



**START OF TENDER DOCUMENT**

**NORTHERN RAILWAY**

**E-Tender No.: 09A-TRD-NDLS-2026-27**

**FOR**

**Augmentation/Replacement of Catenary wire over Delhi Division (7th Phase).**

**Issued by :  
Sr.Divl.Elect.Engr(Tr.D)  
New Delhi**

**NORTHERN RAILWAY  
TOP SHEET**

**Details to be filled in by Railway:**

E-Tender Notice No.	<b>09A-TRD-NDLS-2026-27</b>
System of E-Tendering Bidding	<b>Single Packet System</b>
Full Name of Work	<b>Augmentation/Replacement of Catenary wire over Delhi Division (7th Phase).</b>
Approx. Cost	<b>Rs. 1,80,29,018.38/-</b>
Completion Period	<b>12 Months</b>
BID security amount	<b>Rs. 3,60,600/-</b>
Date & Time from Tender submission period start and end	<b>24.06.2026 (00.00 hrs.) to 08.07.2026 (15.00 hrs.) 15 days</b>
Tender Closing Date & Time	<b>08.07.2026 upto 15.00 hrs.</b>
Date & Time of tender opening (immediately when tender submission ends)	<b>08.07.2026 upto 15.00 hrs.</b>
Tender Calling Authority	<b>Sr. Divil. Elect. Engineer (TRD), DRM's Office, New Delhi.</b>

- Note: (i) Special attention of tenderer/s is drawn to clause 1.1.26 & 1.1.27 of PART-I, Chapter-I "Preamble & General Instructions to Tenderers" vide which they should uploaded the requisite documents along with tender offer pertaining to their technical & financial eligibility etc.
- (ii) **Rates should be quoted inclusive of all taxes as per current Tax Law i.e. GST etc.**

-(sd)-  
(Signature of authorized Railway Official)

**PART-I**  
**Chapter – I**  
**PREAMBLE & GENERAL INSTRUCTIONS to TENDERERS**

**1.1.1 Introduction**

- (i) On behalf of the President of India, Sr. Divil. Elect. Engineer (TRD), Northern Railway, DRM'S Office, New Delhi herein after referred to as 'Railway' (Purchaser) invites open E-Tender under **Single Packet System** from established, experienced and reliable Contractors for execution of works as detailed in tender document. Bidders will be able to submit their original/revised bids upto tender closing date and time only. Manual offers are not allowed against this tender, and any such manual offer received shall be ignored/rejected.
- (ii) The contract emerging out of this tender shall be referred to as Works Contract and contractor who is awarded Work contract shall be referred as Works Contractor/Tenderer.
- (iii) **Scope of work: Augmentation/Replacement of Catenary wire over Delhi Division (7th Phase).**
- (iv) **Location:** Work is to be executed at different locations of different depot zones (as per Annexure-Y) under jurisdiction of Delhi division of Northern Railway. However, Railway reserves right to change site of work anywhere in adjacent / adjoining area of work mentioned in Para 1.1.1 (iii) above in jurisdiction of Delhi Division under **Sr.Divil. Elect. Engineer (TRD), Northern Railway, DRM's Office, New Delhi** and contractor shall be bound to execute the work without any extra cost.

**1.1.2 Tender Document**

This tender document consists of following five parts:

<b>Part – I</b>	Chapter- I	Preamble and General Instructions to tenderers.
	Chapter- II	Special Conditions of Contract
	Chapter- III	Price & Payment
	Chapter- IV	Explanatory Notes
<b>Part – II</b>	Technical specifications	
<b>Part – III</b>	Particular specifications	
<b>Part – IV</b>	Annexures	
<b>Part – V</b>	Tender Forms etc.	

**1.1.3 Sale and Submission of Tender**

**1.1.3.1 Clause applicable for tender documents downloaded from Internet**

- (a) Tender document and associated attachments (if any) can be downloaded from IREPS website i.e. [www.ireps.gov.in](http://www.ireps.gov.in) from the date of tender publication on IREPS website to tender closing date i.e. **08.07.2026 upto 15.00 hrs.** Tender Submission period (i.e. 15 days) starts from **24.06.2026 (00.00 hrs.)** tender closing date and time as mentioned in Top Sheet. Tenderer shall be submit their offer online before tender closing date and time..
- (b) The Original/Notarized/Self-attested (as applicable) documents (scanned copy of all requisite documents as detailed in annexure-11) shall be uploaded on or before tender closing date and time, Tender/offer will be opened as per Top Sheet date and time, i.e. immediately after Tender closing date & time.

- 1.1.3.2** Tenderer/s can download tender documents and associated attachments (if any) free of cost as mentioned in clause 1.1.3.1 , for the purpose of perusal as well as for using same as tender document for submitting their offer. Master copy of tender document will be available in the office of Sr. Divil. Elect. Engineer (TRD), Northern Railway, DRM's Office, New Delhi. After award of work, an agreement will be drawn up. Agreement shall be prepared based on master copy available in office of Sr. Divil.Elect. Engineer (TRD), Northern Railway, DRM's Office, New Delhi and not based on tender documents submitted by Tenderer. In case of any discrepancy between tender documents downloaded from internet and master copy, later shall prevail and will be binding on Tenderers. No claim on this account will be entertained. If any clarification sought by any tenderer may come to Sr.DEE/TRD /DLI, office in any working day.

**In case the intended date for opening of tenders is declared a holiday, the tenders will be opened on the next working day at the same time**

#### **1.1.4 Validity of Tender**

Tenderer shall keep his offer open for a minimum period of **Sixty (60) days** from date of opening of tender.

#### **1.1.5 Tenderer's Address**

Tenderer should state in tender his postal address legibly and clearly. Any communication sent in time, to tenderer by post at his said address shall be deemed to have reached tenderer duly and in time. Important documents should be sent by Registered post.

#### **1.1.6 Period of Completion**

The entire work is required to complete in all respects within **12 (Twelve) Months** from the date of issue of the acceptance letter to the tenderer. Time is the essence of contract. The contractor will be required to maintain steady and regular progress to the satisfaction of the Engineer to ensure that the work will be completed in all respects within the stipulated time.

**Except where specifically stated in tender document, the contract shall be governed by Indian Railway Standard General Conditions of Contract, April 2022 and A&C slip 1 to 11 or latest. The copy of General Conditions of Contract can be obtained from N. Rly., HQ's Office on payment.**

The Tenderer shall furnish list of material and suppliers to the purchaser within fifteen days of receipt of "Letter of Acceptance" to arrange inspection of material through purchaser's representative or RITES".

#### **1.1.7 Purchaser not bound to accept any tender**

The Purchaser shall not be bound to accept the lowest or any Tender or to assign any reason for nonacceptance or rejection of a Tender. The work load on tenderers shall only be considered at this stage. The Purchaser reserves the right to accept any Tender in respect of the whole or any portion of the work specified in the Tender Papers or to sub-divide the work among different Tenderers or to reduce the work or to accept any Tender for less than the tendered quantities without assigning any reason whatsoever.

#### **1.1.8 E-Payment/NEFT/RTGS:**

Tenderers are required to submit their bank details in the proforma given in Form-14 to facilitate e-payment vide NEFT/RTGS, if any.

#### **1.1.9 Foreign Exchange:** No foreign exchange and/or import license will be released/provided to the Contractor in connection with this contract.

#### **1.1.10 Schedule of Rates**

Tenderer are advised to quote the rates online as per format available, on IREPS website, if the tenderer quoted rates other than that specified above will be summarily rejected. Dimensions, Volumes, weights, numbers etc. should be quoted in Metric unit.

The rates, rebates and/or other financial terms, if any, quoted by tenderer in the relevant fields of the Financial Bid page of IREPS website will only be the ruling terms for deciding the inter-se ranking, and any such condition having financial repercussions, if quoted by them anywhere else including attached documents shall not be considered for deciding inter-se ranking.

Additional conditions or stipulations if any must be made by the tenderer/s in a covering letter with the tender offer. The Railway reserves the right not to consider conditional tenders and reject the same without assigning any reason. Only those additional conditions which are explicitly accepted by the Railway shall form part of the contract.

#### **1.1.11 Applicability:** These instructions and conditions of contract shall be applicable for all the tenders and contracts of railways for execution of 'Works' as defined in GFR 2017.

**Order of Precedence of Documents:** In a contract agreement, in case of any difference, contradiction, discrepancy, with regard to conditions of tender/contract, specifications, drawings, Bill(s) of Quantities etc., forming part of the tender/contract, the following shall be the order of precedence:

- i. Letter of Award/Acceptance(LOA)
- ii. Bill(s) of Quantities
- iii. Special Conditions of Contract
- iv. Technical Specifications as given in tender documents
- v. Drawings
- vi. Indian Railways Standard General Conditions of Contract updated with correction slips issued up to date of inviting tender or as otherwise specified in the tender documents.
- vii. Indian Railways Unified Standard Specification (IRUSS-2019) updated with correction slips issued up to date of inviting tender or as otherwise specified in the tender documents, if applicable in the contract.
- viii. CPWD Specifications 2019 Vol I & II updated with correction slips issued up to date of inviting tender or as otherwise specified in the tender documents, if applicable in the contract.
- ix. Indian Railways Unified Standard Specifications (Works and Material) 2010 updated with correction slips issued up to date of inviting tender or as otherwise specified in the tender documents, if applicable in the contract.
- x. IR Specifications/Guidelines updated with correction slips issued up to date of inviting tender or as otherwise specified in the tender documents.
- xi. Relevant B.I.S. Codes updated with correction slips issued up to date of inviting tender or as otherwise specified in the tender documents.

**(1) Interpretation:** These Instructions to Tenderers shall be read in conjunction with the Standard General Conditions of Contract which are referred to herein and shall be subject to modifications additions or suppression by Special Conditions of Contract and/or Special Specifications, if any, annexed to the Tender Forms.

**(2) Definition:** In these Instructions to Tenderers, the following terms shall have the meanings assigned hereunder except where the context otherwise requires:

- a) "Railway" shall mean the President of the Republic of India or the Administrative Officers of the Railway or of the Successor Railway authorized to deal with any matters which these presents are concerned on his behalf.
- (b) "General Manager" shall mean the Officer in-charge of the General Superintendence and Control of the Railway and shall also include Addl. General Manager, the General Manager (Construction) and shall mean and include their successors, of the successor Railway.
- (c) "Chief Engineer" shall mean the Officer in-charge of the Engineering Department of Railway and shall also include Chief Engineer (Construction), Chief Signal & Telecommunication Engineer, Chief Signal & Telecommunication Engineer (Construction), Chief Electrical Engineer, Chief Electrical Engineer (Construction), Chief Mechanical Engineer and shall mean & include their successors, of the Successor Railway.
- (d) "Divisional Railway Manager" shall mean the Officer in-charge of a Division of the Railway and shall mean and include the Divisional Railway Manager of the Successor Railway.
- (e) "Engineer" shall mean the Divisional Engineer or the Executive Engineer, Divisional Signal & Telecom Engineer, Divisional Electrical Engineer, Divisional Mechanical Engineer in executive charge of the works and shall include the superior officers of Open Line and Construction organisations on the Railway of the Engineering, Signal & Telecom, Electrical and Mechanical Departments, i.e. the Senior Divisional Engineer/Deputy Chief Engineer, Senior Divisional Signal & Telecom Engineer / Dy.Chief Signal & Telecom Engineer, Senior Divisional Electrical Engineer / Deputy Chief Electrical Engineer, Senior Divisional Mechanical Engineer and shall mean & include the Engineers of the Successors Railway.
- (f) "Engineer's Representative" shall mean the Assistant Engineer, Assistant Signal & Telecommunication Engineer and Assistant Electrical Engineer, Assistant Mechanical Engineer in direct charge of the works and shall include any Sr. Section/Junior Engineer of Civil Engineering/Signal and Telecommunication Engineering/Mechanical Engineering/Electrical Engineering Departments appointed by the Railway and shall mean and include the Engineer's Representative of the Successor Railway.
- (g) "Contractor" shall mean the Person/Firm/LLP/Trust/Co-operative Society or Company whether incorporated or not who enters into the contract with the Railway and shall include their executors, administrators, successors and permitted assigns.
- (h) "Contract" shall mean and include the Agreement, the Work Order, the accepted Bill(s) of Quantities or Chapter(s) of Standard Schedule of Rates (SSOR) of the Railway modified by the tender percentage for items of works quantified, or not quantified, the Standard General Conditions of

Contract, the Special Conditions of Contracts, if any; the Drawing, the Specifications, the Special Specifications, if any and Tender Forms, if any.

(i) Works shall mean the works to be executed in accordance with the contract. "Works" shall mean the works contemplated in the drawings and Bill(s) of Quantities set forth in the tender forms and required to be executed according to the specifications.

(j) "Specifications" shall mean the Standard Specifications for Materials & Works of Railway as specified by Railway under the authority of the Chief Engineer or as amplified, added to or superseded by Special Specifications, if any.

(k) Standard Schedule of Rates (SSOR) shall mean the schedule of Rates adopted by the Railway, which includes-

1. "Unified Standard Schedule of Rates of the Railway (USSOR)" i.e. the Standard Schedule of Rates of the Railway issued under the authority of the Chief Engineer from time to time, updated with correction slips issued up to date of inviting tender or as otherwise specified in the tender documents;

2. "Delhi Schedule Of Rates (DSR)" i.e. the Standard Schedule of Rates published by Director General/ Central Public Works Department, Government of India, New Delhi, as adopted and modified by the Railway under the authority of the Chief Engineer from time to time, updated with correction slips issued up to date of inviting tender or as otherwise specified in the tender documents.

(l) "Drawing" shall mean the maps, drawings, plans and tracings or prints there of annexed to the contract and shall include any modifications of such drawings and further drawings as may be issued by the Engineer from time to time.

(m) "Constructional Plant" shall mean all appliances or things of whatsoever nature required for the execution, completion or maintenance of the works or temporary works (as hereinafter defined) but does not include materials or other things intended to form or forming part of the permanent work.

(n) "Temporary Works" shall mean all temporary works of every kind required for the execution completion and/or maintenance of the works.

(o) "Site" shall mean the lands and other places on, under, in or through which the works are to be carried out and any other lands or places provided by the Railway for the purpose of the contract.

(p) "Period of Maintenance" shall mean the specified period of maintenance from the date of completion of the works, as certified by the Engineer.

(q) 'Contractor's authorized Engineer' shall mean a graduate Engineer or equivalent, having more than 3 years experience in the relevant field of construction work involved in the contract, duly approved by Engineer.

(r) Date of inviting tender shall be the date of publishing tender notice on IREPS website if tender is published on website or the date of publication in newspaper in case tender is not published on website.

(s) "Bill of Quantities" shall mean Schedule of Item(s) included in the tender document along with respective quantities and rates, accepted by the Railway.

**NOTE:**

**Singular and Plural:** Words importing the singular number shall also include the plural and vice versa where the context requires.

**Headings and Marginal Headings:** The headings and marginal headings in these Standard General Conditions are solely for the purpose of facilitating reference and shall not be deemed to be part thereof or be taken into consideration in the interpretation or construction thereof the contract.

**1.1.12 Application for Registration and Approved list of contractors:**

(i) Works of construction and of supply of material shall be entrusted for execution to contractors whose capabilities and financial status have been investigated and approved to the satisfaction of the Railway. A list of approved contractors may also be maintained by the Railway. The said list be revised periodically once in a year or so by giving wide publicity through advertisements etc. For registration, the contractor including a contractor who is already on the approved list shall apply to the concerned General Manager (Construction) / Chief Administrative Officer (Construction) / Principal Chief Engineer / Principal Chief Signal & Telecommunication Engineer / Principal Chief Mechanical Engineer / Principal Chief Electrical Engineer/ Divisional Railway Manager, furnishing particulars regarding:

(a) his position as an independent contractor specifying engineering organization available with details of partners / staff / engineers employed with qualifications and experience;

(b) his capacity to undertake and carry out works satisfactorily as vouched for by a responsible official or firm; details about the transport equipments, construction tools and plants etc. required for the work, maintained by him;

(c) his previous experience of works similar to that to be contracted for, in proof of which original certificates or testimonials may be called for and their genuineness verified, if needs be, by reference to the signatories thereof;

- (d) his knowledge from actual personal investigation of the resources of the area/zone or zones in which he offers to work;
  - (e) his ability to supervise the work personally or by competent and duly authorized agent;
  - (f) his financial position;
- (ii) An applicant shall clearly state the categories of works and the area/zone/division(s)/district(s) in which he desires registration in the list of approved contractors.
  - (iii) The selection of contractors for enlistment in the approved list would be done by a committee for different value of slabs as notified by Railway.
  - (iv) An annual fee as prescribed by the Railway from time to time would be charged from such approved contractors to cover the cost of sending notices to them and clerkage for tenders etc. Notices shall be sent to them on registered e-mail address and registered postal address.

**1.1.13 Tender Form:** Tender Forms shall embody the contents of the contract documents either directly or by reference and shall be as per specimen form, FORM-1. e-Tender Forms shall be issued free of cost to all tenderers.

**1.1.14 Omissions & Discrepancies:** Should a tenderer find discrepancies in or omissions from the drawings or any of the Tender Forms or should he be in doubt as to their meaning, he should at once notify the authority inviting tenders. The tender inviting authority may, if deemed necessary, clarify the same to all tenderers. It shall be understood that every endeavour has been made to avoid any error which can materially affect the basis of tender and successful tenderer shall take upon himself and provide for the risk of any error which may subsequently be discovered and shall make no subsequent claim on account thereof.

**1.1.15 Bid Security:**

- (1) (a) The tenderer shall be required to submit the Bid Security for **Rs. 3,60,600/-** with the tender for the due performance with the stipulation to keep the offer open till such date as specified in the tender, under the conditions of tender. The Bid Security shall be as under:

Value of the Work	Bid Security
For all works	2% of the estimated cost of the work

Note:

- (i) The Bid Security shall be rounded off to the nearest ₹100. This Bid Security shall be applicable for all modes of tendering.
  - (ii) Any firm recognized by Department of Industrial Policy and Promotion (DIPP) as 'Startups' shall be exempted from payment of Bid Security detailed above.
  - (iii) Labour Cooperative Societies shall submit only 50% of above Bid Security detailed above.
- (b) It shall be understood that the tender documents have been issued to the tenderer and the tenderer is permitted to tender in consideration of stipulation on his part, that after submitting his tender he will not resale from his offer or modify the terms and conditions thereof in a manner not acceptable to the Engineer. Should the tenderer fail to observe or comply with the said stipulation, the aforesaid amount shall be liable to be forfeited to the Railway.
  - (c) (1) If his tender is accepted, this Bid Security mentioned in sub para (a) above will be retained as part security for the due and faithful fulfillment of the contract in terms of Clause 1.1.48 of the Contract (Clause 16 of the Standard General Conditions of Contract). The Bid Security of other Tenderers shall, save as herein before provided, be returned to them, but the Railway shall not be responsible for any loss or depreciation that may happen thereto while in their possession, nor be liable to pay interest thereon.
  - (2) The Bid Security shall be deposited either in cash through e-payment gateway or submitted as Bank Guarantee bond from a scheduled commercial bank of India or as mentioned in tender documents. The Bank Guarantee bond shall be as per **Annexure-8A** and shall be valid for a period of 90days beyond the bid validity period.
  - (3) **In case, submission of Bid Security in the form of Bank Guarantee, following shall be ensured:**
    - i. A scanned copy of the Bank Guarantee shall be uploaded on e-Procurement Portal (IREPS) while applying to the tender.

- ii. The original Bank Guarantee should be delivered in person to the official nominated as indicated in the tender document before closing date for submission of bids (**i.e. excluding the last date of submission of bids**).
- iii. Non submission of scanned copy of Bank Guarantee with the bid on e-tendering portal (IREPS) and/or non submission of original Bank Guarantee within the specified period shall lead to summary rejection of bid.
- iv. The Tender Security shall remain valid for a period of 90 days beyond the validity period for the Tender.
- v. The details of the BG, physically submitted should match with the details available in the scanned copy and the data entered during bid submission time, failing which the bid will be rejected
- vi. The Bank Guarantee shall be placed in an envelope, which shall be sealed. The envelope shall clearly bear the identification "**Bid for the \*\*\*\*\* Project**" and shall clearly indicate the name and address of the Bidder. In addition, the Bid Due Date should be indicated on the right hand top corner of the envelope.
- vii. The envelope shall be addressed to the officer and address as mentioned in the tender document.
- viii. If the envelope is not sealed and marked as instructed above, the Railway assumes no responsibility for the misplacement or premature opening of the contents of the Bid submitted and consequent losses, if any, suffered by the Bidder.

**NOTE: The Bid security beneficiary should be in the favour of: Sr.DFM/N.Rly. DRM's Office, New Delhi.**

- (d) Subject to exemptions provided under para 1 (a) above, the tender must be accompanied by a Bid Security as mentioned in tender documents, failing which the tender shall be summarily rejected.
- (e) The Tenderer(s) shall keep the offer open for a minimum period of 60 days (in case of two packet system of tendering 90days) from the date of closing of the Tender. It is understood that the tender documents have been issued to the Tenderer(s) and the Tenderer(s), is / are permitted to tender in consideration of the stipulation on his / their part that after submitting his / their tender subject to the period being extended further, if required by mutual agreement from time to time, he will not resile from his offer or modify the terms and conditions thereof in a manner not acceptable to \_\_\_\_\_ Railway. Should the tenderer fail to observe or comply with the foregoing stipulation, the amount deposited or Bank guarantee bond submitted as Bid Security for the due performance of the above stipulation, shall be forfeited to the Railway.
- (f) If his tender is accepted,
  - (i) the Bid Security mentioned in sub para1(a) above deposited in cash through e-payment gateway will be retained as part security for the due and faithful fulfillment of the contract in terms of Clause 16 of the Standard General Conditions of Contract or 1.1.48 of tender document ;
  - (ii) the Bid Security mentioned in sub para1(a) above submitted as Bank guarantee bond, will be encashed as part security for the due and faithful fulfillment of the contract in terms of Clause1.1.48 (Clause 16 of the Standard General Conditions of Contract).

The Bid Security of other Tenderers shall, save as herein before provided, be returned to them, but the Railway shall not be responsible for any loss or depreciation to the Bid Security that may happen thereto while in their possession, nor be liable to pay interest thereon.
- (g) In case Contractor submits the Term Deposit Receipt/Bank Guarantee Bond towards either the Full Security Depositor the Part Security Deposit equal to or more than Bid Security, the Railway shall return the Bid Security so retained as per sub para(c) above, to the Contractor.

#### **1.1.16 Care in Submission of Tenders:**

- (a) (i) Before submitting a tender, the tenderer will be deemed to have satisfied himself by actual inspection of the site and locality of the works, that all conditions liable to be encountered during the execution of the works are taken into account and that the rates he enters in the tender forms are adequate and all inclusive to accord with the provisions in Clause-37 of the Standard General Conditions of Contract for the completion of works to the entire satisfaction of the Engineer.



- (a)(ii) Tenderers will examine the various provisions of The Central Goods and Services Tax Act, 2017(CGST)/ Integrated Goods and Services Tax Act, 2017(IGST)/ Union Territory Goods and Services Tax Act, 2017(UTGST)/ respective state's State Goods and Services Tax Act (SGST) also, as notified by Central/State Govt.& as amended from time to time and applicable taxes before bidding. Tenderers will ensure that full benefit of Input Tax Credit (ITC) likely to be availed by them is duly considered while quoting rates.
- (a)(iii) The successful tenderer who is liable to be registered under CGST/IGST/UTGST/SGST Act shall submit GSTIN along with other details required under CGST/IGST/UTGST/SGST Act to railway immediately after the award of contract, without which no payment shall be released to the Contractor. The Contractor shall be responsible for deposition of applicable GST to the concerned authority.
- (a)(iv) In case the successful tenderer is not liable to be registered under CGST/IGST/UTGST/ SGST Act, the railway shall deduct the applicable GST from his/their bills under reverse charge mechanism (RCM) and deposit the same to the concerned authority.
- (b) When work is tendered for by a firm or company, the tender shall be signed by the individual legally authorized to enter into commitments on their behalf.
- (c) The Railway will not be bound by any power of attorney granted by the tenderer or by changes in the composition of the firm made subsequent to the execution of the contract. It may, however, recognize such power of attorney and changes after obtaining proper legal advice, the cost of which will be chargeable to the Contractor.
- (d) Contractor shall be liable to pay/refund the amount collected as GST to the Indian Railways along with interest and penalties, if any imposed by the authorities, in case GST input tax credit of Indian Railways is denied/rejected by the tax authorities due to reasons mentioned below but not limited to:  
 Wrong/incorrect invoices issued by Contractor ;  
 No-filing of GST returns;  
 Non-payment of GST collected from Indian Railways to the authorities;  
 Any other non-compliance done by Contractor;

**General Indemnity:** Contractor hereby agrees to indemnify and hold harmless the Indian Railways from and against any and all losses, including loss on account of Input Tax Credit and all losses incurred by the Indian Railways relating to or arising out of or in connection with any actual or threatened claim, legal action, proceedings, prosecution or inquiry by or against the Indian Railways arising out, directly or indirectly, of failure by the contractor to comply with the provisions of GST and related laws, or based upon or arising from any failure by the Contractor.

**Retention Money:** Any payment liable to be paid by Indian Railways to contractor against the goods or services or both supplied by such contractor to Indian Railways shall be kept on hold in case supplier makes any non-compliance of any of the GST law provisions including non-reporting of invoices in GST returns. Such payment shall be released after proper verification of records and availability of ITC to Indian Railways as per provisions of GST Law.

- (e) The tenderers shall submit a copy of certificate stating that all their statements/documents submitted alongwith bid are true and factual. Standard format of certificate to be submitted by the bidder is enclosed as **Annexure-10**. In addition to Annexure-10 in case of other than Company/Proprietary firm, **Annexure-10(A)** shall also be submitted by the each member of a Partnership Firm Joint Venture (JV)/ Hindu Undivided Family (HUF) / Limited Liability Partnership (LLP) etc. as the case may be. Non submission of above certificate(s) by the bidder shall result in summarily rejection of his/their bid. It shall be mandatorily incumbent upon the tenderer to identify, state and submit the supporting documents duly self attested/digitally signed by which they/he is qualifying the Qualifying Criteria mentioned in the Tender Document

**NOTE: Instructions issued by Railway Board regarding Annexure-10 vide letter no. 2022/CE-I/CT/GCC Correspondence dated 14.05.2024 or latest shall be followed.**

- 1.1.17 Right of Railway to Deal with Tenders:** The Railway reserves the right of not to invite tenders for any of Railway work or works or to invite open or limited tenders and when tenders are called to accept a tender in whole or in part or reject any tender or all tenders without assigning reasons for any such action. In case if tender is accepted in part by Railway administration, Letter of Acceptance shall be issued as counter offer to the Tenderer, which shall be subject to acceptance by the Tenderer.

**A. Two Packets System of Tendering:** With a view to assess the tenders technically without being influenced by the financial bids, 'Two Packets System of tendering' shall be adopted wherein tender documents provide for the same.

**B. Pre Bid Conference:** Intenders having advertised value more than Rs 50 Crore or as mentioned in the tender document, Railway shall conduct Pre Bid Conference(s) with the prospective bidders.

**C. Make in India Policy:** Provisions of Make in India Policy 2017 issued by Govt. of India, as amended from time to time, shall be followed for consideration of tenders.

**D. Permission to Bid for a bidder from a country which shares Land boundary with India:** Any bidder from the countries sharing a land border with India will be eligible to bid in any procurement of works (including turnkey projects) only if the bidder is registered with the Competent Authority. The Competent Authority for registration will be the Registration Committee constituted by the Department for Promotion of Industry and Internal Trade (DPIIT), Government of India. For interpretation of this para, Department of Expenditure, Ministry of Finance, Government of India letter F.No.6/18/2019-PPD dated 23/07/2020 shall be referred.

**E. Clarification of Bids:** To assist in the examination, evaluation & comparison and pre-qualification of the Tender, the Railway may, at its discretion, ask any Bidder for a clarification of its Bid. Any clarification submitted by a Bidder that is not in response to a request by the Railway shall not be entertained or considered. The Railway request for clarification and the response of the bidder in this regard shall be in writing. However, if a Bidder does not provide clarification of its bid by the date and time communicated in the Railway request for clarification, the bid shall be evaluated as per the documents submitted along with the bid.

**1.1.18 Execution of Contract Document:** The Tenderer whose tender is accepted shall be required to appear in person at the office of General Manager/General Manager (Construction), Chief Administrative Officer (Construction), Divisional Railway Manager or concerned Engineer, as the case may be, or if tenderer is a firm or corporation, a duly authorized representative shall appear (there would be no need for appear in person if agreement is signed digitally) and execute the contract agreement within seven days of notice from Railways that the Contract Agreement is ready. Failure to do so shall constitute a breach of the agreement affected by the acceptance of the tender. The Contract Agreement shall be entered into by Railway only after submission of valid Performance Guarantee by the Contractor. In such cases the Railway may determine that such tenderer has abandoned the contract and there upon his tender and acceptance thereof shall be treated as cancelled and the Railway shall be entitled to forfeit the full amount of the Bid Security and other dues payable to the Contractor under this contract. The failed Contractor shall be debarred from participating in the re-tender for that work.

**1.1.19 Form of Contract Document:** Every contract shall be complete in respect of the document it shall so constitute. Not less than 2 copies of the contract document shall be signed by the competent authority and the Contractor and one copy given to the Contractor (there would be no need of signing two copies if agreement is signed digitally).

- (a) For Zone Contracts, awarded on the basis of the percentage above or below the applicable chapter(s) of Standard Schedule of Rates (SSOR) for the whole or part of financial year, the contract agreement required to be executed by the tenderer whose tender is accepted shall be as per specimen form, Annexure-II of GCC. During the currency of the Zone Contract, work orders as per specimen form Annexures-III of GCC, for works not exceeding ₹ 5,00,000 each, shall be issued by the Divisional Railway Manager / Executive Engineer under the agreement for Zone Contract.
- (b) For contracts for specific works, the contract document required to be executed by the tenderer whose tender is accepted shall be an agreement as per specimen form-10.

**1.1.20 Instructions to Tenderers and Conditions of Tender:** The following documents form part of Tender / Contract:

- (a) Tender Forms – First Sheet and Second Sheet
- (b) Special Conditions/Specifications (enclosed)
- (c) Bill(s) of quantities (enclosed)
- (d) Standard General Conditions of Contract and Standard Specifications (Works and Materials) of Indian Railways as amended/corrected upto latest correction slips, copies of which can be seen in the office of \_\_\_\_\_ or obtained from the office of the Chief Engineer, \_\_\_\_\_ Railway on payment of prescribed charges.
- (e) Standard Schedule of Rates (SSOR) as amended / corrected upto latest correction slips, copies of which can be seen in the office of \_\_\_\_\_ or obtained from the office of the Chief Engineer, \_\_\_\_\_ Railway on payment of prescribed charges.
- (f) All general and detailed drawings pertaining to this work which will be issued by the Engineer or his representatives (from time to time) with all changes and modifications.

**1.1.21 Drawings for the Work:** The Drawing for the work can be seen in the office of the Sr.DEE/TRD/NDLS at any time during the office hours. The drawings are only for the guidance of Tenderer(s). Detailed working drawings (if required) based generally on the drawing mentioned above, will be given by the Engineer or his representative from time to time.

- 1.1.22** The Tenderer(s) shall quote his / their rates as a percentage above or below the Standard Schedule of Rates (SSOR) of Railway as applicable to Delhi Division except where he/they are required to quote item rates and must tender for all the items shown in the Bill(s) of Quantities attached. The quantities shown in the attached Bill(s) of Quantities are given as a guide and are approximate only and are subject to variation according to the needs of the Railway. The Railway does not guarantee work under each item of the Bill(s) of Quantities. The tenderer(s) shall quote rates / rebates only at specified place in Tender Form supplied by Railway. Any revision of rates / rebates submitted (quoted) through a separate letter whether enclosed with the bid (Tender Form) or submitted separately or mentioned elsewhere in the document other than specified place shall be summarily ignored and will not be considered..
- 1.1.23** Tenders containing erasures and / or alterations of tender documents are liable to be rejected. Any correction made by tender(s) in his/their entries must be attested by him / them.
- 1.1.24** The works are required to be completed within a specified period mentioned in clause 1.1.6 from the date of issue of acceptance letter.
- 1.1.25 Rights of the Railway to deal with Tender:** The authority for the acceptance of the tender will rest with the Railway. It shall not be obligatory on the said authority to accept the lowest tender or any other tender, and tenderer(s) shall neither demand any explanation for the cause of rejection of his/ their tender nor the Railway to assign reasons for declining to consider or reject any particular tender or tenders.  
If the tenderer(s) deliberately gives / give wrong information in his / their tender or creates / create circumstances for the acceptance of his / their tender, the Railway reserves the right to reject such tender at any stage.  
If any partner(s) of a partnership firm expires after the submission of its tender or after the acceptance of its tender, the Railway shall deem such tender as cancelled/contract as terminated under clause 61 of the Standard General Conditions of Contract, unless the firm retains its character as per partnership agreement. If a sole proprietor expires after the submission of tender or after the acceptance of tender, the Railway shall deem such tender as cancelled / contract as terminated under clause 61 of the Standard General Conditions of Contract.

#### **1.1.26 Eligibility Criteria:**

##### **1.1.26.1 Technical Eligibility Criteria:**

- (a) The tenderer must have successfully completed or substantially completed any one of the following categories of work(s) during last 07 (seven) years, ending last day of month previous to the one in which tender is invited:
- (i) Three similar works each costing not less than the amount equal to 30% of advertised value of the tender, or
  - (ii) Two similar works each costing not less than the amount equal to 40% of advertised value of the tender, or
  - (iii) One similar work costing not less than the amount equal to 60% of advertised value of the tender.
- (b) (1) In case of tenders for composite works (e.g. works involving more than one distinct component, such as Civil Engineering works, S&T works, Electrical works, OHE works etc. and in the case of major bridges – substructure, superstructure etc.), tenderer must have successfully completed or substantially completed any one of the following categories of work(s) during last 07 (seven) years, ending last day of month previous to the one in which tender is invited:
- (i) Three similar works each costing not less than the amount equal to 30% of advertised value of each component of tender, or
  - (ii) Two similar works each costing not less than the amount equal to 40% of advertised value of each component of tender, or
  - (iii) One similar work each costing not less than the amount equal to 60% of advertised value of each component of tender.
- Note for b(1): Separate completed works of minimum required values shall also be considered for fulfillment of technical eligibility criteria for different components.
- (b)(2) In such cases, what constitutes a component in a composite work shall be clearly pre-defined with estimated tender cost of it, as part of the tender documents without any ambiguity.
- (b) (3) To evaluate the technical eligibility of tenderer, only components of work as stipulated in tender documents for evaluation of technical eligibility, shall be considered. The scope of work covered in other remaining components shall be either executed by tenderer himself if he has work experience as mentioned in clause 7 of the Standard General Conditions of Contractor through subcontractor

fulfilling the requirements as per clause 7 of the Standard General Conditions of Contract or jointly i.e., partly himself and remaining through subcontractor, with prior approval of Chief Engineer in writing.

However, if required in tender documents by way of Special Conditions, a formal agreement duly notarised, legally enforceable in the court of law, shall be executed by the main contractor with the subcontractor for the component(s) of work proposed to be executed by the subcontractor(s), and shall be submitted along with the offer for considering subletting of that scope of work towards fulfilment of technical eligibility. Such subcontractor must fulfill technical eligibility criteria as follows: The subcontractor shall have successfully completed at least one work similar to work proposed for subcontract, costing not less than 35% value of work to be subletted, in last 5 years, ending last day of month previous to the one in which tender is invited through a works contract.

*Note: for subletting of work costing up to Rs 50 lakh, no previous work experience of subcontractor shall be asked for by the Railway.*

In case after award of contract or during execution of work it becomes necessary for contractor to change subcontractor, the same shall be done with subcontractor(s) fulfilling the requirements as per clause 7 of the Standard General Conditions of Contract, with prior approval of Chief Engineer in writing.

Note for Item 1.1.26.1:

Work experience certificate from private individual shall not be considered. However, in addition to work experience certificates issued by any Govt. Organisation, work experience certificate issued by Public listed company having average annual turnover of Rs 500 crore and above in last 3 financial years excluding the current financial year, listed on National Stock Exchange or Bombay Stock Exchange, incorporated/registered at least 5 years prior to the date of closing of tender, shall also be considered provided the work experience certificate has been issued by a person authorized by the Public listed company to issue such certificates.

In case tenderer submits work experience certificate issued by public listed company, the tenderer shall also submit along with work experience certificate, the relevant copy of work order, bill of quantities, bill wise details of payment received duly certified by Chartered Accountant, TDS certificates for all payments received and copy of final/last bill paid by company in support of above work experience certificate.

**(c) Definition of similar nature of Work:**

Similar work means that the contractor should have completed the work of Design, supply, erection, testing & commissioning of 50 Hz, single phase 25 KV AC OHE.

- (d) Electrical contractor license: Tenderer shall have a valid Electrical Contractor's License (at the time of opening of tender and also uploaded on IREPS) issued in the name of the firm by any State Government and shall furnish all the particulars of the electrical license held by him along with the tender offer submission.

**1.1.26.2 Financial Eligibility Criteria:** The tenderer must have minimum average annual contractual turnover of V/N or V whichever is less; where V= Advertised value of the tender in crores of Rupees N= Number of years prescribed for completion of work for which bids have been invited.

The average annual contractual turnover shall be calculated as an average of "total contractual payments" in the previous three financial years, as per the audited balance sheet. However, in case balance sheet of the previous year is yet to be prepared/ audited, the audited balance sheet of the fourth previous year shall be considered for calculating average annual contractual turnover.

The tenderers shall submit requisite information as per Annexure-8B, along with copies of Audited Balance Sheets duly certified by the Chartered Accountant/ Certificate from Chartered Accountant duly supported by Audited Balance Sheet.

**1.1.26.3 Bid Capacity:** The tender/technical bid will be evaluated based on bid capacity formula (applicable for tenders having advertised value more than Rs. 10 Crore) detailed as Annexure-8.

**1.1.26.4** No Technical and Financial credentials are required for tenders having advertised value upto Rs. 50 Lakh.

**1.1.26.5** Credentials if submitted in foreign currency shall be converted into Indian currency i.e., Indian Rupee as under:

The conversion rate of US Dollars into Rupees shall be the daily representative exchange rates published by the Reserve Bank of India or entity authorized by RBI to do so for the relevant date or immediately previous date for which rates have been published. Where, relevant date shall be as on the last day of month previous to the one in which tender is invited. In case of any other currency, the same shall first be converted to US Dollars as on the last day of month previous to the one in which tender is invited, and the amount so derived in US Dollars shall be converted into Rupees at the aforesaid rate. The conversion rate of such currencies shall be the daily representative exchange rates published by the International Monetary Fund for the relevant date or immediately previous date for which rates have been published. [Explanation for Para 1.1.26 of the Tender including Para 1.1.26.1 to 1.1.26.5 - Eligibility Criteria:

1. *Substantially Completed Work means an ongoing work in which payment equal to or more than 90% of the present contract value (excluding the payment made for adjustment of Price variation (PVC), if any) has been made to the contractor in that ongoing contract and no proceedings of termination of contract on Contractor's default has been initiated. The credential certificate in this regard should have been issued not prior to 60 days of date of invitation of present tender.*

2. *In case a work is started prior to 07 (seven) years, ending last day of month previous to the one in which tender is invited, but completed in last 07 (seven) years, ending last day of month previous to the one in which tender is invited, the completed work shall be considered for fulfillment of credentials.*

3. *If a work is physically completed and completion certificate to this extent is issued by the concerned organization but final bill is pending, such work shall be considered for fulfillment of credentials*

4. *In case of completed work, the value of final bill (gross amount) including the PVC amount (if paid) shall be considered as the completion cost of work. In case final bill is pending, only the total gross amount already paid including the PVC amount (if paid) shall be considered as the completion cost of work.*

*In case of substantially completed work, the total gross amount already paid including the PVC amount (if paid), as mentioned in the certificate, shall be considered as the cost of substantially completed work.*

5. *If a bidder has successfully completed a work as subcontractor and the work experience certificate has been issued for such work to the subcontractor by a Govt. Organization or public listed company as defined in Note for Item 1.1.26.1 Para 1.1.26 of the Tender, the same shall be considered for the purpose of fulfillment of credentials.*

6. *In case a work is considered similar in nature for fulfillment of technical credentials, the overall cost including the PVC amount (if paid) of that completed work or substantially completed work, shall be considered and no separate evaluation for each component of that work shall be made to decide eligibility.*

7. *In case of newly formed partnership firm, the credentials of individual partners from previous propriety firm(s) or dissolved previous partnership firm(s) or split previous partnership firm(s), shall be considered only to the extent of their share in previous entity on the date of dissolution / split and their share in newly formed partnership firm. For example, a partner A had 30% share in previous entity and his share in present partnership firm is 20%. In the present tender under consideration, the credentials of partner A will be considered to the extent of  $0.3 \times 0.2 \times \text{value of the work done in the previous entity}$ . For this purpose, the tenderer shall submit along with his bid all the relevant documents which include copy of previous partnership deed(s), dissolution deed(s) and proof of surrender of PAN No.(s) in case of dissolution of partnership firm(s) etc.*

8. *In case of existing partnership firm, if any one or more partners quit the partnership firm, the credentials of remaining partnership firm shall be re-worked out i.e., the quitting partner(s) shall take away his credentials to the extent of his share on the date of quitting the partnership firm (e.g. in a partnership firm of partners A, B & C having share 30%, 30% & 40% respectively and credentials of Rs 10 crore; in case partner C quits the firm, the credentials of this partnership firm shall remain as Rs 6 crore). For this purpose, the tenderer shall submit along with his bid all the relevant documents which include copy of previous partnership deed(s), dissolution deed(s) and proof of surrender of PAN No.(s) in case of dissolution of partnership firm(s) etc.*

9. *In case of existing partnership firm if any new partner(s) joins the firm without any modification in the name and PAN/TAN no. of the firm, the credentials of partnership firm shall get enhanced to the extent of credentials of newly added partner(s) on the same principles as mentioned in item 6 above. For this purpose, the tenderer shall submit along with his bid all the relevant documents which include copy of previous partnership deeds, dissolution/splitting deeds and proof of surrender of PAN No.(s) in case of dissolution of partnership firm etc.*

10. *Any partner in a partnership firm cannot use or claim his credentials in any other firm without leaving the partnership firm i.e., In a partnership firm of A&B partners, A or B partner cannot use*

*credentials of partnership firm of A&B partners in any other partnership firm or propriety firm without leaving partnership firm of A&B partners.*

*11. In case a partner in a partnership firm is replaced due to succession as per succession law, the proportion of credentials of the previous partner will be passed on to the successor.*

*12. If the percentage share among partners of a partnership firm is changed, but the partners remain the same, the credentials of the firm before such modification in the share will continue to be considered for the firm as it is without any change in their value. Further, in case a partner of partnership firm retires without taking away any credentials from the firm, the credentials of partnership firm shall remain the same as it is without any change in their value.*

*13. In a partnership firm "AB" of A&B partners, in case A also works as propriety firm "P" or partner in some other partnership firm "AX", credentials of A in propriety firm "P" or in other partnership firm "AX" earned after the date of becoming a partner of the firm AB shall not be added in partnership firm AB.*

*14. In case a tenderer is LLP, the credentials of tenderer shall be worked out on above lines similar to a partnership firm.*

*15. In case company A is merged with company B, then company B would get the credentials of company A also.]*

#### **1.1.27 Tenderer's Credentials:**

Documents testifying tenderer previous experience and financial status should be produced along with the tender. Tenderer(s) who is / are not borne on the approved list of the Contractors of \_\_\_\_\_ Railway shall submit along with his / their tender:

- (i) Certificates and testimonials regarding contracting experience for the type of job for which tender is invited with list of works carried out in the past.
- (ii) Audited Balance Sheet duly certified by the Chartered Accountant regarding contractual payments received in the past.
- (iii) The list of personnel / organization on hand and proposed to be engaged for the tendered work. Similarly list of Plant & Machinery available on hand and proposed to be inducted and hired for the tendered work.
- (iv) A copy of certificate stating that they are not liable to be disqualified and all their statements/documents submitted along with bid are true and factual. Standard format of the certificate to be submitted by the bidder is enclosed as Annexure-10 In addition to Annexure-10. in case of other than Company/Proprietary firm, Annexure-10(A) shall also be submitted by the each member of a Partnership Firm Joint Venture (JV)/ Hindu Undivided Family (HUF) / Limited Liability Partnership (LLP) etc. as the case may be. Non submission of above certificate(s) by the bidder shall result in summarily rejection of his/their bid. It shall be mandatorily incumbent upon the tenderer to identify, state and submit the supporting documents duly self attested/digitally signed by which they/he is qualifying the Qualifying Criteria mentioned in the Tender Document
- (v) The Railway reserves the right to verify all statements, information and documents submitted by the bidder in his tender offer, and the bidder shall, when so required by the Railway, make available all such information, evidence and documents as may be necessary for such verification. Any such verification or lack of such verification, by the Railway shall not relieve the bidder of its obligations or liabilities hereunder nor will it affect any rights of the Railway there under.
- (vi) (a) In case of any information submitted by tenderer is found to be false, forged or incorrect at any time during process for evaluation of tenders, it shall lead to forfeiture of the tender Bid Security besides banning of business for a period of upto Two years.  
(b) In case of any information submitted by tenderer is found to be false, forged or incorrect after the award of contract, the contract shall be terminated. Bid Security, Performance Guarantee and Security Deposit available with the railway shall be forfeited. In addition, other dues of the contractor, if any, under this contract shall be forfeited and agency shall be banned for doing business for a period of upto Two years.

