, For Schedule E upon stringing of catenary and contact wire in the relevant block section(where item has been erected)90% payment shall be done against respective schedule. Balance 10% payment will be done on successful completion of work

(d) Progress payment for erected bracket assemblies, will be made even though the register arm dropper and steady arm are not erected and final revision and adjustment are not done. 90% of the progress payments due for overhead equipment, will be made when the catenary and contact wires are strung and droppers installed. 10% of the progress payment due for overhead equipment will be made only after the catenary and contact wires are finally adjusted for proper height and/or stagger and all other items of work included in this item are fully completed (vide explanatory notes,) and work of Switching stations in the respective section is completed. Progress payments for Item 5 and Item 7 to 33 of Schedule, Section-A to D, will, however, be made after the relevant equipments are in position even though the final revision and adjustments are not done.

Note: No on account payment shall be admissible on the items included in Schedule, Section-E. However, progress payment shall be admissible. The payment for the schedule for Transporting OHE material under section E shall be done 95% upon each trip.

PAYMENT FOR ADDITIONAL SUPPLIES and materials supplied by the contractor:
1.3.12

(a) The contractor shall receive payment for additional supplies ordered and material supplied by the contractor at 75% of the supply value during execution of work. On successful completion of work, contractor will receive the remaining 25% of the payment, if any, in accordance with the prices included,

PAYMENTS FOR SURPLUS MATERIALS :

The Contractor shall receive payment on prices included for the surplus materials taken over by the Purchaser at 75% of the schedule Value and remaining 25% will be paid on successful completion of work.

MEASUREMENTS :

(a) Payments for field work shall be made in accordance with approved designs and drawings and measured in relevant units except where provided or otherwise. In case the dimensions of the work are more than those shown in approved designs and drawings, the Contractor will not be entitled to any extra payment unless dimensions were increased on account of physical impossibility of carrying out the work in accordance with approved drawings and designs. In case the dimensions of work are less than those shown in

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the approved designs and drawings and the work is accepted without being rejected, payment will be made as per work actually done.

(b) The measurements will be made generally in accordance with standard engineering practice and in conformity with the explanatory notes for schedule, Section-A to E (Part I, Chapter IV).

(i) It shall be open to the Contractor and the Railway to take specific objection to any recorded measurement or classification on any ground within seven days of the date of such measurements. Any re-measurements taken by the Engineer or the Engineer's representative in the presence of the Contractor or in his absence after due notice has been given to him in consequence of objection made by the contractor shall be final and binding on the contractor and no claim whatsoever shall thereafter be entertained regarding the accuracy and classification of the measurements.

(ii) If an objection raised by the Contractor is found by the Engineer to be incorrect the Contractor shall be liable to pay the actual expenses incurred in measurements.

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