**1.1.28** Non-compliance with any of the conditions set forth therein above is liable to result in the tender being rejected.

#### **1.1.29 Documents to be Submitted Along with Tender**

- (i) The tenderer shall clearly specify whether the tender is submitted on his own (Proprietary Firm) or on behalf of a Partnership Firm / Company / Joint Venture (JV) / Registered Society / Registered Trust / Hindu Undivided Family (HUF) / Limited Liability Partnership (LLP) etc. The tenderer(s) shall enclose the attested copies of the constitution of their concern, and copy of PAN Card along with their tender.

- Tender Documents in such cases are to be signed by such persons as may be legally competent to sign them on behalf of the firm, company, association, trust or society, as the case may be.
- (ii) Following documents shall be submitted by the tenderer:
- (a) **Sole Proprietorship Firm:**
    - (i) All documents in terms of Para 1.1.26 of the Tender above.
  - (b) **HUF:**
    - (i) A copy of notarized affidavit on Stamp Paper declaring that he who is submitting the tender on behalf of HUF is in the position of 'Karta' of Hindu Undivided Family (HUF) and he has the authority, power and consent given by other members to act on behalf of HUF.
    - (ii) All other documents in terms of Para 1.1.26 of the Tender above.
  - (c) **Partnership Firm:**
    - (i) All documents as mentioned in para 1.1.33 of the Tender .
  - (d) **Joint Venture (JV):** All documents as mentioned in para 1.1.32 of the Tender.
  - (e) **Company registered under Companies Act 2013:**
    - (i) The copies of **MOA (Memorandum of Association) / AOA (Articles of Association)** of the company
    - (ii) A copy of Certificate of Incorporation
    - (iii) A copy of Authorization/Power of Attorney issued by the Company (backed by the resolution of Board of Directors) in favour of the individual to sign the tender on behalf of the company and create liability against the company.
    - (iv) All other documents in terms Para 1.1.26 of the Tender above.
  - (f) **LLP (Limited Liability Partnership):**
    - (i) A copy of LLP Agreement
    - (ii) A copy of Certificate of Incorporation
    - (iii) A copy of Power of Attorney/Authorization issued by the LLP in favour of the individual to sign the tender on behalf of the LLP and create liability against the LLP.
    - (iv) An undertaking by all partners of the LLP that they are not blacklisted or debarred by Railways or any other Ministry / Department of the Govt. of India from participation in tenders / contracts as on the date of submission of bids, either in their individual capacity or in any firm/LLP or JV in which they were / are partners/members. Concealment / wrong information in regard to above shall make the contract liable for determination under Clause 1.1.95 (Clause 62 of the Standard General Conditions of Contract).
    - (v) All other documents in terms of Para 1.1.26 of the Tender.
  - (g) **Registered Society & Registered Trust:**
    - (i) A copy of Certificate of Registration
    - (ii) A copy of Memorandum of Association of Society/Trust Deed
    - (iii) A copy of Power of Attorney in favour of the individual to sign the tender documents and create liability against the Society/Trust.
    - (iv) A copy of Rules & Regulations of the Society
    - (v) All other documents in terms of Para 1.1.26 of the Tender above.
  - (iii) If it is NOT mentioned in the submitted tender that tender is being submitted on behalf of a Sole Proprietorship firm / Partnership firm / Joint Venture / Registered Company etc., then the tender shall be treated as having been submitted by the individual who has signed the tender.
  - (iv) After opening of the tender, any document pertaining to the constitution of Sole Proprietorship Firm / Partnership Firm / Registered Company/ Registered Trust / Registered Society / HUF/LLP etc. shall be neither asked nor considered, if submitted. Further, no suo moto cognizance of any document available in public domain (i.e., on internet etc.) or in Railway's record/office files etc. will be taken for consideration of the tender, if no such mention is available in tender offer submitted.
  - (v) A tender from JV shall be considered only where permissible as per the tender conditions.
  - (vi) The Railway will not be bound by any change of power of attorney or in the composition of the firm made subsequent to the submission of tender. Railway may, however, recognize such power of attorney and changes after obtaining proper legal advice, the cost of which will be chargeable to the Contractor.

**1.1.30** The tenderer whether sole proprietor / a company or a partnership firm/ registered society / registered trust / HUF / LLP etc if they want to act through agent or individual partner(s), should submit along

with the tender, a copy of power of attorney duly stamped and authenticated by a Notary Public or by Magistrate in favour of the specific person whether he/they be partner(s) of the firm or any other person, specifically authorizing him/them to sign the tender, submit the tender and further to deal with the Tender/ Contract up to the stage of signing the agreement except in case where such specific person is authorized for above purposes through a provision made in the partnership deed / Memorandum of Understanding / Article of Association /Board resolution, failing which tender shall be summarily rejected.

A separate power of attorney duly stamped and authenticated by a Notary Public or by Magistrate in favour of the specific person whether he/they be partner(s) of the firm or any other person, shall be submitted after award of work, specifically authorizing him/them to deal with all other contractual activities subsequent to signing of agreement, if required.

*Note: A Power of Attorney executed and issued overseas, the document will also have to be legalized by the Indian Embassy and notarized in the jurisdiction where the Power of Attorney is being issued. However, the Power of Attorney provided by Bidders from countries that have signed the Hague Legislation Convention 1961 are not required to be legalized by the Indian Embassy if it carries a conforming Apostille certificate.*

#### **1.1.31 Employment/Partnership Etc. of Retired Railway Employees:**

- (a) Should a tenderer
  - i) be a retired Engineer of the gazetted rank or any other gazetted officer working before his retirement, whether in the executive or administrative capacity or whether holding a pensionable post or not, in the Engineering or any other department of any of the railways owned and administered by the President of India for the time being, OR
  - ii) being partnership firm / joint venture (JV) / registered society / registered trust etc have as one of its partners/members a retired Engineer of the gazetted rank or any other gazetted officer working before his retirement, OR
  - iii) being an incorporated company have any such retired Engineer of the gazetted rank or any other gazetted officer working before his retirement as one of its directors

AND

in case where such Engineer or officer had not retired from government service at least 1 year prior to the date of submission of the tender

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the tenderer will give full information as to the date of retirement of such Engineer or gazetted officer from the said service and as to whether permission for taking such contract, or if the Contractor be a partnership firm or an incorporated company, to become a partner or director as the case may be, has been obtained by the tenderer or the Engineer or officer, as the case may be from the President of India or any officer, duly authorized by him in this behalf, shall be clearly stated in writing at the time of submitting the tender.

- b) In case, upon successful award of contract, should a tenderer depute for execution of the works under or to deal matters related with this contract, any retired Engineer of gazette rank or retired gazetted officer working before his retirement in the Engineering or any other department of any of the railways owned and administered by the President of India for the time being, and now in his employment, then the tenderer will ensure that retired Engineer or retired gazetted officer had retired from government service at least 1 year prior to the date of his employment with tenderer and in case he had retired from service within a year then he possesses the requisite permission from the President of India or any officer, duly authorized by him in this behalf, to get associated with the tenderer.
- c) Should a tenderer or Contractor being an individual, have member(s) of his family or in the case of partnership firm/ company / joint venture (JV) / registered society / registered trust etc. one or more of his partner(s)/shareholder(s) or member(s) of the family of partner(s)/shareholder(s) having share of more than 1% in the tendering entity employed in gazetted capacity in the Engineering or any other department of the railway, then the tenderer at the time of submission of tender, will inform the authority inviting tenders the details of such persons.

Note: -If information as required as per 1.1.31 a), b), c) above has not been furnished, contract is liable to be dealt in accordance with provision of Clause 1.1.95 (clause 62 of the Standard General Condition of contract). Tenderer shall furnish detail/information as per Annexure-20.

#### **1.1.32 Participation of Joint Venture (JV) in Works Tender:** This para shall be applicable for works tenders wherein tender documents provide for the same.

- 1 Separate identity/name shall be given to the Joint Venture.



- 2 Number of members in a JV shall not be more than three, if the work involves only one department (say Civil or S&T or Electrical or Mechanical) and shall not be more than five, if the work involves more than one Department. One of the members of the JV shall be its Lead Member who shall have a majority (at least 51%) share of interest in the JV. The other members shall have a share of not less than 20% each in case of JV with upto three members and not less than 10% each in case of JV with more than three members. In case of JV with foreign member(s), the Lead Member has to be an Indian firm/company with a minimum share of 51%.
- 3 A member of JV shall not be permitted to participate either in individual capacity or as a member of another JV in the same tender.
- 4 The tender form shall be purchased and submitted only in the name of the JV and not in the name of any constituent member. The tender form can however be submitted by JV or any of its constituent member or any person authorized by JV through Power of Attorney to submit tender.
- 5 *Bid Security shall be submitted by JV or authorized person of JV either as :*
  - (i) Cash through e-payment gateway or as mentioned in tender document, or
  - (ii) Bank Guarantee bond either in the name of JV, or in the name of all members of JV as per MOU irrespective of their share in the JV if the JV has not been constituted legally till the date of submission of tender.
- 6 A copy of Memorandum of Understanding (MoU) duly executed by the JV members on a stamp paper, shall be submitted by the JV alongwith the tender. The complete details of the members of the JV, their share and responsibility in the JV etc. particularly with reference to financial, technical and other obligations shall be furnished in the MoU.
- 7 Once the tender is submitted, the MoU shall not normally be modified / altered / terminated during the validity of the tender. In case the tenderer fails to observe/comply with this stipulation, the full Bid Security shall be liable to be forfeited.
- 8 Approval for change of constitution of JV shall be at the sole discretion of the Railway. The constitution of the JV shall not normally be allowed to be modified after submission of the bid by the JV, except when modification becomes inevitable due to succession laws etc., provided further that there is no change in qualification of minimum eligibility criteria by JV after change of composition. However, the Lead Member shall continue to be the Lead Member of the JV. Failure to observe this requirement would render the offer invalid.
- 9 Similarly, after the contract is awarded, the constitution of JV shall not be normally allowed to be altered during the currency of contract except when modification become inevitable due to succession laws etc. and minimum eligibility criteria should not get vitiated. Failure to observe this stipulation shall be deemed to be breach of contract with all consequential penal action as per contract conditions.
- 10 On award of contract to a JV, a single Performance Guarantee shall be submitted by the JV as per tender conditions. All the Guarantees like Performance Guarantee, Bank Guarantee for Mobilization Advance, Machinery Advance etc. shall be accepted only in the name of the JV and no splitting of guarantees amongst the members of the JV shall be permitted.
- 11 On issue of LOA (Letter of Acceptance), the JV entity to whom the work has been awarded, with the same shareholding pattern as was declared in the MOU/JV Agreement submitted alongwith the tender, shall be got registered before the Registrar of the Companies under 'The Companies Act - 2013' (in case JV entity is to be registered as Company) or before the Registrar/Sub-Registrar under the 'The Indian Partnership Act, 1932' (in case JV entity is to be registered as Partnership Firm) or under 'The LLP Act 2008' (in case JV entity is to be registered as LLP). A separate PAN shall be obtained for this entity. The documents pertaining to this entity including its PAN shall be furnished to the Railways before signing the contract agreement for the work. In case the tenderer fails to observe/comply with this stipulation within 60 days of issue of LOA, contract is liable to be terminated. In case contract is terminated railway shall be entitled to forfeit the full amount of the Bid Security and other dues payable to the Contractor under this contract. The entity so registered, in the registered documents, shall have, inter-alia, following Clauses:
  - 11.1 Joint and Several Liability - Members of the entity to which the contract is awarded, shall be jointly and severally liable to the Railway for execution of the project in accordance with General and Special Conditions of Contract. The members of the entity shall also be liable jointly and severally for the loss, damages caused to the Railways during the course of execution of the contract or due to non-execution of the contract or part thereof.
  - 11.2 Duration of the Registered Entity - It shall be valid during the entire currency of the contract including the period of extension, if any and the maintenance period after the work is completed.
  - 11.3 Governing Laws - The Registered Entity shall in all respect be governed by and interpreted in accordance with Indian Laws.
- 12 Authorized Member - Joint Venture members in the JV MoU shall authorize Lead member on behalf of the Joint Venture to deal with the contract, sign the agreement or enter into contract in respect of the said tender, to receive payment, to witness joint measurement of work done, to sign measurement books and similar such action in respect of the said tender/contract. All notices/correspondences with respect to the contract would be sent only to this authorized member of

- the JV.
- 13** No member of the Joint Venture shall have the right to assign or transfer the interest right or liability in the contract without the written consent of the other members and that of the Railway in respect of the said tender/contract.
- 14** Documents to be enclosed by the JV alongwith the tender:
- 14.1** In case one or more of the members of the JV is/are partnership firm(s), following documents shall be submitted:
- (i) A notarized copy of the Partnership Deed or a copy of the Partnership deed registered with the Registrar.
  - (ii) A copy of consent of all the partners or individual authorized by partnership firm, to enter into the Joint Venture Agreement on a stamp paper,
  - (iii) A notarized or registered copy of Power of Attorney in favour of the individual to sign the MOU/JV Agreement on behalf of the partnership firm and create liability against the firm.
  - (iv) An undertaking by all partners of the partnership firm that they are not blacklisted or debarred by Railways or any other Ministry / Department of the Govt. of India from participation in tenders / contracts as on the date of submission of bids, either in their individual capacity or in any firm/LLP in which they were / are partners/members. Any Concealment / wrong information in regard to above shall make the bid ineligible or the contract shall be determined under Clause 1.1.95 (Clause 62 of the Standard General Conditions of Contract).
- 14.2** In case one or more members is/are Proprietary Firm or HUF, the following documents shall be enclosed:
- (i) A copy of notarized affidavit on Stamp Paper declaring that his Concern is a proprietary Concern and he is sole proprietor of the Concern OR he who is signing the affidavit on behalf of HUF is in the position of 'Karta' of Hindu Undivided Family (HUF) and he has the authority, power and consent given by other members to act on behalf of HUF.
- 14.3** In case one or more members of the JV is/are companies, the following documents shall be submitted:
- (i) A copy of resolutions of the Directors of the Company, permitting the company to enter into a JV agreement,
  - (ii) The copies of MOA (Memorandum of Association) / AOA (Articles of Association) of the company
  - (iii) A copy of Certificate of Incorporation
  - (iv) A copy of Authorization/copy of Power of Attorney issued by the Company (backed by the resolution of Board of Directors) in favour of the individual, to sign the tender, sign MOU/JV Agreement on behalf of the company and create liability against the company
- 14.4** In case one or more members of the JV is/are LLP firm/s, the following documents shall be submitted:
- (i) A copy of LLP Agreement
  - (ii) A copy of Certificate of Incorporation of LLP
  - (iii) A copy of resolution passed by partners of LLP firm, permitting the Firm to enter into a JV agreement
  - (iv) A copy of Authorization /copy of Power of Attorney issued by the LLP firm (backed by resolution passed by the Partners) in favour of the individual, to sign the tender and/or sign the MOU/ JV agreement on behalf of the LLP and create liability against the LLP.
  - (v) An undertaking by all partners of the LLP that they are not blacklisted or debarred by Railways or any other Ministry / Department of the Govt. of India from participation in tenders / contracts as on the date of submission of bids, either in their individual capacity or in any firm/LLP or JV in which they were / are partners/members. Any Concealment / wrong information in regard to above shall make the contract liable for determination under Clause 62 of the Standard General Conditions of Contract.
- 14.5** In case one or more members of the JV is/are Society/s or Trust/s, the following documents shall be submitted:
- (i) A copy of Certificate of Registration
  - (ii) A copy of Memorandum of Association of Society/Trust Deed
  - (iii) A copy of Rules & Regulations of the Society
  - (iv) A copy of Power of Attorney, in favour of the individual to sign the tender documents and create liability against the Society/Trust.
- 14.6** All other documents in terms of Para 1.1.26 of the Tender above.
- 14.7** A Power of attorney executed and issued overseas, the document will also have to be legalized by the Indian Embassy and notarized in the jurisdiction where the power of

attorney is being issued. However, the Power of Attorney provided by Bidder from countries that have signed the Hague Legislation Convention 1961 are not required to be legalized by the Indian Embassy if it carries a conforming Apostille certificate.

- 15** Credentials & Qualifying Criteria: Technical, financial eligibility and Bid capacity of the JV shall be adjudged based on satisfactory fulfillment of the following criteria:

**15.1** Technical Eligibility Criteria ('a' or 'b' mentioned hereunder):

- (a) For Works without composite components

The technical eligibility for the work as per para 1.1.26.1 above, shall be satisfied by either the 'JV in its own name & style' or 'Lead member of the JV'.

Each other (non-lead) member(s) of JV, who is/ are not satisfying the technical eligibility for the work as per para 1.1.26.1 above, shall have technical capacity of minimum 10% of the cost of work i.e., each non-lead member of JV member must have satisfactorily completed or substantially completed during the last 07 (seven) years, ending last day of month previous to the one in which tender is invited, one similar single work for a minimum of 10% of advertised value of the tender.

- (b) For works with composite components

The technical eligibility for major component of work as per para 1.1.26.1 above, shall be satisfied by either the 'JV in its own name & style' or 'Lead member of the JV' and technical eligibility for other component(s) of work as per para 1.1.26.1 above, shall be satisfied by either the 'JV in its own name & style' or 'any member of the JV'.

Each other (non-lead)member(s) of JV, who is/ are not satisfying the technical eligibility for any component of the work as per para 1.1.26.1 above, shall have technical capacity of minimum 10% of the cost of any component of work mentioned in technical eligibility criteria. i.e., each other (non-lead) member of must have satisfactorily completed or substantially completed during the last 07 (seven) years, ending last day of month previous to the one in which tender is invited, one similar single work for a minimum of 10% of cost of any component of work mentioned in technical eligibility criteria.

*Note for Para 1.1.32.15.1:*

a) The Major component of the work for this purpose shall be the component of work having highest value. In cases where value of two or more component of work is same, any one work can be classified as Major component of work.

b) Value of a completed work done by a Member in an earlier JV shall be reckoned only to the extent of the concerned member's share in that JV for the purpose of satisfying his/her compliance to the above mentioned technical eligibility criteria in the tender under consideration.

**15.2** Financial Eligibility Criteria

The JV shall satisfy the requirement of "Financial Eligibility" mentioned at para 1.1.26.2 above. The "financial capacity" of the lead member of JV shall not be less than 51% of the financial eligibility criteria mentioned at para 1.1.26.2 above.

The arithmetic sum of individual "financial capacity" of all the members shall be taken as JV's "financial capacity" to satisfy this requirement.

Note: Contractual payment received by a Member in an earlier JV shall be reckoned only to the extent of the concerned member's share in that JV for the purpose of satisfying compliance of the above mentioned financial eligibility criteria in the tender under consideration.

**15.3** Bid Capacity

The JV shall satisfy the requirement of "Bid Capacity" requirement mentioned at para 1.1.26.3 above. The arithmetic sum of individual "Bid capacity" of all the members shall be taken as JV's "Bid capacity" to satisfy this requirement.

**1.1.33 Participation of Partnership Firms in Works Tender:**

- 1 The Partnership Firms participating in the tender should be legally valid under the provisions of the Indian Partnership Act.

- 2 The partnership firm should have been in existence or should have been formed prior to submission of tender. Partnership firm should have either been registered with the Registrar or the partnership deed should have been notarized as per the Indian Partnership Act, prior to submission of tender.
- 3 Separate identity / name should be given to the partnership firm. The partnership firm should have PAN / TAN number in its own name and PAN / TAN number in the name of any of the constituent partners shall not be considered. The valid constituents of the firm shall be called partners.
- 4 Once the tender has been submitted, the constitution of the firm shall not normally be allowed to be modified / altered / terminated during the validity of the tender as well as the currency of the contract except when modification becomes inevitable due to succession laws etc., in which case prior permission should be taken from Railway and in any case the minimum eligibility criteria should not get vitiated. The re-constitution of firm in such cases should be followed by a notary certified Supplementary Deed. The approval for change of constitution of the firm, in any case, shall be at the sole discretion of the Railways and the tenderer shall have no claims what-so-ever. Any change in the constitution of Partnership firm after submission of tender shall be with the consent of all partners and with the signatures of all partners as that in the Partnership Deed. Failure to observe this requirement shall render the offer invalid and full Bid Security shall be forfeited.
- If any Partner/s withdraws from the firm after submission of the tender and before the award of the contract, the offer shall be rejected and Bid Security of the tenderer will be forfeited. If any new partner joins the firm after submission of tender but prior to award of contract, his / her credentials shall not qualify for consideration towards eligibility criteria either individually or in proportion to his share in the previous firm. In case the tenderer fails to inform Railway beforehand about any such changes / modification in the constitution which is inevitable due to succession laws etc. and the contract is awarded to such firm, then it will be considered a breach of the contract conditions liable for determination of the contract under Clause 1.1.95 (Clause 62 of the Standard General Conditions of Contract).
- 5 A partner of the firm shall not be permitted to participate either in his individual capacity or as a partner of any other firm in the same tender.
- 6 The tender form shall be submitted only in the name of partnership firm. The Bid Security shall be submitted by partnership firm. The Bid Security submitted in the name of any individual partner or in the name of authorized partner (s) shall not be considered.
- 7 On issue of Letter of Acceptance (LOA) to the partnership firm, all the guarantees like Performance Guarantee, Guarantee for various Advances to the Contractor shall be submitted only in the name of the partnership firm and no splitting of guarantees among the partners shall be acceptable.
- 8 On issue of Letter of Acceptance (LOA), contract agreement with partnership firm shall be executed in the name of the firm only and not in the name of any individual partner.
- 9 In case the Letter of Acceptance (LOA) is issued to a partnership firm, the following undertakings shall be furnished by all the partners through a notarized affidavit, before signing of contract agreement.
- (a) Joint and several liabilities:  
The partners of the firm to which the Letter of Acceptance (LOA) is issued, shall be jointly and severally liable to the Railway for execution of the contract in accordance with General and Special Conditions of the Contract. The partners shall also be liable jointly and severally for the loss, damages caused to the Railway during the course of execution of the contract or due to non-execution of the contract or part thereof.
- (b) Duration of the partnership deed and partnership firm agreement:  
The partnership deed/partnership firm agreement shall normally not be modified/altered/ terminated during the currency of contract and the maintenance period after the work is completed as contemplated in the conditions of the contract. Any change carried out by partners in the constitution of the firm without permission of Railway, shall constitute a breach of the contract, liable for determination of the contract under Clause 1.1.95 (Clause 62 of the Standard General Conditions of Contract).
- (c) Governing laws: The partnership firm agreement shall in all respect be governed by and interpreted in accordance with the Indian laws.
- (d) No partner of the firm shall have the right to assign or transfer the interest right or liability in the contract without the written consent of the other partner/s and that of the Railway.
- 10 The tenderer shall clearly specify that the tender is submitted on behalf of a partnership firm. The following documents shall be submitted by the partnership firm, with the tender:
- (i) A notarized copy of the Partnership Deed or a copy of the Partnership deed registered with the Registrar.
- (ii) A notarized or registered copy of Power of Attorney in favour of the individual to tender for the work, sign the agreement etc. and create liability against the firm.
- (iii) An undertaking by all partners of the partnership firm that they are not blacklisted or debarred by Railways or any other Ministry / Department of the Govt. of India from participation in tenders / contracts as on the date of submission of bids, either in their individual capacity or in any firm/LLP in which they were / are partners/members. Any

Concealment / wrong information in regard to above shall make the bid ineligible or the contract shall be determined under Clause 1.1.95 (Clause 62 of the Standard General Conditions of Contract).

- (iv) All other documents in terms of Para 1.1.26 of the Tender above.

**11 Evaluation of eligibility of a partnership firm:**

Technical and financial eligibility of the firm shall be adjudged based on satisfactory fulfillment of the eligibility criteria laid down in Para 1.1.26 of the Tender above.

**12 Advances to Contractor –**

If specifically provided in Tender Documents of tender having advertised value more than Rs 50 Crores, Railway shall make payment, as an Interest bearing advances, as per Contractor's request. These advances shall carry a simple interest as per Railway Norms. The payment and recovery of such advances shall be made as per manners prescribed in Clause 1.1.78.4 (Clause 46.4 of the Standard General Conditions of Contract).

- 1.1.34 (i) Execution Co-Relation and Intent of Contract Documents:** The contract documents shall be signed in triplicate by the Railway and the Contractor. The contract documents are complementary and what is called for by anyone shall be as binding as if called for by all, the intention of the documents is to include all labour and materials, equipments and transportation necessary for proper execution of work. Materials or works not covered by or properly inferable from any heading or class of the specifications shall not be supplied by the Railway to the Contractors unless distinctly specified in the contract documents. Materials or works described in words which so applied have a well-known technical or trade meaning, shall be held to refer to such recognized standards.

(ii) If a work is transferred from the jurisdiction of one Railway to another Railway or to a Project authority or vice versa while contract is in subsistence, the contract shall be binding on the Contractor and the Successor Railway/Project in the same manner & take effect in all respects as if the Contractor and the Successor Railway/Project were parties thereto from the inception and the corresponding officer or the Competent Authority in the Successor Railway/Project will exercise the same powers and enjoy the same authority as conferred to the Predecessor Railway/Project under the original contract/agreement entered into.

(iii) If for administrative or other reasons the contract is transferred to the Successor Railway, the contract shall, notwithstanding any things contained herein contrary there to, be binding on the Contractor and the Successor Railway in the same manner and take effect in all respects as if the Contractor and the Successor Railway had been parties thereto from the date of this contract.

- 1.1.35 (i) Law Governing the Contract:** The contract shall be governed by the law for the time being in force in the Republic of India.

(ii) **Compliance to Regulations and Bye-Laws:** The Contractor shall conform to the provision of any statute relating to the works and regulations and bye-laws of any local authority and of any water and lighting companies or undertakings, with whose system the work is proposed to be connected and shall before making any variation from the drawings or the specifications that may be necessitated by so confirming give to the Engineer notice specifying the variation proposed to be made and the reason for making the variation and shall not carry out such variation until he has received instructions from the Engineer in respect thereof. The Contractor shall be bound to give all notices required by statute, regulations or bye-laws as aforesaid and to pay all fees and taxes payable to any authority in respect thereof.

(iii) **Environmental and Forest clearances:** The Railway represents and warrants that the environmental and forest clearances pertaining to the work commensurate with the progress of work/agreed programme, will be obtained by Engineer. In the event of any delay in securing respective clearances leading to delay in execution of work, the Contractor shall be entitled to Extension of Time for the period of such delay in accordance with the provisions of Clause 1.1.49A (ii) (Clause-17A(ii) of GCC).

- 1.1.36 Communications to be in Writing:** All notices, communications, reference and complaints made by the Railway or the Engineer or the Engineer's Representative or the Contractor inter-se concerning the works shall be in writing or e-mail on registered e-mail IDs i.e. the e mail id provided for correspondence in the contract agreement, otherwise email id registered with IREPS and no notice, communication, reference or complaint not in writing or through e-mail, shall be recognized.

**1.1.37 Service of Notices on Contractors:** The Contractor shall furnish to the Engineer the name, designation and address of his authorized agent and all complaints, notices, communications and references shall be deemed to have been duly given to the Contractor, if delivered to the Contractor or his authorized agent or left at or posted to the address so given and shall be deemed to have been so given in the case of posting on day on which they would have reached such address in the ordinary course of post/ e-mail or on the day on which they were so delivered or left. In the case of contract by partners, any change in the constitution of the firm shall be forthwith notified by the Contractor to the Engineer.

**1.1.38 Occupation and Use of Land:** No land belonging to or in the possession of the Railway shall be occupied by the Contractor without the permission of the Railway. The Contractor shall not use, or allow to be used the site for any purposes other than that of executing the works. Whenever non-railway bodies/persons are permitted to use railway premises with competent authority's approval, conservancy charges as applicable from time to time may be levied.

**1.1.39 Assignment or Subletting of Contract:** The Contractor shall not assign or sublet the contract or any part thereof or allow any person to become interested therein in any manner whatsoever without the special permission in writing of the Chief Engineer, save as provided below. Any breach of this condition shall entitle the Railway to rescind the contract under Clause 1.1.95 (Clause 62 of GCC) and also render the Contractor liable for payment to the Railway in respect of any loss or damage arising or ensuing from such cancellation; provided always that execution of the details of the work by petty Contractor under the direct and personal supervision of the Contractor or his agent shall not be deemed to be sub-letting under this clause.

In case Contractor intends to subcontract part of work, he shall submit a proposal in writing seeking permission of Chief Engineer for the same. While submitting the proposal to railway, Contractor shall ensure the following:

- (a) (i) The Contractor shall not sub-contract the Works comprising more than 40% (forty percent) of the Contract Price and shall carry out Works for at least 60% (sixty percent) of the total Contract Price directly under its own supervision and through its own personnel. The Parties expressly agree that for the purposes of computing the value of sub-contracts under this clause 1.1.39 (a)(i), the Contract Price shall exclude any sub-contract for the procurement of goods and equipment like [rails, sleepers and track fittings, signaling and telecommunication & Power supply equipment]. The Parties agree that all obligations and liabilities under this Agreement for the entire Railway Project shall at all time remain with the Contractor. {The Parties agree that works equal to at least 30% (thirty percent) of the Contract Price shall be discharged solely by the Lead Member.}\$

Procurement of material, hire of equipment or engagement of labour by prime contractor or procuring entity will not mean sub-contracting.

\$ May be deleted if the contractor is not a Consortium/Joint Venture.

- (ii) The subcontractor shall have successfully completed at least one work similar to work proposed for subcontract in last 5 years, ending date of submission of proposal by Contractor to Railway, costing not less than 35% value of work to be subletted, through a works contract. For fulfilment of above, Work Experience Certificate issued by a Govt. Department/Organisation shall be considered. Further, Work Experience Certificate issued by a Public listed company shall be considered provided the company is having average annual turnover of Rs 500 crore and above in last 3 financial years excluding the current financial year, listed on National Stock Exchange or Bombay Stock Exchange, registered at least 5 years back from the date of submission of proposal by Contractor to Railway and work experience certificate issued by a person authorised by the Public Listed Company to issue such certificates.

*Note: for subletting of work costing up to Rs 50 lakh no previous work experience shall be asked for by the Railway.*

In case contractor submits subcontractor's work experience certificate issued by public listed company, the contractor shall also submit along with work experience certificate, the relevant copy of work order, bill of quantities, bill wise details of payment received duly certified by Chartered Accountant, TDS certificates for all payments received and copy of final/last bill paid by company in support of above work experience certificate.

- (iii) There is no banning of business with the sub-contractor in force over IR.

- (b) The Contractor shall provide to the Engineer a copy of the agreement to be entered into by Contractor with subcontractor. No subcontractor shall be permitted without a formal agreement between Contractor and subcontractor. This agreement shall clearly define the scope of work to be carried out by subcontractor and the terms of payment in clear & unambiguous manner.
- (c) On receipt of approval from Chief Engineer, Contractor shall enter into a formal agreement legally enforceable in Court of Law with subcontractor and submit a copy of the same to the Engineer.
- (d) The Contractor shall intimate to the Engineer not less than 7 days in advance, the intended date of commencement of subcontractor's work.
- (e) Once having entered into above arrangement, Contractor shall discontinue such arrangement, if he intends to do so at his own or on the instructions of Railway, with prior intimation to Chief Engineer.
- (f) The Contractor shall indemnify railway against any claim of subcontractor.
- (g) The Contractor shall release payment to the Sub-contractor(s) promptly and shall endeavour to resolve all issues amicably and speedily with the Sub-contractor(s), so that the execution of work is not affected in any manner whatsoever.
- (h) In addition to issuance of work experience certificate to Contractor, the Engineer, when, based on documents, is satisfied that subcontracted work has been carried out by subcontractor, shall issue work experience certificate to the subcontractor also for the portion of work subcontracted and successfully completed by the sub-contractor.

Note: Work Experience Certificate to the subcontractor shall be issued only when the contractor's work is complete and contractor is entitled for the issuance of Work Experience Certificate. However, in the same contract, when the Chief Engineer, based on documents, is satisfied that the subcontractor has successfully carried out subletted work; without issuance of work experience certificate to subcontractor at this stage, the Chief Engineer can, **only once**, consider the successfully completed subletted work for the fulfilment of eligibility for further subletting of work to the subcontractor in the same contract. When the contractor's work is complete and contractor is entitled for the issuance of work experience certificate, the subcontractor shall be issued one Work Experience Certificate for the total scope of work executed by the subcontractor in the contract.

- (i) The responsibility of successful completion of work by subcontractor shall lie with Contractor. Subcontracting will in no way relieve the Contractor to execute the work as per terms of the Contract.
- (j) Further, in case Engineer is of the view that subcontractor's performance is not satisfactory, he may instruct the Contractor to remove the subcontractor from the work and Contractor has to comply with the above instructions with due promptness. Contractor shall intimate the actual date of discontinuation of subcontract to Engineer. No claim of Contractor whatsoever on this account shall be entertained by the Railway and this shall be deemed as 'excepted matter' (matter not arbitrable).
- (k) The permitted subcontracting of work by the Contractor shall not establish any contractual relationship between the sub-contractor and the Railway and shall not relieve the Contractor of any responsibility under the Contract.

**1.1.40 Assistance by Railway for the Stores to be obtained by the Contractor:** Owing to difficulty in obtaining certain materials (including Tools & Plant) in the market, the Railway may have agreed without any liability therefore to endeavour to obtain or assist the Contractor in obtaining the required quantities of such materials as may be specified in the Tender. In the event of delay or failure in obtaining the required quantities of the aforesaid material, the Contractor shall not be deemed absolved of his own responsibility and shall keep in touch with the day to day position regarding their availability and accordingly adjust progress of works including employment of labour and the Railway shall not in any way be liable for the supply of materials or for the non-supply thereof for any reasons whatsoever nor for any loss or damage arising in consequence of such delay or non-supply.

**1.1.41 Railway Passes:** No free railway passes shall be issued by the Railway to the Contractor or any of his employee/worker.

**1.1.42 Carriage of Materials:** No forwarding orders shall be issued by the Railway for the conveyance of Contractor's materials, tools and plant by train which may be required for use in the works and the Contractor shall pay full freight charges at public tariff rates therefor.

- 1.1.43 Use of Ballast Trains:** The Railway may agree to allow the Contractor use of the ballast or material trains under such conditions as shall be specially prescribed, provided that the Contractor shall pay for the use thereof charges calculated at public tariff rates on the marked carrying capacity of each vehicle subject to specified minimum charge per day or part of day and provided further that the Contractor shall indemnify the Railway against any claims or damages arising out of the use or misuse thereof and against any liabilities under the Workmen's Compensation Act, 1923 or any statutory amendments thereto.
- 1.1.44 Representation on Works:** The Contractor shall, when he is not personally present on the site of the works place, keep a responsible agent at the works during working hours who shall on receiving reasonable notice, present himself to the Engineer and orders given by the Engineer or the Engineer's representative to the agent shall be deemed to have the same force as if they had been given to the Contractor. Before absenting himself, the Contractor shall furnish the name and address of his agent for the purpose of this clause and failure on the part of the Contractor to comply with this provision at any time will entitle the Railway to rescind the contract under Clause 1.1.95 (Clause 62 of GCC).
- 1.1.45 Relics and Treasures:** All gold, silver, oil, other minerals of any description, all precious stones, coins, treasures relics antiquities and other similar things which shall be found in or upon the site shall be the property of the Railway and the Contractor shall duly preserve the same to the satisfaction of the Railway and shall from time to time deliver the same to such person or persons as the Railway may appoint to receive the same.
- 1.1.46 Excavated Material:** The Contractor shall not sell or otherwise dispose of or remove except for the purpose of this contract, the sand, stone, clay ballast, earth, trees, rock or other substances or materials which may be obtained from any excavation made for the purpose of the works or any building or produced upon the site at the time of delivery of the possession thereof but all the substances, materials, buildings and produce shall be the property of the Railway provided that the Contractor may, with the permission of the Engineer, use the same for the purpose of the works either free of cost or pay the cost of the same at such rates as may be determined by the Engineer.
- 1.1.47 Indemnity by Contractors:** The Contractor shall indemnify and save harmless the Railway from and against all actions, suit, proceedings, losses, costs, damages, charges, claims and demands of every nature and description brought or recovered against the Railways by reason of any act or omission of the Contractor, his agents or employees, in the execution of the works or in his guarding of the same. All sums payable by way of compensation under any of these conditions shall be considered as reasonable compensation to be applied to the actual loss or damage sustained, and whether or not any damage shall have been sustained.
- 1.1.48.(1) Security Deposit:** The Security Deposit shall be 5% of the contract value. The Bid Security submitted by the Contractor with his tender will be retained/encashed by the Railways as part of security for the due and faithful fulfillment of the contract by the Contractor. Provided further that, if Contractor submits the Cash or Term Deposit Receipt issued from a Scheduled commercial bank of India or irrevocable Bank Guarantee Bond from a Scheduled commercial bank of India, either towards the Full Security Depositor the Part Security Deposit equal to or more than Bid Security, the Railway shall return the Bid Security, to the Contractor.

Balance of Security Deposit may be deposited by the Contractor in cash or Term Deposit Receipt issued from Scheduled commercial bank of India or irrevocable Bank Guarantee bond issued from Scheduled commercial bank of India, or may be recovered at the rate of 6% of the bill amount till the full Security Deposit is recovered. Provided also that in case of defaulting Contractor, the Railway may retain any amount due for payment to the Contractor on the pending "on account bills" so that the amounts so retained (including amount guaranteed through Performance Guarantee) may not exceed 10% of the total value of the contract.

The Irrevocable Bank Guarantee submitted towards Security deposit shall be initially valid up to the stipulated date of Maintenance period plus 60 days and shall be extended from time to time, depending upon extension of contract granted in terms of Clause 1.1.49A & 1.1.49B (Clause 17A and 17B of the Standard General Conditions of Contract).

Note: Security Deposit deposited in cash by the Contractor or recovered from the running bills of a Contractor or submitted by contractor as Term Deposit Receipt(s) can be refunded/returned to the contractor, in lieu of irrevocable Bank Guarantee bond issued from scheduled commercial bank of India, to be submitted by him, for an amount equal to or more than the already available Security Deposit, provided however that, in a contract of value less than Rs. 50 Crore, such refund/ return of



the already available Security Deposit is permitted up to two times and in a contract of value equal to or more than Rs. 50 Crore, such refund / return of the already available Security Deposit is permitted up to three times.

- 2) (i) Refund of Security Deposit:** Security Deposit mentioned in sub clause (1) above shall be returned to the Contractor along with or after, the following:
- (a) Final Payment of the Contract as per clause 1.1.84 (a) **and**
  - (b) Execution of Final Supplementary Agreement or Certification by Engineer that Railway has No Claim on Contractor **and**
  - (c) Maintenance Certificate issued, on expiry of the maintenance period as per clause 1.1.83 (a), in case applicable.
- (2) (ii) Forfeiture of Security Deposit:** Whenever the contract is rescinded as a whole under clause 1.1.95 (1) of these conditions, the Security Deposit already with railways under the contract shall be forfeited. However, in case the contract is rescinded in part or parts under clause 1.1.95 (1) of these conditions, the Security Deposit shall not be forfeited.
- (3)** No interest shall be payable upon the Bid Security and Security Deposit or amounts payable to the Contractor under the Contract, but Government Securities deposited in terms of Sub-Clause 1.1.48.(4)(b) of this clause will be payable with interest accrued thereon.

#### **4) Performance Guarantee**

The procedure for obtaining Performance Guarantee is outlined below:

- (a) The successful bidder shall have to submit a Performance Guarantee (PG) within 21 (Twenty one) days from the date of issue of Letter of Acceptance (LOA). Extension of time for submission of PG beyond 21 (Twenty one) days and upto 60 days from the date of issue of LOA may be given by the Authority who is competent to sign the contract agreement. However, a penal interest of 12% per annum shall be charged for the delay beyond 21(Twenty one) days, i.e. from 22<sup>nd</sup> day after the date of issue of LOA. Further, if the 60<sup>th</sup> day happens to be a declared holiday in the concerned office of the Railway, submission of PG can be accepted on the next working day.

In all other cases, if the Contractor fails to submit the requisite PG even after 60 days from the date of issue of LOA, the contract is liable to be terminated. In case contract is terminated railway shall be entitled to forfeit Bid Security and other dues payable to the contractor against that particular contract, subject to maximum of PG amount. In case a tenderer has not submitted Bid Security on the strength of their registration as a Startup recognized by Department of Industrial Policy and Promotion (DIPP) under Ministry of Commerce and Industry, DIPP shall be informed to this effect. The failed Contractor shall be debarred from participating in re-tender for that work.

- (b) The successful bidder shall submit the Performance Guarantee (PG) amounting to 5% of the original contract value and **Additional Performance Guarantee as per clause 1.1.48(4)(h)** in any of the following forms:

- (i) A deposit of Cash;
- (ii) Irrevocable Bank Guarantee;
- (iii) Insurance Surety Bond as per Annexure-19

**Note: In case of extension of Date of Completion, selected bidder needs to submit extended Insurance Surety Bond/Fresh Insurance Surety Bond/fresh Performance Security, in any form as given above, before expiry of existing Insurance Surety Bond.**

- (iv) Government Securities including State Loan Bonds at 5% below the market value;
- (v) Pay Orders and Demand Drafts tendered by any Scheduled Commercial Bank of India;
- (vi) Guarantee Bonds executed or Deposits Receipts tendered by any Scheduled Commercial Bank of India;
- (vii) Deposit in the Post Office Saving Bank;
- (viii) Deposit in the National Savings Certificates;
- (ix) Twelve years National Defence Certificates;
- (x) Ten years Defence Deposits;
- (xi) National Defence Bonds and
- (xii) Unit Trust Certificates at 5% below market value or at the face value whichever is less. Also, FDR in favour of **Sr.DFM/N.Rly. DRM's Office, New Delhi/FA&CAO** (free from any encumbrance) may be accepted.

- (c) The Performance Guarantee shall be submitted by the successful bidder after the Letter of Acceptance (LOA) has been issued, but before signing of the contract agreement. This P.G. shall be initially valid upto the stipulated date of completion plus 60 days beyond that. In case, the time for completion of work gets extended, the Contractor shall get the validity of P.G. extended to cover such extended time for completion of work plus 60 days.
- (d) The value of PG to be submitted by the Contractor is based on original contract value and shall not change due to subsequent variation(s) in the original contract value.
- (e) The Performance Guarantee (PG) shall be released after physical completion of the work based on 'Completion Certificate' issued by the competent authority stating that the Contractor has completed the work in all respects satisfactorily.
- (f) Whenever the contract is rescinded, the Performance Guarantee already submitted for the contract shall be encashed.
- (g) The Engineer shall not make a claim under the Performance Guarantee except for amounts to which the President of India is entitled under the contract (not withstanding and/or without prejudice to any other provisions in the contract agreement) in the event of:
  - (i) Failure by the Contractor to extend the validity of the Performance Guarantee as described herein above, in which event the Engineer may claim the full amount of the Performance Guarantee.
  - (ii) Failure by the Contractor to pay President of India any amount due, either as agreed by the Contractor or determined under any of the Clauses/Conditions of the Agreement, within 30 days of the service of notice to this effect by Engineer.
  - (iii) The Contract being determined or rescinded under clause 1.1.95 of these conditions.
- (h) If a tender is accepted on the quoted rates of bidder which is below the advertised tender value, an additional performance security shall be submitted by the bidder as below:

Bid quoted in % of advertised cost	Additional Performance Guarantee (%)
Below 0-5% (inclusive)	NIL
Below 5%	5%

**NOTE: As per Railway Board letter no. 2022/CE-I/CT/GCC-2022/Policy/Pt.-I dated 09.01.2025 & 2022/CE-I/CT/GCC-2022/POLICY/Pt.I (E-3320424) dated 13.03.2026 or latest).**

- 1.1.49 Force Majeure Clause:** If at any time, during the continuance of this contract, the performance in whole or in part by either party of any obligation under this contract shall be prevented or delayed by reason of any war, hostility, acts of public enemy, civil commotion, sabotage, serious loss or damage by fire, explosions, epidemics/pandemics, strikes, lockouts or acts of God (hereinafter, referred to events) provided, notice of the happening of any such event is given by either party to the other within 30 days from the date of occurrence thereof, neither party shall by reason of such event, be entitled to terminate this contract nor shall either party have any claim for damages against the other in respect of such non-performance or delay in performance, and works under the contract shall be resumed as soon as practicable after such event has come to an end or ceased to exist, and the decision of the Engineer as to whether the works have been so resumed or not shall be final and conclusive, PROVIDED FURTHER that if the performance in whole or in part of any obligation under this contract is prevented or delayed by reason of any such event for a period exceeding 120 days, either party may at its option terminate the contract by giving notice to the other party.
- (A) **Extension of Time in Contracts:** Subject to any requirement in the contract as to completion of any portion or portions of the works before completion of the whole, the Contractor shall fully and finally complete the whole of the works comprised in the contract (with such modifications as may be directed under conditions of this contract) by the date entered in the contract or extended date in terms of the following clauses:
    - (i) **Extension due to Modification:** If any modifications have been ordered which in the opinion of the Engineer have materially increased the magnitude of the work, then such extension of the contracted date of completion may be granted as shall appear to the Engineer to be reasonable in the circumstances, provided moreover that the Contractor shall be responsible for requesting such extension of the date as may be considered necessary as soon as the cause thereof shall arise.
    - (ii) **Extension for Delay not due to Railway or Contractor:** If in the opinion of the Engineer, the progress of work has any time been delayed by any act or neglect of Railway's employees or by

other Contractor employed by the Railway under Sub-Clause (4) of Clause 1.1.52 of these Conditions or in executing the work not forming part of the contract but on which Contractor's performance necessarily depends or by reason of proceeding taken or threatened by or dispute with adjoining or to neighbouring owners or public authority arising otherwise through the Contractor's own default etc. or by the delay authorized by the Engineer pending arbitration or in consequences of the Contractor not having received in due time necessary instructions from the Railway for which he shall have specially applied in writing to the Engineer or his authorized representative then upon happening of any such event causing delay, the Contractor shall immediately give notice thereof in writing to the Engineer within 15 days of such happening, but shall nevertheless make constantly his best endeavours to bring down or make good the delay and shall do all that may be reasonably required of him to the satisfaction of the Engineer to proceed with the works. The Contractor may also indicate the period for which the work is likely to be delayed and shall be bound to ask for necessary extension of time.

- (iii) **Extension for Delay due to Railways:** In the event of any failure or delay by the Railway to hand over the Contractor possession of the lands necessary for the execution of the works or to give the necessary notice to commence the works or to provide the necessary drawings or instructions or any other delay caused by the Railway due to any other cause whatsoever, then such failure or delay shall in no way affect or vitiate the contract or alter the character thereof or entitle the Contractor to damages or compensation therefor, but in any such case, the Railway may grant such extension or extensions of the completion date as may be considered reasonable.

The Contractor shall indicate the period for which the work is likely to be delayed and shall seek extension of time as may be considered necessary under clause 1.1.49A(i) or/and 1.1.49A(ii) or/ and 1.1.49A(iii) above, as soon as the cause thereof shall arise and, in any case, not less than 15 days before the expiry of the date fixed for completion of the works. The Engineer shall consider the same and shall grant and communicate such extension of time as in his opinion is reasonable having regard to the nature and period of delay and the type and quantum of work affected thereby. No other compensation shall be payable for works so carried forward to the extended period of time; the same rates, terms and conditions of contract being applicable, as if such extended period of time was originally provided in the original contract itself.

The non-submission of request for extension or submission of request within less than 15 days before the expiry of the date fixed for completion of the works, shall make him ineligible for extension under these sub clauses, subject to final decision of Engineer.

**(B) Extension of Time with Liquidated Damages (LD) for delay due to Contractor:**

The time for the execution of the work or part of the works specified in the contract documents shall be deemed to be the essence of the contract and the works must be completed not later than the date(s) as specified in the contract. If the Contractor fails to complete the works within the time as specified in the contract for the reasons other than the reasons specified in Clause 1.1.49 and 1.1.49A, the Railway may, if satisfied that the works can be completed by the Contractor within reasonable short time thereafter, allow the Contractor for further extension of time (Proforma at Form-12) as the Engineer may decide. On such extension the Railway will be entitled without prejudice to any other right and remedy available on that behalf, to recover from the Contractor as agreed damages and not by way of penalty for each week or part of the week, a sum calculated at the rate of Liquidated Damages as decided by Engineer, between 0.05% to 0.30% of contract value of the works for each week or part of the week.

For the purpose of this Clause, the contract value of the works shall be taken as value of work as per contract agreement including any supplementary work order/contract agreement issued. Provided also, that the total amount of liquidated damages under this condition shall not exceed 5% of the contract value or of the total value of the item or groups of items of work for which a separate distinct completion period is specified in the contract.

Provided further, that if the Railway is not satisfied that the works can be completed by the Contractor and in the event of failure on the part of the contractor to complete the work within further extension of time allowed as aforesaid, the Railway shall be entitled without prejudice to any other right or remedy available in that behalf, to appropriate the contractor's Security Deposit and rescind the contract under Clause 1.1.95 of these Conditions, whether or not actual damage is caused by such default.

NOTE:

In a contract, where extension(s) of time have been allowed once under clause 1.1.49B, further request(s) for extension of time under clause 1.1.49A can also be considered under exceptional circumstances. Such extension(s) of time under clause 1.1.49A shall be without any Liquidated damages, but the Liquidated damages already recovered during extension(s) of time granted previously under clause 1.1.49B shall not be waived. However, Price variation during such extension(s) shall be dealt as applicable for extension(s) of time under clause 1.1.49B.

- C Bonus for Early Completion of Work:** In open tenders having advertised value more than Rs.50 crore and original period of completion 12 months or more, when there is no reduction in original scope of work by more than 10%, and no extension granted on either railway or Contractor's account, Contractor shall be entitled for a bonus of 1% for each 30 days early completion of work. The period of less than 30 days shall be ignored while working out bonus. The maximum bonus shall be limited to 5% of original contract value. The completion date shall be reckoned as the date of issuance of completion certificate by Engineer.

#### **1.1.50 Illegal Gratification:**

- (1) Procuring authorities as well as bidders, contractors and consultants should observe the highest standard of ethics and should not indulge in the following prohibited practices, either directly or indirectly, at any stage during the procurement process or during execution of resultant contracts:
  - (i) "Corrupt practice": making offers, solicitation or acceptance of bribe, rewards or gifts or any material benefit, in exchange for an unfair advantage in the procurement process or to otherwise influence the procurement process or contract execution;
  - (ii) "Fraudulent practice": any omission or misrepresentation that may mislead or attempt to mislead so that financial or other benefits may be obtained or an obligation avoided. This includes making false declaration or providing false information for participation in a tender process or to secure a contract or in execution of the contract;
  - (iii) "Anti-competitive practice": any collusion, bid rigging or anti-competitive arrangement, or any other practice coming under the purview of The Competition Act, 2002, between two or more bidders, with or without the knowledge of the procuring entity, that may impair the transparency, fairness and the progress of the procurement process or to establish bid prices at artificial, non-competitive levels;
  - (iv) "Coercive practice": any coercion or any threat to impair or harm, directly or indirectly, any party or its property to influence the procurement process or affect the execution of a contract;
  - (v) "Conflict of interest"(COI): any personal, financial, or business relationship between the bidder and any personnel of the procuring entity who are directly or indirectly related to the procurement or execution process of the contract, which can affect the decision of the procuring entity directly or indirectly;
  - (vi) "Undue Advantage": improper use of information obtained by the bidder from the procuring entity with an intent to gain an unfair advantage in the procurement process or for personal gain. This also includes if the bidder (or his allied firm) provided services for the need assessment/ procurement planning of the tender process in which he is participating;
  - (vii) "Obstructive practice": materially impede the procuring entity's investigation of a procurement process either by deliberately destroying, falsifying, altering; or by concealing of evidence material to the investigation; or by making false statements or by threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to such investigation or from pursuing the investigation; or by impeding the procuring entity's rights of audit or access to information;
- (2) **Punitive Provisions:** Without prejudice to and in addition to the rights of the procuring entity to other penal provisions as per the bid documents or contract, if the procuring entity comes to a conclusion that a (prospective) bidder/contractor directly or through an agent, has violated this code of integrity in competing for the contract or in executing a contract, the procuring entity may take appropriate measures including one or more of the following:
  - (i) If his bids are under consideration in any procurement.
  - (a) Forfeiture or encashment of bid security;
  - (b) calling off of any pre-contract negotiations; and

- (c) rejection and exclusion of the bidder from the procurement process.
- (ii) If a contract has already been awarded
  - (a) Cancellation of the relevant contract and recovery of compensation for loss incurred by the procuring entity;
  - (b) Forfeiture or encashment of any other security or bond relating to the procurement;
  - (c) Recovery of payments including advance payments, if any, made by the procuring entity along with interest thereon at the prevailing rate;
- (iii) Provisions in addition to above:
  - (a) Removal from the list of enlisted contractors and banning/debarment of the bidder from participation in future procurements of the procuring entity for a period not less than one year;
  - (b) In case of anti-competitive practices, information for further processing may be filed under a signature of the Joint Secretary level officer, with the Competition Commission of India;
  - (c) Initiation of suitable disciplinary or criminal proceedings against any individual or staff found responsible.

Any question or dispute as to the commission of any such offence or compensation payable to the Railway under this Clause shall be settled by the General Manager of the Railway, in such a manner as he shall consider fit & sufficient and his decision shall be final & conclusive.

**1.1.51 (i) Contractor's understanding:** It is understood and agreed that the Contractor has, by careful examination, satisfied himself as to the nature and location of the work, the conformation of the ground, the character, quality and quantity of the materials to be encountered, the character of equipment and facilities needed preliminary to and during the progress of the works, the general and local conditions, the labour conditions prevailing therein and all other matters which can in any way affect the works under the contract.

**(ii) Commencement of Works:** The Contractor shall commence the works within 15 days after the receipt by him of an order in writing to this effect from the Engineer and shall proceed with the same with due expedition and without delay.

**(iii) Accepted Programme of Work:** The Contractor who has been awarded the work shall as soon as possible but not later than 30 days after the date of receipt of the acceptance letter in respect of contracts with initial completion period of two years or less or not later than 90 days for other contracts have to submit the detailed programme of work indicating the time schedule of various items of works in the form of Bar Chart/PERT/CPM. He shall also submit the details of organisation (in terms of labour and supervisors), plant and machinery that he intends to utilize (from time to time) for execution of the work within stipulated date of completion. The programme of work amended as necessary by discussions with the Engineer, shall be treated as the agreed programme of the work for the purpose of this contract and the Contractor shall endeavor to fulfill this programme of work. The progress of work will be watched accordingly and the liquidated damages will be with reference to the overall completion date. Nothing stated herein shall preclude the Contractor in achieving earlier completion of item or whole of the works than indicated in the programme.

In Contracts for works of New Line/Gauge Conversion/Doubling/Railway Electrification, finalized through Tenders having advertised value more than Rs.100crores, the Contractor shall submit a detailed time programme to the Engineer within 30 days after issue of LOA. The program shall include the physical and Financial Progress vis-à-vis program and forecast cash flow adopting Project Management Software such as **Primavera/Sure Track/MS Project etc.** The program must identify the milestones, interface requirements and program reporting elements. The Contractor shall supply, free of cost one set of authorized software to the Engineer and the soft copy of structured program for the project. This shall be updated every month. The Contractor shall also submit a revised programme whenever the previous programme is inconsistent with actual progress. Each programme shall include:

The order in which the Contractor intends to carry out the Works, including the anticipated timing of each stage, Contractor's Documents, procurement, manufacture of Plant, delivery to Site, construction, erection and testing, each of these stages for work by each Subcontractor, if any, the sequence and timing of inspections and tests specified in the Contract, and a supporting report which includes:

a general description of the methods which the Contractor intends to adopt, and of the major stages, in the execution of the Works, and details showing the Contractor's reasonable estimate for the number of each class of Contractor's Personnel & Equipment, required on the Site for each major stage.

Unless the Engineer, within 21 days after receiving a programme, gives notice to the Contractor stating the extent to which it does not comply with the Contract, the Contractor shall proceed in accordance with the programme, subject to his other obligations under the Contract. The Engineer shall be entitled to rely upon the programme when planning their activities.

If, at any time, the Engineer gives notice to the Contractor that a programme fails (to the extent stated) to comply with the Contract or to be consistent with actual progress and the Contractor's stated intentions, the Contractor shall submit a revised programme to the Engineer within 15 days in accordance with this Sub-Clause.

**(iv) Setting out of Works:** The Contractor shall be responsible for the correct setting out of all works in relation to original points, lines and levels of reference at his cost. The Contractor shall execute the work true to alignment, grade, levels and dimensions as shown in the drawing and as directed by the Engineer's representative and check these at frequent intervals. The Contractor shall provide all facilities like labour and instruments and shall co-operate with the Engineer's representative for checking of all alignment, grades, levels and dimensions. If, at any time, during the progress of the works any error appear or arise in any part of the work, the Contractor, on being required so to do by the Engineer's representative shall, at his own cost rectify such errors, to the satisfaction of the Engineer's representative.

Such checking shall not absolve the Contractor of his own responsibility of maintaining accuracy in the work. The Contractor shall carefully protect and preserve all bench marks, sight rails, pegs and other things used in setting out the work.

**1.1.52 (i) Compliance to Engineer's Instructions:** The Engineer shall direct the sequence in which the several parts of the works shall be executed and the Contractor shall execute without delay all orders given by the Engineer from time to time; but the Contractor shall not be relieved thereby from responsibility for the due performance of the works in all respects.

**(ii) Alterations to be Authorized:** No alterations in or additions to or omissions or abandonment of any part of the works shall be deemed authorised, except under written instructions from the Engineer.

**(iii) Extra Works:** Should works over and above those included in the contract require to be executed at the site, the Contractor shall have no right to be entrusted with the execution of such works which may be carried out by another Contractor or Contractors or by other means at the option of the Railway.

**(iv) Separate Contracts in Connection with Works:** The Railway shall have the right to let other contracts in connection with the works. The Contractor shall afford other Contractors reasonable opportunity for the storage of their materials and the execution of their works and shall properly connect and coordinate his work with theirs. If any part of the Contractor's work depends upon proper execution or result upon the work of another Contractor(s), the Contractor shall inspect and promptly report to the Engineer any defects in such works that render it unsuitable for such proper execution and results. The Contractor's failure so-to inspect and report shall constitute an acceptance of the other Contractor's work as fit and proper for the reception of his work, except as to defects which may develop in the other Contractor's work after the execution of his work.

**1.1.53 Instruction of Engineer's Representative:** Any instructions or approval given by the Engineer's representative to Contractor in connection with the works shall bind the Contractor as though it had been given by the Engineer provided always as follows:

- (a) Failure of the Engineer's representative to disapprove any work or materials shall not prejudice the power of the Engineer thereafter to disapprove such work or material and to order the removal or breaking up thereof.
- (b) If the Contractor shall be dissatisfied by reason of any decision of the Engineer's representative, he shall be entitled to refer the matter to the Engineer who shall there upon confirm or vary such decision.

**1.1.54 (i) Adherence to Specifications and Drawings:** The site and the detailed drawings shall be made available to the contractor commensurate with the accepted programme of work submitted under clause 1.1.51 (iii). The whole of the works shall be executed in perfect conformity with the specifications and drawings of the contract. If Contractor performs any works in a manner contrary to the specifications or drawings or any of them and without such reference to the Engineer, he shall bear all the costs arising or ensuing therefrom and shall be responsible for all loss to the Railway.

(ii) **Drawings and Specifications of the Works:** The Contractor shall keep one copy of Drawings and Specifications at the site, in good order, and such contract documents as may be necessary, available to the Engineer or the Engineer's Representative.

(iii) **Ownership of Drawings and Specifications:** All Drawings and Specifications and copies thereof furnished by the Railway to the Contractor are deemed to be the property of the Railway. They shall not be used on other works and with the exception of the signed contract set, shall be returned by the Contractor to the Railway on completion of the work or termination of the Contract.

(iv) **Compliance with Contractor's Request for Details:** The Engineer shall furnish with reasonable promptness, after receipt by him of the Contractor's request, additional instructions by means of drawings or otherwise, necessary for the proper execution of the works or any part thereof. All such drawings and instructions shall be consistent with the Contract Documents and reasonably inferable there from.

(v) **Meaning and Intent of Specification and Drawings:** If any ambiguity arises as to the meaning and intent of any portion of the Specifications and Drawings or as to execution or quality of any work or material, or as to the measurements of the works the decision of the Engineer thereon shall be final subject to the appeal (within 7 days of such decision being intimated to the Contractor) to the Chief Engineer who shall have the power to correct any errors, omissions, or discrepancies in aforementioned items and whose decision in the matter in dispute or doubt shall be final and conclusive.

**1.1.55 Working during Night:** The Contractor shall not carry out any work between sun-set and sun-rise without the previous permission of the Engineer. However, if the Engineer is satisfied that the work is not likely to be completed in time except by resorting to night work, he may order the same without confirming any right on the Contractor for claiming any extra payment for the same.

**1.1.56 Damage to Railway Property or Private Life and Property:** The Contractor shall be responsible for all risk to the work and for trespass and shall make good at his own expense all loss or damage whether to the works themselves or to any other property of the Railway or the lives, persons or property of others from whatsoever cause in connection with the works until they are taken over by the Railway, although all reasonable and proper precautions may have been taken by the Contractor. In case the Railway shall be called upon to make good any costs, loss or damages, or to pay any compensation, including that payable under the provisions of the Workmen's Compensation Act or any statutory amendments thereof to any person or persons sustaining damages as aforesaid by reason of any act, or any negligence or omissions on the part of the Contractor; the amount of any costs or charges including costs and charges in connection with legal proceedings, which the Railway may incur in reference thereto, shall be charged to the Contractor. The Railway shall have the power and right to pay or to defend or compromise any claim of threatened legal proceedings or in anticipation of legal proceedings being instituted consequent on the action or default of the Contractor, to take such steps as may be considered necessary or desirable to ward off or mitigate the effect of such proceedings, charging to Contractor, as aforesaid; any sum or sums of money which may be paid and any expenses whether for reinstatement or otherwise which may be incurred and the propriety of any such payment, defence or compromise, and the incurring of any such expenses shall not be called in question by the Contractor.

**1.1.57 Sheds, Storehouses and Yards:** The Contractor shall at his own expense provide himself with sheds, storehouses and yards in such situations and in such numbers as in the opinion of the Engineer is requisite for carrying on the works and the Contractor shall keep at each such sheds, storehouses and yards a sufficient quantity of materials and plant in stock as not to delay the carrying out of the works with due expedition and the Engineer and the Engineer's representative shall have free access to the said sheds, store houses and yards at any time for the purpose of inspecting the stock of materials or plant so kept in hand, and any materials or plant which the Engineer may object to shall not be brought upon or used in the works, but shall be forthwith removed from the sheds, storehouses or yards by the Contractor. The Contractor shall at his own expenses provide and maintain suitable mortar mills, soaking vats or any other equipments necessary for the execution of the works.

**1.1.58 (a) Provision of Efficient and Competent Staff at Work Sites by the Contractor:**

(i) The Contractor shall place and keep on the works at all times efficient and competent staff to give the necessary directions to his workmen and to see that they execute their work in sound & proper manner and shall employ only such supervisors, workmen & labourers in or about the execution of any of these works as are careful and skilled in the various trades.

(ii) The Contractor shall at once remove from the works any agents, permitted sub-contractor, supervisor, workman or labourer who shall be objected to by the Engineer and if and

whenever required by the Engineer, he shall submit a correct return showing the names of all staff and workmen employed by him.

- (iii) In the event of the Engineer being of the opinion that the Contractor is not employing on the works a sufficient number of staff and workmen as is necessary for proper completion of the works within the time prescribed, the Contractor shall forthwith on receiving intimation to this effect deploy the additional number of staff and labour as specified by the Engineer within seven days of being so required and failure on the part of the Contractor to comply with such instructions will entitle the Railway to rescind the contract under Clause 1.1.95 of these conditions.

**(b) Deployment of Qualified Engineers at Work Sites by the Contractor:**

- (i) The Contractor shall also employ qualified Graduate Engineer(s) or equivalent, or qualified Diploma Engineer(s), as prescribed in the tender documents.
- (ii) In case the Contractor fails to employ the Engineer, as aforesaid in Para 1.1.58 (b)(i), he shall be liable to pay liquidated damages at the rates, as prescribed in the tender documents.
- (iii) No. of qualified Engineers required to be deployed by the Contractor for various activities contained in the works contract shall be specified in the tender documents as 'Special Condition of Contract'.

**NOTE: {Railway Board's letter no. 2012/CE-I/CT/O/20, New Delhi, Dated 10.05.2013 or latest guidelines shall be followed}**

- 1.1.59 (a) Workmanship and Testing:** The whole of the works and/or supply of materials specified and provided in the contract or that may be necessary to be done in order to form and complete any part thereof shall be executed in the best and most substantial workman like manner with materials of the best and most approved quality of their respective kinds, agreeable to the particulars contained in or implied by the specifications and as referred to in and represented by the drawings or in such other additional particulars, instructions and drawings given during the carrying on of the works and to the entire satisfaction of the Engineer according to the instructions and directions which the Contractors may from time to time receive from the Engineer. The materials may be subjected to tests by means of such machines, instruments and appliances as the Engineer may direct and wholly at the expense of the Contractor.

**(b) Removal of Improper Work and Materials:** The Engineer or the Engineer's Representative shall be entitled to order from time to time:

- (a) The removal from the site, within the time specified in the order, of any materials which in his opinion are not in accordance with the specifications or drawings.
- (b) The substitution of proper and suitable materials, and
- (c) The removal and proper re-execution, notwithstanding any previous tests thereof or on account payments therefor, of any work which in respect of materials or workmanship is not in his opinion in accordance with the specifications and in case of default on the part of the Contractor in carrying out such order, the Railway shall be entitled to rescind the contract under Clause 1.1.95 of these conditions.
- (d) The provision of Construction and Demolition Waste Management Rule 2016 issued by Ministry of Environment Forest and Climate Change dated 29.03.2016 and published in the Gazette of India, Part – II, Section -3, Sub-section (ii) are binding upon the Contractor. Contractor shall implement these provisions at worksites, for which no extra payment will be payable.

- 1.1.60 Facilities for Inspection:** The Contractor shall afford the Engineer and the Engineer's Representative every facility for entering in and upon every portion of the work at all hours for the purpose of inspection or otherwise and shall provide all labour, materials, planks, ladders, pumps, appliances and things of every kind required for the purpose and the Engineer and the Engineer's Representative shall at all times have free access to every part of the works and to all places at which materials for the works are stored or being prepared.

- 1.1.61 Examination of Work before Covering Up:** The Contractor shall give 7 days' notice to the Engineer or the Engineer's Representative whenever any work or materials are intended to be covered up in the earth, in bodies or walls or otherwise to be placed beyond the reach of measurements in order that the work may be inspected or that correct dimensions may be taken before being so covered, placed beyond the reach of measurement in default whereof, the same shall at the option of the Engineer or the Engineer's Representative be uncovered and measured at the Contractor's expense or no allowance shall be made for such work or materials.



- 1.1.62 Temporary Works:** All temporary works necessary for the proper execution of the works shall be provided and maintained by the Contractor and subject to the consent of the Engineer shall be removed by him at his expenses when they are no longer required and in such manner as the Engineer shall direct. In the event of failure on the part of the Contractor to remove the temporary works, the Engineer will cause them to be removed and cost as increased by supervision and other incidental charges shall be recovered from the Contractor. If temporary huts are provided by the Contractor on the Railway land for labour engaged by him for the execution of works, the Contractor shall arrange for handing over vacant possession of the said land after the work is completed; if the Contractor's labour refuse to vacate, and have to be evicted by the Railway, necessary expenses incurred by the Railway in connection therewith shall be borne by the Contractor.
- 1.1.63 (i) Contractor to Supply Water for Works:** Unless otherwise provided in the Contract, the Contractor shall be responsible for the arrangements to obtain supply of water necessary for the works.
- (ii) Water Supply from Railway System:** The Railway may supply to the Contractor part or whole of the quantity of the water required for the execution of works from the Railway's existing water supply system at or near the site of works on specified terms and conditions and at such charges as shall be determined by the Railway and payable by the Contractor, provided that the Contractor shall arrange, at his own expense, to effect the connections and lay additional pipelines and accessories on the site and that the Contractor shall not be entitled to any compensation for interruption or failure of the water supply.
- (iii) Water Supply by Railway Transport:** In the event of the Railway arranging supply of water to the Contractor at or near the site of works by travelling water tanks or other means, the freight and other charges incurred thereby, including demurrage charges that may be levied, shall be paid by the Contractor in addition to the charges referred to in Sub-Clause (ii) of the Clause provided that the Contractor shall not be entitled to any compensation for interruption or failure of the water supply.
- (iv)(a) Contractor to Arrange Supply of Electric Power for Works:** Unless otherwise provided in the contract, the Contractor shall be responsible for arrangements to obtain supply of Electric Power for the works.
- (iv)(b) Electric Supply from the Railway System:** The Railway may supply to the Contractor part or whole of the electric power wherever available and possible, required for execution of works from the Railway's existing electric supply systems at or near the site of works on specified terms and conditions and such charges as shall be determined by the Railway and payable by the Contractor provided the cost of arranging necessary connections to the Railway's Electric Supply systems and laying of underground/overhead conductor, circuit protection, electric power meters, transmission structure, shall be borne by the Contractor and that the Contractor shall not be entitled to any compensation for interruption or failure of the Electric supply system.
- 1.1.64 Property in Materials and Plant:** The materials and plant brought by the Contractor upon the site or on the land occupied by the Contractor in connection with the works and intended to be used for the execution thereof shall immediately be deemed to be the property of the Railway. Such of them as during the progress of the works are rejected by the Engineer under Clause 1.1.57 of these conditions or are declared by him not to be needed for the execution of the works or such as on the grant of the certificate of completion remain unused shall immediately on such rejection, declaration or grant cease to be deemed the property of the Railway and the Contractor may then (but not before) remove them from the site or the said land. This clause shall not in any way diminish the liability of the Contractor nor shall the Railway be in any way answerable for any loss or damage which may happen to or in respect of any such materials or plant either by the same being lost, stolen, injured or destroyed by fire, tempest or otherwise.
- 1.1.65 (i) Tools, Plant and Materials Supplied by Railway:** The Contractor shall take all reasonable care of all tools, plant and materials or other property whether of a like description or not belonging to the Railway and committed to his charge for the purpose of the works and shall be responsible for all damage or loss caused by him, his agents, permitted sub-contractor, or his workmen or others while they are in his charge. The Contractors shall sign accountable receipts for tools, plants and materials made over to him by the Engineer and on completion of the works shall hand over the unused balance of the same to the Engineer in good order and repair, fair wear and tear excepted, and shall be responsible for any failure to account for the same or any damage done thereto.

**(ii) Hire of Railway's Plant:** The Railway may hire to the Contractor such plant as concrete mixers, compressors and portable engines for use during execution of the works on such terms as may be specified in the special conditions or in a separate agreement for Hire of Plant.

**1.1.66 (i) Precaution During Progress of Works:** During the execution of works, unless otherwise specified, the Contractor shall at his own cost provide the materials for and execute all shoring, timbering and strutting works as is necessary for the stability and safety of all structures, excavations and works and shall ensure that no damage, injury or loss is caused or likely to be caused to any person or property.

**(ii) Roads and Water Courses:** Existing roads or water courses shall not be blocked cut through, altered, diverted or obstructed in any way by the Contractor, except with the permission of the Engineer. All compensations claimed for any unauthorized closure, cutting through, alteration, diversion or obstruction to such roads or water courses by the Contractor or his agent or his staff shall be recoverable from the Contractor's bills/Security Deposit or any other dues of Contractor with the Government of India.

**(iii) Provision of Access to Premises:** During progress of work in any street or thoroughfare, the Contractor shall make adequate provision for the passage of traffic, for securing safe access to all premises approached from such street or thoroughfare and for any drainage, water supply or means of lighting which may be interrupted by reasons of the execution of the works and shall react and maintain at his own cost barriers, lights and other safeguards as prescribed by the Engineer, for the regulation of the traffic, and provide watchmen necessary to prevent accidents. The works shall in such cases be executed night and day, if so ordered by the Engineer and with such vigour so that the traffic way be impeded for as short a time as possible.

**(iv) Safety of Public:** The Contractor shall be responsible to take all precautions to ensure the safety of the public whether on public or railway property and shall post such look out men as may, in the opinion of the Engineer, be required to comply with regulations appertaining to the work. Contractor shall ensure placement of barricading / partitions at the place of work to ensure safety of habitants of adjacent area, failing which Engineer may advise stoppage of work as per his discretion.

**(v) Display Board:** The Contractor shall be responsible for displaying the details of works i.e. name of work, approximate cost, expected date of completion, name and address of the Contractor and address of Engineer on a proper steel Board of size not less than 1m x 1m.

**1.1.67 Use of Explosives:** Explosives shall not be used on the works or on the site by the Contractor without the permission of the Engineer and then also only in the manner and to the extent to which such permission is given. Where explosives are required for the works, they shall be stored in a special magazine to be provided by and at the cost of the Contractor in accordance with the Explosive Rules. The Contractor shall obtain the necessary license for the storage and the use of explosives. All operations in which or for which explosives are employed shall be at the sole risk and responsibility of the Contractor and the Contractor shall indemnify the Railway in respect thereof.

**1.1.68 (i) Suspension of Works:** The Contractor shall on the order of the Engineer, suspend the progress of the works or any part thereof for such time or times and in such manner as the Engineer may consider necessary and shall during such suspension properly protect and secure the work so far as is necessary in the opinion of the Engineer. If such suspension is:

- (a) Provided for in the contract, or
- (b) Necessary for the proper execution of the works or by the reason of weather conditions or by some default on the part of the Contractor, and or
- (c) Necessary for the safety of the works or any part thereof, or
- (d) Necessary for the safety of adjoining public or other property or safety of the public or workmen or those who have to be at the site, or
- (e) Necessary to avoid disruption of traffic and utilities, as also to permit fast repair and restoration of any damaged utilities, or
- (f) Due to instruction of The National Green Tribunal or any other statutory authority due to high level of pollution in the city of worksite.

**(ii)** The Contractor shall not be entitled to the extra costs, if any, incurred by him during the period of suspension of the works, but in the event of any suspension ordered by the Engineer for reasons other than aforementioned and when each such period of suspension exceeds 14 days, the Contractor shall be entitled to such extension of time for completion of the works as the Engineer may consider proper having regard to the period or periods of such suspensions and to such

compensations as the Engineer may consider reasonable in respect of salaries or wages paid by the Contractor to his employees during the periods of such suspension.

(iii) **Suspension Lasting More than 3 Months:** If the progress of the works or any part thereof is suspended on the order of the Engineer for more than three months at a time, the Contractor may serve a written notice on the Engineer requiring permission within 15 days from the receipt thereof to proceed with the works or that part thereof in regard to which progress is suspended and if such permission is not granted within that time the Contractor by further written notice so served may, but is not bound to, elect to treat the suspension where it affects part only of the works as an omission of such part or where it affects the whole of the works, as an abandonment of the contract by the Railway.

#### **1.1.69 Rates for Items of Works:**

The rates, entered in the accepted Bill(s) of Quantities of the Contract are intended to provide for works duly and properly completed in accordance with the General and Special (if any) Conditions of the Contract and the Specifications and drawings together with such enlargements, extensions, diminutions, reductions, alterations or additions as may be ordered in terms of Clause 1.1.74 of these conditions and without prejudice to the generality thereof and shall be deemed to include and cover superintendence and labour, supply, including full freight of materials, stores, patterns, profiles, moulds, fittings, centerings, scaffolding, shoring props, timber, machinery, barracks, tackle, roads, pegs, posts, tools and all apparatus and plant required on the works, except such tools, plant or materials as may be specified in the contract to be supplied to the Contractor by the Railway, the erection, maintenance and removal of all temporary works and buildings, all watching, lighting, bailing, pumping and draining, all prevention of or compensation for trespass, all barriers and arrangements for the safety of the public or of employees during the execution of works, all sanitary and medical arrangements for labour camps as may be prescribed by the Railway, the setting of all work and of the construction, repair and upkeep of all center lines, bench marks and level pegs thereon, site clearance, all fees duties, royalties, rent and compensation to owners for surface damage or taxes and impositions payable to local authorities in respect of land, structures and all material supplied for the work or other duties or expenses for which the Contractor may become liable or may be put to under any provision of law for the purpose of or in connection with the execution of the contract and all such other incidental charges or contingencies as may have been specially provided for in the Specifications.

However, if rates of existing GST or cess on GST for Works Contract is increased or any new tax /cess on Works Contract is imposed by Statute after the date of opening of tender but within the original date of completion/date of completion extended under clause 1.1.49 & 1.1.49A and the Contractor thereupon properly pays such taxes/cess, the Contractor shall be reimbursed the amount so paid.

Further, if rates of existing GST or cess on GST for Works Contract is decreased or any tax/cess on Works Contract is decreased / removed by Statute after the date of opening of tender, the reduction in tax amount shall be recovered from Contractor's bills/Security Deposit or any other dues of Contractor with the Government of India.

**1.1.70 Demurrage and Wharfage Dues:** Demurrage charges calculated in accordance with the scale in force for the time being on the Railway and incurred by the Contractor failing to load or unload any goods or materials within the time allowed by the Railway for loading as also wharfage charges, of materials not removed in time, as also charges due on consignments booked by or to him shall be paid by the Contractor, failing which such charges shall be debited to the Contractor's account in the hands of the Railway and shall be deducted from any sums which may become due to him in terms of the contracts.

**1.1.71 (i) Rates for Extra Items of Works:** (a) Standard Schedule of Rates (SSOR) Items: Any item of work carried out by the Contractor on the instructions of the Engineer which is not included in the accepted Bill(s) of Quantities but figures in the Standard Schedule of Rates (SSOR), shall be executed at the rates set forth in the "Standard Schedule of Rates (SSOR)" modified by the tender percentage as accepted in the contract for that chapter of Standard Schedule of Rates (SSOR).

For item(s) not covered in this sub clause, the rate shall be decided as agreed upon between the Engineer and the Contractor before the execution of such items of work as per sub clause (b).

(b) Other Items: For any item of work to be carried out by the Contractor but not included in the accepted Bill(s) of Quantities and also not covered under sub clause (a) above, the Contractor shall

be bound to notify the Engineer at least seven days before the necessity arises for the execution of such items of works that the accepted Bill(s) of Quantities does not include rate or rates for such extra work involved. The rates payable for such items shall be decided at the meeting to be held between the Engineer and Contractor, in as short a period as possible after the need for the special item has come to the notice. In case the Contractor fails to attend the meeting after being notified to do so or in the event of no settlement being arrived at, the Railway shall be entitled to execute the extra works by other means and the Contractor shall have no claim for loss or damage that may result from such procedure.

The assessment of rates for extra item(s) shall be arrived at based on the prevailing market rates of labour, machinery & materials and by taking guidance from the following documents in order of priority:

- i. Analysis of Rates for "Unified Standard Schedule of Rates of Indian Railways (USSOR)"
- ii. Analysis of Rates for "Delhi Schedule of Rates issued by CPWD (DSR)"
- iii. Market Analysis

(ii) Provided that if the Contractor commences work or incurs any expenditure in regard thereto before the rates as determined and agreed upon as lastly hereuntofore-mentioned, then and in such a case the Contractor shall only be entitled to be paid in respect of the work carried out or expenditure incurred by him prior to the date of determination of the rates as aforesaid according to the rates as shall be fixed by the Engineer. However, if the Contractor is not satisfied with the decision of the Engineer in this respect, he may appeal to the Chief Engineer within 30 days of getting the decision of the Engineer, supported by analysis of the rates claimed. The Chief Engineer's decision after hearing both the parties in the matter would be final and binding on the Contractor and the Railway.

**1.1.72 (i) Handing over of Works:** The Contractor shall be bound to hand over the works executed under the contract to the Railway complete in all respects to the satisfaction of the Engineer. The Engineer shall determine the date on which the work is considered to have been completed, in support of which his certificate shall be regarded as sufficient evidence for all purposes. The Engineer shall determine from time to time, the date on which any particular section of the work shall have been completed, and the Contractor shall be bound to observe any such determination of the Engineer.

(ii) **Clearance of Site on Completion:** On completion of the works, the Contractor shall clear away and remove from the site all constructional plant, surplus materials, rubbish and temporary works of every kind and leave the whole of the site and works clean and in a workman like condition to the satisfaction of the Engineer. No final payment in settlement of the accounts for the works shall be paid, held to be due or shall be made to the Contractor till, in addition to any other condition necessary for final payment, site clearance shall have been effected by him, and such clearance may be made by the Engineer at the expense of the Contractor in the event of his failure to comply with this provision within 7 days after receiving notice to that effect. Should it become necessary for the Engineer to have the site cleared at the expenses of the Contractor, the Railway shall not be held liable for any loss or damage to such of the Contractor's property as may be on the site and due to such removal there from which removal may be affected by means of public sales of such materials and property or in such a way as deemed fit and convenient to the Engineer.

(A) **Offloading of Part(s) of Work:** At the final stage of completion/ commissioning of work, in case the contractor fails to complete the final part(s) of the work and the value of such part(s) of the work is limited to 5% of the original contract value, the Engineer may allow/decide for offloading of such part(s) of works, either after the Contractor's request in writing to do so or after serving a 14 (Fourteen) days suo-moto notice (as per Form-12A), if the Engineer is of the opinion that :-

- (i) Such Offloading of works (up to 5% of original contract value) would enable successful completion of contract/work,
  - (ii) Termination/ Part termination of the contract at this stage is not be in the interest of the Railway/work,; and
  - (iii) The anticipated additional cost for execution of such works through other mode would not be substantial and can be recovered from the pending dues of the contractor;
- The Contractor shall be informed, in due course, by the Engineer of the mode and cost of execution of such offloaded work through other agency(ies) (as per Form-12B). The extra expenditure so incurred in execution of the offloaded work, shall be recovered from subsequent Bill(s) or any other dues of the Contractor, but not exceeding the value of Performance Guarantee available in the contract. There shall be no other repercussion of such offloading on execution of the balance contract. The Contractor shall have no claim on account of above mentioned offloading of works.

**1.1.73 Modification to Contract to be in Writing:** In the event of any of the provisions of the contract required to be modified after the contract documents have been signed, the modifications shall be made in writing and signed by the Railway and the Contractor and no work shall proceed under such modifications until this has been done. Any verbal or written arrangement abandoning, modifying, extending, reducing or supplementing the contract or any of the terms thereof shall be deemed conditional and shall not be binding on the Railway unless and until the same is incorporated in a formal instrument and signed by the Railway and the Contractor, and till then the Railway shall have the right to repudiate such arrangements.

**1.1.74 (1) Powers of Modification to Contract:** The Engineer on behalf of the Railway shall be entitled by order in writing to enlarge or extend, diminish or reduce the works or make any alterations in their design, character position, site, quantities, dimensions or in the method of their execution or in the combination and use of materials for the execution thereof or to order any additional work to be done or any works not to be done and the Contractor will not be entitled, to any compensation for any increase/reduction in the quantities of work but will be paid only for the actual amount of work done and for approved materials supplied against a specific order.

(2)(i) Unless otherwise specified in the special conditions of the contract, the accepted variation in quantity of each individual item of the contract would be upto 25% of the quantity originally contracted, except in case of foundation work (in which no variation limit shall apply). However, the rates for the increased quantities shall be as per sub- para (iii) below.

(2)(ii) The Contractor shall be bound to carry out the work at the agreed rates and shall not be entitled to any claim or any compensation whatsoever upto the limit of 25% variation in quantity of individual item of works.

(2)(iii) In case an increase in quantity of an individual item by more than 25% of the agreement quantity is considered unavoidable, then same shall be executed at following rates.

a. Quantities operated in excess of 125% but upto 140% of the agreement quantity of the concerned item, shall be paid at 98% of the rate awarded for that item in that particular tender;

b. Quantities operated in excess of 140% but upto 150% of the agreement quantity of the concerned item shall be paid at 96% of the rate awarded for that item in that particular tender;

c. Variation in quantities of individual items beyond 150% will be avoided and would be permitted only in exceptional unavoidable circumstances and shall be paid at 96% of the rate awarded for that item in that particular tender.

d. Variation to quantities of Minor Value Item:

The limit for varying quantities for minor value items shall be 100% (as against 25% prescribed for other items). A minor value item for this purpose is defined as an item whose original agreement value is less than 1 % of the total original contract value.

d.(i) Quantities operated upto and including 100% of the agreement quantity of the concerned minor value item, shall be paid at the rate awarded for that item in that particular tender;

d.(ii) Quantities operated in excess of 100% but upto 200% of the agreement quantity of the concerned minor value item, shall be paid at 98% of the rate awarded for that item in that particular tender;

d.(iii) Variation in quantities of individual minor value item beyond 200% will be avoided and would be permitted only in exceptional unavoidable circumstances and shall be paid at 96% of the rate awarded for that item in that particular tender.

(2)(iv) In case of earthwork items, the variation limit of 25% shall apply to the gross quantity of earthwork items and variation in the quantities of individual classifications of soil shall not be subject to this limit.

(2)(v) As far as Standard Schedule of Rates (SSOR) items are concerned, the variation limit of 25% would apply to the value of SSOR schedule(s) as a whole and not on individual SSOR items. However, in case of Non Standard Schedule of Rates (SSOR) items, the limit of 25% would apply on the individual items irrespective of the manner of quoting the rate (single percentage rate or individual item rate).

(3) **Valuation of Variations:** The enlargements, extensions, diminution, reduction, alterations or additions referred to in Sub-Clause (2) of this Clause shall in no degree affect the validity of the contract; but shall be performed by the Contractor as provided therein and be subject to the same conditions, stipulations and obligations as if they had been originally and expressively included and provided for in the Specifications and Drawings and the amounts to be paid therefor shall be

calculated in accordance with the accepted Bill(s) of Quantities. Any extra item(s)/quantities of work falling outside the purview of the provisions of Sub-Clause (2) above shall be paid for at the rates determined under Clause-39 of these Conditions.

**1.1.75 (a) Quarterly Statement of Claims:** The Contractor shall prepare and furnish to the Engineer once in every quarter commencing from the month following the month of issue of Letter of Acceptance, an account giving full and detailed particulars of all claims for any additional expenses to which the Contractor may consider himself entitled to and of all extra or additional works ordered by the Engineer which he has executed during the preceding quarter and no claim for payment for such work will be considered which has not been included in such particulars.

**(b) Signing of "No Claim" Certificate :** The Contractor shall not be entitled to make any claim whatsoever against the Railway under or by virtue of or arising out of this contract, nor shall the Railway entertain or consider any such claim, if made by the Contractor, after he shall have signed a "No Claim" Certificate in favour of the Railway in such form as shall be required by the Railway after the works are finally measured up. The Contractor shall be debarred from disputing the correctness of the items covered by "No Claim" Certificate or demanding a clearance to arbitration in respect thereof.

**1.1.76 Quantities in Bill(s) of Quantities Annexed to Contract:** The quantities set out in the accepted Bill(s) of Quantities with items of works quantified are the estimated quantities of the works and they shall not be taken as the actual and correct quantities of the work to be executed by the Contractor in fulfillment of his obligations under the contract.

**1.1.77 (i) Measurement of Works by Railway:** The Contractor shall be paid for the works at the rates in the accepted Bill(s) of Quantities and for extra works at rates determined under Clause 1.1.71 of these Conditions on the measurements taken by the Engineer or the Engineer's representative in accordance with the rules prescribed for the purpose by the Railway. The quantities for items the unit of which in the accepted Bill(s) of Quantities is 100 or 1000 shall be calculated to the nearest whole number, any fraction below half being dropped and half and above being taken as one; for items the unit of which in the accepted Bill(s) of Quantities is single, the quantities shall be calculated to two places of decimals. Such measurements will be taken of the work in progress from time to time and at such intervals as in the opinion of the Engineer shall be proper having regard to the progress of works. The date and time on which 'on account' or 'final' measurements are to be made shall be communicated to the Contractor who shall be present at the site and shall sign the results of the measurements (which shall also be signed by the Engineer or the Engineer's representative) recorded in the official measurements book as an acknowledgement of his acceptance of the accuracy of the measurements. Failing the Contractor's attendance, the work may be measured up in his absence and such measurements shall, notwithstanding such absence, be binding upon the Contractor whether or not he shall have signed the measurement books provided always that any objection made by him to measurement shall be duly investigated and considered in the manner set out below:

(a) It shall be open to the Contractor to take specific objection to any recorded measurements or Classification on any ground within seven days of the date of such measurements. Any re-measurement 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.

(b) 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.

**(ii) Measurement of Works by Contractor's Authorized Representative (in case the contract provides for the same):**

(a) The Contractor shall be paid for the works at the rates in the accepted Bill(s) of Quantities and for extra works at rates determined under Clause 1.1.71 of these Conditions on the measurements taken by the Contractor's authorized Engineer in accordance with the rules prescribed for the purpose by the Railway. The quantities for items the unit of which in the accepted Bill(s) of Quantities is 100 or 1000 shall be calculated to the nearest whole number, any fraction below half being dropped and half and above being taken as one; for items the unit of which in the accepted Bill(s) of Quantities is single, the quantities shall be calculated to two places of decimals. Such measurements will be taken of the work in progress from time to time. The date and time on which 'on account' or 'final' measurements are to be made shall be communicated to the Engineer. The date and time of test checks shall be communicated to the Contractor who shall be present at the site and shall witness the test checks, failing the Contractor's attendance the test checks may be conducted in his absence and such test checks shall notwithstanding such absence be binding upon

Contractor provided always that any objection made by Contractor to test check shall be duly investigated and considered in the manner set out below:

(i) It shall be open to the Contractor to take specific objection to test checks of any recorded measurement within 7 days of date of such test checks. Any re-test check done by the concerned Railway's authority in the presence of the Contractor or in his absence after due notice given to him in consequent 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.

**(b) Incorrect measurement, actions to be taken:** If in case during test check or otherwise, it is detected by the Engineer that agency has claimed any exaggerated measurement or has claimed any false measurement for the works which have not been executed; amounting to variation of 5% or more of claimed gross bill amount, action shall be taken as following:

(i) On first occasion of noticing exaggerated/ false measurement, Engineer shall recover liquidated damages equal to 10% of claimed gross bill value.

(ii) On any next occasion of noticing any exaggerated/false measurement, railway shall recover liquidated damages equal to 15% of claimed gross bill value. In addition, the facility of recording of measurements by Contractor as well as release of provisional payment shall be withdrawn. Once withdrawn, measurements shall be done by railway as per clause 1.1.77(i) above.

**1.1.78 (1) "On-Account " Payments:** The Contractor shall be entitled to be paid from time to time by way of "On-Account" payment only for such works as in the opinion of the Engineer he has executed in terms of the contract. All payments due on the Engineer's/Engineer's Representative's certificates of measurements or Engineer's certified "Contractor's authorized Engineer's measurements" shall be subject to any deductions which may be made under these presents and shall further be subject to, unless otherwise required by Clause 1.1.48 of these Conditions, a retention of six percent by way of Security Deposits, until the amount of Security Deposit by way of such retentions shall amount to 5% of the total value of the contract provided always that the Engineer may by any certificate make any correction or modification in any previous certificate which shall have been issued by him and that the Engineer may withhold any certificate, if the works or any part thereof are not being carried out to his satisfaction.

**(2) Rounding off Amounts:** The total amount due on each certificate shall be rounded off to the nearest rupee, i.e. sum less than 50 paise shall be omitted and sums of 50 paise and more upto ₹1 will be reckoned as ₹ 1.

**(3) On Account Payments not Prejudicial to Final Settlement:** "On-Account" payments made to the Contractor shall be without prejudice to the final making up of the accounts (except where measurements are specifically noted in the Measurement Book as "Final Measurements" and as such have been signed by the Contractor and Engineer/Engineer's Representative) and shall in no respect be considered or used as evidence of any facts stated in or to be inferred from such accounts nor of any particular quantity of work having been executed nor of the manner of its execution being satisfactory.

**(4)** If payment(s) of Advances are applicable in the contract, as mentioned in the Tender Documents, Railway shall make payment(s) of Interest bearing advances, on the request of contractor. The payment and recovery of such Advances shall be made as under:

**(a): Mobilisation Advance –**

This shall be limited to 10% of the Contract value and shall be paid in 2 stages :

Stage 1– 5% of Contract Value on signing of the contract agreement.

Stage 2 – 5% on mobilization of site-establishment, setting up offices, bringing in equipment and actual commencement of work.

The stage 1 of advance shall be payable immediately after signing of contract agreement.

The stage 2 of advance shall be payable at the time of mobilisation, only after submission of an utilization certificate by the contractor that the Stage 1 advance has been properly utilized in the contract.

These Advances shall be payable against irrevocable guarantee (Bank Guarantee, FDRs) from a scheduled commercial bank of India of at least 110% of the value of the sanctioned advance amount (covering principal plus interest).

**(b): Advance Against Machinery and Equipment –**

This advance shall be limited to a maximum of 10% of the contract value against new Machinery & Equipment, involving substantial outlay, brought to site and essentially required for the work. This advance shall not exceed 75% of the purchase price of such Equipment and shall be payable when Equipment is hypothecated to the President of India by a suitable bond or alternatively covered by an irrevocable Bank Guarantee from a scheduled commercial bank of India for full cost of the Plant & Equipment in a form acceptable to Railways. The Plant & Equipment shall be insured for the full value and for the entire period, they are required for the work. This Plant & Equipment shall not be removed from the site of work without prior written permission of the Engineer. No advance should be given against old Plant & Machinery.

**The advances under sub clause (a) and (b) above, are subject to the following conditions -**

(i) The full amount of Advances shall be recovered from contractor dues. The recovery shall commence when the value of contract executed reaches 15% of original contract value and shall be completed when the value of work executed reaches 85% of the original contract value. The installments on each "on account bill" will be on pro-rata basis.

Interest shall be recovered on the advance outstanding for the period commencing from the date of payment of advance till date of particular on-account bill (through which recovery of principal is effected) and adjusted fully against on-account bill along with pro-rata principal recovery. In the event of any short-fall, the same shall be carried forward to the next on-account bill and shall attract interest.

(ii) The advances shall be used by the Contractor for the purpose of the Contract, and for the purpose for which they are paid. Under no circumstances, shall the advances be diverted for other purposes. Any such diversion shall be construed as a breach of the Contract and the Contractor shall be asked to return the advance at once and pay interest at 15% per annum till the advance is recovered back from him. The Contractor shall return the advance and pay the interest in one go without demur. The Contractor, if required by the Engineer shall provide the details of utilisation of Mobilisation advance.

(iii) If the Contractor is found to have contravened the provision, it will constitute a breach of contract and Railway shall be entitled to terminate the contract and forfeit his Performance Guarantee as well as Security Deposit.

(iv) In cases, where the Contract is rescinded as per clause 1.1.95 of the contract or short closed under any other condition(s) of the contract, without making full recovery of advances and accrued interest thereon, by the Railway, such balance of advances and accrued interest thereon shall immediately become due and payable by the Contractor to the Railway. The same shall be recovered from any due of Contractor with the Government of India.

**5) Manner of Payment:** Unless otherwise specified payments to the Contractor will be transferred electronically to his bank account.

**1.1.79 Price Variation Clause (PVC):**

(i) **Applicability:** Price Variation Clause (PVC) shall be applicable only in tender having advertised value above **Rs. 2 Crores**. Provided further that, in a contract where PVC is applicable, following shall be outside the purview of price adjustments (i.e. shall be excluded from the gross value of the work for the purpose of price variation) :

(a) Materials supplied by Railway to the Contractors, either free or at fixed rate;

(b) Any extra item(s) included in subsequent variation falling outside the purview of the Bill(s) of Quantities of tender, under clause 1.1.71(i)(b) of these Standard General Conditions, unless applicability of PVC and 'Base Month' has been specially agreed, while fixing the rates of such extra item(s).

(ii) **Base Month:** The Base Month for 'Price Variation Clause' shall be taken as the one month prior to closing of tender, unless otherwise stated elsewhere. The quarter for applicability of PVC shall commence from the month following the Base month. The Price Variation shall be based on the average Price Index of the quarter under consideration.

(iii) **Validity:** Rates accepted by Railway Administration shall hold good till completion of work and no additional individual claim shall be admissible except:

(a) Payment/recovery for increase/decrease in GST on works contract or imposition/removal of any tax/cess on Works Contract as per Clause 1.1.69,

(b) Payment/recovery for overall market situation as per Price Variation Clause given hereunder.



(iv) Components of various items in a contract on which variation in prices be admissible, shall be steel, cement, ferrous material, non-ferrous material, insulators, zinc and other materials, labour, plant & machinery, fuel, explosives, detonators etc. Adjustment for variation in prices of these items shall be determined in the manner prescribed.

(v) No price variation shall be admissible for fixed components.

(vi) The percentages of various components in various type of works shall be as specified for all item (s)/ Bill(s) of Quantities in tender document and the same shall be fixed as per table & classifications given below:

**(I). For Civil Engineering Works**

S N	Classification		1A, 2 & 3A	4A	5A	6A	7	8A	9A	1B, 3B, 4B, 5B, 6B 8B & 9B	1C, 3C, 4C, 5C, 6C, 8C & 9C	3D, 4D, 5D, 6D, 8D & 9D	3E, 4E, 5E, 6E, 8E & 9E
	Components												
1	Fixed	*	15	15	15	15	15	15	15	15	15	15	15
2	Labour	L <sub>c</sub>	20	25	30	20	50	20	20	0	0	10	25
3	Steel	S <sub>c</sub>	0	0	0	0	0	0	0	85	0	50	0
4	Cement	C <sub>c</sub>	0	0	15	0	0	0	0	0	85	0	0
5	Plant Machinery & Spares	PM <sub>c</sub>	30	15	5	20	15	20	30	0	0	10	30
6	Fuel & Lubricants	F <sub>c</sub>	25	15	5	15	15	20	15	0	0	10	20
7	Other materials	M <sub>c</sub>	10	15	30	30	5	25	20	0	0	5	10
8	Detonators & Explosive	E <sub>c</sub>	0	15	0	0	0	0	0	0	0	0	0
Total			100	100	100	100	100	100	100	100	100	100	100

\*It shall not be considered for any price variation.

The classification mentioned in the table above represents following type of item(s) in the work(s) –

<b>1</b>	<b>Earthwork in Formation</b>	
	1A	All Item(s) excluding 1B or/and 1C
	1B	Item(s) for supply of Steel
	1C	Item(s) for supply of Cement
<b>2</b>	<b>Ballast Supply Works</b>	
<b>3</b>	<b>Tunnelling Works (Without Explosives)</b>	
	3A	All Item(s) excluding 3B or/and 3C or/and 3D or/and 3E
	3B	Item(s) for supply of Steel
	3C	Item(s) for supply of Cement or/and Grout
	3D	Item(s) for Fabrication & Erection of Structures including supply of Steel
	3E	Item(s) for Fabrication & Erection of Structures excluding supply of Steel.
<b>4</b>	<b>Tunnelling Works (With explosives)</b>	
	4A	All Item(s) excluding 4B or/and 4C or/and 4D or/and 4E
	4B	Item(s) for supply of Steel

	4C	Item(s) for supply of Cement or/and Grout
	4D	Item(s) for Fabrication & Erection of Structures including supply of Steel
	4E	Item(s) for Fabrication & Erection of Structures excluding supply of Steel.
<b>5</b>	<b>Building Works</b>	
	5A	All Item(s) excluding 5B or/and 5C or/and 5D or/and 5E
	5B	Item(s) for supply of Steel
	5C	Item(s) for supply of Cement
	5D	Item(s) for Fabrication & Erection of Structures including supply of Steel
	5E	Item(s) for Fabrication & Erection of Structures excluding supply of Steel.
<b>6</b>	<b>Bridges &amp; Protection work</b>	
	6A	All Item(s) excluding 6B or/and 6C or/and 6D or/and 6E
	6B	Item(s) for supply of Steel
	6C	Item(s) for supply of Cement
	6D	Item(s) for Fabrication, Assembly, Erection& Launching of Girders including supply of Steel
	6E	Item(s) for Fabrication, Assembly, Erection & Launching of Girders excluding supply of Steel
<b>7</b>	<b>Permanent Way linking</b>	
<b>8</b>	<b>Platform, Passenger Amenities</b>	
	8A	All Item(s) excluding 8B or/and 8C or/and 8D or/and 8E
	8B	Item(s) for supply of Steel item/fittings
	8C	Item(s) for supply of Cement Item
	8D	Item(s) for Fabrication & Erection of Structures including supply of Steel
	8E	Item(s) for Fabrication & Erection of Structures excluding supply of Steel
<b>9</b>	<b>Any Other Works not covered in Classification 1 to 8</b>	
	9A	All Item(s) excluding 9B or/and 9C or/and 9D or/and 9E
	9B	Item(s) for supply of Steel
	9C	Item(s) for supply of Cement or/and Grout
	9D	Item(s) for Fabrication & Erection of Structures including supply of Steel
	9E	Item(s) for Fabrication & Erection of Structures excluding supply of Steel

(vii) **Formulae:** The Amount of variation in prices in various components (labour, material etc.) shall be worked out by the following formulae:

$$(i) \quad L = \frac{(W \text{ or } W_{SF} \text{ or } W_F \text{ or } W_{SFL} \text{ or } W_{FL}) \times (L_Q - L_B) \times L_C}{L_B \times 100}$$

$$(ii) \quad M = \frac{(W \text{ or } W_{SF} \text{ or } W_F \text{ or } W_{SFL} \text{ or } W_{FL}) \times (M_Q - M_B) \times M_C}{M_B \times 100}$$

$$(iii) \quad F = \frac{(W \text{ or } W_{SF} \text{ or } W_F \text{ or } W_{SFL} \text{ or } W_{FL}) \times (F_Q - F_B) \times F_C}{F_B \times 100}$$

$$(iv) \quad E = \frac{(W) \times (E_Q - E_B) \times E_C}{E_B \times 100}$$

$$(v) \quad PM = \frac{(W \text{ or } W_{SF} \text{ or } W_F \text{ or } W_{SFL} \text{ or } W_{FL}) \times (PM_Q - PM_B) \times PM_C}{PM_B \times 100}$$

$$PM_B \times 100$$

$$(vi) \quad S = \frac{(W \text{ or } W_S \text{ or } W_{SF}) \times (S_Q - S_B) \times S_C}{S_B \times 100}$$

$$(vii) \quad C = \frac{(W \text{ or } W_C) \times (C_Q - C_B) \times C_C}{C_B \times 100}$$

**(II) For Railway Electrification Works:**

- (viii)  $T = [0.4136(C_Q - C_B) / C_B] \times 85$
- (ix)  $R = [0.94(R_T - R_O) / R_O + 0.06(Z_T - Z_O) / Z_O] \times 85$
- (x)  $N = [(P_T - P_O) / P_O] \times 85$
- (xi)  $I = [(I_T - I_O) / I_O] \times 85$
- (xii)  $G = [(M_Q - M_B) / M_B] \times 85$
- (xiii)  $Er = [(L_Q - L_B) / L_B] \times 85$

Where,

L	Amount of price variation in Labour
M	Amount of price variation in Materials
F	Amount of price variation in Fuel
E	Amount of price variation in Explosives
PM	Amount of price variation in Plant, Machinery and Spares
S	Amount of price variation in Steel Supply Item
C	Amount of price variation in Cement Supply Item
T	Percentage variation payable on the gross value of bill of Concreting (Bill(s) of Quantities for concrete items)
R	Percentage variation payable on the gross value of bill of Ferrous Items (Bill(s) of Quantities for ferrous items)
N	Percentage variation payable on the gross value of bill of Non-Ferrous Items (Bill(s) of Quantities for non-ferrous items)
I	Percentage variation payable on the gross value of bill of Insulator (Bill(s) of Quantities for Insulator items)
G	Percentage variation payable on the gross value of bill of General Works (Bill(s) of Quantities for General items)
Er	Percentage variation payable on the gross value of erection (Bill(s) of Quantities for Erection Item)
L <sub>C</sub>	% of Labour Component in the item(s)
M <sub>C</sub>	% of Material Component in the item(s)
F <sub>C</sub>	% of Fuel Component in the item(s)
E <sub>C</sub>	% of Explosive Component in the item(s)
PM <sub>C</sub>	% of Plant, Machinery and Spares Component in the item(s)
S <sub>C</sub>	% of Steel Supply item Component in the item(s)
C <sub>C</sub>	% of Cement Supply item Component in the item(s)
W	Gross value of work done by Contractor as per on-account bill(s) excluding the Gross value of work under W <sub>S</sub> or/and W <sub>C</sub> or/and W <sub>SF</sub> or/and W <sub>F</sub> or/and W <sub>SFL</sub> or/and W <sub>FL</sub> and cost of materials supplied by Railway either free or at fixed rate,
W <sub>S</sub>	Gross value of work done by Contractor for item(s) of supply of steel.
W <sub>C</sub>	Gross value of work done by Contractor for item(s) of supply of cement and /or supply of grout material.
W <sub>SF</sub>	Gross value of work done by Contractor for item(s) of Fabrication & Erection of Structures including supply of Steel.
W <sub>F</sub>	Gross value of work done by Contractor for Fabrication & Erection of Structures excluding supply of Steel.
W <sub>SFL</sub>	Gross value of work done by Contractor for item(s) of Fabrication, Assembly, Erection / Launching of Girders including supply of Steel.
W <sub>FL</sub>	Gross value of work done by Contractor for item(s) of Fabrication, Assembly, Erection / Launching of Girders excluding supply of Steel.
L <sub>B</sub>	Consumer Price Index for Industrial Workers - All India: Published in R.B.I. Bulletin for the base period
L <sub>Q</sub>	Consumer Price Index for Industrial Workers - All India: Published in R.B.I. Bulletin for the average price index of the 3 months of the quarter under consideration
M <sub>B</sub>	Wholesale Price Index: All commodities – as published in the R.B.I. Bulletin for the base period
M <sub>Q</sub>	Wholesale Price Index: All commodities – as published in the R.B.I. Bulletin for the average price index of the 3 months of the quarter under consideration

F <sub>B</sub>	The average of official prices of Diesel available on the official website of 'Petroleum Planning and Analysis cell' under Ministry of Petroleum and Natural Gas for Delhi, Kolkata, Mumbai & Chennai, for the base period
F <sub>Q</sub>	The average of official prices of Diesel available on the official website of 'Petroleum Planning and Analysis cell' under Ministry of Petroleum and Natural Gas for Delhi, Kolkata, Mumbai & Chennai, for the 3 months of the quarter under consideration
E <sub>B</sub>	Index number of Monthly Whole Sale Price Index for the category 'Explosive' of (g). Manufacture of other chemical products under (J) MANUFACTURE OF CHEMICALS AND CHEMICAL PRODUCTS, published by Office of Economic Adviser, Govt. of India, Ministry of Commerce & Industry, Department of Industrial Policy & Promotion (DIPP), for the base period.
E <sub>Q</sub>	Index number of Monthly Whole Sale Price Index for the category 'Explosive' of (g). Manufacture of other chemical products under (J) MANUFACTURE OF CHEMICALS AND CHEMICAL PRODUCTS, published by Office of Economic Adviser, Govt. of India, Govt. of India, Ministry of Commerce & Industry, Department of Industrial Policy & Promotion (DIPP), for the average price index of 3 months of the quarter under consideration.
PM <sub>B</sub>	Index Number of Wholesale Prices in India by Groups and Sub Groups (Averages) for 'Manufacture of machinery for mining, quarrying and construction'– published in RBI (Reserve Bank of India) Bulletin, for the base period.
PM <sub>Q</sub>	Index Number of Wholesale Prices in India by Groups and Sub Groups (Averages) for 'Manufacture of machinery for mining, quarrying and construction'– published in RBI (Reserve Bank of India) Bulletin, for the average price index of 3 months of the quarter under consideration.
S <sub>B</sub>	The average rate provided by the Joint Plant Committee for the relevant category of steel item as mentioned in Clause 1.1.79(ix); for the base period.
S <sub>Q</sub>	The average rate provided by the Joint Plant Committee for the relevant category of steel item as mentioned in Clause 1.1.79(ix); for the 3 months of the quarter under consideration.
C <sub>B</sub>	Index No. of Wholesale Price Index of sub-group Cement, Lime & Plaster as published in RBI Bulletin for the base period
C <sub>Q</sub>	No. of Wholesale Price Index of sub-group Cement, Lime & Plaster as published in RBI Bulletin for the average price index of the 3 months of the quarter under consideration
R <sub>T</sub>	IEEMA price index for Steel Blooms (size 150mmx150mm) for the month which is two months prior to date of inspection of material.
R <sub>O</sub>	IEEMA price index for Steel Blooms (size 150mmx150mm) for the month which is one month prior to date of opening of tender.
P <sub>T</sub>	IEEMA price index for Copper wire rods for the month which is two months prior to date of inspection of material.
P <sub>O</sub>	IEEMA price index for Copper wire rods for the month which is one month prior to date of opening of tender.
Z <sub>T</sub>	IEEMA price index for Zinc for the month which is two months prior to date of inspection of material
Z <sub>O</sub>	IEEMA price index for Zinc for the month which is one month prior to date of opening of tender
I <sub>T</sub>	RBI wholesale price index for the sub-group "Insulators" for the month which is two months prior to date of inspection of material
I <sub>O</sub>	RBI wholesale price index for the sub-group "Insulators" for the month which is one month prior to date of opening of tender

**(III) SIGNALING & TELECOMMUNICATION WORKS:**

- (b) The following expressions and meanings are assigned to the value of the work done for signalling and telecommunication works:
- SIGWK = Value of signalling works for a stage payment of the item signalling works;
- INVSIG = Value of inventory for signalling works for a stage payment of the item inventory for signalling works;
- INTGTESTSIG = Value of integrated testing and commission for signalling works of the Railway Project;
- COMWK= Value of telecommunication works for a stage payment of the item telecommunication works;
- INVCOM = Value of inventory for telecommunication works for a stage payment of the item inventory for telecommunication works; and
- INTGTESTCOM = Value of integrated testing and commission for telecommunication works of the Railway Project.

- (b) Price adjustment for changes in cost of signalling works and telecommunication works shall be paid in accordance with the following formula:
- (i) 
$$\text{VSIGWK} = 0.85 \text{ SIGWK} \times [\text{PELEX} \times (\text{ELEX}_i - \text{ELEX}_o) / \text{ELEX}_o + \text{POFC} \times (\text{OFC}_i - \text{OFC}_o) / \text{OFC}_o + \text{PLB} \times (\text{LBI} - \text{LBO}) / \text{LBO} + \text{POTH} \times (\text{OTHi} - \text{OTHo}) / \text{OTHo} + \text{S30C} \times (\text{P30C}_i - \text{P30C}_o) / \text{P30C}_o + \text{S24C} \times (\text{P24C}_i - \text{P24C}_o) / \text{P24C}_o + \text{S19C} \times (\text{P19C}_i - \text{P19C}_o) / \text{P19C}_o + \text{S12C} \times (\text{P12C}_i - \text{P12C}_o) / \text{P12C}_o + \text{S9C} \times (\text{P9C}_i - \text{P9C}_o) / \text{P9C}_o + \text{S6C} \times (\text{P6C}_i - \text{P6C}_o) / \text{P6C}_o + \text{S4C} \times (\text{P4C}_i - \text{P4C}_o) / \text{P4C}_o + \text{S2C} \times (\text{P2C}_i - \text{P2C}_o) / \text{P2C}_o + \text{S12C2.5} \times (\text{P12C2.5}_i - \text{P12C2.5}_o) / \text{P12C2.5}_o + \text{S2C2.5} \times (\text{P2C2.5}_i - \text{P2C2.5}_o) / \text{P2C2.5}_o + \text{S2C25} \times (\text{P2C25}_i - \text{P2C25}_o) / \text{P2C25}_o + \text{QC} \times (\text{PQC}_i - \text{PQC}_o) / \text{PQC}_o];$$
  - (ii) 
$$\text{VINVSIG} = 0.85 \text{ SIGWK} \times [\text{PELEX} \times (\text{ELEX}_i - \text{ELEX}_o) / \text{ELEX}_o + \text{POTH} \times (\text{OTHi} - \text{OTHo}) / \text{OTHo}];$$
  - (iii) 
$$\text{VINTGTESTSIG} = 0.85 \text{ INTGTESTSIG} \times [\text{PLB} \times (\text{LBI} - \text{LBO}) / \text{LBO} + \text{POTH} \times (\text{OTHi} - \text{OTHo}) / \text{OTHo}];$$
  - (iv) 
$$\text{VCOMWK} = 0.85 \text{ COMWK} \times [\text{PELEX} \times (\text{ELEX}_i - \text{ELEX}_o) / \text{ELEX}_o + \text{POFC} \times (\text{OFC}_i - \text{OFC}_o) / \text{OFC}_o + \text{PLB} \times (\text{LBI} - \text{LBO}) / \text{LBO} + \text{POTH} \times (\text{OTHi} - \text{OTHo}) / \text{OTHo} + \text{S30C} \times (\text{P30C}_i - \text{P30C}_o) / \text{P30C}_o + \text{S24C} \times (\text{P24C}_i - \text{P24C}_o) / \text{P24C}_o + \text{S19C} \times (\text{P19C}_i - \text{P19C}_o) / \text{P19C}_o + \text{S12C} \times (\text{P12C}_i - \text{P12C}_o) / \text{P12C}_o + \text{S9C} \times (\text{P9C}_i - \text{P9C}_o) / \text{P9C}_o + \text{S6C} \times (\text{P6C}_i - \text{P6C}_o) / \text{P6C}_o + \text{S4C} \times (\text{P4C}_i - \text{P4C}_o) / \text{P4C}_o + \text{S2C} \times (\text{P2C}_i - \text{P2C}_o) / \text{P2C}_o + \text{S12C2.5} \times (\text{P12C2.5}_i - \text{P12C2.5}_o) / \text{P12C2.5}_o + \text{S2C2.5} \times (\text{P2C2.5}_i - \text{P2C2.5}_o) / \text{P2C2.5}_o + \text{S2C25} \times (\text{P2C25}_i - \text{P2C25}_o) / \text{P2C25}_o + \text{QC} \times (\text{PQC}_i - \text{PQC}_o) / \text{PQC}_o + \text{PCEQP} \times (\text{CEQPi} - \text{CEQP}_o) / \text{CEQP}_o];$$
  - (v) 
$$\text{VINVCOM} = 0.85 \text{ SIGWK} \times [\text{PELEX} \times (\text{ELEX}_i - \text{ELEX}_o) / \text{ELEX}_o + \text{PCEQP} \times (\text{CEQPi} - \text{CEQP}_o) / \text{CEQP}_o + \text{POTH} \times (\text{OTHi} - \text{OTHo}) / \text{OTHo}];$$
 and
  - (vi) 
$$\text{VINTGTESTCOM} = 0.85 \text{ INTGTESTCOM} \times [\text{PLB} \times (\text{LBI} - \text{LBO}) / \text{LBO} + \text{POTH} \times (\text{OTHi} - \text{OTHo}) / \text{OTHo}].$$

Where

VSIGWK = Increase or decrease in the cost of signalling works during the period under consideration due to changes in the rates for relevant components as specified in sub-paragraph (h);

VINVSIG = Increase or decrease in the cost of inventory for signalling during the period under consideration due to changes in the rates for relevant components as specified in sub-paragraph (h);

VINTGTESTSIG = Increase or decrease in the cost of integrated testing and commissioning of signalling works of the Railway Project during the period under consideration due to changes in the rates for relevant components as specified in sub-paragraph (h);

VCOMWK = Increase or decrease in the cost of communication works during the period under consideration due to changes in the rates for relevant components as specified in sub-paragraph (h);

VINVCOM = Increase or decrease in the cost of inventory for telecommunications works during the period under consideration due to changes in the rates for relevant components as specified in sub-paragraph (h);

VINTGTESTCOM = Increase or decrease in the cost of integrated testing and commissioning of telecommunication works of the Railway Project during the period under consideration due to changes in the rates for relevant components as specified in sub-paragraph (h);

PCEQP, PELEX, PIC, PLB, POFC, and POTH are the percentages of communication equipment, electronics, PVC insulated cables, labour, optical fibre cables, and other materials respectively;

CEQP<sub>o</sub> = The wholesale price index as published by the Ministry of Commerce and Industry, Government of India (hereinafter called "WPI") for communication equipment for the month of the Base Month;

CEQP<sub>i</sub> = The WPI for communication equipment for the average price index of the 3 months of the quarter under consideration;

ELEX<sub>o</sub> = The WPI for electronics for the month of the Base Month;

ELEX<sub>i</sub> = The WPI for electronics for the average price index of the 3 months of the quarter under consideration;

P30C<sub>i</sub> = Price payable per Km as adjusted in accordance with price variation Clause for size 30C x 1.5 sq mm signalling cable

P30C<sub>o</sub> = Price per Km of cable as per purchase order/ Contract agreement.

S30C = Percentage of size 30C x 1.5 sq mm signalling cable shall govern the price adjustment of the contract price for signalling and telecommunication works.

P24C<sub>i</sub> = Price payable per Km as adjusted in accordance with price variation Clause for size 24C x 1.5 sq mm signalling cable

P24C<sub>o</sub> = Price per Km of cable as per purchase order/ Contract agreement.

S24C = Percentage of size 24C x 1.5 sq mm signalling cable shall govern the price adjustment of the contract price for signalling and telecommunication works.

P19C<sub>i</sub> = Price payable per Km as adjusted in accordance with price variation Clause for size 19C x 1.5 sq mm signalling cable

P19C<sub>o</sub> = Price per Km of cable as per purchase order/ Contract agreement.

S19C = Percentage of size 19C x 1.5 sq mm signalling cable shall govern the price adjustment of the contract price for signalling and telecommunication works.

P12C<sub>i</sub> = Price payable per Km as adjusted in accordance with price variation Clause for size 12C x 1.5 sq mm signalling cable

P12C<sub>o</sub> = Price per Km of cable as per purchase order/ Contract agreement.

S12C = Percentage of size 12C x 1.5 sq mm signalling cable shall govern the price adjustment of the contract price for signalling and telecommunication works.

P9C<sub>i</sub> = Price payable per Km as adjusted in accordance with price variation Clause for size 9C x 1.5 sq mm signalling cable

P9C<sub>o</sub> = Price per Km of cable as per purchase order/ Contract agreement.

S9C = Percentage of size 9C x 1.5 sq mm signalling cable shall govern the price adjustment of the contract price for signalling and telecommunication works.

P6C<sub>i</sub> = Price payable per Km as adjusted in accordance with price variation Clause for size 6C x 1.5 sq mm signalling cable

P6C<sub>o</sub> = Price per Km of cable as per purchase order/ Contract agreement.

S6C = Percentage of size 6C x 1.5 sq mm signalling cable shall govern the price adjustment of the contract price for signalling and telecommunication works.

P4C<sub>i</sub> = Price payable per Km as adjusted in accordance with price variation Clause for size 4C x 1.5 sq mm signalling cable

P4C<sub>o</sub> = Price per Km of cable as per purchase order/ Contract agreement.

S4C = Percentage of size 4C x 1.5 sq mm signalling cable shall govern the price adjustment of the contract price for signalling and telecommunication works.

P2C<sub>i</sub> = Price payable per Km as adjusted in accordance with price variation Clause for size 2C x 1.5 sq mm signalling cable

P2C<sub>o</sub> = Price per Km of cable as per purchase order/ Contract agreement.

S2C = Percentage of size 2C x 1.5 sq mm signalling cable shall govern the price adjustment of the contract price for signalling and telecommunication works.

P12C2.5<sub>i</sub> = Price payable per Km as adjusted in accordance with price variation Clause for size 12C x 2.5 sq mm signalling cable

P12C2.5<sub>o</sub> = Price per Km of cable as per purchase order/ Contract agreement.

S12C2.5 = Percentage of size 12C x 2.5 sq mm signalling cable shall govern the price adjustment of the contract price for signalling and telecommunication works.

P2C2.5<sub>i</sub> = Price payable per Km as adjusted in accordance with price variation Clause for size 2C x 2.5 sq mm signalling cable

P2C2.5<sub>o</sub> = Price per Km of cable as per purchase order/ Contract agreement.

S2C2.5 = Percentage of size 2C x 2.5 sq mm signalling cable shall govern the price adjustment of the contract price for signalling and telecommunication works.

P2C25<sub>i</sub> = Price payable per Km as adjusted in accordance with price variation Clause for size 2C x 25 sq mm signalling cable

P2C25<sub>o</sub> = Price per Km of cable as per purchase order/ Contract agreement.

S2C25 = Percentage of size 2C x 25 sq mm signalling cable shall govern the price adjustment of the contract price for signalling and telecommunication works.

PQC<sub>i</sub> = Price payable per Km as adjusted in accordance with price variation Clause for size 0.9mm dia, 6 Quad cable.

PQC<sub>o</sub> = Price per Km of cable as per purchase order/ Contract agreement.

QC = Percentage of size 0.9mm dia, 6 Quad cable shall govern the price.

LBo = The consumer price index for industrial workers – All India, published by Labour Bureau, Ministry of Labour, Government of India, (hereinafter called “CPI”) for the month of the Base Month;

LBi = The CPI for industrial workers – All India for the average price index of the 3 months of the quarter under consideration;

OFC<sub>o</sub> = The WPI for fibre cables for the month of the Base Month;

OFC<sub>i</sub> = The WPI for fibre cables for the average price index of the 3 months of the quarter under consideration;

OTHo = The WPI for all commodities for the month of the Base Month; and

OTHi = The WPI for all commodities for the average price index of the 3 months of the quarter under consideration.

- (c) The following percentages shall govern the price adjustment of the Contract Price for signalling and telecommunication works:

<div> <div>Works</div> <div>Component</div> </div>	Signalling			Telecommunication		
	Signalling Works	Signalling inventory	Integrated testing and Commissioning	Telecommunication Works	Telecomm inventory	Integrated testing and Commissioning
Electronics (PELEX)	***%	***%		***%	***%	
Communication Equipment (PCEQP)				***%	***%	
Optical Fibre Cable (POFC)	***%			***%		
30C x 1.5 sq mm signalling cable(S30C)	***%			***%		
24C x 1.5 sq mm signalling cable (S24C)	***%			***%		
19Cx 1.5 sq mm signalling cable (S19C)	***%			***%		
12C x 1.5 sq mm signalling cable (S12C)	***%			***%		
9C x 1.5 sq mm signalling cable (S9C)	***%			***%		
6C x 1.5 sq mm signalling cable (S6C)	***%			***%		
4C x 1.5 sq mm signalling cable (S4C)	***%			***%		
2C x 1.5 sq mm signalling cable (S2C)	***%			***%		
12C x 2.5 sq mm signalling cable (S12C2.5)	***%			***%		
2C x 2.5 sq mm signalling cable (S2C2.5)	***%			***%		
2C x 25 sq mm signalling cable (S2C25)	***%			***%		
0.9 mm dia, 6Quad cable (QC)	***%			***%		
Labour (PLB)	***%		***%	***%	***%	***%
Other materials	***%	***%	***%	***%	***%	***%
Total	100%	100%	100%	100%	100%	100%

**(Note- the percentages may be finalized by tendering authority depending on BOQ)**

#### **FORMULAE FOR SIGNALING & TELECOM CABLE**

The price payable for signalling cables is variable as per Price Variation Formula given below:

**For Signalling Copper Cables:**

$$P_i = P_o + CuF (Cu - Cu_o) + CCFcu(CC - CCo) + FeF (Fe - Fe_o)$$

**For Telecom Copper Cables For Jelly Filled, 0.9 mm dia, 6 quad cable**

$$P_i = P_o + CuF (Cu - Cu_o) + AlFcu(Al - Alo) + CCFcu (CC - CCo) + FeF (Fe - Fe_o)$$

**For Aluminium Power Cables:**

$$P_i = P_o + AlF (Al - Alo) + CCFAI(CC - CCo) + FeF (Fe - Fe_o)$$

Where,

P<sub>i</sub>= Price payable per KM as adjusted in accordance with Price variation clause.

P<sub>o</sub>= Price per KM of cable as per Purchase order.

CuF= Variation factor for Copper

Cu<sub>o</sub>= Price of copper Rod in Rs. Per MT

CCFCu= Variation factor for PVC Compound for Copper Signalling & Telecom cable

CC<sub>o</sub>= Price of PVC Compound in Rs. Per MT

AlF= Variation factor for Aluminium

Alo= Price of EC grade LME Aluminium rods (Properzi rods) in Rs. Per MT.

CCFAI = Variation factor for PVC Compound for Aluminium power cable

FeF= Variation factor for Steel

Fe<sub>o</sub>= Price of Steel for Armour (Flat strip 4 mm. x 0.8mm/ Round 1.4mm dia) in Rs. Per MT

**(Prices per MT for Cu<sub>o</sub>, CC<sub>o</sub>, Fe<sub>o</sub>, Alo as applicable on the 1<sup>st</sup> working day of the month, one month prior to the deadline for submission of bids. The above prices and indices are as published by IEEMA vide circular reference no. IEEMA (PVC) /CABLE --/-- one month prior to the deadline for submission of bids.)**

Cu= Price of Copper Rod in Rs. Per MT.

C<sub>c</sub>= Price of PVC Compound in Rs. Per MT.

Fe= Price of Steel for Armouring (Flat strip 4mm x 0.8 mm/ Round 1.4mm dia) in Rs. Per MT.

Al = Price of EC grade LME Aluminium rods (Properzi rods) in Rs. Per MT.

**(Prices per MT for Cu, CC, Fe, Al as prevailing on 1<sup>st</sup> working day of the calendar month covering the date One month prior to the date of inspection call letter will be applicable for the calculation of updated price. The above prices and indices are as published by IEEMA vide circular reference no. IEEMA (PVC) /CABLE --/-- one month prior to the date of inspection.)**

The value of variation factors for copper, steel and PVC Compound are different for different sizes of signalling cables. Accordingly, the PVC formula for some of the types of signalling cable is as given under:-

Underground Railway Signalling Cable unscreened and armoured copper conductor

- (i) Size 30 C x 1.5 sq.mm.  
 $P_{30C_i} = P_{30Co} + 0.391(Cu - C_{uo}) + 0.557(CC - CC_{Co}) + 0.425(Fe - Fe_o)$   
 For armouring, price of steel flat strip of size 4mmx0.8mm is to be taken into consideration.
- (ii) Size 24C x 1.5 sq.mm  
 $P_{24C_i} = P_{24Co} + 0.313(Cu - C_{uo}) + 0.481(CC - CC_{Co}) + 0.398(Fe - Fe_o)$   
 For armouring, value of steel flat strip of size 4mmx0.8mm is to be taken into consideration.
- (iii) Size 19C x 1.5 sq.mm  
 $P_{19C_i} = P_{19Co} + 0.248(Cu - C_{uo}) + 0.395(CC - CC_{Co}) + 0.343(Fe - Fe_o)$   
 For armouring, value of steel flat strip of size 4mmx0.8mm is to be taken into consideration.
- (iv) Size 12C x 1.5 sq.mm  
 $P_{12C_i} = P_{12Co} + 0.157(Cu - C_{uo}) + 0.277(CC - CC_{Cu}) + 0.289(Fe - Fe_o)$   
 For armouring, value of steel wire size 1.4mm dia is to be taken into consideration.
- (v) Size 9C x 1.5 sq.mm  
 $P_{9C_i} = P_{9Co} + 0.117(Cu - C_{uo}) + 0.241(CC - CC_{Cu}) + 0.383(Fe - Fe_o)$   
 For armouring, value of steel wire size 1.4mm dia is to be taken into consideration.
- (vi) Size 6Cx 1.5 sq.mm  
 $P_{6C_i} = P_{6Co} + 0.078(Cu - C_{uo}) + 0.199(CC - CC_{Cu}) + 0.329(Fe - Fe_o)$   
 For armouring, value of steel wire size 1.4mm dia is to be taken into consideration.
- (vii) Size 4Cx1.5 sq.mm  
 $P_{4C_i} = P_{4Co} + 0.052(Cu - C_{uo}) + 0.152(CC - CC_{Co}) + 0.277(Fe - Fe_o)$   
 For armouring, value of steel wire size 1.4mm dia is to be taken into consideration.
- (viii) Size 2C x 4 sq.mm(multistrand)  
 $P_{2C_i} = P_{2Co} + 0.073(Cu - C_{uo}) + 0.156(CC - CC_{Co}) + 0.3(Fe - Fe_o)$   
 For armouring, value of steel wire size 1.4mm dia is to be taken into consideration.
- (ix) Size 12C x 2.5 sq.mm  
 $P_{12C2.5_i} = P_{12C2.5o} + 0.282(Cu - C_{uo}) + 0.371(CC - CC_{Co}) + 0.342(Fe - Fe_o)$   
 For armouring, value of steel flat strip of size 4mmx0.8mm is to be taken into consideration.
- (x) Size 2C x 2.5 sq.mm  
 $P_{2C2.5_i} = P_{2C2.5o} + 0.047(Cu - C_{uo}) + 0.139(CC - CC_{Co}) + 0.277(Fe - Fe_o)$   
 For armouring, value of steel wire size 1.4mm dia is to be taken into consideration.
- (xi) Size 2C x 25 sq.mm PVC insulated, armoured, Aluminium power cable  
 $P_{2C25_i} = P_{2C25o} + 0.146(Al - Al_o) + 0.303(CC - CC_{Co}) + 0.306(Fe - Fe_o)$   
 For armouring, value of steel flat strip of size 4mmx0.8mm is to be taken into consideration.
- (xii) For Jelly filled, 0.9mm dia, 6 quad cable  
 $P_{QC_i} = P_{QCo} + 0.135(Al - Al_o) + 0.139(Cu - C_{uo}) + 0.515(CC - CC_{Co}) + 0.693(Fe - Fe_o)$   
 For PVC Compound Grade CW-22, is to be taken into consideration.

**1.1.79 (viii)** The demands for escalation of cost shall be allowed on the basis of provisional indices as mentioned above in Clause 46A.7. Any adjustment needed to be done based on the finally published indices shall be made as and when they become available.

**1.1.79 (ix)** (1) Relevant categories of steel for the purpose of operating Price Variation formula as mentioned in this Clause shall be as under:

SL	Classification	Rates to be used for calculating S <sub>Q</sub> or S <sub>B</sub>
1.	Reinforcement bars and other rounds	Average of per tonne rates of 10mm dia TMT & 25mm dia TMT; confirming IS1786; Fe 500
2.	All types and sizes of angles, channels and joists	Average of per tonne rates of 'Angle 75x75x6mm, Mild Steel Plate 10mm thickness and Channel 150x75mm; confirming IS2062, E250 Gr "A"
3.	All types and sizes of plates	Average of per tonne rates of 'MS Plates 10mm thickness and 25mm thickness; confirming IS2062, E250 Gr "A"
4.	Any other section of steel not covered	Average of price for the 3 categories covered under SL 1, 2 & 3 in



	in the above categories	this table.
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- (2). Relevant city for referring “JPC (Joint Plant Committee)” rates of steel items (SQ /SB) in different Zonal Railways shall be as under :

SL	City	Railway
1.	Delhi	Northern , North Central, North Eastern, North Western
2.	Kolkata	Eastern, East Central, East Coast, Northeast Frontier, South Eastern, Southeast Central
3.	Mumbai	Central, Western, West Central
4.	Chennai	Southern, South Central&South Western

#### 1.1.79(x) Price Variation during Extended Period of Contract

The price adjustment as worked out above, i.e. either increase or decrease shall be applicable upto the stipulated date of completion of work including the extended period of completion where such extension has been granted under Clause 1.1.49A (17A of the Standard General Conditions of Contract). However, where extension of time has been granted due to Contractor's failure under Clause 1.1.49B (17B of the Standard General Conditions of Contract), price adjustment shall be done as follows:

(a) In case the indices increase above the indices applicable to the last month of original completion period or the extended period under Clause 1.1.49A, the price adjustment for the period of extension granted under Clause 1.1.49B shall be limited to the amount payable as per the Indices applicable to the last month of the original completion period or the extended period under Clause 1.1.49 (17A of the Standard General Conditions of Contract); as the case may be.

(b) In case the indices fall below the indices applicable to the last month of original/ extended period of completion under Clause 1.1.49A, as the case may be; then the lower indices shall be adopted for the price adjustment for the period of extension under Clause 1.1.49B of the Standard General Conditions of Contract.

**1.1.80 Maintenance of Works:** The Contractor shall at all times during the progress and continuance of the works and also for the period of maintenance specified in the Tender Form after the date of issue of the certificate of completion by the Engineer or any other earlier date subsequent to the completion of the works that may be fixed by the Engineer, be responsible for and effectively maintain and uphold in good substantial, sound and perfect condition all and every part of the works and shall make good from time to time and at all times as often as the Engineer shall require, any damage or defect that may during the above period arise in or be discovered or be in any way connected with the works, provided that such damage or defect is not directly caused by errors in the contract documents, act of providence or insurrection or civil riot, and the Contractor shall be liable for and shall pay and make good to the Railway or other persons legally entitled thereto whenever required by the Engineer so to do, all losses, damages, costs and expenses they or any of them may incur or be put or be liable to by reasons or in consequence of the operations of the Contractor or of his failure in any respect.

**1.1.81 (1) Certificate of Completion of Works:** As soon as in the opinion of the Engineer, the work has been completed and has satisfactorily passed any final test or tests that may be prescribed, the Engineer shall issue a certificate of completion duly indicating the date of completion in respect of the work and the period of maintenance of the work shall commence from the date of completion mentioned in such certificate. The certificate, inter alia, should mention that the work has been completed in all respects and that all the contractual obligations have been fulfilled by the Contractor and that there is no due from the Contractor to Railways against the contract concerned.

The Engineer may also issue such a certificate indicating date of completion with respect to any part of the work (before the completion of the whole of work), which has been both completed to the satisfaction of the Engineer and occupied or used by the Railway. When any such certificate is given in respect of part of a work, such part shall be considered as completed and the period of maintenance of such part shall commence from the date of completion mentioned in the completion certificate issued for that part of the work.

**(2) Contractor not Absolved by Completion Certificate:** The Certificate of Completion in respect of the works referred to in Sub-Clause (1) of this Clause shall not absolve the Contractor from his liability to make good any defects imperfections, shrinkages or faults which may appear during the period of maintenance specified in the tender arising in the opinion of the Engineer from materials or workmanship not in accordance with the drawings or specifications or instruction of the Engineer, which defects, imperfections, shrinkages or faults shall upon the direction in writing of the

Engineer be amended and made good by the Contractor at his own cost; and in case of default on the part of Contractor, the Engineer may employ labour and materials or appoint another Contractor to amend and make good such defects, imperfections, shrinkages and faults and all expenses consequent thereon and incidental thereto shall be borne by the Contractor and shall be recoverable from any moneys due to him under the contract.

**(3) Final Supplementary Agreement:** After the work is completed or otherwise concluded by the parties with mutual consent, and taken over by the Railway as per terms and conditions of the contract agreement, and there is unequivocal no claim on either side under the Contract other than as mentioned in item 4 of Form-15, the parties shall execute the Final Supplementary Agreement as per Annexure Form-15.

**1.1.82 Approval only by Maintenance Certificate:** No certificate other than Maintenance Certificate, if applicable, referred to in Clause 50 of the Conditions shall be deemed to constitute approval of any work or other matter in respect of which it is issued or shall be taken as an admission of the due performance of the contract or any part thereof.

**1.1.83 (a) Maintenance Certificate:** The Contract shall not be considered as completed until a Maintenance Certificate, if applicable, shall have been signed by the Engineer stating that the works have been completed and maintained to his satisfaction. The Maintenance Certificate shall be given by the Engineer upon the expiration of the period of maintenance or as soon thereafter as any works ordered during such period pursuant to Sub Clause (2) to Clause 48 of these Conditions shall have been completed to the satisfaction of the Engineer, and full effect shall be given to this Clause notwithstanding the taking possession of or using the works or any part thereof by the Railway.

The Competent Authority to issue above Maintenance Certificate shall normally be the authority who is competent to sign the contract. If this Competent Authority is of the rank lower than JA Grade, then a JA Grade Officer (concerned with the work) should issue the Certificate. The Certificate, inter alia, should mention that the work has been completed in all respects and that all the contractual obligations have been fulfilled by the Contractor and that there is no due from the Contractor to Railways against the contract concerned.

**(b) Cessation of Railway's Liability:** The Railway shall not be liable to the Contractor for any matter arising out of or in connection with the contract for execution of the works unless the Contractor has made a claim in writing in respect thereof before the issue of the Maintenance Certificate under this clause.

**(c) Unfulfilled Obligations:** Notwithstanding the issue of the Maintenance Certificate the Contractor and (subject to Sub-Clause (2) of this Clause) the Railway shall remain liable for the fulfillment of any obligation incurred under the provision of the contract prior to the issue of the Maintenance Certificate which remains unperformed at the time such Certificate is issued and for the purposes of determining the nature and extent of any such obligations, the contract shall be deemed to remain in force between the parties thereto.

**1.1.84 (a) Final Payment:** On the Engineer's certificate of completion in respect of the works, adjustment shall be made and the balance of account based on the Engineer or the Engineer's representative's certified measurements or Engineer's certified "contractor's authorized engineer's measurements" of the total quantity of work executed by the Contractor upto the date of completion and on the rates accepted in Bill(s) of Quantities and for extra works on rates determined under Clause 39 of these Conditions shall be paid to the Contractor subject always to any deduction which may be made under these presents and further subject to the Contractor having signed delivered to the Engineer enclosing either a full account in detail of all claims he may have on the Railway in respect of the works or having delivered No Claim Certificate and the Engineer having after the receipt of such account given a certificate in writing that such claims are not covered under excepted matter i.e. Clauses 7(j), 8, 18, 22(5), 39.1, 39.2, 40A, 43(2), 45(i)(a), 55, 55-A(5), 57, 57A, 61(1), 61(2) and 62(1), 63(iv) and 63.2.11 of the Standard General Conditions of Contract or in any Clause (stated as excepted matter) of the Special Conditions of the Contract, that the whole of the works to be done under the provisions of the Contracts have been completed, that they have been inspected by him since their completion and found to be in good and substantial order, that all properties, works and things, removed, disturbed or injured in consequence of the works have been properly replaced and made good and all expenses and demands incurred by or made upon the Railway for or in the respect of damage or loss by from or in consequence of the works, have been satisfied agreeably and in conformity with the contract.

**(b) Post Payment Audit:** It is an agreed term of contract that the Railway reserves to itself the right to carry out a post-payment audit and/ or technical examination of the works and the Final Bill including all supporting vouchers, abstracts etc. and to make a claim on the Contractor for the refund of any excess amount paid to him till the release of security deposit or settlement of claims, whichever is later, if as a result of such examination any over-payment to him is discovered to have been made in respect of any works done or alleged to have been done by him under the contract.

**(c) Production of Vouchers etc. by the Contractor:**

- (i) For a contract of more than one crore of rupees, the Contractor shall, whenever required, produce or cause to be produced for examination by the Engineer any quotation, invoice, cost or other account, book of accounts, voucher, receipt, letter, memorandum, paper of writing or any copy of or extract from any such document and also furnish information and returns verified in such manner as may be required in any way relating to the execution of this contract or relevant for verifying or ascertaining cost of execution of this contract (the decision of the Engineer on the question of relevancy of any documents, information or return being final and binding in the parties). The Contractor shall similarly produce vouchers etc., if required to prove to the Engineer, that materials supplied by him, are in accordance with the specifications laid down in the contract.
- (ii) If any portion of the work in a contract of value more than one crore of rupees be carried out by a sub-contractor or any subsidiary or allied firm or company (as per Clause 7 of the Standard General Conditions of Contract), the Engineer shall have power to secure the books of such sub-contractor or any subsidiary or allied firm or company, through the Contractor, and such books shall be open to his inspection.
- (iii) The obligations imposed by Sub Clause (i) & (ii) above is without prejudice to the obligations of the Contractor under any statute rules or orders binding on the Contractor.

**1.1.85 (a) Withholding and Lien in Respect of Sums Claimed:** Whenever any claim or claims for payment of a sum of money arises out of or under the contract against the Contractor, the Railway shall be entitled to withhold and also have a lien to retain such sum or sums in whole or in part from the security, if any, deposited by the Contractor and for the purpose aforesaid, the Railway shall be entitled to withhold the said cash Security Deposit or the Security if any, furnished as the case may be and also have a lien over the same pending finalization or adjudication of any such claim. In the event of the security being insufficient to cover the claimed amount or amounts or if no security has been taken from the Contractor, the Railway shall be entitled to withhold and have a lien to the extent of the such claimed amount or amounts referred to supra, from any sum or sums found payable or which at any time thereafter may become payable to the Contractor under the same contract or any other contract with this or any other Railway or any Department of the Central Government pending finalization or adjudication of any such claim.

It is an agreed term of the contract that the sum of money or moneys so withheld or retained under the lien referred to above, by the Railway will be kept withheld or retained as such by the Railways till the claim arising out of or under the contract is determined by the arbitrator (if the contract governed by the Arbitration Clause) or by the competent court as the case may be and that the Contractor will have no claim for interest or damages whatsoever on any account in respect of such withholding or retention under the lien referred to supra and duly notified as such to the Contractor. For the purpose of this clause, where the Contractor is a partnership firm or a company, the Railway shall be entitled to withhold and also have a lien to retain towards such claimed amount or amounts in whole or in part from any sum found payable to any partner / company, as the case may be whether in his individual capacity or otherwise.

**(b) Lien in Respect of Claims in other Contracts:**

(i) Any sum of money due and payable to the Contractor (including the Security Deposit returnable to him) under the contract may be withheld or retained by way of lien by the Railway, against any claim of this or any other Railway or any other Department of the Central Government in respect of payment of a sum of money arising out of or under any other contract made by the Contractor with this or any other Department of the Central Government.

(ii) However, recovery of claims of Railway in regard to terminated contracts may be made from the Final Bill, Security Deposits and Performance Guarantees of other contract or contracts, executed by the Contractor. The Performance Guarantees submitted by the Contractor against other contracts, if required, may be withheld and encashed. In addition, 10% of each subsequent 'on-account bill' may be withheld, if required, for recovery of Railway's dues against the terminated contract.

(iii) It is an agreed term of the contract that the sum of money so withheld or retained under this Clause by the Railway will be kept withheld or retained as such by the Railway till the claim arising out of or under any other contract is either mutually settled or determined by arbitration, if the other contract is governed by Arbitration Clause or by the competent court as the case may be and Contractor shall have no claim for interest or damages whatsoever on this account or on any other ground in respect of any sum of money withheld or retained under this Clause and duly notified as such to the Contractor.

**1.1.86 Signature on Receipts for Amounts:** Every receipt for money which may become payable or for any security which may become transferable to the Contractors under these presents, shall, if signed in the partnership name by anyone of the partners of a Contractor's firm be a good and sufficient discharge to the Railway in respect of the moneys or security purported to be acknowledged thereby and in the event of death of any of the Contractor, partners during the pendency of the contract, it is hereby expressly agreed that every receipt by anyone of the surviving Contractor partners shall if so signed as aforesaid be good and sufficient discharge as aforesaid provided that nothing in this Clause contained shall be deemed to prejudice or effect any claim which the Railway may hereafter have against the legal representative of any Contractor partner so dying for or in respect to any breach of any of the conditions of the contract, provided also that nothing in this clause contained shall be deemed to prejudice or effect the respective rights or obligations of the Contractor partners and of the legal representatives of any deceased Contractor partners interse.

**1.1.87 (a) Wages to Labour:** The Contractor shall be responsible to ensure compliance with the provision of the Minimum Wages Act, 1948 (hereinafter referred to as the "said Act") and the Rules made thereunder in respect of any employees directly or through petty Contractors or sub-contractors employed by him for the purpose of carrying out this contract.

If, in compliance with the terms of the contract, the Contractor supplied any labour to be used wholly or partly under the direct orders and control of the Railways whether in connection with any work being executed by the Contractor or otherwise for the purpose of the Railway such labour shall, for the purpose of this Clause, still be deemed to be persons employed by the Contractor.

If any moneys shall, as a result of any claim or application made under the said Act be directed to be paid by the Railway, such money shall be deemed to be moneys payable to the Railway by the Contractor and on failure by the Contractor to repay the Railway any moneys paid by it as aforesaid within seven days after the same shall have been demanded, the Railways shall be entitled to recover the same from Contractor's bills/Security Deposit or any other dues of Contractor with the Government of India.

**(b) Apprentices Act:** The Contractor shall be responsible to ensure compliance with the provisions of the Apprentices Act, 1961 and the Rules and Orders issued thereunder from time to time in respect of apprentices directly or through petty Contractors or sub-contractors employed by him for the purpose of carrying out the Contract.

If the Contractor directly or through petty Contractors or sub-contractors fails to do so, his failure will be a breach of the contract and the Railway may, in its discretion, rescind the contract. The Contractor shall also be liable for any pecuniary liability arising on account of any violation of the provisions of the Act.

**1.1.88 Provisions of Payments of Wages Act:** The Contractor shall comply with the provisions of the Payment of Wages Act, 1936 and the rules made thereunder in respect of all employees employed by him either directly or through petty Contractors or sub-contractors in the works. If in compliance with the terms of the contract, the Contractor directly or through petty Contractors or sub-contractors shall supply any labour to be used wholly or partly under the direct orders and control of the Engineer whether in connection with the works to be executed hereunder or otherwise for the purpose of the Engineer, such labour shall nevertheless be deemed to comprise persons employed by the Contractor and any moneys which may be ordered to be paid by the Engineer shall be deemed to be moneys payable by the Engineer on behalf of the Contractor and the Engineer may on failure of the Contractor to repay such money to the Railways deduct the same from any moneys due to the Contractor in terms of the contract. The Railway shall be entitled to recover the same from Contractor's bills/Security Deposit or any other dues of Contractor with the Government of India all moneys paid or payable by the Railway by way of compensation of aforesaid or for costs of expenses in connection with any claim thereto and the decision of the Engineer upon any question arising out of the effect or force of this Clause shall be final and binding upon the Contractor.

**(a) Provisions of Contract Labour (Regulation and Abolition) Act, 1970:**

(1) The Contractor shall comply with the provision of the contract labour (Regulation and Abolition) Act, 1970 and the Contract labour (Regulation and Abolition) Central Rules 1971 as modified from time to time, wherever applicable and shall also indemnify the Railway from and against any claims under the aforesaid Act and the Rules.

(2) The Contractor shall obtain a valid license under the aforesaid Act as modified from time to time before the commencement of the work and continue to have a valid license until the completion of the work. Any failure to fulfill the requirement shall attract the penal provision of the Act.

(3) The Contractor shall pay to the labour employed by him directly or through sub-contractors the wages as per provision of the aforesaid Act and the Rules wherever applicable. The Contractor shall notwithstanding the provisions of the contract to the contrary, cause to be paid the wages to labour, indirectly engaged on the works including any engaged by sub-contractors in connection with the said work, as if the labour had been immediately employed by him.

(4) In respect of all labour directly or indirectly employed in the work for performance of the Contractor's part of the contract, the Contractor shall comply with or cause to be complied with the provisions of the aforesaid Act and Rules wherever applicable.

(5) In every case in which, by virtue of the provisions of the aforesaid Act or the rules, the Railway is obliged to pay any amount of wages to a workman employed by the Contractor or his sub-contractor in execution of the work or to incur any expenditure on account of the contingent, liability of the Railway due to the Contractor's failure to fulfill his statutory obligations under the aforesaid Act or the rules, the Railway will recover from the Contractor, the amount of wages so paid or the amount of expenditure so incurred and without prejudice to the rights of the Railway under the Section 20, Sub-Section (2) and Section 2, Sub-Section (4) of the aforesaid Act, the Railway shall be at liberty to recover such amount or part thereof from Contractor's bills/Security Deposit or any other dues of Contractor with the Government of India. The Railway shall not be bound to contest any claim made against it under Sub-Section (1) of Section 20 and Sub-Section (4) of Section 21 of the aforesaid Act except on the written request of the Contractor and upon his giving to the Railway full security for all costs for which the Railway might become liable in contesting such claim. The decision of the Chief Engineer regarding the amount actually recoverable from the Contractor as stated above shall be final and binding on the Contractor.

**(b) Provisions of Employees Provident Fund and Miscellaneous Provisions Act, 1952:** The Contractor shall comply with the provisions of Para 30 & 36-B of the Employees Provident Fund Scheme, 1952; Para 3 & 4 of Employees' Pension Scheme, 1995; and Para 7 & 8 of Employees Deposit Linked Insurance Scheme, 1976; as modified from time to time through enactment of "Employees Provident Fund & Miscellaneous Provisions Act, 1952", wherever applicable and shall also indemnify the Railway from and against any claims under the aforesaid Act and the Rules.

**(c)(i)** Contractor is to abide by the provisions of various labour laws in terms of above clause 54, 55, 55-A and 55-B of the Standard General Conditions of Contract. In order to ensure the same, an application has been developed and hosted on website '[www.shramikkalyan.indianrailways.gov.in](http://www.shramikkalyan.indianrailways.gov.in)'. Contractor shall register his firm/company etc. and upload requisite details of labour and their payment in this portal. These details shall be available in public domain. The registration/ updation in Portal shall be done as under:

(a) Contractor shall apply for onetime registration of his company/firm etc. in the Shramikkalyan portal with requisite details subsequent to issue of Letter of Acceptance. Engineer shall approve the contractor's registration in the portal within 7 days of receipt of such request.

(b) Contractor once approved by any Engineer, can create password with login ID (PAN No.) for subsequent use of portal for all Letter of Acceptances (LoAs) issued in his favour.

(c) The contractor once registered on the portal, shall provide details of his Letter of Acceptances (LoAs) / Contract Agreements on shramikkalyan portal within 15 days of issue of any LoA for approval of concerned Engineer. Engineer shall update (if required) and approve the details of LoA filled by contractor within 7 days of receipt of such request.

(d) After approval of LoA by Engineer, contractor shall fill the salient details of contract labours engaged in the contract and ensure updating of each wage payment to them on shramikkalyan portal on monthly basis.

(e) It shall be mandatory upon the contractor to ensure correct and prompt uploading of all salient details of engaged contractual labour & payments made thereof after each wage period.

(ii) While processing payment of any 'On Account Bill' or 'Final Bill' or release of 'Advances' or 'Performance Guarantee / Security Deposit', contractor shall submit a certificate to the Engineer or Engineer's representatives that "I have uploaded the correct details of contract labours engaged in connection with this contract and payments made to them during the wage period in Railway's Shramikkalyan portal at 'www.shramikkalyan.indianrailways.gov.in' till \_\_\_\_ Month, \_\_\_\_ Year."

**(d) Provisions of "The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996" and "The Building and Other Construction Workers' Welfare Cess Act, 1996":**

The tenderers, for carrying out any construction work, shall get themselves registered with the Registering Officer under Section-7 of the Building and Other Construction Workers Act, 1996 and Rules made thereto by the concerned State Govt., and submit Certificate of Registration issued by Registering Officer of the concerned State Govt. (Labour Dept.). The Cess shall be deducted from contractor's bills as per provisions of the Act.

**1.1.89 Reporting of Accidents:** The Contractor shall be responsible for the safety of all employees directly or through petty Contractors or sub-contractor employed by him on the works and shall report serious accidents to any of them however and wherever occurring on the works to the Engineer or the Engineers Representative and shall make every arrangement to render all possible assistance.

**1.1.90 Provision of Workmen's Compensation Act:** In every case in which by virtue of the provisions of Section 12 Sub-Section (1) of the Workmen's Compensation Act 1923, Railway is obliged to pay compensation to a workman directly or through petty Contractor or sub-contractor employed by the Contractor in executing the work, Railway will recover from the Contractor the amount of the compensation so paid, and, without prejudice to the rights of Railway under Section 12 Sub-section (2) of the said Act, Railway shall be at liberty to recover such amount or any part thereof from Contractor's bills/Security Deposit or any other dues of Contractor with the Government of India. Railway shall not be bound to contest any claim made against it under Section 12 Sub-Section (1) of the said Act except on the written request of the Contractor and upon his giving to Railway full security for all costs for which Railway might become liable in consequence of contesting such claim.

**(a) Provision of Mines Act:** The Contractor shall observe and perform all the provisions of the Mines Act, 1952 or any statutory modifications or re-enactment thereof for the time being in force and any rules and regulations made thereunder in respect of all the persons directly or through the petty Contractors or sub-contractors employed by him under this contract and shall indemnify the Railway from and against any claims under the Mines Act, or the rules and regulations framed thereunder, by or on behalf of any persons employed by him or otherwise.

**1.1.91 Railway not to Provide Quarters for Contractors:** No quarters shall normally be provided by the Railway for the accommodation of the Contractor or any of his staff employed on the work. In exceptional cases where accommodation is provided to the Contractor at the Railway's discretion, recoveries shall be made at such rates as may be fixed by the Railway for the full rent of the buildings and equipments therein as well as charges for electric current, water supply and conservancy.

**1.1.92 (a) Labour Camps:** The Contractor shall at his own expense make adequate arrangements for the housing, supply of drinking water and provision of latrines and urinals for his staff and workmen, directly or through the petty Contractors or sub-contractors and for temporary creche (Bal-Mandir) where 50 or more women are employed at a time. Suitable sites on Railway land, if available, may be allotted to the Contractor for the erection of labour camps, either free of charge or on such terms and conditions that may be prescribed by the Railway. All camp sites shall be maintained in clean and sanitary conditions by the Contractor at his own cost.

**(b) Compliance to Rules for Employment of Labour:** The Contractor(s) shall conform to all laws, bye-laws rules and regulations for the time being in force pertaining to the employment of local or imported labour and shall take all necessary precautions to ensure and preserve the health and safety of all staff employed directly or through petty contractors or sub-contractors on the works.

**(c) Preservation of Peace:** The Contractor shall take requisite precautions and use his best endeavours to

(i) Prevent any riotous or unlawful behaviour by or amongst his workmen and other employed directly or through the petty Contractors or sub-contractors on the works and for the preservation of peace and protection of the inhabitants and

(ii) Security of property in the neighbourhood of the works. In the event of the Railway requiring the maintenance of a Special Police Force at or in the vicinity of the site during the tenure of works,

the expenses thereof shall be borne by the Contractor and if paid by the Railway shall be recoverable from the Contractor.

(d) **Sanitary Arrangements:** The Contractor shall obey all sanitary rules and carry out all sanitary measures that may from time to time be prescribed by the Railway Medical Authority and permit inspection of all sanitary arrangements at all times by the Engineer, the Engineer's Representative or the Medical Staff of the Railway. Should the Contractor fail to make the adequate sanitary arrangements, these will be provided by the Railway and the cost thereof recovered from the Contractor.

(e) **Outbreak of Infectious Disease:** The Contractor shall remove from his camp such labour and their families as refuse protective inoculation and vaccination when called upon to do so by the Engineer or the Engineer's Representative on the advice of the Railway Medical Authority. Should cholera, plague, or other infectious disease break out, the Contractor shall burn the huts, beddings, clothes and other belongings of or used by the infected parties and promptly erect new huts on healthy sites as required by the Engineer, failing which within the time specified in the Engineer's requisition, the work may be done by the Railway and the cost thereof recovered from the Contractor.

(f) **Treatment of Contractor's Staff in Railway Hospitals:** The Contractor and his staff, other than labourers and their families requiring medical aid from the railway hospital and dispensaries will be treated as private patients and charged accordingly. The Contractors' labourers and their Families will be granted free treatment in railway hospitals and dispensaries where no other hospitals or dispensaries are available provided the Contractor pays the cost of medicines, dressing and diet money according to the normal scale and additional charges for special examinations such as pathological and bacteriological examination, X-Ray, etc. and for surgical operation.

(g) **Medical Facilities at Site:** The Contractor shall provide medical facilities at the site as may be prescribed by the Engineer on the advice of the Railway Medical Authority in relation to the strength of the Contractor's resident staff and workmen.

(h) **Use of Intoxicants:** The sale of ardent spirits or other intoxicating beverages upon the work or in any of the buildings, encampments or tenements owned, occupied by or within the control of the Contractor or any of his employees shall be forbidden and the Contractor shall exercise his influence and authority to the utmost extent to secure strict compliance with this condition.

(i) **Restrictions on the Employment of Retired Engineers of Railway Services Within One Year of their Retirement:** The Contractor shall not, if he is a retired Government Engineer of Gazetted rank, himself engage in or employ or associate a retired Government Engineer of Gazetted rank, who has not completed one year from the date of retirement, in connection with this contract in any manner whatsoever without obtaining prior permission of the President and if the Contractor is found to have contravened this provision it will constitute a breach of contract and administration will be entitled to terminate the contract and forfeit his Performance Guarantee as well as Security Deposit.

**1.1.93 (a) Non-Employment of Labourers below the age of 15:** The Contractor shall not employ children below the age of 15 as labourers directly or through petty Contractors or sub-contractors for the execution of work.

(b) **Medical Certificate of Fitness for Labour:** It is agreed that the Contractor shall not employ a person above 15 and below 19 years of age for the purpose of execution of work under the contract unless a medical certificate of fitness in the prescribed form (Proforma at Annexure-13) granted to him by a certifying surgeon certifying that he is fit to work as an adult, is obtained and kept in the custody of the Contractor or a person nominated by him in this behalf and the person carries with him, while at work; a token giving a reference to such certificate. It is further agreed that the responsibility for having the adolescent examined medically at the time of appointment or periodically till he attains the age of 19 years shall devolve entirely on the Contractor and all the expenses to be incurred on this account shall be borne by him and no fee shall be charged from the adolescent or his parent for such medical examination.

(c) **Period of Validity of Medical Fitness Certificate:** A certificate of fitness granted or renewed for the above said purposes shall be valid only for a period of one year at a time. The certifying surgeon shall revoke a certificate granted or renewed if in his opinion the holder of it, is no longer fit for work in the capacity stated therein. Where a certifying surgeon refuses to grant or renew a certificate or revoke a certificate, he shall, if so required by the person concerned, state his reasons in writing for doing so.

(d) **Medical Re-Examination of Labourer:** Where any official appointed in this behalf by the Ministry of Labour is of the opinion that any person employed in connection with the execution of any work under this contract in the age group 15 to 19 years is without a certificate of fitness or is having a certificate of fitness but no longer fit to work in the capacity stated in the certificate, he may serve on the Contractor, or on the person nominated by him in this regard, a notice requiring that such persons shall be examined by a certifying surgeon and such person shall not if the concerned official so directs, be employed or permitted to do any work under this contract unless he has been medically examined and certified that he is fit to work in the capacity stated in the certificate.

**EXPLANATIONS:**

- (1) Only Qualified Medical Practitioners can be appointed as "Certifying Surgeons" and the term "Qualified Medical Practitioners" means a person holding a qualification granted by an authority specified in the Schedule to the Indian Medical Degrees Act, 1916 (VII of 1916) or in the Schedule to the Indian Medical Council Act, 1933 (XXVII) of 1933.
- (2) The Certifying surgeon may be a medical officer in the service of State or Municipal Corporation.

**1.1.94 (1) Right of Railway to Determine the Contract:** The Railway shall be entitled to determine and terminate the contract at any time should, in the Railway's opinion, the cessation of work becomes necessary owing to paucity of funds or from any other cause whatever, in which case the value of approved materials at site and of work done to date by the Contractor will be paid for in full at the rate specified in the contract. Notice in writing from the Railway of such determination and the reasons therefor shall be conclusive evidence thereof.

(2) **Payment on Determination of Contract:** Should the contract be determined under sub clause (1) of this clause and the Contractor claims payment for expenditure incurred by him in the expectation of completing the whole of the work, the Railways shall admit and consider such claims as are deemed reasonable and are supported by vouchers to the satisfaction of the Engineer. The Railway's decision on the necessity and propriety of such expenditure shall be final and conclusive.

(3) The Contractor shall have no claim to any payment of compensation or otherwise, howsoever on account of any profit or advantage which he might have derived from the execution of the work in full but which he did not derive in consequence of determination of contract.

**1.1.95 (1) Determination of Contract owing to Default of Contractor:** If the Contractor should:

- (i) Becomes bankrupt or insolvent, or
- (ii) Make an arrangement for assignment in favour of his creditors, or agree to carry out the contract under a Committee of Inspection of his creditors, or
- (iii) Being a Company or Corporation, go into liquidation (other than a voluntary liquidation for the purposes of amalgamation or reconstruction), or
- (iv) Have an execution levied on his goods or property on the works, or
- (v) Assign the contract or any part thereof otherwise than as provided in Clause 7 of these Conditions, or
- (vi) Abandon the contract, or
- (vii) Persistently disregard the instructions of the Engineer, or contravene any provision of the contract, or
- (viii) Fail to adhere to the agreed programme of work by a margin of 10% of the stipulated period, or
- (ix) Fail to Execute the contract documents in terms of Para 8 of the Instructions to Tenderers.
- (x) Fail to submit the documents pertaining to identity of JV and PAN in terms of Para 1.1.32.11 of Tender.
- (xi) Fail to remove materials from the site or to pull down and replace work after receiving from the Engineer notice to the effect that the said materials or works have been condemned or rejected under Clause 25 and 27 of Standard General Conditions of Contract (GCC), or
- (xii) Fail to take steps to employ competent or additional staff and labour as required under Clause 26 of Standard General Conditions of Contract (GCC), or
- (xiii) Fail to afford the Engineer or Engineer's representative proper facilities for inspecting the works or any part thereof as required under Clause 28 of Standard General Conditions of Contract (GCC), or
- (xiv) Promise, offer or give any bribe, commission, gift or advantage either himself or through his partner, agent or servant to any officer or employee of the Railway or to any person on his or on their behalf in relation to the execution of this or any other contract with this Railway.



(xv) Fail to adhere to the provisions of Para 16 of Standard General Conditions of Contract (GCC), or provision Clause 59(9) of Standard General Conditions of Contract (GCC).

(xvi) Submits copy of fake documents / certificates in support of credentials, submitted by the tenderer. Then and in any of the **said Clause**, the Engineer on behalf of the Railway may serve the Contractor with a notice (Proforma at Annexure-14) in writing to that effect and if the Contractor does not within seven days after the delivery to him of such notice proceed to make good his default in so far as the same is capable of being made good and carry on the work or comply with such directions as aforesaid of the entire satisfaction of the Engineer, the Railway shall be entitled after giving 48 hours' notice (Proforma at Annexure-15 or 17, as the case may be) in writing under the hand of the Engineer to rescind the contract as a whole or in part or parts (as may be specified in such notice) and after expiry of 48 hours' notice, a final termination notice (Proforma at Annexure-16 or 18, as the case may be) should be issued.

Note: Engineer at his discretion may resort to the part termination of contract with notices (Proforma at Annexure- 14, 17 and 18), only in cases where progress of work is more than or equal to 80% of the original scope of work.

**(2) Right of Railway after Rescission of Contract owing to Default of Contractor:**

In the event of any or several of the courses, referred to in Sub-Clause(1) of this Clause, being adopted:

(a) The Contractor shall have no claim to compensation for any loss sustained by him by reason of his having purchased or procured any materials or entered into any commitments or made any advances on account of or with a view to the execution of the works or the performance of the contract and Contractor shall not be entitled to recover or be paid any sum for any work thereto for actually performed under the contract unless and until the Engineer shall have certified the performance of such work and the value payable in respect thereof and the Contractor shall only be entitled to be paid the value so certified.

(b) In the contract which has been rescinded as a whole, the Security Deposit already with railways under the contract shall be encashed/ forfeited and the Performance Guarantee already submitted for the contract shall be encashed. The balance work shall be got done independently without risk & cost of the failed Contractor. The failed Contractor shall be debarred from participating in the tender for executing the balance work. If the failed Contractor is a JV or a Partnership firm, then every member/partner of such a firm shall be debarred from participating in the tender for the balance work in his/her individual capacity or as a partner of any other JV /partnership firm. Further the authorized representative of failed Contractor cannot be accepted as authorized representative in new contract.

(c) In the contract rescinded in part or parts,

(i) The full Performance Guarantee available for the contract shall be recovered. No additional Performance Guarantee shall be required for balance of work being executed through the part terminated contract. The contract value of part terminated contract stands reduced to the balance value of work under the contract.

(ii) The Security Deposit of part terminated contract shall be dealt as per clause 16(2) of Standard General Conditions of Contract (GCC).

(iii) The defaulting Contractor shall not be issued any completion certificate for the contract.

(iv) The balance work shall be got done independently without risk & cost of the failed Contractor. The failed Contractor shall be debarred from participating in the tender for executing the balance work. If the failed Contractor is a JV or a Partnership firm, then every member/partner of such a firm shall be debarred from participating in the tender for the balance work in his/her individual capacity or as a partner of any other JV /partnership firm.

(v) Further the authorized representative of failed Contractor will not be accepted as authorized representative in new contract.

(d) The Engineer or the Engineer's Representative shall be entitled to take possession of any materials, tools, implements, machinery and buildings on the works or on the property on which these are being or ought to have been executed, and to retain and employ the same in the further execution of the works or any part thereof until the completion of the works without the Contractor being entitled to any compensation for the use and employment thereof or for wear and tear or destruction thereof.

(e) The Engineer shall as soon as may be practicable after removal of the Contractor fix and determine ex-parte or by or after reference to the parties or after such investigation or enquiries as he may consider fit to make or institute and shall certify what amount (if any) had at the time of rescission of the contract been reasonably earned by or would reasonably accrue to the Contractor in respect of the work then actually done by him under the contract and what was the value of any unused, or partially used materials, any constructional plant and any temporary works upon the site.

The legitimate amount due to the Contractor after making necessary deductions and certified by the Engineer should be released expeditiously.

**1.1.96 (a) Conciliation of Disputes:**

- (i) This clause is applicable in the tender having advertised value less than or equal to Rs 50 Crore.
- (ii) All disputes and differences of any kind whatsoever arising out of or in connection with the contract, whether during the progress of the work or after its completion and whether before or after the determination of the contract, shall be referred by the Contractor to the "Chief Engineer" or "Divisional Railway Manager" through "Notice of Dispute" provided that no such notice shall be served later than 30 days after the date of issue of Completion Certificate by the Engineer. Chief Engineer or Divisional Railway Manager shall, within 30 days after receipt of the Contractor's "Notice of Dispute", notify the name of conciliator(s) to the Contractor.
- (iii) The Conciliator(s) shall assist the parties to reach an amicable settlement in an independent and impartial manner within the terms of contract.
- (iv) If the parties reach agreement on a settlement of the dispute, they shall draw up and sign a written settlement agreement duly signed by Engineer In-charge, Contractor and conciliator(s). When the parties sign the settlement agreement, it shall be final and binding on the parties.
- (v) The parties shall not initiate, during the conciliation proceedings, any arbitral or judicial proceedings in respect of a dispute that is the subject matter of the conciliation proceedings.
- (vi) The conciliation proceedings shall be terminated as per Section 76 of 'The Arbitration and Conciliation Act, 1996.

**(b) Matters Finally Determined by the Railway:** All disputes and differences of any kind whatsoever arising out of or in connection with the contract, whether during the progress of the work or after its completion and whether before or after the determination of the contract, shall be referred by the Contractor to the GM and the GM shall, within 120 days after receipt of the Contractor's representation, make and notify decisions on all matters referred to by the Contractor in writing provided that matters for which provision has been made in Clauses 7(j), 8, 18, 22(5), 39.1, 39.2, 40A, 43(2), 45(i)(a), 55, 55-A(5), 57, 57A, 61(1), 61(2), 62(1), 63(iv) and 63.2.11 of the Standard General Conditions of Contract or in any Clause (stated as excepted matter) of the Special Conditions of the Contract, shall be deemed as 'excepted matters' (matters not arbitrable) and decisions of the Railway authority, thereon shall be final and binding on the Contractor; provided further that 'excepted matters' shall stand specifically excluded from the purview of the Dispute Adjudication Board (DAB) and Arbitration.

**(c) Dispute Adjudication Board (DAB):** This clause is applicable in the tender having advertised value more than Rs 50 Crore.

**1** Any dispute/s if not settled with the Engineer, shall be referred to DAB.

The DAB shall consist of a panel of three Retired Railway Officers, retired not below senior administrative grade (SAG). The DAB shall be formed within 90 days of signing of Contract Agreement. For this purpose, a panel of DAB members shall be maintained in the General Manager's office. The complete panel, which shall not be less than five members, shall be sent by Chief Engineer to the Contractor to nominate one member of the DAB from the panel as Contractor's nominee within two weeks of receipt of the panel. On receipt of Contractor's nominee, the Chief Engineer shall nominate one member from the same panel as Railway nominee for the DAB. Both above nominees shall jointly select presiding member of the DAB from the same panel.

**2** The appointment of DAB shall be effectuated by way of a tri-partite agreement among the Railway, Contractor and the respective DAB members. The terms of the remuneration of each member shall be as fixed by Ministry of Railways from time to time. Each party shall be responsible for paying one-half of this remuneration.

**3** If one or more of the members appointed refuses to act as DAB member, or is unable or unwilling to perform his functions as DAB member for any reason whatsoever or dies or in the opinion of the Chief Engineer fails to act without undue delay, the parties shall terminate the mandate of such DAB member and thereupon new DAB member shall be appointed in the same manner, as the outgoing DAB member had been appointed.

**4** The appointment of any member may be terminated by mutual agreement of both Parties, but not by the Railway or the Contractor acting alone. Unless otherwise agreed by both the Parties, the appointment of the DAB (including each member) shall expire upon expiry of this Contract Agreement.

**5** Before start of DAB proceedings, each DAB member shall give the following certificate to the Railway and the Contractor:

*"I have no any past or present relationship in relation to the subject matter in dispute, whether financial, business, professional or other kind. Further, I have no any past or present*

*relationship with or interest in any of the parties whether financial, business, professional or other kind, which is likely to give rise to justifiable doubts as to my independence or impartiality.”*

**6** DAB proceedings shall be conducted as decided by the DAB. The DAB shall give its decision within 90 days of a Dispute referred to it by any of the Parties, duly recording the reasons before arriving at the decision. The DAB shall decide the issue within terms and conditions of the contract. This time limit shall be extendable subject to the Parties mutual agreement.

**7** The DAB decision shall not be binding on both the Parties. In case any party is not satisfied by the decision of DAB, then the aggrieved party may approach Arbitral Tribunal for arbitration proceedings.

**8** No dispute shall be referred to Arbitral Tribunal unless the same has been referred to DAB for adjudication. However, in case DAB is not formed due to any reason, the disputes can be directly referred to Arbitral Tribunal to adjudicate the dispute.

**9** In the specific cases of any misconduct by any of the members of the DAB, the parties shall have the right to specifically bring it to the notice of the DAB such conduct, through a statement filed with necessary documents in proof of such misconduct and the DAB, after taking NOTICE of such conduct initiate the replacement of the member concerned, in the same manner the member to be replaced was appointed.

**10** Once the decision is given by DAB, DAB cannot review the decision at its own or on the request of one party, unless both parties agree for review of decision by DAB.

**11** In case DAB decision is not challenged by either party within 180 days of receipt of decision of DAB, the decision shall be considered as final and parties would be barred for referring the same to Arbitral Tribunal for adjudication.

**12** The obligation of the Railway and the Contactor shall not be altered by reasons of issue being or under reference to DAB.

**13** The DAB shall conduct the proceedings at any convenient venue which shall be decided by DAB in consultations with parties.

**14** It is a term of this contract that the Parties shall not approach any Court of Law for settlement of such disputes or differences unless an attempt has first been made by the parties to settle such disputes or differences through DAB and Arbitral Tribunal.

#### **1.1.97.1 Demand for Arbitration:**

**1.1.97.(1)(i)(a):** In the event of any dispute or difference between the parties hereto as to the construction or operation of this contract, or the respective rights and liabilities of the parties on any matter in question, dispute or difference on any account or as to the withholding by the Railway of any certificate to which the Contractor may claim to be entitled to, or if the Railway fails to make a decision within 120 days, then and in any such case, but except in any of the “excepted matters” referred to in Clause 1.1.96(b) of these Conditions, the Contractor, after 120 days but within 180 days of his presenting his final claim on disputed matters shall demand in writing that the dispute or difference be referred to arbitration.

**1.1.97.(1)(i)(b):** Arbitration as a method of dispute resolution should not be routinely or automatically included in procurement contracts/tenders, especially in large contracts.

**1.1.97.(1)(i)(c):** As a norm, arbitration as a method of dispute resolution may be restricted to disputes with a value less than Rs. 10 crore. This figure is with reference to the value of the dispute (not the value of the contract, which may be much higher).

**1.1.97.(1)(i)(d):** Inclusion of arbitration clauses covering disputes with a value exceeding Rs. 10 crore, should be based on careful application of mind and recording of reasons and with the approval of an officer not below the rank of Senior Administrative Grade (SAG) or the Accepting Authority of the tender whichever is higher.

**1.1.97.(1)(ii)(a):** The demand for arbitration shall specify the matters which are in question, or subject of the dispute or difference as also the amount of claim item-wise. Only such dispute or difference, in respect of which the demand has been made, together with counter claims or set off, given by the Railway, shall be referred to arbitration and other matters shall not be included in the reference.

**1.1.97.(1)(ii)(b):** The parties may waive off the applicability of Sub-Section 12(5) of Arbitration and Conciliation (Amendment) Act 2015, if they agree for such waiver in writing, after dispute having arisen between them, in the format given under Annexure XV of GCC.

**1.1.97(1)(iii)(a):** The Arbitration proceedings shall be assumed to have commenced from the day, a written and valid demand for arbitration is received by the Railway.

- 1.1.97.(1)(iii)(b):** The claimant shall submit his claims stating the facts supporting the claims alongwith all the relevant documents and the relief or remedy sought against each claim within a period of 30 days from the date of appointment of the Arbitral Tribunal.
- 1.1.97.(1)(iii)(c):** The Railway shall submit its defence statement and counter claim(s), if any, within a period of 60 days of receipt of copy of claims from Tribunal, unless otherwise extension has been granted by Tribunal.
- 1.1.97.(1)(iii)(d):** Place of Arbitration: The place of arbitration would be within the geographical limits of the Division of the Railway where the cause of action arose or the Headquarters of the concerned Railway or any other place with the written consent of both the parties.
- 1.1.97.(1)(iv):** No new claim shall be added during proceedings by either party. However, a party may amend or supplement the original claim or defense thereof during the course of arbitration proceedings subject to acceptance by Tribunal having due regard to the delay in making it.
- 1.1.97.(1)(v):** If the Contractor(s) does/do not prefer his/their specific and final claims in writing, within a period of 90 days of receiving the intimation from the Railways that the final bill is ready for payment, he/they will be deemed to have waived his/their claim(s) and the Railway shall be discharged and released of all liabilities under the contract in respect of these claims.
- 1.1.97.(2):** **Obligation During Pendency of Arbitration:** Work under the contract shall, unless otherwise directed by the Engineer, continue during the arbitration proceedings, and no payment due or payable by the Railway shall be withheld on account of such proceedings, provided, however, it shall be open for Arbitral Tribunal to consider and decide whether or not such work should continue during arbitration proceedings.
- 1.1.97.(3) :** **Appointment of Arbitrator:**
- 1.1.97.(3)(a) :** The Arbitral Tribunal shall consist of a panel of three arbitrators. General Manager/Additional General Manager will appoint two arbitrators, one railway nominee and other from among the contractor's nominee. Contractor can recommend his nominee either from approved panel of Railways or from approved panel of Indian Council of Arbitration (ICA) within 30 days from the date of dispatch of approval of written and valid acceptance of demand for arbitration by the General Manager/Additional General Manager.
- 1.1.97.(3)(a)(i):** If contractor wants to choose his nominee from Railway panel, the Railway will send a panel of at least four (4) names of retired Railway Officers empanelled to work as Arbitrator within 30 days from the day when a written and valid demand for arbitration is received by the General Manager/Additional General Manager. Contractor will be asked to suggest to General Manager/Additional General Manager at least 2 names out of the panel for appointment as Contractor's nominee within 30 days from the date of dispatch of the request by Railway. The General Manager/Additional General Manager shall appoint at least one out of them as the Contractor's nominee within 30 days from the receipt of the names of Contractor's nominees. The railway panel shall be provided free of cost to the contractor.
- 1.1.97.(3)(a)(ii):** If contractor wants to choose his nominee from Indian Council of Arbitration panel, Contractor will send at least 2 names of Arbitrators from the ICA panel for appointment as Contractor's nominee within 30 days from the date of dispatch of the request by Railway. The General Manager/Additional General Manager shall appoint at least one out of them as the Contractor's nominee within 30 days from the receipt of the names of Contractor's nominees. Nomination and appointment of arbitrators from ICA panel shall be as per the ICA Rules for Domestic Commercial Arbitration and amended from time to time.

Some general guidelines of ICA Rules for Domestic Commercial Arbitration are as under:

- i. Contractor may access the ICA's panel of arbitration through ICA's official webpage: <https://icaindia.co.in/pdf/Engineers.pdf>.
- ii. A formal request for nomination shall be submitted to ICA, accompanied by:
  - a. A brief Statement of Claim outlining the nature and quantum of the disputes.
  - b. A copy of the relevant contract and any supporting documents.
  - c. A copy of the notice intimating the other party of the initiation of arbitration proceedings, with proof of delivery (if any).
- iii. Ad-hoc appointment fees for the nomination and appointment of arbitrators shall be as per the ICA Rules for Domestic Commercial Arbitration and revised from time to time and shall be submitted along with the request.

- 1.1.97.3.(a).iii:** The serving railway officer working in arbitral tribunal in the ongoing arbitration cases as per clause 1.1.97.(3)(a)(i) and clause 1.1.97.(3)(a)(ii) above, can continue as arbitrator in the tribunal even after his retirement.
- 1.1.97.(3)(b):** Two selected arbitrators are free to select presiding arbitrator (3rd arbitrator) within thirty (30) days from the date of their appointment. The presiding arbitrator may be selected from approved panel of Railways or approved panel of Indian Council of Arbitration (as per mutual agreement), which will be approved by General Manager/Additional General Manager. General Manager/Additional General Manager shall complete this exercise of appointing the Arbitral Tribunal within 30 days from the receipt of the names of all the three arbitrators.
- 1.1.97.(3)(c)(i):** If one or more of the arbitrators appointed as above refuses to act as arbitrator, withdraws from his office as arbitrator, or vacates his/their office/offices or is/are unable or unwilling to perform his functions as arbitrator for any reason whatsoever or dies or in the opinion of the General Manager/Additional General Manager fails to act without undue delay, the General Manager/Additional General Manager shall appoint new arbitrator/arbitrators to act in his/their place in the same manner in which the earlier arbitrator/arbitrators had been appointed. Such re-constituted Tribunal may, at its discretion, proceed with the reference from the stage at which it was left by the previous arbitrator (s).
- 1.1.97.(3) (c) (ii):** (a) The Arbitral Tribunal shall have power to call for such evidence by way of affidavits or otherwise as the Arbitral Tribunal shall think proper, and it shall be the duty of the parties hereto to do or cause to be done all such things as may be necessary to enable the Arbitral Tribunal to make the award without any delay. The proceedings shall normally be conducted on the basis of documents and written statements.
- (b) Before proceeding into the merits of any dispute, the Arbitral Tribunal shall first decide and pass its orders over any plea submitted/objections raised by any party, if any, regarding appointment of Arbitral Tribunal, validity of arbitration agreement, jurisdiction and scope of the Tribunal to deal with the dispute (s) submitted to arbitration, applicability of time 'limitation' to any dispute, any violation of agreed procedure regarding conduct of the arbitral proceedings or plea for interim measures of protection and record its orders in day to day proceedings. A copy of the proceedings duly signed by all the members of tribunal should be provided to both the parties.
- 1.1.97.3(c)(iii):** (i) Qualification of Railway Empanelled Arbitrator (s):
- (a) Retired Railway Officers not below SA Grade level, one year after his date of retirement.
  - (b) Age of arbitrator at the time of appointment shall be below 70 years.
  - (c) Persons not involved in any current vigilance/CBI cases or against whom disciplinary or prosecution proceedings are not in process.
  - (d) Persons who had not been imposed a major penalty or two or more minor penalties or against whom administrative action has not been taken three times or more or
  - (e) Persons who have not been imposed one minor Penalty and against whom two administrative actions have not been taken as a result of vigilance/CBI action while in service on Railways.
  - (ii) An arbitrator may be appointed notwithstanding the total number of arbitration cases in which he has been appointed in the past.
  - (iii) While appointing arbitrator(s) under Sub-Clause 1.1.97.3(a), 1.1.97.(3)(a)(i), 1.1.97.(3)(a)(ii) & 1.1.97.(3)(b) above, due care shall be taken that he/they is/are not the one/those who had an opportunity to deal with the matters to which the contract relates or who in the course of his/their duties as Railway servant(s) expressed views on all or any of the matters under dispute or differences. A certification to this effect as per GCC annexure- XVI shall be taken from Arbitrators also. The proceedings of the Arbitral tribunal or the award made by such Tribunal will, however, not be invalid merely for the reason that one or more arbitrator had, in the course of his service, opportunity to deal with the matters to which the contract relates or who in the course of his/their duties expressed views on all or any of the matters under dispute.
- 1.1.97.(3)(d)(i):** The arbitral award shall state item wise, the sum and reasons upon which it is based. The analysis and reasons shall be detailed enough so that the award could be inferred therefrom.
- 1.1.97.(3)(d)(ii):** A party may apply for corrections of any computational errors, any typographical or clerical errors or any other error of similar nature occurring in the award of a Tribunal and interpretation of a specific point of award to Tribunal within 60 days of receipt of the award.
- 1.1.97.(3)(d)(iii):** A party may apply to Tribunal within 60 days of receipt of award to make an additional award as to claims presented in the arbitral proceedings but omitted from the arbitral award.

- 1.1.97.(4):** Any ruling on award shall be made by a majority of members of Tribunal. In the absence of such a majority, the views of the Presiding Arbitrator shall prevail.
- 1.1.97.(5):** Where the arbitral award is for the payment of money, no interest shall be payable on whole or any part of the money for any period till the date on which the award is made.
- 1.1.97. (6):** The cost of arbitration shall be borne by the respective parties. If all the three arbitrators are selected from the Railway Panel, the fee of the arbitrators shall be determined as per the rates fixed/revised by Railway Board from time to time and the fee shall be borne equally by both the parties, provided parties sign an agreement in the format given at GCC Annexure XV to these conditions after/ while referring these disputes to Arbitration. However, if any of the three arbitrators is selected from the Panel of Indian Council of Arbitration (ICA), the fee of the arbitrators shall be determined as per the rates fixed/revised by the Indian Council of Arbitration from time to time and the fee shall be borne equally by both the parties, provided parties sign an agreement in the format given at GCC Annexure XV to these conditions after/ while referring these disputes to Arbitration.
- 1.1.97.(7)** Subject to the provisions of the aforesaid Arbitration and Conciliation Act 1996 and the rules thereunder and relevant para of the Standard General Conditions of Contract and any statutory modifications thereof shall apply to the appointment of arbitrators and arbitration proceedings under this Clause.
- 1.1.97.(8)** In case arbitration award is challenged by a party in the Court of Law, 75% of award amount, pending adjudication by Court of Law, shall be made by party to other party. In case payment is to be made by Railway to Contractor, the terms & conditions as incorporated in the Ministry of Railways letter No. 2016/CE(I)/CT/ARB/3(NITI Aayog)/Pt. dated 08<sup>th</sup> Mar,2017 as amended from time to time, shall be followed. In case Contractor has to pay to the Railway, then 75% of the award amount shall be deducted by the Railway from the Contractor's bills, Performance Guarantee/ Security Deposit or any other dues of Contractor with the Government of India.

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**PART-I  
CHAPTER II**

**SPECIAL CONDITIONS OF CONTRACT**

**1.2.1 Introduction**

The several documents forming the tender are to be taken as mutually complementary to one another. Detailed drawings shall be followed in preference to small scale drawings and figured dimensions in preference to scaled dimensions. The tender shall be governed by General conditions of Contract, preamble and General Instructions to the tenderer, Technical specification and Special Conditions of Contract etc. If there is varying or conflicting provisions in documents forming part of contract. Sr. Divil. Elect. Engineer (TRD) DRM's Office, New Delhi shall be deciding authority with regard to the intentions of the provision and decision will be final and binding on contractor.

**1.2.2 Loss In Transit** - If loss or damage occurs to stores or any part thereof during transit by rail, the contractor shall have only such remedy as is available to Public against the carrier under the Indian Railway (Amendment) Act - 1961, no.39 of 1961 or latest.

**1.2.3 Scheme of work** - Within a period of 15 days beginning from date of issue of Letter of Acceptance of Tender, the Contractor shall submit detailed time schedule for design and submission of various documents enumerated in tender papers to purchaser.

**1.2.4 Procurement of Materials/Quality of Materials:**

All materials used in the work shall be procured from RDSO/ CORE approved sources only and of the best quality and of the class most suited for the purpose specified. It is essential that the manufacturer/s from whom supply is arranged should have long experience of design and manufacture of equipments components, materials and fittings. The requisite facilities for testing prototypes supplied against this contract should be available with the manufacturer. In the case of these equipments components or fittings for which the requisite facilities for testing prototypes are not available with the Manufacturer the manufacturer shall arrange to carry out the prototype tests at his own cost in a testing laboratory approved by the Purchaser. Only tested quality steel shall be used. All erection work carried out shall also be of the best quality, acceptable to the Purchaser.

**NOTE:-**

1. The supply of all materials shall be from the approved sources only (as mentioned in the RDSO's/CORE's approved list of vendors). However, items / materials for which RDSO/CORE approved sources do not exist, the same may be procured as per relevant BIS/Specifications or from other sources after one time approval of the source (for particular work only) from the competent authority.
2. Apart from deviations, if any, proposed by the contractor and accepted by the purchaser, in case of ambiguity in tender paper in respect of procurement of materials required for the subject work, the decision of the purchaser shall be final.

**1.2.5 Specified Railway Stores:**

**(1) FOR OHE WORKS:**

- (a) The Purchaser shall supply to the contractor free on rail or free on lorry upto the railway siding/ contractor's depot all the steel work that are indicated in Annexure-4 (if any). The materials will be unloaded & stacked by the contractor at the appropriate place in the presence of Purchaser's representative. The steel work which are to be supplied by the Purchaser to the contractor will be made available as described above sufficiently in advance of the planned dates of erection. The contractor may return to the Purchaser any steel work found defective or damaged on account of manufacturing defects. After completion of the works, any undamaged surplus steel work left over with the contractor shall be returned to the Purchaser. For the purpose of final reconciliation, the procedure laid down in para 1.4.6, Part-I, Chapter-IV, will be followed.

**(b) Equipments, components, fittings and other materials:**

The various materials which will be supplied to the contractor by the Purchaser free on rail or free on lorry upto the Railway siding/contractor's depot, are listed in Annexure-4 (if any). The prices in Schedule-1 (Section-1 to 5 & 11), shall be exclusive of the cost of supply of these items. For the

purpose of final reconciliation, the procedure laid down in para 1.4.6, Part-I, Chapter-IV, will be followed. The shortage, if any, shall be recovered from the contractor by the Purchaser at the prices specified in note at the end of para 1.4.6 (f) Part-I, Chapter-IV. In addition the material/items specified in Annexure-4, some of the items which are normally in the contractor's scope of supply may also be supplied by the Railways either in part or in full, to meet the requirement of tendered work. The recovery of such items will be made in terms of Clause 1.3.2 and 1.3.8 (Part-I, Chapter-III).

Further, the Purchaser reserves the right to supply any equipments, components or materials, indigenous or imported, from his own resources in quantities which may fulfill the contract either in whole or in part upto a maximum of 10% of the total value of the contract free on rail or free on lorry upto the Railway siding/Contractor's depot. The same shall be accepted by the Contractor provided that the Purchaser shall at the time of issue of letter of Acceptance of the tender to the Contractor, indicate to the contractor the list of materials and quantities thereof which will be supplied by the Purchaser free on rail or free on lorry upto the Railway siding/ contractor's depot sufficiently in advance of the planned dates of erection. Such materials shall be tested by the contractor at his own cost before use to the extent that the specifications require tests at site prior to installation but the contractor shall not be responsible for any defects in the material or component and the contractor may return to the Purchaser any materials which are found defective or damaged on account of manufacturing defects. Any damaged surplus materials left out with the contractor on completion of works should also be returned to the Purchaser for which necessary adjustments would be made. The cost of materials supplied by the Purchaser to the contractor in terms of the above sub-para would be recovered from the contractor as indicated in para 1.3.8 (Part-I, Chapter-III). Purchaser may also supply material to the extent of 10% of contract value as Rly supply material for which no recovery shall be affected. Instead, contract value shall get reduced to that extent which will be accepted by the contractor provided the Purchaser shall at the time of issue of letter of Acceptance of the tender to the Contractor, indicate to the contractor the list of materials and quantities thereof which will be supplied by the Purchaser as free Rly supply materials.

- (c) Should it be impossible for the Contractor to obtain any of the items included in schedule-3, Part-V, Form-6 indigenously for any reason accepted as adequate by the Purchaser, the Purchaser, will arrange to import such items at his own cost and supply them to the Contractor in accordance with above para. The cost of such supplies shall be recovered in accordance with para 1.3.8 of (Part-I, Chapter-III).
- (d) The various equipments, components and materials supplied by the Purchaser to the Contractor will be handed over to the Contractor, as far as possible in a stage ready for installation. The Purchaser shall supply to the Contractor within reasonable time (as far as possible) six copies each of the drawings of all items to be supplied by the Purchaser. Wherever possible, 3 copies each of the instructions booklets for various equipments will also be supplied by the Purchaser. The Contractor shall carefully follow the instructions mentioned in the various instruction booklets and those indicated by the Purchaser during the erection of equipments supplied by the Purchaser and shall endeavor to bring such equipment into successful operation. In the event of the failure of any item supplied by the Purchaser due to inherent defects/deficiencies in the item, the Contractor shall not be responsible. Should the defects be repairable at site without requiring the dismantlement of the equipment, the repair shall be done by the Contractor, free of cost, for which the necessary replacement parts will be supplied by the Purchaser, free of cost, to the Contractor. If the defect cannot be rectified at site and the replacement of the equipment is required, then the Purchaser shall replace the defective equipment, alternatively the Contractor may be required to dismantle the defective equipment and re-erect the required equipment for which he shall be paid separately at original schedule-1 rates as applicable, if available or at rates to be mutually agreed to between the Purchaser and the Contractor prior to undertaking the work.
- (e) In case damage to the stores handed over to the Contractor, is caused by faulty test or careless handling by the Contractor as distinct from damage due to inherent manufacturing defect, the cost of repairs to replacement of the damaged equipment shall be borne by the Contractor.

NOTE: (1) Booster Transformers complete with all accessories will be supplied along with necessary oil for the first filling to the Contractor. The Contractor shall make his own arrangements for oil filtration, testing and commissioning as well as arrangements for oil filtration plant and power supply for the same.

(2) Empty drums, wooden crates, and other packing materials including gunny bags used for supply of Purchaser's materials to the contractor shall be the property of the Contractor. The Tenderer should take note of this while quoting rates.



- (f) Railway may supply any item to the contractor for erection which are not provided for in the contract. Erection rate shall be mutually finalised as Non Schedule item, if Schedule of Rate for the same are not available in the contract. Railway may also supply for erection, with the consent of the contractor, any item as per the latest specifications as a substitute of the same item of old specifications provided for in the contract.

**(2) FOR TSS & SCADA Works:**

- (a) The various materials which will be supplied to the Contractor by the Purchaser, free at Contractor's depot are listed in Annexure-4 (As applicable). The price in Schedule-1, Section-8 to 10 & 11, shall be exclusive of the cost of supply of these items. For the purpose of final reconciliation the procedure laid down in Para 1.4.5, Part-1, Chapter-IV B will be followed. Shortages shall be recovered from the Contractor by the purchaser at the prices specified in the Note at the end of Para 1.4.5, Part-1, Chapter-IV B. Cost of repairs to damage of materials handed over to the Contractor, shall be borne by the Contractor.
- (b) Further the Purchaser reserves the right to supply any equipments, components or materials which are in contractor's scope of supply, indigenous or imported, from his own resources in quantities which may fulfill the contract either in whole or in part up to a maximum of 10% of the total value of the contract. No handling charges will be paid to the Contractor for such supplies, and the same shall be accepted by the Contractor provided that the Purchaser shall, at the time of issue of Letter of Acceptance of Tender to the Contractor, indicate to the Contractor the list of materials and quantities thereof which will be supplied. Such materials will be supplied by the Purchaser free at the Contractor's depot/sufficiently in advance of the planned date/s of erection. Such materials shall be tested by the Contractor at his cost before use to the extent that the specifications require tests at site prior to installation but Contractor will not be responsible for any defects in the material or component and he may return to the Purchaser any materials which are found defective or damaged on account of manufacturing defects. Any undamaged surplus materials left with the Contractor on completion of the work should also be returned to the Purchaser for which necessary adjustments would be made. The cost of the materials supplied by the Purchaser to the Contractor in terms of the above sub-para would be recovered from the Contractor as per Railway extent Rules.
- (c) The various equipments, components and materials supplied by the Purchaser to the Contractor will be handed over to the Contractor, as far as possible in a stage ready for installation. The Purchaser shall supply to the Contractor within reasonable time (as far as possible) six copies each of the drawings of all items to be supplied by the Purchaser. Wherever possible 3 copies each of the instructions booklets for various equipments will also be supplied by the Purchaser. The Contractor shall carefully follow the instructions mentioned in the various instruction booklets and those indicated by the Purchaser during the erection of equipments supplied by the Purchaser and shall endeavor to bring such equipment into successful operation. In the event of the failure of any item supplied by the Purchaser due to inherent defects/deficiencies in the item, the Contractor shall not be responsible. Should the defects be repairable at site without requiring the dismantlement of the equipment, the repair shall be done by the Contractor, free of cost, for which the necessary replacement parts will be supplied by the Purchaser, free of cost, to the Contractor. If the defect cannot be rectified at site and the replacement of the equipment is required, then the Purchaser shall replace the defective equipment, alternatively the Contractor may be required to dismantle the defective equipment and re-erect the required equipment for which he shall be paid separately at original schedule-1, (Part-I, Chapter-IVB & IVC), rates as applicable, if available or at rates to be mutually agreed to between the Purchaser and the Contractor prior to undertaking the work.
- (d) In case damage to the stores handed over to the Contractor, is caused by faulty test or careless handling by the Contractor as distinct from damage due to inherent manufacturing defect, the cost of repairs to replacement of the damaged equipment shall be borne by the Contractor.  
**NOTE:** (1) Empty drums, wooden crates, and other packing materials including gunny bags used for supply of Purchaser's materials to the contractor shall be the property of the Contractor. The Tenderer should take note of this while quoting rates.
- (e) **SUPPLY OF CEMENT**      **DELETED**
- (f) Railway may supply any item to the contractor for erection which are not provided for in the contract. Erection rate shall be mutually finalised as Non Schedule item, if Schedule of Rate for the same are not available in the contract. Railway may also supply for erection, with the consent of the contractor, any item as per the latest specifications as a substitute of the same item of old specifications provided for in the contract.

### 1.2.6 Other Railway Stores:

If any material other than those specified in above para is supplied by the purchaser either at the Contractor's request or suo-moto in order to prevent any possible delay in the execution of the works likely to occur due to the Contractor's inability to make adequate arrangements for supply thereof or otherwise, recovery will be made from Contractor's bills at the book rate or the last purchase rate or market rate prevailing at the time of supply whichever is higher plus 5% on account of initial freight and 2% on account of incidental charges together with supervision charges at 12.5% of the total cost inclusive of material, freight and incidental charges or Schedule-3 rate for OHE works. In case of TSS & SCADA works it shall be the supply rate of schedule-1, Section-8 to 10 & 11, whichever is higher, freight between the Purchaser's source of supply and the Contractor's depot or Railway siding shall be to the Contractor's account. If, however, the material required by the Contractor is not available in Purchaser's stock or the Purchaser decides not to supply the same, be that for whatever reason, the Purchaser shall not be bound to arrange for the supply at cost quoted above or at any other cost nor will this fact be accepted as an excuse for delay in execution of works.

**NOTE:** If the contractor runs short of materials and such materials are available in the Purchaser's stock, the material may be supplied by the Purchaser on loan to the Contractor who will return these on receipt of his supplies or within One month whichever is earlier. The material shall be received by contractor's representative in supervisory category declared by contractor and who shall be authorized under duly executed Power of Attorney to receive material issued by purchaser to the contractor. The value of the loaned material would be computed by the purchaser based on recovery will be made from Contractor's bills at the book rate or the last purchase rate or prevailing market rate whichever is higher plus 5% on account of initial freight and 2% on account of incidental charges together with supervision charges at 12.5% of the total cost inclusive of material, freight and incidental charges and equivalent amount would be withheld from the subsequent progress payments due to the contractor. In case the contractor fails to return the material within the stipulated period from the date of loaning of material, the material loaned earlier would be treated as sold. The recoveries of the value of the sold material would be on the basis of the issue rate or market rate prevailing at the time of supply or market rate at the end of two months period whichever is higher, plus 5% freight charges and 2% incidental charges together with supervision charges at 12.5% of the total cost inclusive of material, freight and incidental charges whichever is higher. This recovery would be made from any bill submitted by the Contractor subsequently for payment duly adjusting the above referred withheld amount, if any on account of loaning material. However, in case the loaned material is returned within the stipulated six months or earlier, the withheld amount from the progress would be released.

#### **NOTE for TSS & SCADA works:**

No material other than those specified in clause 1.2.5 above shall be supplied. The unspecified stores can be supplied to the Contractor on the discretion of the Railway administration subject to the availability of materials. The transaction shall be strictly on sale basis for which recovery will be made as per para 1.2.6 above from the first bill received from the contractor subsequent to the handing over of the materials.

### 1.2.7 Contractor's Organisation -

#### **(1) FOR OHE WORKS:**

(a) The Contractor shall set up at least one main depot for receiving and storing steel work and other materials and establish a workshop for small fabrication and assembly work, if considered necessary by the Contractor. If he and the Purchaser deem it necessary, sub-depots may be set up to ease operation of work trains and distribution of materials. The location of Contractor's depot and sub-depots will be mutually agreed upon by the Purchaser and the Contractor. For the main and sub-depots, the Purchaser shall offer open space reasonably leveled and workable and suitable for storage of materials free of charge inside Railway premises which will be convenient from the point of view of operation. The depot/s shall, as far as possible, be located such as to be accessible by road. The depot will be provided with a siding of suitable length to accommodate the work trains and allow shunting of trains within the depot area, free of charge, to serve the area for the use of the Contractor.

**NOTE :** For unloading of Purchaser's steel work and other Railway materials, for attention to wagons, for stabling of Purchaser's wagons of work trains the Purchaser at his own cost, will arrange for provision of additional sidings, as required by him. All other expenses for providing covered and enclosed storage and workshop accommodation, other facilities and running the

establishment shall be borne by the Contractor. Labour charges for laying of additional sidings or alterations to the sidings, if considered essential by the Contractor, shall be borne by the Contractor. The recoverable costs shall be finalised and mutually agreed upon, before the tracks are laid. Track materials such as Rails, fastenings and ballast, and/or ashes cinder only for additions or alterations to sidings shall be provided free of charge to the Contractor by the Purchaser. Maintenance of all sidings will be done by the Purchaser at his own cost, On completion of the work the cost of dismantling such additional sidings shall be borne by the Contractor. In case of difference of opinion in these matters the decision of the General Manager or his successor shall be final.

(b) The Purchaser will also provide free of charge stabling lines for work trains at suitable stations, should it be considered necessary to suit convenience of operation or to avoid haulage of work trains back to main or sub-depot/s except for the purpose of recoupment of stock on work trains. Space for storage of ballast and sand may also be provided free of charge along such stabling lines as convenient to the Purchaser. The receipt of storage of materials at the main and sub-depots shall be so planned as to avoid transport of materials between the main and sub-depot/s and vice versa to the maximum extent possible.

**NOTE** For para 1.2.7 1(a) & (b): The delay in providing open space/stabling lines shall only entitle the contractor suitable DOC extension and no other compensation shall be admissible.

(c) The main depots will be located at stations as indicated in part-III. The proposed location/s of sub-depots and stabling lines is/are to be given by the Tenderer for scrutiny and approval by the Purchaser.

(d) For the main depot the services of a commercial Clerk shall be provided, when required, for complying with commercial formalities of receiving and dispatching goods. The cost of such clerk/s will be borne by the Purchaser.

(e) The contractor shall hand over the depot, sub-depot area complete with sidings, within a period of one year from completion of the work, cleaned of all Contractor's stores or refuse unless otherwise agreed to by the Purchaser.

(f) The Contractor will be responsible for transfer of materials from source of supply to the main or sub depots, between depot/s and workshops except where otherwise stated. If wagons are required, the Purchaser will use his good offices for expeditious allotment. The Contractor will be responsible for all loss and/ or damage in the transfer of materials and for demurrage or wharfage he may incur, and no loss damage or expenses incurred on this account will be reimbursed by the Purchaser. Work trains for transport between depots or between depot/s and work site will be provided as per extent rules.

(g) Electricity may be supplied at places where spare capacity is available for running of machinery and for lighting. The Contractor shall provide his own distribution system in consultation and with the approval of the Purchaser. The cost of providing connections and of energy consumed shall be paid by the Contractor to the Purchaser in accordance with relevant rules and prevailing rates of the Railway.

(h) At places where piped water supply is available the Purchaser may supply water to the Contractor at convenient points for his office, workshops and stores if necessary in connection with the work. The Contractor shall arrange to lay his own pipe lines for distribution in consultation and with the approval of the Purchaser. The Contractor shall be charged for consumption by the Railways. The Contractor shall arrange water at the work site at his own cost.

(j) The Contractor shall arrange at his own cost all tools, plants and facilities as necessary for erection and testing of the equipments, in compliance with the Specification.

(k) No conservancy cess charges will be recovered from the Contractor. The Tenderer should take note of this while quoting rates.

(l) Contractor shall arrange and make available at their depot the following measuring equipments duly calibrated for inspection at site by the representative of the purchaser as and when required:

(i) Weighing Machine of capacity 2 MT
(ii) Alco meter

(iii) Vernier Caliper
(iv) Micrometer
(v) Radius Gauge
(vi) Thread Gauge
(vii) Steel Measuring Tapes 3m & 30 m length each
(viii) Angle Protractor

**(2) FOR TSS & SCADA WORKS:**

a) The Contractor shall set up at least one main depot for receiving and storing steel work and other materials and establish a workshop for small fabrication and assembly work. The location of Contractor's depot will be mutually agreed upon by the Purchaser and the Contractor. The Purchaser shall offer free of charge open space reasonably level and workable for the depots. The depot will be provided with a siding of suitable length free of charge. All other expenses for providing covered and enclosed storage and workshop accommodation and facilities and running the establishment shall be incurred by the Contractor.

b) The Contractor shall hand over the depot area complete with siding on completion of the work, cleared of all structures, stores or refuse unless otherwise agreed to by the Purchaser.

c) The Contractor will be responsible for transport of materials from source of supply to the depot or between depot and work site. If wagons are required, the Purchaser will use his good offices for expeditious allotment. The Contractor will be responsible for all loss and/or damage in the transfer of materials and for demurrage or wharf age he may incur, and no loss, damage or expenses incurred on this account, will be reimbursed by the Purchaser.

d) Electricity may be supplied at places where spare capacity is available for running of machinery and for lighting. The Contractor shall provide his own distribution system in consultation and with the approval of the Purchaser. The cost of providing connection and of energy consumed shall be paid by the Contractor to the Purchaser in accordance with relevant rules and prevailing rates of the Railway.

e) At places where piped water supply is available, the Purchaser may supply water to the Contractor at convenient point/s for execution of work and for his depot, if necessary. The Contractor shall arrange to lay his own pipelines for distribution, in consultation and with the approval of the Purchaser. The Contractor will be charged for consumption subject to periodical revision by the General Manager or his successor.

f) The Contractor shall arrange at his own cost all tools, plants and facilities for erection and testing of the equipment, in compliance with the specification.

The list of machinery, tools and plants and the other infrastructure available with the Tenderer will be furnished along with the bid.

g) No conservancy cess charges will be recovered from the Contractor. The Tenderer should take note of this while quoting rates.

**1.2.8 Contractor's drawings etc.** – Any calculations, designs, drawings, schedules, information, data, progress charts etc. required by Purchaser's Engineer in connection with the contract shall be furnished by Contractor at his own expenses. The Contractor will not be required to furnish drawings, designs and calculations etc. for basic designs and employment schedules provided by the Purchaser in case no modification/deviation is required for a particular basic design/employment schedule. In case of new developments in designs, comments on Research Designs and Standards Organisation (hereinafter called R.D.S.O.'s) and decision of Purchaser to implement the same basic drawings /designs/employment schedules will be submitted by contractor to the Purchaser. If the RDSO's drawings/ designs/ employment schedule is not revised, Contractor need not submit drawings/ designs/ employment schedules to the Railway. In the event of Contractor suggesting any alteration/deviation in standard drawings, he shall submit the retraced drawings with full calculations and justification of change to the Purchaser. The Purchaser if convinced of need of the alteration shall approach RDSO for necessary approval. In case of any ambiguity in the interpretation of design and drawing, the decision of the purchaser shall be final and conclusive.

### 1.2.9 Sub-Contractors:

The contractor may sublet a part of the works under this contract and enter into contract with suppliers for supply of materials.

The name of all sub-contractors proposed to be employed for execution of works or any part thereof including manufacture of components and fittings shall be submitted by the contractor to the purchaser and got approved by him before the contractor enters into an agreement with the sub-contractor for the purpose.

The contractor shall, arrange for effective supervision of sub-contractor's work and remain solely responsible for material supplied for works carried out on his behalf by the sub-contractor.

### 1.2.10 Quality Assurance Materials

- (a) All the equipments, materials, fittings and components will be subject to quality control programme of the manufacturer, being part of the quality Assurance programme of the Contractor. The materials may also be inspected by the Purchaser or his representative either at the manufacturer works or at the Contractor's depot. The Purchaser or his representative shall have the right to be present during all the stages of manufacture and shall be accorded free of charge all reasonable facilities for inspection and testing as well as to examine the stage inspection report of the manufacturer in addition to the quality audit which the Contractor may institute as a part of his programme so as to satisfy himself that the materials are in accordance with specifications, approved drawings and designs and Purchaser's prescribed quality Assurance Standards.

(b) Erection

All erection work will also be subjected to the Quality Assurance Programme including inspection by the Purchaser or his representative to ensure that the work is done in accordance with the specifications and approved drawings and designs and Purchaser's prescribed Quality Assurance Standards.

- (c) **Expenses of Purchaser' Representative** - All expenses of Purchaser's representative shall be borne by Purchaser whether inspected material is finally utilised in work or not.

- (d) The decision of General Manager/Sr. DEE/TRD or his successor shall be final in respect of acceptability or otherwise of any material, fittings, component or equipment required for the work.

- (e) **Quality Assurance Programme** - For proper control of quality and to ensure that the materials, equipment and fittings are manufactured according to specification and the erection in according to approved instructions, drawings, specifications, the Contractor shall adopt a suitable quality assurance programme to ensure quality at all necessary points, whether at manufacturer's works, or in his depot or at work site as well as during erection. Such quality assurance programme shall also meet the requirement of purchaser's prescribed Quality Assurance Standards. This programme of the Contractor shall generally cover the following:

1. The Organisation to manage and implement Quality Assurance Programme.

2. The Documentation control system:-

- i. Basic control system.
- ii. Adopted at manufacturer's work
- iii. Adopted at Contractor's Depot and work site.

3. Procedure adopted for:

- i. Source Inspection.
- ii. Incoming raw material inspection.
- iii. Verification of material purchased.
- iv. Fabrication Controls.
- v. Site erection controls.

4. Inspection and Test Procedure for:

- i. Manufacture and quality control procedure.
- ii. Field activity.
5. System of handling and storage.

6. System of quality audit.
7. System of maintenance of records.
8. For purpose of obtaining On Account Payment, the Contractor shall submit along with the invoice, the documents indicated in prescribed Quality Assurance Standards which should inter-alia cover following as may be applicable in each case.
  - i) Material test reports on raw materials used.
  - ii) Material type and routine test report on components specification.
  - iii) Inspection plan with reports of the Inspection plan check points.
  - iv) Routine test report.
  - v) Factory test results as required under the specification.
  - vi) Quality audit report including test check report of Purchaser's representative if any.

**1.2.11(i) Cranes:**

**(a) FOR OHE WORKS**

One crane of adequate capacity with a jib of requisite length will be provided by the Purchaser, for use in a work-train for mast erection by the Contractor, free of all charges including pay and allowances of the crew and all running expenditure will be borne by the Purchaser. Extra cranes required for additional work trains may be provided to suit the needs of the progress of work if considered necessary by the Purchaser. Road crane for handling heavy materials at the contractor's depot will be arranged by the contractor who will also arrange his own crew for its operation and maintenance. All charges including pay and allowances of the crew and all running expenditure will be borne by the contractor. However, in exceptional cases where the Purchaser is satisfied that it is not feasible for the contractor to arrange a road crane himself, the same may be made available to the contractor on hire basis depending on its availability with the Purchaser on mutually agreed terms and conditions.

It may, however, be noted that if the road crane required by the contractor is not available with the Purchaser or if the purchaser decides not to supply the same be that for whatever reason, the purchaser shall not be bound to arrange for the supply of the road crane nor will this fact be accepted as an excuse for delay in execution of works.

**(b) FOR TSS & SCADA WORKS :**

The contractor can make his own arrangement for loading and unloading of all material at his depot or at work sites. The contractor may, however, obtain such facilities from the Railways as a normal user on payment of normal schedule charges.

**1.2.11(ii) Traffic Blocks:**

- a. The purchaser will make arrangements to obtain traffic blocks (hereinafter referred to as blocks) necessary for the running and operation of work train and light ladder trolleys and track lorries for works to be carried out along or adjacent to the track. The Contractor shall, however, carry out maximum amount of work possible without blocks. Works such as grouting of traction masts, muffing, and erection of brackets shall invariably be done without blocks. Installation of droppers and adjustment of traction overhead equipment may also be permitted to be carried out with light ladder trolleys protected by banner flags in accordance with General and Subsidiary Rules of Indian Railway.

Contractor shall arrange a minimum of two mobile phones in working condition with Sim Card in working condition to improve communication with Railway Authorities at site/control/ divisional offices at New Delhi. It should be with respective divisional/control office to carry out maximum amount of work possible without blocks. Mobile sets shall be returned to contractor after completion of work.

- b. Blocks will normally be granted any time during day or night to suit convenience of traffic operations. The Contractor shall equip himself to carry out all construction during night block also efficiently by suitable lighting equipment. The blocks granted will ordinarily be on one track at a time over a distance covered by one or two consecutive block sections. In case of blocks to be granted after sunset, the Contractor will be informed at least 24 hours in advance. The duration of blocks, normal and maximum, which would ordinarily be granted on different tracks and in different sections, during day and/or night time. Blocks shall not be availed of by the Contractor when it is not possible for him to complete the specific field work within the block period granted by the Purchaser.

- c. Block periods shall be counted from time the track is placed at Contractor's disposal at work-spot till it is cleared by the Contractor. The contractor shall in consultation with the Purchaser submit a weekly block programme for works or for work trains 7 days in advance of the week for which the programme has been submitted. At the end of each week a comparison shall be made between the block periods asked for by the Contractor and that availed of by the Contractor, fractions of an hour in the total being ignored.
- d. Blocks will be subject to normal operating conditions and rules of the Railway. All formalities of exchanging private number etc. with the traffic control will be carried out by Purchaser's staff and for this purpose the Purchaser will depute a representative for each erection gang, who will be responsible for imposing traffic blocks and also removing the same after men, material and equipment have been cleared by the Contractor from running tracks and same declared safe for traffic by Purchaser's representative in case of works involving safety of running tracks.  
  
The protection required for block working i.e. flagmen, flags etc. shall be provided by the contractor. Competency for the above shall, however, be given by the Railway authority. Protection of track by banner flags shall be done in accordance with General Rules of Indian Railways and Subsidiary Rules of the concerned zonal Railway where work is being carried out. Flagmen so deployed by the contractor shall be medically fit.
- e. Blocks required for carrying out works necessitated by the thefts, pilferage, accidents or such other incidents, shall be granted by Purchaser over and above the normal requirements of block.
- f. Traffic Blocks not to be granted for Traction sub-station and SCADA works.

#### **1.2.12 Default and Delay**

- (a) The contractor shall execute the work with due diligence and expedition keeping to the approved time schedule. Should he refuse or neglect to comply with any reasonable orders given to him in writing by the Purchaser's Engineer or representative in connection with the work or contrivance the provision of the contract or the progress of work lags persistently behind the time schedule due to his neglect, the purchaser shall be at liberty to give seven (7) days notice in writing to the contractor requiring him to make good the neglect or contravention complained and should the contractor fail to comply with requisitions made in the notice within seven days from the receipt thereof, the purchaser shall be entitled after giving 48 hours notice in writing under the hand of the Contractor's Engineer (to rescind the contract as a whole or in part or parts as may be specified in such notice) and action would be taken as per tender conditions para 1.1.48 (1) to (3).
- (b) **Loss sustained due to default and delay:**
  - (i) In the event of any loss to the purchaser on account of execution and/or completion of the work or any parts thereof by agencies other than the contractor, in terms of para (a) above the contractor shall be liable to reimburse the loss to the purchaser without prejudice to the other right and remedies of the purchaser, and the reimbursement in full or in part as the case may be met at the option, of the purchaser, from out of all or any of the following sources viz.
  - (ii) Any amount due and payable to the contractor by the Purchaser on any account whatsoever.
  - (iii) The Contractor's Security Deposit in the hands of the Purchaser as far as available; and
  - (iv) Any other assets whatsoever of the Contractor
  - (v) (ii) and/or (iii) above-mentioned the Purchaser shall have the right of appropriation suo-moto.

**NOTE:** The above para should be read in conjunction with para 1.2.22.

#### **1.2.13 Correctness of work and materials:**

- (a) The contractor shall be solely responsible for the correctness of the position, levels and dimensions of the works according to approved drawings, notwithstanding that he may have been assisted by the Purchaser or his men in setting out the same.
- (b) If any dimension figured upon a drawing differs from that obtained by scaling the drawing, the figured dimension should be normally taken as correct, unless it is prima facie mistake. But all such cases shall be brought to the notice of the Purchaser's Engineers and the discrepancy set right before execution.

#### **1.2.14 Contractor's Responsibility for discrepancy:**

- (a) All designs and drawings submitted by the contractor shall be based on a thorough study and shall be such that the contractor is satisfied about their suitability. The purchaser's approval will be based on these considerations, notwithstanding the approval communicated by the Purchaser during the progress of the contract for designs and drawings, proto type samples of components, material and equipment after inspection of materials after erection and adjustments to installations, the ultimate responsibility for correct design and execution of work shall rest with the contractor unless the purchaser insists on adoption of his own designs in spite of the contractor not being agreeable to it.
- (b) The contractor shall be responsible for and shall bear and pay the costs for any alteration of works arising from any discrepancies, errors or omissions in the designs and drawings supplied by him, whether such designs and drawings have been approved by the purchaser or not.

#### **1.2.15 Additions and Alterations to erected equipment:**

The Purchaser may require additional installations or modifications or replacements as per new designs as evolved or decided during the currency of the contract to be carried out on the works he deems necessary, either during the execution or after a part or whole of the installations coming within the purview of the contract has been put into commercial service. Further it may be necessary and expedient to energies overhead equipment which has been completed and finally adjusted in portions in yards. This will necessitate erection of new equipment in the vicinity or joining energised equipment. In case the prices for such additional works or modifications or replacements are not covered by the schedule of prices and are such that either party considers additional prices for such works justified, such additional works or modifications shall be carried out by the Contractor. Any additional prices for such work items would be mutually settled between the purchaser and the contractor, based on proper rate analysis and with reference to the current prevalent market rates or the rates available with the Railway Administration in that or nearby area/s. In case additional installations or modifications or replacements are required to be carried out under this para, the Purchaser shall grant a reasonable extension of time, should it be necessary.

#### **1.2.16 Training of Purchaser's Staff - Contractor shall train, free of charge, in a manner mutually agreed between the Purchaser and contractor, such staff of Purchaser as may be deputed by him and the wages and allowances and all other associated expenses of such staff shall be paid by the Purchaser.**

#### **1.2.17 Work By Other Agencies:**

- a. Any other works undertaken at same time by the Purchaser or the Railway direct or through some other agencies at the same time or section where the contractor is carrying out his work will not entitle the contractor to prefer any claim regarding any delays or hindrances he may have to face on this account but Purchaser shall grant a reasonable extension of time to the contractor. The Contractor shall comply with any instruction which may be given to him by the Purchaser in order to permit simultaneous execution of his own works and those undertaken by other contractors or the Railway without being entitled on this account on any extra charge.
- b. The contractor shall not be entitled to any extra payment due to hindrance resulting from normal Railway operations, such as delay on account of adequate number of and duration of blocks not being granted, operational delay in movement of work trains etc. but the Purchaser shall grant a reasonable extension of time to the contractor.
- c. Contractor shall take note that owing to works being carried out by the Purchaser and others, there may be breaks in continuity of the locations for work owing to works such as track remodeling being undertaken. But contractor shall not be entitled to claim any extra payment on account of such breaks. However, such breaks in the continuity of work would be reasonable ground for extension of completion date/s for the work.
- d. If the purchaser is unable to supply materials to the contractor as specified in the contract, in time, the contractor shall not be entitled to any extra payment on account of such delay in supply. However, such delays in supply will be reasonable ground for extension of completion date/s for work.
- e. In cases where the lines to be electrified are not in their final position, the Purchaser will furnish the remodelling plans for such lines to the Contractor and/ or peg out the altered or remodelled position of the tracks to be electrified to enable preparation of designs and assessment of quantities of components required for the work. However, the contractor may not undertake field work on such



tracks till they are in final position. The contractor shall not be entitled to any compensation in case of delay in such remodeling work, but Purchaser will grant a reasonable extension of time for completion.

- f. In course of checking the overhead equipment layout plans, the contractor shall prepare a list of infringements, if any exist, and advise Purchaser in time. The Purchaser will arrange for removal of these infringements. The works which will be carried out by the Purchaser are detailed below:
  - i. Alterations of slewing of tracks to accommodate traction structures of overhead equipment or to suit Railway requirements.
  - ii. Alterations to over-bridges, tunnels, foot-over-bridges and irrigation troughs, raising of bridges or troughs, or lowering of tracks to give sufficient clearance for overhead equipment.
  - iii. Protection at over bridges to prevent accidental or malicious interference with overhead equipment.
  - iv. In cuttings, any work necessary to provide clearance for traction structures.
  - v. At viaducts and bridges, any alterations required to enable traction structure to be accommodated.
  - vi. Alterations to station buildings, signal gantries, signal cabins and other similar constructions, which may be required for erection of overhead equipment, with requisite electrical clearances.
  - vii. Diversion of drainage channels of concrete or earthen ware pipes required to accommodate foundations.
  - viii. Removal of signal, telegraph, power lines and guys to enable overhead equipment to be erected, with requisite electrical clearances.
  - ix. Any blasting work required for excavation in rock other than for foundations.
  - x. Any rail strapping or other similar work/s necessary for the installation of track structures and overhead equipment on bridges and over bridges.
  - xi. Any special steel work and fittings for attachment for masts/portals on steel girder or other bridges, or for attachment to other non-traction structures of the Railway for carrying or anchoring overhead equipment conductors.
  - xii. Dismantling and drilling of piers of bridges and walls, supply and grouting of dowel pins or holding down bolts, in the piers of bridges or walls.
  - xiii. Clearing the way and removing all infringements for erection of 25 kV feeder lines from grid sub-stations.
  - xiv. Chopping/trimming of tree branches required for erection of Overhead equipment shall be done by contractor. At least four metre clearance shall be made available before 25 kV charging between the nearest 25 kV live parts/OHE structures and the tree branches. Also to ensure that there are no loose tree branches nearby or overhead which are likely to fall on the live OHE. However cutting of the trees is NOT covered under this sub clause.
- g. In the course of checking layout plans and general arrangement drawings for switching and/or booster stations, the contractor shall prepare a list of infringements if any exist, and advise the purchaser in time. The Purchaser will arrange for removal of these infringements at his own cost.

#### **1.2.18 Access to work site:**

- (a) Access to the site for the purpose of this contract shall be accorded to the Contractor by the Purchaser at all times. In the execution of the work no person other than the Contractor or his duly appointed representative or approved sub-contractor and bonafide workmen shall have access to the site. Access to the site of work at all times shall be allowed by the Contractor to officials or approved representatives of the Purchaser or to Railway staff for purpose of maintenance.
- (b) The Purchaser or his authorised representative shall have the right to refuse admission to the work site of any person employed by the Contractor whom the Purchaser or his Engineer may consider undesirable.

- (c) The Purchaser or his Engineer shall be at liberty to object to the employment of any person as Contractor's Agent/ Representative, approved Sub-contractor's supervisors, workmen or labour for execution of this contract on the ground of misconduct, incompetence or negligence. The Contractor on receipt of notice of such objection in writing from the Purchaser or his Engineer shall forthwith remove the person so objected to and provide in his place any other competent person and shall not allow the persons so objected to, to enter the site of work subsequently or remain in the execution of the contract. The Purchaser will not be liable to pay any cost or damage on this account.
- (d) While finalizing the general arrangement and layout of subsections, the Contractor shall prepare a list of infringements, if any, which have to be removed, and incorporate the list in the said drawings. The Contractor will arrange for the removal of such infringements at his own cost.

#### **1.2.19 Infringement of patents**

- (a) The Contractor is forbidden to use any patents or registered drawings, process or patterns in fulfilling his contract without the previous consent in writing of the owner of such patents, drawings, patterns or trade marks, except where these are specified by the Purchaser himself. Royalties where payable for the use of such patented processes, registered drawings or patterns shall be borne exclusively by the Contractor. The contractor shall advise the Purchaser of any proprietary right that may exist on such processed drawings or patterns which he may use of his own accord.
- (b) In the case of patent taken out by the Contractor of the drawings or patterns registered by him, or of those patents, drawings, or patterns for which he holds a license, the signing of the Contract automatically gives the Purchaser the right to repair by himself the purchased articles covered by the patent or by any person or body chosen by him and to obtain from any sources he desires the component parts required by him in carrying out the repair work. In the event of infringement of any patent rights due to above action of the Purchaser, he shall be entitled to claim damages from the contractor on the grounds of any loss of any nature which he may suffer e.g. in the case of attachment because of counterfeiting.
- (c) **Indemnification by contractor** - In the event of any claim or demand being made or action being brought against the Purchaser for infringement of letter's patent in respect of any equipment, machine, plant, work or thing used or supplied by the Contractor under this contract or in respect of any methods of using or working by the Purchaser of such equipment machine, plant work or thing, the contractor shall indemnify the purchaser and keep him indemnified and harmless against all claims, costs, charges and expenses arising from or incurred by reason of such claim provided that the Purchaser shall notify the contractor immediately any claim is made and that the contractor shall be at liberty, if he so desires with the assistance of the Purchaser if required but at the Contractor's expense, to conduct all negotiations for the settlement of the same or any litigations that may arise there from and provided that no such equipment, machine, plant work or thing, shall be used by the Purchaser for any purpose or in any manner other than that for which they have been supplied by the Contractor and specified under this contract.

#### **1.2.20 Insurance**

- a. Contractor shall take out and keep in force a policy or policies of insurance against all liabilities of contractor or purchaser at common law or under any statute in respect of accidents to persons who shall be employed by contractor in or about the site of the Contractor's Offices for purpose of carrying out the works on site. The Contractor shall also take out and keep in force a policy or policies of insurance against all recognized risks to their offices and depots. Such insurance shall in all respects be to the approval of Purchaser and if he so requires in his name.
- b. **Insurance of materials and installations** - The Contractor shall take out and keep in force a policy or policies of insurance for all materials in storage and traction installations excluding foundations under erection and/or erected until such materials and installations are provisionally handed over to the purchaser. For this purpose, traction installations in a section (Para 1.2.25) shall be deemed to have been provisionally handed over, when provisional acceptance certificate is issued for the section or the traction installations, in the section are commissioned or on the expiry of three months after installations are given ready in all respect for handing over, whichever is earlier, for commercial use. If validity of contract is extended, validity of insurance should also be extended subsequently. Contractor shall not be liable for losses, damages to equipments erected, in the course of erection or in stores at contractor's depot in consequence of mutiny or other similar causes over which the contractor has no control and which cannot be insured. Such losses or damages shall be the liability

of the Purchaser and if required by the purchaser, be made good by contractor, at the cost of purchaser.

**Note:** It may be noted that the beneficiary of the insurance policy should be Railways or the policies should be pledged in favour of Railways. The contractor shall keep the policy/policies current till the installations are provisionally handed over to the purchaser. It may also be noted that in the event of contractor's failure to keep the policy current and alive, renewal of the policy will be done by the purchaser, for which the cost of the premium will be recovered from the contractor.

- c. The Contractor should, however, insure the stores/materials brought to site against risks in consequence of war and invasion, as required under emergency risks (goods) Insurance Act in force from time to time.
- d. The Contractor shall take out all insurance covers in connection with the contract with Govt. recognized insurance companies.
- e. For purpose of enabling the Contractor to take the insurance cover in connection with this contract, the Purchaser will advise the approximate price of all the Railway supply materials two months before the same are handed over to the Contractor at his depot. However, the recovery in case of shortages of such materials will be made in accordance with provisions specified in Note at the end of Para 1.4.6.(f),

#### **1.2.21 Accident**

- (a) The contractor shall, in respect of all staff engaged by him or by his sub-contractor, indemnify and keep the purchaser at all times indemnified and protected against all claims made and liabilities incurred under Workman's Compensations Act, the Factories Act and the Payment of Wages Act, and rules made thereunder from time to time or under any other labour and Industrial Legislation made from time to time.
- (b) The contractor shall indemnify and keep the purchaser indemnified and harmless against all actions, suits, claims demands, costs, charges or expenses arising in connection with any death or injury sustained by any person or persons within the Railway premises and any loss or damage to Railway property sustained due to the acts or omission of the contractor, his sub-contractors, his agents or his staff during the executions of this contract irrespective of whether such liability arises under the Workman's Compensation Act, or Fatal Accident Act or any other statute in force for the time being.
- (c) The contractor's liability to meet third party claims of the type outlined above will be applicable only in cases where accidents have been caused by bad design, workmanship, material or negligence on the part of the contractor and further the liability of the contractor.
- (d) The contractor shall be responsible for all repairs and rectifications of damages to traction installations erected or under erection due to railway accidents, thefts, pilferage or any other cause, without delay to minimize or to avoid traffic detentions, in a section until the installation are provisionally handed over to the purchaser.

#### **1.2.22 Contractor's liability for costs and damages:**

##### **(a) Withholding and lien in respect of sums claimed.**

Whenever any claim or claims for payment of a sum of money arises out of or under the Contract against the Contractor, the Purchaser shall be entitled to withhold and also have lien to retain such sum or sums in whole or in part from the Security, if any, deposited by the Contractor and for the purpose aforesaid, the Purchaser shall be entitled to withhold the said cash security deposit or the security if any, furnished as the case may be and also have lien over the same pending finalisation or adjudication of any such claim. In the event of the Security being insufficient to cover the claimed amount or amounts or if no security has been taken from the Contractor, the Purchaser shall be entitled to withhold and have lien to retain to the extent of such claim amount or amounts referred to supra, from any sum or sums found payable or which at any time thereafter may become payable to the Contractor under the same contract or any other Department of the Central Government pending finalisation or adjudication of any such claim. It is an agreed term of the contract that the sum of money or moneys so withheld or retained under the lien referred to by the Purchaser till the claim arising out of or under the contract is determined by the Arbitrator (if the contract is governed by the Arbitration clause) or by the competent court as the case may be and that the Contractor will have no claim for interest or damages whatsoever or any account in respect of such withholding or retention

under the lien referred to supra and duly notified as such to the Contractor. If the Contractor is a partnership firm or a limited company, the Purchaser shall be entitled to withhold and also have lien to retain towards such claimed amount or amounts in whole or in part from any sum found payable to any partner/limited company, as the case may be, whether in his individual capacity or otherwise.

**(b) LIEN IN RESPECT OF OTHER CONTRACTS**

Any sum or sums of money due and payable to the Contractor (including the security deposit returnable to him) under the Contract may be withheld or retained by way of lien by the Railway against any claim of this or any other Railway or any other Department of the Central Government in respect of payment of a sum of money arising out of or under any other contract made by the contractor with this or any other Railway or any other department of the Central Government.

- (c)** It is an agreed term of the contract that the sum of money so withheld or retained under this clause by the Purchaser will be kept withheld or retained as such by the Purchaser till the claim arising out of or under any other contract is either mutually settled or determined by the Arbitrator, if the other contract is governed by the Arbitration clause or by the competent court as the case may be, and that the Contractor shall have no claim for interest or damages whatsoever on this account or any other grounds in respect of any sum of money withheld or retained under this clause and duly notified to the Contractor .

**1.2.23 Safety measures:**

- a. The Contractor shall take all precautionary measures in order to ensure the protection of his own personnel moving or working on the Railway premises, but shall then conform to the rules and regulations of the Railway. If and when, in the course of the work there is likely to be any danger to persons in the employment of the Contractor due to running traffic while working in the Railway siding and premises, the Contractor shall provide necessary protection i.e. Flagmen, Flag etc. required in block working. Competency for the above shall, however, be given by the Railway authorities. The Purchaser shall remain indemnified by the Contractor in the event of any accident occurring in the normal course of work, arising out of the failure of Contractor or his men to exercise reasonable precaution at all places of work. Contractor shall ensure placement of barricading / partitions at the place of work to ensure safety of habitants of adjacent area, failing which Engineer may advise stoppage of work as per his discretion.
- b. Blasting of rock for foundation work shall be done only after due notice is given to the Purchaser and time/s and date/s for blasting operations agreed to by the Purchaser. Blasting, if required to be done in the vicinity of the track, shall not be undertaken until the Purchaser's flagmen on duty take necessary steps to protect trains and the track is adequately protected by the Contractor against damage by blasted rock. The Contractor shall follow detailed instructions which will be issued to him regarding blasting operations in the vicinity of tracks. The flagmen for protection of trains and the Track in such cases will be provided by the contractor but deputation at site will be done by the purchaser.
- c. During stringing operations every care shall be taken to prevent conductors hanging low over tracks on which traffic block has not been given. All conductors shall be pulled out before traffic block is cleared so that such conductors do not infringe with moving traffic.
- d. Ladder trolleys shall be used with caution. They shall not be put on tracks until the flagmen are on duty to protect the trolleys and the Purchaser's representative authorises in writing for the trolleys to be put on the tracks. Ladder trolleys shall be promptly removed on instructions from the Purchaser's representative and well in advance of trains. No claims shall rest on the Purchaser in the event of a ladder/trolley being run over by train. The flagmen for the above job will be provided by the contractor.

Competency for the above shall, however, be given by the Railway authority. Protection of track by banner flags shall be done in accordance with General Rules of Indian Railways and Subsidiary Rules of the concerned zonal Railway where work is being carried out. Flagmen so deployed by the contractor shall be medically fit for A/3 category (as per Indian Rly Medical Manual). prescribed fee for which shall be borne by the contractor.

- e. The contractor shall abide by all Railway regulations in force for the time being and ensure that the same are followed by his representatives, Agents or sub-contractors or workmen. He shall give due notice to his employees and workers about provision of the para.

- f. While working within station limits, especially on passenger platforms, the contractor shall ensure that at all times sufficient space is left for free-movement of passenger traffic. He must cover and/or barricade the excavations carried out in such areas and continue to maintain these till the work is completed, with a view to avoid any accident to public, contractor's staff or to Railway staff.
- g. The works must be carried out most carefully without any infringement of the Indian Railway Act or the General and Subsidiary Rules in force on Railway in such a way that they do not hinder Railway operation or affect proper functioning of or damage any Railway equipment, structure or rolling stock except as agreed to by purchaser, provided that all damage and disfiguration caused by the contractor to any Railway property must be made good by the contractor at his own cost failing which cost of such repairs shall be recovered from the contractor.
- h. If safety of track or track drainage etc. is affected as a consequence of works undertaken by the contractor, the contractor shall take immediate steps to restore normal conditions. In case of delay, the purchaser shall, after giving due notice to the contractor in writing, take necessary steps and recover the costs from the contractor.
- i. Moreover, if any time works to be carried out directly concern safety of trains, the contractor's staff must comply fully with the Railway regulations given to him by the authorised Railway Staff. The contractor's employees and workers may for no reasons operate an installation concerning train safety or train movement. They shall notify the authorised representative of the purchaser who will take all necessary steps in this regard.
- j. The Contractor shall be responsible for safe custody of all equipments till provisional acceptance.
- k. The Contractor's liability to meet third party claims of the type outlined above will be applicable only in cases where accidents have been caused by bad design, workmanship material or negligence on the part of the contractor and further the liability of the contractor.
- l. The Contractor shall ensure that unauthorised, careless or inadvertent operation of switchgear, which may result in accident to staff and/or damage to equipment, does not occur.
- m. The Contractor shall abide by all instructions issued by the purchaser from time to time in connection with protection/safety of track/ Railway installations /personnel as well as quality control. The Contractor should not leave the excavated pits unfilled overnight. Due to any reason if it become necessary to leave the pit unfilled overnight, it should be filled back effectively with sand bags to the satisfaction of the Purchaser's representative.
- n. During execution of work, contractors shall ensure that all safety precautions are taken by their men to protect themselves and site to prevent any untoward incident. In this regard contractor will ensure that adequate number of safety helmets, safety belts, safety jackets with reflective arms band, rope, ladders, emergency light etc. are available at site before the work is actually started. Above list is only indicative and is not exhaustive and safety item will be arranged as per requirement. Railway reserve the right to stop work in absence of proper safety gear and no claim shall be entertained in this regard. Decision of the Engineer-in-charge will be final and binding upon contractor. Cost of all safety gear is deemed to have been included in rates quoted and nothing extra is payable under this contract.
- o. Locations where road vehicles are plying/ likely to play closer to track should be protected by providing Rail barricading/ fencing/wall/trenching as per site conditions.
- p. In case of failure to adhere to above provisions or if unsafe practices/safety violation by contractor/his staff are noticed at the site of work, the contractor shall be levied with a penalty of Rs. 20,000/- for the 1st incident, Rs. 50,000/- for the 2nd incident and Rs. 1,00,000/- for subsequent such incident. Repeated safety violations shall become a valid ground for initiating the contract termination proceedings under relevant clause of GCC.
- q. Any incident involving (i) hitting of contractor's machinery/tools & plants/trolley/motor vehicle or (ii) hitting of any part of work executed/structure erected arising out of defective/unsafe execution of work(s) with the Railway's rolling stock/departmental vehicle moving on the Railway track(s), shall be treated as violation of safety on the work site and a minimum penalty imposed for each of such incident shall be Rs. 1,00,000/-. The amount of penalty imposed in such cases, as decided by the purchaser, shall be final and binding on the contractor. However, the actual amount of the liability shall be governed by the provisions contained in para-1.2.21 (Accidents), and the imposition of the minimum penalty of Rs. 1,00,000/-, as mentioned above, shall be in addition to (over and above) the

actual amount of liability in such cases, as governed by the provisions contained in para-1.2.21 (Accidents) of Part-I, Chapter-II.

#### **1.2.24 Extension of time:**

If such a failure aforesaid shall have arisen from any cause which the purchaser may admit as being a responsible ground for extension of time the purchaser shall allow such additional time as he may in his absolute discretion consider to be reasonably justified by the circumstances of the case. The contractor will apply for extension at least two months before the expiry of the period of completion. The competent authority while granting extension to the currency of contract under clause 17 (B) of GCC may also consider levy of token penalty as deemed fit based on the merit of the case.

##### **NOTE:**

- (i) Form-13 will be applicable in case of extension on purchaser's account.
- (ii) Form-13 will also be applicable in case of extension on contractor's account but the Purchaser is reasonably satisfied that the Contractor cannot be penalised for such delay.
- (iii) Form-12 will be applicable in case of extension on contractor's account with penalty.

#### **1.2.25 Provisional Acceptance:**

##### **(1) For OHE and TSS works**

- (a) Immediately after completion of works at each switching station/Booster station/TSS or after completion of work in a section of overhead equipment between two consecutive switching stations including the works of the said switching stations hereinafter referred to as a sub-group, the Contractor shall certify and advise the Purchaser in writing that the section/stations are (i) Complete (ii) ready for satisfactory commercial service and (iii) ready to be handed over. He will also place at the disposal of the Purchaser the required staff for checking it and putting it into operation.
- (b) The test or tests as stipulated in Part - II of the specification excluding power collection tests which would be carried out subsequently in connection with the taking over by the Purchaser of the equipment and installations shall be carried out jointly by the Purchaser and the Contractor within a month after the receipt of the Contractor's notifications, as stated in sub-para above.
- (c) After inspection and satisfactory conclusion of tests and when the Purchaser is satisfied with the satisfactory working of the installations he will issue a 'Provisional Acceptance Certificate' which would be signed by both the parties. The Provisional Acceptance Certificate will not be withheld for any minor defects.
- (d) Should the result/s of inspection and the test/s be not satisfactory, an extension of one month will be granted to the Contractor to make good the defects and deficiencies pointed out by the Purchaser. Fresh inspection and tests will then be carried out after the Contractor has attended to the defects and deficiencies. If these tests are also not satisfactory, the Purchaser may proceed at the Contractor's expenses by all means deemed expedient, to have the installation made satisfactory until they comply with the specifications and approved drawings and designs.
- (e) In such a case, or in case of delay in completing the work under this Contract within the time limit, the Purchaser reserves the right if he deems it possible to use in a reasonable manner any section or any part of the section even if some installations of the sections are not completely erected. The Purchaser will give to the Contractor for this purpose seven days previous notice. The Contractor shall then take at his own expense all necessary steps to complete the works in accordance with the provisions of the contract. In case it becomes impossible to proceed with the above mentioned taking over tests, for reasons other than for which the Contractor is responsible, the "Provisional Acceptance Certificate" shall be issued at or within a mutually agreed reasonable period not exceeding three months after completion of the relevant sections as indicated in subpara/s above.

##### **NOTE**

- 1) Provisional Acceptance Certificate for each section/ Sub-group will be issued immediately after all tests (excluding power collection tests) are completed to the satisfaction of the Purchaser. Should the Purchaser be unable to complete the tests and energisation of the line within a reasonable time which shall not exceed one month from the date of Contractor's notification, the issue of Provisional Acceptance Certificate shall not be delayed and shall be issued within a maximum time of three months after notification under para (a) above has been given.

- (2) The issue of Provisional Acceptance Certificate shall not be withheld for rectification of minor defects which may reasonably be considered not essential for introduction of commercial service and operation of installation. In such cases, only the value of materials and cost of rectification of minor defects shall be withheld from the payments of Provisional Acceptance until rectification is completed.

(2) **For SCADA works: -DELETED-**

**1.2.26 Defective equipments to be changed**

- (a) Notwithstanding the issue of Provisional Acceptance Certificate and partial or full use of any equipment, if the completed equipment or any portion thereof before it is finally taken over at the end of the guarantee period be found to be or to have become defective in course of usage by the Railway due to faulty material, design or workmanship, or otherwise fails to fulfill the requirement of the Contract and/or its purpose, the Purchaser shall normally give the Contractor prompt notice setting forth the particulars of each defects or failure and the Contractor shall forthwith make the defects good or modify or replace the equipment, as may be directed by the Purchaser's Engineer, at his own cost in all respects to make it comply satisfactorily with the said requirements. Should the Contractor fail to do within a reasonable time the service of the said notice upon him or should time not permit of service of such notice, the Purchaser may repair or reject and replace the whole or part of such defective equipment as the case may be, at the cost of the Contractor. The Contractor's full liability under this clause shall be satisfied by the payment to the Purchaser of the extra total cost, if any, of such replacement delivered and erected as provided for in the original Contract, such extra cost being the ascertained difference between the price paid by the Purchaser under the provisions above mentioned for such replacement and the Contractor's price for the plant so replaced, plus the sum, if any, paid by the Purchaser to the Contractor in respect of such defective equipment. Should the Purchaser not so replace the rejected equipment within a reasonable time, the Contractor's liability under this clause shall be satisfied by the repayment by the Contractor of all moneys paid by the Purchaser to him in respect of such rejected equipment. Rejected/defective materials shall be returned to the Contractor to the extent possible.
- (b) Provisions of this para will apply only in respect of the equipments and components supplied by the Contractor or his sub-Contractor.

**1.2.27 Use of Rejected Equipments**

In event of such rejection as aforesaid, purchaser shall, without prejudice to his other rights and remedies and, in particular, without prejudice to his the rights under the clause just preceding, be entitled to the use of rejected equipment for a time reasonably sufficient to enable him to obtain other replacement equipment. During such period, if the rejected equipment is used commercially, the contractor shall not be entitled to the payment on energisation until such rejected equipment is rectified and/or replaced, but the Purchaser shall not be entitled to claim any damages arising out of rejected equipment in respect of such period.

**1.2.28 Guarantee**

- (a)(i) **FOR OHE Works:-** The Contractor shall guarantee satisfactory working of the installations erected by him for a period of eighteen months from the date of commercial operation or from the date of provisional Acceptance of each section (1.2.25) by the Purchaser whichever is later. The guarantee for spares should be coincident with the guarantee for erected equipment.
- (ii) **FOR TSS Works:-** The Contractor shall guarantee satisfactory working of the installations erected by him for a period of thirty six months from the date of commercial operation or from the date of provisional Acceptance of each section (1.2.25) by the Purchaser whichever is later. The guarantee for spares should be coincident with the guarantee for erected equipment.
- (b) During the period of guarantee the Contractor shall keep available an experienced engineer and necessary equipment to attend to any defective installations resulting from defective erection and/or defects in the equipment supplied by the Contractor. This engineer shall not attend to rectification of defects which arise out of normal wear and tear and come within the purview of routine maintenance work. The contractor shall bear the cost of modifications, additions or substitutions that may be considered necessary due to faulty materials, design or workmanship for the satisfactory working of the equipment. The final decision shall rest with the General Manager/Chief Electrical Engineer/ Sr.DEE/TRD or his successor(s)/Nominee.

- (c) During the period of Guarantee the Contractor shall be liable for the replacement at site of any parts which may be found defective in the equipment whether such equipment be of his own manufacture or those of his sub-contractor whether arising from faulty design, materials, workmanship or negligence in any manner on the part of the Contractor provided always that such defective parts as are not repairable at site are promptly returned to the Contractor if so required by him at his (Contractor's) own expenses. In case of type defects in Contractor's equipment and components detected during guarantee period, contractor should replace all such items irrespective of the fact whether all such items have failed or not. The Contractor shall bear the cost of repairs carried out on his behalf by the Purchaser at site. In such a case, the contractor shall be informed in advance of the works proposed to be carried out by the Purchaser.
- (d) If it becomes necessary for the Contractor to replace or renew any defective portion of the equipment under the Para aforesaid then the provisions of the said Para shall also apply to the portions of the equipment so replaced or renewed until the expiration of six month from the date of such replacement or renewal or until the end of the above mentioned period (sub Para (a) above) whichever is later. Such extension shall not apply in case of defects of a minor nature, the decision of the General Manager/Sr. DEE/TRD or his successor/nominee being final in the matter. If any defect be not remedied within a reasonable time during the aforesaid period the Purchaser may proceed to do work at the Contractor's risk and expense, but without prejudice to any other rights and remedies which the Purchaser may have against the Contractor in respect of such defects or faults.
- (e) The repaired or renewal parts shall be delivered and erected on site free of charge to the purchaser.
- (f) Any materials, fittings, components or equipments supplied under this work shall also be covered by the provisions of this paragraph. The liability of the Contractor under the guarantee will be limited to re-supply of equipments, components and fittings. Such re-supply shall be effected at the Contractor's depot or, in the event of closure of the depot, at the stores depot of the Engineer-in-charge of maintenance of overhead equipment of the section covered by the contract.
- (g) In the case of materials, components, fittings and equipment supplied by the Purchaser no liability will rest on the contractor for failures on account of defective materials or workmanship and for any consequential damages. Such defective materials, if not yet erected on line, will be returned by the Contractor to the Purchaser and such quantities will be considered for the purpose of final reconciliation over and above allowances as per Part I, Chapter IV.

#### **1.2.29 Final Acceptance**

- (a) The Final acceptance of the entire equipment installed shall take effect from date of expiry of the period of guarantee as defined in clause 1.2.28 of the expiry of the last of the respective periods of guarantee of various sections for which provisional Acceptance Certificates are issued or brought into commercial operation, provided in any case that the Contractor has complied fully with his obligations under clause 1.2.28 in respect of each section, provided also that the attention has been paid by way of maintenance by the Purchaser.
- (b) If on the other hand the contractor has not so complied with his obligation under clause 1.2.28 in respect of any section, the Purchaser may either extend the period of guarantee in respect of that section until the necessary works are carried out by the Contractor or carry out those works or being them carried out suo-moto on behalf of Contractor at Contractor's expenses. After expiry of period of guarantee for each section, a certificate of final acceptance for the section shall be issued by the Purchaser and the last of such certificate will be called the last and final acceptance certificate. The Contract shall not be considered as completed until the issue of final acceptance certificate by the Purchaser.
- (c) The Purchaser shall not be liable to the Contractor for any matter arising out of or in connection with the contract or execution of work unless the Contractor shall have made a claim in writing in respect thereof before the issue of final acceptance certificate under this clause.
- (d) Notwithstanding the issue of final acceptance certificate, the Contractor and the Purchaser (subject to sub-clause as above) shall remain liable for fulfillment of any obligation incurred under the provision of the contract prior to the issue of final acceptance certificate which remains unperformed at the time such certificate is issued and for determining the nature and extent of such obligation the contract shall be deemed to remain in force between parties hereto.



### **1.2.30 Payment**

Payment will be governed by the terms specified in Part-I, Chapter III and in accordance with accepted schedule of prices, read with relevant Paras of other parts and Chapters of the Tender Papers. The Purchaser retains the right to withhold money due to the contractor arising out of this contract for any default of the contractor from other contracts which the contractor may have with the Government of India.

- i) The Contractor shall, whenever required, produce or cause to be produced for examination by the Purchaser any quotation/invoice, cost of other account, book of account, voucher, receipt letter, memorandum paper or writing or any copy of or extract from any such document and also furnish information and returns verified in such manner as may be required in anywise relating to the execution of this contract or relevant for verifying or ascertaining the cost of execution of this Contract (the decision of the purchaser on the question of relevancy of any documents, information or return being final and binding on parties). The Contractor shall similarly produce vouchers etc., if required, to prove to the Purchaser, that materials supplied by him are in accordance with the specifications laid down in the contract.
- ii) If any portion of the work be carried out by a sub-contractor or any subsidiary or allied firm or company the Purchaser shall have power to secure books of such sub-contractor or any subsidiary or allied firm or company, through the Contractor, and such books shall be open to his inspection. The Contractor should seek prior permission from the purchaser for subletting whole and/or part of work to any sub-contractor.
- iii) The obligations imposed by sub-clause (i) and (ii) above are without prejudice to the obligation of the Contractor under any statute, rules or order binding to the Contractor or other conditions of the contract.
- iv) It is an agreed term of the contract that the purchaser reserves to itself the right to carry out post-payment Audit and/or technical examination of the works and the final bill, including all supporting vouchers, abstracts etc. and to make a claim on the Contractor for the refund of any excess amount paid to him if as a result of such examination any over payment to him is discovered to have been made in respect of any work done or alleged to have been done by him under contract.

### **1.2.31 SITE CLEARANCE:**

- (a) At the end of each spell or work and on completion of the work, the Contractor shall, as a part of his contractual obligation, leave the tracks, switching/ booster station sites and their approaches, store yards etc. Cleared of rubbish and obstruction of all kinds according to the instructions of the Purchaser's Representatives. Besides, he shall take all necessary steps in the course of the execution of the works to avoid the presence of loose earth and ballast on platforms, in drainage on the track formation and pathways in the vicinity. If within a fortnight of completion of the particular item of site work the refuse is not cleared, the Purchaser will arrange to get them removed at the cost of the Contractor. However, before the Purchaser actually gets the site cleared he shall send intimation in writing to the Contractor expressing his intention.
- (b) The storage of equipment, tools and machinery used by the Contractor shall be done in an orderly manner and anything used by the Contractor for execution of the works shall in no way constitute a danger or hindrance to the working of the Railway or to the movement of its staff or passengers.

### **1.2.32 Equipments, components and material received for work**

The Contractor shall utilise all equipments, components or materials, procured specifically for the purpose of execution of the work, in work or other requirements. Any surplus materials left over at the end of the work shall not be disposed off without prior approval of the Purchaser in writing. The Purchaser may within a period of six months from the date of Provisional Acceptance of last section, switching/Booster station, notify the Contractor of the Purchaser's interest in any or all of the surplus materials and shall have right to take over the materials, so indicated at quoted prices. The Materials so notified by the Purchaser shall be taken over by Purchaser and paid for in full. The Contractor may use in any manner deemed fit, only such surplus materials which are not covered by Purchaser's notification after getting the approval of the Purchaser in writing.

### **1.2.33 Local Conditions:**

It will be imperative on each tenderer to fully acquaint himself with the entire local conditions and factors which would have any effect on the performance of the contract and cost of the stores. The Railway shall not entertain any request for clarifications from the tenderer regarding such local conditions. No request for the change of price, or time schedule of completion of work on account of any local condition or factor shall be entertained after the offer is accepted.

The intending tenderer will be deemed to have satisfied himself that all conditions liable to be encountered during the execution of the works are taken into account and that the rates he enters in the tender papers are adequate and all inclusive, for the completion of works to the entire satisfaction of the Railways.

In the event of the intending tenderer desiring to have a field survey before furnishing his quotations, he may apply to Railways for permission in this regard. The Railways will give such permission in writing but all the expenses in this regard will be born by the tenderers.

The intending tenderer is advised to study the tender papers carefully, any submission of a bid by the tenderers shall be deemed to have been done after a careful study and examination of these documents with full understanding of the implication thereof. These conditions and specifications shall be deemed to have been accepted unless otherwise, specifically commented upon by the Tenderer in his offer. Failure to adhere to anyone of these instructions may render his offer liable to be ignored without any references.

### **1.2.34 Compliance:**

Offer should be fully in accordance with the drawings and specifications. Details of variations from the drawing and specifications, if any should clearly be indicated and in such an event, a certificate from the user must be furnished to the effect that the product offered performs the requisite functions satisfactorily. The names of such users should also be indicated.

Tenderer should give details of similar works executed and the customer's along with their performance certificate.

Should the tenderer wish to depart from the provision of the specifications and drawings on account of any reason he should clearly draw attention in his offer to the proposed point of deviation and submit complete information with justification, drawings and specifications to explain the related merits of his proposal viz-a-viz the stipulations laid down in tender documents for appreciation and understanding of Railways. In the absence of any such deviation it will be deemed that the tenderer is fully satisfied with the intents of specifications and drawings and shall comply with the statutory provisions laid in the tender documents. The statement of deviation, if any should be given in Form 3.

### **1.2.35 Inspection**

- (a) The Railways particularly for the following aspects shall accept the works after inspection.
  - i. Approval of quality of works as per the specifications.
  - ii Any defects, deficiencies noticed in the works will be recorded in the site order book so that the contractor acts upon it without loss of time.
  - iii Erection, testing & commissioning as per the approved drawings and the Indian Standard codes of practice & RDSO specifications.
  - iv Any defects, deficiencies noticed in the works will be recorded in the site order book so that the contractor acts upon it without loss of time.
- (b) The cost of the inspection of the completed works will be on Railway accounts subject to any other provisions contained hereunder or elsewhere in contract. Fifteen day's notice must be given by the contractor to the railway for arranging the inspection by RITES/ Purchaser's representative.
- (c) The contractor shall provide without any extra cost to the Railways all materials, equipments, machine, plant, tools and labour of every kind of which the Railways inspecting officer may consider necessary for any test and examination to be made at site or elsewhere.
- (d) All the equipments and material shall be of best quality and will be tested / inspected by the Engineer or Engineer's representative at site of work and approved before they are installed/used in the works covered in the contract. If the contractor uses any equipment's materials without the prior approval of Railways these are liable to be rejected.

- (e) The decision of the Inspecting Officer with regard to the acceptance or rejection of the equipment/work will be final and binding on the contractor.

**1.2.36 Inspection & Rejection:**

All works connected with this contract shall be done in accordance with the standard established methods of overhauling of electrical equipments and shall comply with the relevant Indian Electricity Rules, ISI code, Specifications and Standards. The work shall also be strictly in accordance with the instructions/recommendations of the manufacturers. All fragile and sensitive equipment shall be protected adequately and handled carefully during the works.

**1.2.37 Consequence of Rejection:**

The works which shall be rejected by the inspecting officer of the Railway, the contractor shall replace such rejected equipments / assemblies of the work forthwith but in any event not later than a period of one week from the date of rejection. The contractor shall bear all the cost of such replacement including freight etc. but without being entitled to any extra time on this account.

**1.2.38 Public Procurement (Preference to Make in India), Order-2017:**

Whereas it is the policy of the Government of India to encourage 'Make in India' and promote manufacturing and production of goods and services in India with a view to enhancing income and employment, and

Whereas procurement by the Government is substantial in amount and can contribute towards this policy objective, and

Whereas local content can be increased through partnerships, cooperation with local companies, establishing production units in India or Joint Ventures (JV) with Indian suppliers, increasing the participation of local employees in services and training them.

Now therefore the following Order is issued:

- (i) **This Order is issued pursuant to Rule 153(iii) of the General Financial Rules 2017.**

- (ii) **Definitions:** For the purposes of this Order:

*'Local Content'* means the amount of value added in India which shall, unless otherwise prescribed by the Nodal Ministry, be the total value of the item procured(excluding net domestic indirect taxes) minus the value of imported content in the item(including all customs duties) as a proportion of the total value, in percent.

*'Local Supplier'* means a supplier or service provider whose product or service offered for procurement meets the minimum local content as prescribed under this Order or by the competent Ministries/Departments in pursuance of this Order.

*'L 1'* means the lowest tender or lowest bid of the lowest quotation received in a tender, bidding process or other procurement solicitation as adjudged in the evaluation process as per the tender or other procurement solicitation.

*'margin of purchase preference'* means the maximum extent to which the price quoted by a local supplier may be above the L 1 for the purpose of purchase preference.

*'Nodal Ministry'* means the Ministry or Department identified pursuant to this order in respect of a particular item of goods or services.

*'Procuring entity'* means a Ministry or department or attached or subordinate office of or autonomous body controlled by, the Government of India and includes Government companies as defined in the Companies Act.

- (iii) **Requirement of Purchase Preference:** Subject to the provisions of this Order and to any specific instructions issued by the Nodal Ministry or in pursuance of this Order, purchase preference shall be given to local suppliers in all procurements undertaken by procuring entities in the manner specified hereunder:

- a. In procurement of goods in respect of which the Nodal Ministry has communicated that there is sufficient local capacity and local competition, and where the estimated value of procurement is Rs. 50 Lakhs or less, only local suppliers shall be eligible. If the estimated value of procurement of such goods is more than Rs. 50 Lakhs, the provisions of subparagraph b or c, as the case may be, shall apply.
  - b. In the procurement of goods which are not covered by paragraph (iii)(a) and which are divisible in nature, the following procedure shall be followed.
    - i. Among all qualified bids, the lowest bid will be termed as L1. If L1 is from a local supplier, the contract for full quantity will be awarded to L1.
    - ii. If L1 bid is not from a local supplier, 50% of the order quantity shall be awarded to L1. Thereafter, the lowest bidder among the local suppliers, will be invited to match the L1 price for the remaining 50% quantity subject to the local supplier's quoted price falling within the margin of purchase preference, and contract for that quantity shall be awarded to such local supplier subject to matching the L1 price. In case such lowest eligible local supplier fails to match the L1 price or accepts less than the offered quantity, the next higher local supplier within the margin of purchase preference shall be invited to match the L1 price for remaining quantity and so on, and contract shall be awarded accordingly. In case some quantity is still left uncovered on local suppliers, then such balance quantity may also be ordered on the L1 bidder.
  - c. In procurements of goods not covered by sub-paragraph (iii)(a) and which are not divisible, and in procurement of services where the bid is evaluated on price alone, the following procedure shall be followed.
    - i. Among all qualified bids, the lowest bid will be termed as L1. If L1 is from a local supplier, the contract will be awarded to L1.
    - ii. If L1 is not from a local supplier, the lowest bidder among the local suppliers, will be invited to match the L1 price subject to local supplier's quoted price falling within the margin of purchase preference, and the contract shall be awarded to such local supplier subject to matching the L1 price.
    - iii. In case such lowest eligible local supplier fails to match the L1 price, the local supplier with the next higher bid within the margin of purchase preference shall be invited to match the L1 price and so on and contract shall be awarded accordingly. In case none of the local suppliers within the margin of purchase preference matches the L1 price, then the contract may be awarded to the L1 bidder.
- (iv) Exemption of small purchases:** Notwithstanding anything contained in paragraph (iii), procurements where the estimated value to be procured is less than Rs. 5 lakhs shall be exempt from this Order. However, it shall be ensured by procuring entities that procurement is not split for the purpose of avoiding the provisions of this Order.
- (v) Minimum local content:** The minimum local content shall ordinarily be 50%. The Nodal Ministry may prescribe a higher or lower percentage in respect of any particular item and may also prescribe the manner of calculation of local content.
- (vi) Margin of Purchase Preference:** The margin of purchase preference shall be 20%.
- (vii) Requirement for specification in advance:** The minimum local content, the margin of purchase preference and the procedure for preference to Make in India shall be specified in the notice inviting tenders or other form of procurement solicitation and shall not be varied during a particular procurement transaction.
- (viii) Government E-market place:** In respect of procurement through the Government E-market place (GeM) shall, as far as possible, specifically mark the items which meet the minimum local content while registering the item for display, and shall, wherever feasible, make provision for automated comparison with purchase preference and without purchase preference and for obtaining consent of the local supplier in those cases where purchase preference is to be exercised.

**(ix) Verification of local content:**

a. The local supplier at the time of tender, bidding or solicitation shall be required to provide self-certification that the item offered meets the minimum local content and shall give details of the location(s) at which the local value addition is made.

**b. In cases of procurement for a value in excess of Rs. 10 crores, the local supplier shall be required to provide a certificate from the statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of local content.**

c. Decisions on complaints relating to implementation of this Order shall be taken by the competent authority which is empowered to look into procurement-related complaints relating to the procuring entity.

d. Nodal Ministries may constitute committees with internal and external experts for independent verification of self-declarations and auditor's/accountant's certificates on random basis and in the case of complaints.

e. Nodal Ministries and procuring entities may prescribe fees for such complaints.

f. False declarations will be in breach of the Code of Integrity under Rule 175(1)(i)(h) of the General Financial Rules for which a bidder or its successors can be debarred for up to two years as per Rule 151(iii) of the General Financial Rules, along with such other actions as may be permissible under law.

g. A supplier who has been debarred by any procuring entity for violation of this Order shall not be eligible for preference under this Order for procurement by any other procuring entity for the duration of the debarment. The debarment for such other procuring entities shall take effect prospectively from the date on which it comes to the notice of other procurement entities, in the manner prescribed under paragraph (ix)(h) below.

h. The Department of Expenditure shall issue suitable instructions for the effective and smooth operation of this process, so that:

i. The fact and duration of debarment for violation of this Order by any procuring entity are promptly brought to the notice of the Member-Convenor of the Standing Committee and the Department of Expenditure through the concerned Ministry/Department or in some other manner.

ii. On a periodical basis such cases are consolidated and a centralized list or decentralized lists of such suppliers with the period of debarment is maintained and displayed on website(s);

iii. in respect of procuring entities other than the one which has carried out the debarment, the debarment takes effect prospectively from the date of uploading on the website(s) in the such a manner that ongoing procurements are not disrupted.

**(x) Specifications in Tenders and other procurement solicitations:**

a. Every procuring entity shall ensure that the eligibility conditions in respect of previous experience fixed in any tender or solicitation do not require proof of supply in other countries or proof of exports.

b. Procuring entities shall endeavour to see that eligibility conditions, including on matters like turnover, production capability and financial strength do not result in unreasonable exclusion of local suppliers who would otherwise be eligible, beyond what is essential for ensuring quality of creditworthiness of the supplier.

c. Procuring entities shall, within 2 months of the issue of this Order review all existing eligibility norms and conditions with reference to sub-paragraphs 'a' and 'b' above.

d. If a Nodal Ministry is satisfied that Indian suppliers of an item are not allowed to participate and/ or compete in procurement by any foreign government, it may, if it deems appropriate, restrict or exclude bidders from that country from eligibility for procurement of that item and/or other items relating to that Nodal Ministry. A copy of every instruction or decision taken in this regard shall be sent to the Chairman of the Standing Committee.

e. For the purpose of sub-paragraph (x)(d) above, a supplier or bidder shall be considered to be from a country if (i) the entity is incorporated in that country, or (ii) a majority of its shareholding or effective control of the entity is exercised from that country; or (iii) more than 50% of the value of the item being supplied has been added in that country. Indian suppliers shall mean those entities which meet any of these tests with respect to India”.

**“This tender compiles with public procurement policy order-2017 dated 15.06.2017” (vide Rly. Bd’s letter no. 2015/RS(G)/779/5 dated 16.03.2018 & HQ’s letter no. 14-Elect./Plg./Tender Policy Dt. 26.03.2018) or latest.**

### **1.2.39 Letter of Credit as Mode of Payment:**

- (i) For all the tenders having **advertised cost of Rs. 10 lakh or above**, the contractor shall have the option to take payment from Railways through a letter of credit (LC) arrangement.
- (ii) This option of taking payment through LC arrangement has to be exercised in IREPS (Indian Railway E-Procurement System - the e-application on which tenders are called by Railways) by the tenderer at the time of bidding itself, and the tenderer shall affirm having read over and agreed to the terms and conditions of the LC option.
- (iii) The option so exercised, shall be an integral part of the bidder's offer.
- (iv) The above option of taking payment through LC arrangement, once exercised by tenderer at the time of bidding, shall be final and no change shall be permitted, thereafter, during execution of contract.
- (v) In case tenderer opts for payment through LC, following shall be the procedure to deal release of payment through LC:
  - (a) The LC shall be a sight LC.
  - (b) The contractor shall select his Advising/Negotiating bank for LC. The incidental cost towards issue of LC and its operation thereof shall be borne by the contractor.
  - (c) SBI, New Delhi, Main Branch will be the nodal branch for issue of LCs based on online requests received from Railway Accounts Units for tenders opened in financial year 2018-19. SBI branches where the respective Railway Accounts Office has its Account (local SBI branch) will be the issuance/reimbursing branch for LC issued under this arrangement. The Bank shall remain same for this tender till completion of contract. The incidental cost @0.15% per annum of LC value, towards issue of LC and operation thereof shall be borne by the contractor and shall be recovered from his bills.
  - (d) The LC shall be opened initially for duration of 180 to 365 days in consultation with contractor. The LC shall be extended time to time as per the progress of the contract, on the request of the contractor. The value of LC to be opened initially as well as extended thereafter shall be finalized by the engineer in consultation with the contractor on the basis of expected progress of work.
  - (e) The LC terms and conditions shall inter-alia indemnify and save harmless the Railway from and against all losses, claims and demands of every nature and description brought or recovered against the Railways by reason of any act or omission of the contractor, his agents or employees, in relation to the Letter of Credit (LC). All sums payable/borne by Railways on this account shall be considered as reasonable compensation and paid by contractor.
  - (f) The LC terms and conditions shall inter-alia provide that Railways will issue a Document of Authorisation (format enclosed as **Annexure-12**) after passing the bill for completed work, to enable contractor to claim the authorized amount from their bank.
  - (g) The acceptable, agreed upon document for payments to be released under the LC shall be the Document of Authorisation.
  - (h) The Document of Authorisation shall be issued by Railway Accounts Office against each bill passed by Railways.
  - (i) On issuance of Document of Authorisation, a copy of Document of Authorisation shall be posted on IREPS for download by the contractor. A digitally signed copy of Documents of Authorisation shall also be sent by Railway Accounts office to Railway's bank (Local SBI Branch).
  - (j) The contractor shall take print out of the Document of Authorisation available on IREPS and present his claim to his bank (advising Bank) for necessary payments as per LC terms and conditions. The claim shall comprise of copy of Document of Authorisation, Bill of Exchange and Bill.

- (k) The payment against LC shall be subject to verification from Railway's Bank (Local SBI Branch).
- (l) The contractor's bank (advising bank) shall submit the documents to the Railway's Bank (Local SBI Branch).
- (m) The railway's bank (issuing bank) shall, after verifying the claim so received w.r.t. the digitally signed Document of Authorisation received from Railway Accounts Office, release the payment to contractor's bank (advising bank) for crediting the same to contractor's account.
- (n) Any number of bills can be dealt within one LC, provided the sum total of payments to contractor is within the amount for which LC has been opened.
- (o) The LC shall be closed after the release of final payment including PVC amount, if any, to the contractor.
- (p) The release of Performance Guarantee or Security Deposit shall be dealt directly by Railway with the contractor i.e. not through LC.

#### **1.2.40 Labour data on Railway's shramikkalyan portal by Contractor:**

- (A) Contractor is to abide by the provisions of Payment of Wages act & Minimum Wages act in terms of clause 54 and 55 of Indian Railways General Condition of Contract. In order to ensure the same, an application has been developed and hosted on website [www.shramikkalyan.indianrailways.gov.in](http://www.shramikkalyan.indianrailways.gov.in). Contractor shall register his firm/company etc. and upload requisite details of labour and their payment in this portal. These details shall be available in public domain. The registration/updation of Portal shall be done as under:
  - (i) Contractor shall apply for onetime registration of his company/firm etc. in the shramikkalyan portal with requisite details subsequent to issue of Letter of Acceptance. Engineer shall approve the contractor's registration on the portal within 7 days of receipt of such request.
  - (ii) Contractor once approved by any Engineer, can create password with login ID (PAN No.) for subsequent use of portal for all LOAs issued in his favour.
  - (iii) The contractor once/registered on the portal, shall provide details of his Letter of Acceptance (LOA)/Contract Agreement on shramikkalyan portal with 15 days of issue of any LOA for approval of concerned Engineer. Engineer shall update (if required) and approve the details of LOA filled by contractor within 7 days of receipt of such request.
  - (iv) After approval of LOA by Engineer, Contractor shall fill the salient details of contract labours engaged in the contract and ensure updating of each wage payment to them on shramikkalyan portal on monthly basis.
  - (i) It shall be mandatory upon the contractor to ensure correct and prompt uploading of all salient details of engaged contractual labour & payments made thereof after each wage period.
- (B) While processing payment of any 'On Account bill' or 'Final bill' or release of 'Advances' or 'Performance Guarantee/Security deposit', Contractor shall submit a certificate to the Engineer or Engineer's representatives that "I have uploaded the correct details of contract labours engaged in connection with this contract and payments made to them during the wage period in Railways Shramikkalyan portal at '[www.shramikkalyan.indianrailways.gov.in](http://www.shramikkalyan.indianrailways.gov.in) till \_\_\_\_\_ Month, \_\_\_\_\_ Years.

#### **1.2.41 Instructions issued by Railway Board vide letter no. 2024/CE-I/CAO(C) Workshop/Part-2 dated 03.06.2024 through JPO, Circular etc. for all works requiring digging work close to Railway signaling, telecommunication, electrical etc. Cables shall be followed and Penalty to be imposed for damages to cable, if any shall be as under:**

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

#### **1.2.42 Drawings, Specifications, Indian Standards (IS) etc. shall be followed as per latest available version or revised Drawings, specifications, parameters and Indian Standards (IS) etc. & latest Instructions issued by Railway Board/HQ's/Divisions.**

#### **1.2.43 General:**

- (a) Wherever an item of work covers supply of materials and/or erection, such item shall include all bolts, nuts, and washers of GI/SS etc. as per CORE/RDSO latest specification & drawing, procured from

- RDSO/CORE approved sources to complete the item of work. No separate payment for fasteners is admissible.
- (b) Erection of any item of equipment, whether supplied by the purchaser or contractor will include testing, commissioning and bringing the equipment into operation to the entire satisfaction of the purchaser.
  - (c) The basic quantity of components and materials required to make up a unit of work for the selected items are indicated for guidance only. There may be minor variation to suit erection but no adjustment in prices shall be made on that account. Prices quoted shall be inclusive of all incidental charges viz. freight, handling, taxes, duties, insurance, GST if any and works contract tax as applicable etc.
  - (d) All OHE components are to be supplied by the contractor as per latest specification & drawing of CORE/RDSO whether specifically mentioned or not.
  - (e) All works shall be carried out strictly in accordance to the CORE/RDSO drawings, specifications and guidelines if any. However any modified arrangement if in vogue in Northern Railway or suggested by Sr.DEE/TRD/DLI, the work will be executed accordingly without any alteration in accepted rates.
  - (f) The special condition & Technical specifications for schedule items are enclosed & Tenderer visit site for working conditions/requirements and Tenderer shall go through them thoroughly before submitting offer.
  - (g) All the equipments/materials shall confirm to relevant RDSO/CORE/IS specifications and shall be of reputed approved make of RDSO/CORE/Railway.
  - (h) The materials required for execution of work shall be supplied by the contractor after inspection by RITES or Sr.DEE/TRD/DLI or his authorised representative at the manufacturer/supplier/purchaser premises or at the site as decided by Sr.DEE/TRD/DLI or his authorised representative.
  - (i) The contractor is required to physically supply all the major materials covered under the Schedule of work to the consignee before starting the work.
  - (j) The tenderer should read thoroughly the instruction of the tender booklet and sign in all the pages of the booklet with necessary seal.
  - (k) Various reference drawings given along with the tender documents are only for broad guideline purpose. However, contractor has to prepare detailed planning and drawing taking into consideration, various aspects of tender documents, site condition and submit the same for the approval of Sr.DEE/TRD/DLI or his authorised representative before executing the work.
  - (l) Contractor has to safe guard the material/equipments against theft, pilferage, damage etc. till the complete installation is taken over by Railways.
  - (m) The contractor will have to carry out the detailed site-survey for the assessment of the quantity of materials along with its character, quality, type/style, size in detail of the materials to be encountered before execution of work.

**NOTE: Explanatory note may please also refer.**

#### **1.2.44 Scope of work: The scope of work is as under:**

- (a) Stringing/erection and termination of catenary wire including clamping at supports and dropper arrangements including transportation etc. by manual method.
- (b) Dismantling of OHE equipment including catenary wire, jumpers and dropper wires etc.

NOTE: Tenderer/s is/are advised to follow Railway standard practice for replacement of catenary wire in consideration of RDSO/CORE specifications & drawings.

#### **1.2.45 Stringing/dismantling of overhead equipment:**

The material to be supplied by the Railway as mentioned in annexure-4 will be made available at concerned OHE Depot where work is to be executed or Railway Stores. The contractor shall make his own arrangements for transporting, loading, unloading and stacking of these materials at site. After completion of the works, any surplus materials left over with the contractor shall be returned to the Railways for the purpose of final reconciliation.

The tenderer should make his own arrangements for carrying out installations i.e. stringing of overhead equipment etc. The contractor may demand for railway tower wagon i.e. 8-wheeler tower wagon or 4-wheeler tower wagon for wiring but No crane/road crane will be supplied by Railways. In case the contractor desires to utilise railway tower wagon for erection purpose, Railways will loan the same for which hire charges will be deducted from contractors bills as follows:-

Tower wagon (each) Rs.2006/- per hour (as certified by concerned consignee)



The hiring charges for 8-wheeler tower wagon and 4-wheeler tower wagon is the same. Railway will provide only one 8-wheeler tower wagon at a time and rest will be 4-wheeler tower wagon, if required. The hire charges will be levied on hourly basis for utilization. Any damage to tower wagon or other tools and plant so supplied by Railways, the contractor has to be make good at the contractor's cost at the time of return. Other clauses for hiring of railway tower wagon:

- a) For railway tower wagon (8w/4w) the fuel are to be provided by railway.
- b) One driver and one assistant each will be provided by railway.
- c) Hours to be calculated on the basis of Power block allowed and upto cancellation of the same (as certified by concerned consignee).
- d) Movement of tower wagon should be controlled by Railway supervisors.
- e) Extra lighting arrangement (if required at night time working) to be arrange by the contractor at his own cost.

#### **1.2.46 Penalty for bursting of Power Block:**

Penalty will be levied at the rate of Rs. 5,000/- for the first thirty minutes or part thereof and at the rate of Rs. 5,000/- for every 15 minutes thereof, if the power block is bursted by the contractor and the train services are effected. If the train services are not effected, the purchaser at his discretion may waive such penalty. Bursting of power block means the extra time taken over and above the granted power block period.

#### **1.2.47 Power Block Working: Protection of Men/staff working**

- a) Railway will arrange only power block for the works related to power block depending on the traffic and other conditions. The contractor shall ensure the removal of men and material before cancellation of power block. The contractor shall have to take full advantage of available power block by employing adequate staff for getting the maximum possible work done during the available power block period. For adhering to target date of completion, the contractor may have to work during night time under power block .
- b) The Contractor shall take all precautions necessary to protect staff working under him or Railway/Public. The contractor shall treat all other lines live except the line under power block. He should ensure execution of work under the supervision of competent person to carry out the work in electrified areas. Unless the adjacent lines are also under power block, voltage and current will be induced in the line under power block. To protect against these induced voltages and currents, earth discharge rods are to be provided. Care should be taken by the contractor that these discharge rods are intact and not disturbed by his staff. He shall also ensure that none of the staff working under him shall work/reach beyond safe working limits.
- c) Under all conditions, the contractor shall have to arrange protection of his staff against traffic/electrical accidents. He shall have also to take all necessary precautions to guard against any possible obstructions to traffic during working by providing necessary guy execution of work. If any claim due to traffic/electrical accident and damage to Railway property shall be bear by Contractor at his own cost.
- d) At the end of each power block work the contractor shall ensure removal of all men and material and no work inclusive of OHE should be left out in a state of obstruction to running of trains and the OHE should be made fit for run electric traffic.
- e) The contractor shall have to take all precautions to prevent possible electrical accidents due to proximity of adjacent live OHE always in live condition, unless otherwise a power block is granted on the adjacent line, the contractor shall also take all precautions to protect his staff working on the line against traffic (running of trains) on the working lines/adjacent lines.

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**PART-I**  
**CHAPTER – III**  
**PRICE AND PAYMENT**

**1.3.1 Scope:**

This Chapter deals with prices to be paid for supply and/or erection of various items of work or for supplies and other amounts payable in accordance with accepted schedules of prices and rates and terms and conditions of payment mentioned herein. This is a works contract. The total prices for the completed items of work are the actual prices payable to the Contractor as per the terms and condition of the Contract.

**1.3.2 Schedule of prices:**

**(a) (i) Prices for item with SOR (OHE): -DELETED-**

~~The rates given against various items of work in five sections of Schedule 1, (section 1 to 5) of the Tender paper are the standard schedule of rates (S.O.R.). The tenderers are required to quote a single percentage below/at par/above against the S.O.R. cost of each subsection separately while quoting the rates as per format available, on IREPS website. The actual payment to be made against any item of any subsection of Schedule 1, section 1 to 5, shall be derived after loading the SOR prices of that section with the tenderer's quoted percentage for the same section. The prices so obtained shall be the unit prices for the various items of work given in Schedule 1, section 1 to 5.~~

**(a) (ii) Prices for item with SOR (TSS): -DELETED-**

~~The unit prices given against various items of works in Schedule 1, (Section 8, 9 & 10) of the tender paper are standard schedule of rates (S.O.R.). The Tenderers are required to quote uniform percentage below/at par/above against the S.O.R. cost for these items while quoting the rates as per format available, on IREPS website. The actual payment to be made against any item of Schedule 1 Section 8, 9 & 10, shall be derived after loading the SOR prices with the tenderer's quoted percentage. The prices so obtained shall be the unit prices for the various items of works given in Schedule 1, Section 8, 9 & 10.~~

**(iii) Non-Schedule of Rates Items**

The unit rates of Non-schedule of rates have to be quoted separately in items of Section-6, 7, 11 on IREPS website. The tenderers are required to quote uniform percentage below/at par/above or unit rate against the estimated cost for these items while quoting Offered prices as per format available, on IREPS website. The actual payment to be made against any item of Non-schedule items (Section-6, 7, 11), shall be derived either after loading the estimated cost with the tenderer's quoted percentage or quoted unit rates for particular item of non-schedule items as per IREPS format.

All unit rates as above shall be FIRM irrespective of minor variations in basic quantities and use of alternative types of various components and fittings approved by the Purchaser. Minor changes in the basic designs shall not affect unit prices, so long as such changes are mutually agreed to by the Purchaser and the Contractor. All Unit Prices shall be in Rupees. The prices shall be for materials and erection, except for the materials specified in Part-IV, Annexure-4, for which only erection charges will be payable and for execution of work in accordance with specifications and approved drawings and designs. The Contractor shall carefully note the items of materials, equipments, fittings and components which will be supplied by the Purchaser.

**(b) Unit prices for OHE & TSS**

**For materials.**

The unit prices indicated in Schedule-1 (Section-1 to 5 & Section- 8, 9, 10 & 11) are inclusive of the prices of materials including all incidental charges for transport, loading/ unloading and handling of materials, commission for arranging dispatch by rail direct from manufacturer's factory and completing all necessary formalities in this respect, such as submission of forwarding notes, arranging placement of wagon, collection of railway receipts, all insurance premia, bankers charges for bank guarantee, indemnity bonds inclusive of cost of stamps etc. as also siding or shunting charges, if any, levied by the Railway.

The prices shall include all taxes, duties and levies, as per current tax regime or latest like GST etc., applicable on this contract. Therefore, they should quote their prices taking into account the rate of taxes as leviable in the event of sale through works contract to the Central Government Organisation in that state. It is clarified that required forms applicable for this purpose will be supplied to the contractor as applicable in the state where the contract is being executed. The price shall also include provision for losses and wastages in transit and erection.

#### **For Erection**

The unit prices indicated in of Schedule-1 (Section-1 to 5 & Section- 8, 9, 10 & 11), are inclusive of cost of erection/dismantling and testing to be done by the Contractor to the extent indicated in part-II, Chapter-VII or latest and also cover all cost of administration of the contractor, insurance premia, banker's charges for guarantees, cost of stamps, cost of storage, loading and unloading and handling of materials, and for any road transport which the Contractor may use for carriage of materials between his depot and depot/s and site of work. The unit prices shall include cost of works and adjustments necessary to be done by the Contractor during or after the tests carried out by the Purchaser as per tender conditions/RDSO/CORE Standards.

#### **Copper For components and fittings: -DELETED-**

**(c) Other price adjustments:**

**PRICE VARIATION: [Price Variation Clause (PVC) Para 1.1.79 of Part-I, Chapter-I (Clause 46A of GCC) as applicable .**

**(d) Quantities**

The approximate estimated quantities of various items of work are included in Part-V, Form-5.

**(e) Explanatory notes**

Explanatory notes for various items of work included in schedule-1 (Section-1 to 5, 6 & 7 and Section- 8, 9, 10 & 11 ) are given in part-I, Chapter IV (A, B & C).

#### **1.3.3 Price of Equipments, Components and Materials.**

The rates given in any sections of Schedule-3, form-6 of the tender paper loaded by same percentage increase/decrease quoted by the tenderer against S.O.R. rates for the corresponding section of Schedule-1, Section-1 to 5 & 8, 9 & 10, items shall be the effective "On account" rates for items given in the above mentioned sections of the Schedule-3, form-6.

#### **1.3.4 Price of Additional supplies:** The additional supplies will be taken over from the Contractor at the prices indicated in Schedule-3 as worked out after applying the overall percentage as applicable (para 1.1.74 (2) and 1.3.10).

#### **1.3.5 Payments and recoveries -**

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

- i) Payment of mobilisation advance.
- ii) Payment for designs.
- iii) Payments for foundations.
- iv) "On Account" payments.
- v) Progress payments for supply and erection.
- vi) Payments for additional supplies.
- vii) Reimbursement on account of price variation.
- viii) Payment for provisional acceptance for each sub-group.
- ix) Payment for surplus materials taken over.
- x) Final settlement.

### **1.3.6 Invoicing procedure**

- a) The contractor shall submit his invoicing procedure for approval by Purchaser within fifteen days from date of receipt of Letter of Acceptance of Tender. Separate invoices shall be submitted for different activities as being done presently. However, all these bills will normally be submitted once in a month only. More than one bill for one type of payment in a month can be allowed on case to case basis by obtaining Sr.DEE/TRD/DLI's approval. Separate invoices shall be submitted for different type of payments. Each invoice shall be submitted with original supporting documents wherever these are acceptable to the Purchaser's Engineer. Where copies of original documents are required in support of several invoices including in the bill, true certified copies of original documents may be forwarded to Purchaser's Engineer, with his consent.
- b) Invoices shall be submitted only on basis of agreed principles and prices, quantities and measurements of works completed shall be approved by Purchaser's Engineer prior to submission of invoices. For this purpose, schedule of quantities and measurements submitted by contractor for approval of Purchaser's Engineer may be only upto extent of work completed except in case of payments on provisional acceptance.

#### **1.3.6.1 Payments for designs:**

The entire payment for designs & drawing will be made in the final bill (if any).

### **1.3.7 On account payments**

- a) 'On account' payment will be made for equipment, components, fittings, and materials required for the execution/erection of the work and additional supplies as described below subject to a maximum of 2 'On Account' bills for items costing up to Rs. 1 lakh. For items costing beyond 1 lakh, the 'On Account' bills shall not be less than 1 lakh.

No on account payment will be made on supply of concreting materials & NS items etc. (if any). On account payments made will subsequently be adjusted against progress payments and against payments on provisional acceptance and/or against payment due on supply of spares and other supplies. All on account shall be covered by a standing Indemnity Bond in the approved form.

NOTE: All invoices shall be accompanied by the following:

- i) Supplier's challans.
- ii) Inspection certificate granted by the purchaser's representative.
- iii) Certificate of receipt of materials at the Contractor's depot duly accepted by the purchaser's Engineers.
- iv) Certificate that the stores have been insured.
- v) Quality assurance documents
- vi) Statement indicating the requirement of quantity of sub-station and quantity claimed in the bill.
- b) -deleted-
- c) -deleted-
- d) Limit for 'On account' payment.

The total on account payment shall not exceed 80% of the total value of materials required to complete the work. For this purpose the total value of the materials required to complete the work shall be the total of all items except design & drawing and concrete work of total supply portion of Schedule-1 as per the latest approved assessment of quantities.

In case the contract covers more than one traction sub-station, the limit of "ON ACCOUNT" payment for each substation shall be computed separately.

- e) 'On Account' payments will commence only when Schedule-1 is approved by the Purchaser.

### **1.3.8 Recoveries from Contractor**

- a) All recoveries for materials supplied and services rendered by Purchaser to the Contractor and other refunds due from the contractor shall unless otherwise specified, ordinarily be made by deductions from payments due to the Contractor covering the value of supply and erection in progress payment for erection, and from payment on Provisional Acceptance.

- b) The cost of materials supplied by the Purchaser under 1.2.5(b) will be recovered in full by Purchaser at the relevant price in Schedule-3 or book rate or last purchase rate or prevailing market rate whichever is higher, including 1.4.6 for Part-1, Chapter-IVA & C and 1.4.5 for Part-I, Chapter-IV B to extent of requirement of such materials, from the payments to be made to the Contractor.
- c) The cost of materials if supplied under para 1.2.6 (Other Railway Stores) will be recovered in the manner indicated in sub-para (a) above.
- d) The materials supplied under paras 1.2.5.1 (Railway Stores) and 1.2.6 (Other Railway Stores) shall be covered by standing indemnity bond (Form-11).
- e) The security deposit shall be as per clause 1.1.48 (1) to (3) of Part-I, Chapter-I. The amount over and above the initial deposit of bid security will be recovered from ONA/Progress payment bills as per relevant clause.

### **1.3.9 Progress payments for supply and erection (General)**

- (i) 80% of the item price (material cost) on receipt of materials in railway custody after successful inspection and due certificated by Engineer representative at manufacture works or at site of works as per policy. For this purpose 80% of contract value of each items will be considered as material cost of that item.
- (ii) Further payment of material & erection cost of cover 90% of the contract price on successful completion of inspection and due certificated of installation and testing of all material including equipment by Engineer representative.
- (iii) Balance 10% payment shall be released after successful completion of work and certification by Engineer representative against irrevocable guarantee bond / Bank guarantee valid upto guarantee period of equal amount 05% of contract value towards performance guarantee. The security amount already deposit by the contractor any at the description of the contractor be adjusted toward payment performance guarantee valid for guarantee period.
- (iv) **Foundation Progress Payment: -DELETED-**  
~~(a) Payment shall be made on casting of foundation blocks, with or without core holes, to extent of 70% of Prices of particular foundation item 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, payment shall be made to the extent of work done.~~  
~~(b) On completion of erection of Mast/Portal/Boom and their grouting the contractor shall receive payments to the extent of 80% against particular foundation item, less payments made under para 1.3.9(iv)(a). The contractor shall ensure that the erected mast/portal (& structure) upright is in safe condition before /during grouting and even after grouting is completed. The contractor shall be fully responsible for any unsafe condition arising out of the delay in grouting of the mast/portal (& structure) upright and if contractor fails to adhere above a suitable penalty shall be imposed by Railway for each instance.~~  
~~(c) On completion of wiring & load shifting etc., the contractor shall receive payments to the extent of 90% against particular foundation item, less payment made under para 1.3.9 (iv) (a) & (b). Balance 10% payment shall be released as per Para 1.3.9(iii).~~

### **1.3.10 Payment for additional supplies**

The contractor shall receive payments for additional supplies covered under para 1.1.74 (2)(c), if any, in accordance with the price including in Schedule-3, on delivery of such supplies to the Purchaser after due adjustment against 'On Account Payment' made in terms of para 1.3.7.

### **1.3.11 Taxes**

- (a) All taxes, duties and levies (including Octroi etc., if any) arising out of the transaction between the contractor and his sub-contractors/suppliers for this work will be included in the rates quoted by the contractor in the relevant schedule.
- (b) Wherever the law makes it statutory for the Purchaser to deduct any amount towards applicable tax on works contract, the same will be deducted and remitted to the concerned authority.
- (c) However, if rates of existing GST or cess on GST for Works Contract is increased or any new tax /cess on Works Contract is imposed by Statute after the date of opening of tender but within the original date of completion/date of completion extended under clause 17 & 17A of GCC and the Contractor thereupon properly pays such taxes/cess, the Contractor shall be reimbursed the amount so paid.

- (d) Further, if rates of existing GST or cess on GST for Works Contract is decreased or any tax/cess on Works Contract is decreased / removed by Statute after the date of opening of tender, the reduction in tax amount shall be recovered from Contractor's bills/Security Deposit or any other dues of Contractor with the Government of India.

**1.3.12 Payment on Provisional Acceptance**

On issue of Provisional Acceptance Certificate for any section/TSS, and on fulfillment of para 2.5.11 & 2.5.8 as applicable, the contractor shall receive payment of balance price for Supply and/or Erection against schedule-1 (except item of design & Drawing) in each section/TSS for the quantities for which progress payments have already been made.

**1.3.13 Payments for surplus Materials**

The contractor shall receive payment on prices included in schedule-3 for the surplus materials taken over by the Purchaser (Para 1.2.32) on delivery of such materials to the Purchaser.

**1.3.14 Final settlement**

On expiry of the Guarantee period and issue of Certificate of Final Acceptance of entire installations (Para 1.2.29), the security deposit will be refunded or Bank Guarantee released to contractor after adjustment of any dues payable by the contractor to the Purchaser and after the conditions under para 1.1.48 (1) to (3) have been satisfied.

**1.3.15 Payment of labour cess**

**An amount equivalent to 1% of the bills is being deducted at the time of bill passing in works contract toward labour cess**

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## PART- I

### CHAPTER – IV A: EXPLANATORY NOTES OF SCHEDULE SCHEDULE OF PRICES Part “A”- OHE GENERAL

- 1.4.1 Explanatory notes for various Items of work in schedule –1 are 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 variation to suit erection but no adjustment in prices of Schedule-1 (Part-I, Chapter-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 work, indicated herein, except where otherwise specified for materials supplied by the purchaser.
- 1.4.3 In the explanatory notes given in Part-B (Particular) 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, forging, 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 Part-B (Particular) of this Chapter, the term "bimetallic connection" is meant to cover any connection between a copper conductor and an aluminum conductor. The clamps used for such connections shall be made up of a suitable aluminum alloy or copper alloy and the copper/aluminum conductor shall be wrapped with a bimetallic (aluminum copper) strip to prevent direct contact between aluminum and copper.
- 1.4.5 Special notes for measurements are included in Part-B (Particular) of this chapter under various Items, where necessary.
- 1.4.6 Reconciliation of materials supplied by the purchaser
- a) The following procedure shall be adopted for the final reconciliation of the various equipments, materials fittings and conductors supplied by the purchaser. (See Annex-4)
  - 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 purchaser by the Contractor.
  - c) -Deleted-
  - d) -Deleted-
  - e) -Deleted -
  - f) **Other equipments, fittings and components:** The purchaser will supply the requirement of the various other equipment's, components or fittings listed in Annexure - 4. If there are any shortage 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

- (i) If there are any shortage 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 @ 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 shall be on the Contractor's account.
- (ii) No recovery/reconciliation shall however, be made as per the preceding paras if the Items stated under clause 1.4.6 are made contractor supply by including the respective optional Items in the contract.

#### 1.4.7 Released Material

The contractor shall return to the purchaser all the released OHE material from the existing system at the first available opportunity but not later than a week at the purchaser's store. If the contractor fails to return the released material in specified time, the cost of released material will be recovered from the progress bill before releasing any payment.

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**PART- I**  
**CHAPTER – IV A:**  
**EXPLANATORY NOTES FOR SCHEDULE OF RATES**  
**PART-B - OHE PARTICULAR**  
**Schedule-1, Section-1 to 5**

**-DELETED-**

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**PART- I**  
**CHAPTER – IV A:**  
**EXPLANATORY NOTES FOR SCHEDULE OF RATES**  
**PART-B - OHE PARTICULAR**  
**Schedule-1, Section-6 to 7**

**-DELETED-**

## **PART- I**

### **CHAPTER – IV ‘B’ EXPLANATORY NOTES OF SCHEDULE SCHEDULE OF PRICES Part “A”- TSS GENERAL**

- 1.4.1** Explanatory notes for various Items of work in Schedule-1(Pt. I, Ch. IVB) are given below:-
- 1.4.2** (a) Wherever an item of work covers supply of materials and/or erection, such items shall include all bolts, nuts, locknuts, washers etc. except as provided for in Annexure-4.  
(b) The equipment and materials to be supplied by the Contractor against various items should conform to RDSO's specification and drawings given in Part-IV.
- 1.4.3** Erection of any item of equipment, whether supplied by the Contractor or by the Purchaser will include proper connecting, testing, commissioning and bringing the equipment into operation in accordance with Part II, Chapter VII and to the satisfaction of the Purchaser.
- 1.4.4** Special notes for measurements are included in of this Chapter under various items, where necessary.
- 1.4.5** Reconciliation of materials supplied by the Purchaser (See 1.2.5).  
(a) The following procedure shall be adopted for the final reconciliation of the various equipments, materials, fittings and conductors supplied by the Purchaser in terms of Para 1.2.5 (See Annexure-4).  
(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 the work all surplus materials supplied by the Purchaser together with 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) Other Equipments, fittings & components: The Purchaser will supply the requirement of the various other equipments, components and materials 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 the note below.

**NOTE:** If there are any shortages during final reconciliation, their cost will be recovered by the Purchaser from the Contractor at the issue rate or market rate prevailing at the time of supply, 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 rail head shall be to the Contractor's account.

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**PART- I**  
**CHAPTER – IV B:**  
**EXPLANATORY NOTES FOR SCHEDULE OF RATES**  
**TSS PARTICULAR**  
**Schedule-1, Section-8A, 8B, 8C, 8D, 9A, 9B, 9C, 10A, 10B & 10C**

**-DELETED-**

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## PART- I

### CHAPTER – IV C: EXPLANATORY NOTES OF SCHEDULE SCHEDULE OF PRICES Part “A”- Non-Schedule of Rates GENERAL

- 1.4.1 Explanatory notes for various Items of work in schedule –1 are 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 variation to suit erection but no adjustment in prices of Schedule-1 (Part-I, Chapter-IVC) 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 work, indicated herein, except where otherwise specified for materials supplied by the purchaser.
- 1.4.3 In the explanatory notes given in Part-B (Particular) 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, forging, 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 Part-B (Particular) of this Chapter, the term "bimetallic connection" is meant to cover any connection between a copper conductor and an aluminum conductor. The clamps used for such connections shall be made up of a suitable aluminum alloy or copper alloy and the copper/aluminum conductor shall be wrapped with a bimetallic (aluminum copper) strip to prevent direct contact between aluminum and copper.
- 1.4.5 Special notes for measurements are included in Part-B (Particular) of this chapter under various Items, where necessary.
- 1.4.6 Reconciliation of materials supplied by the purchaser
- a) The following procedure shall be adopted for the final reconciliation of the various equipments, materials fittings and conductors supplied by the purchaser. (See Annex-4)
  - 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 purchaser by the Contractor.
  - c) -Deleted-
  - d) -Deleted-
  - f) -Deleted -
  - f) **Other equipments, fittings and components:** The purchaser will supply the requirement of the various other equipment's, components or fittings listed in Annexure - 4. If there are any shortage 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

- (i) If there are any shortage 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 @ 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 shall be on the Contractor's account.
- (ii) No recovery/reconciliation shall however, be made as per the preceding paras if the Items stated under clause 1.4.6 are made contractor supply by including the respective optional Items in the contract.

#### 1.4.7 Released Material

The contractor shall return to the purchaser all the released OHE material from the existing system at the first available opportunity but not later than a week at the purchaser's store. If the contractor fails to return the released material in specified time, the cost of released material will be recovered from the progress bill before releasing any payment.

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**PART- I**  
**CHAPTER – IV C:**  
**PART-B NON-SCHEDULE OF RATES PARTICULAR**  
**EXPLANATORY NOTES FOR NON-SCHEDULE OF RATES ITEMS**

**Item no. NS-1: Supply of material for replacement of Catenary wire for Conventional OHE.**

The price shall cover supply of all components required for complete replacement of catenary wire including jumper wire (50 Sq.mm, 19/1.80 mm), dropper wire, dropper clips, parallel clamps for Jumpering and splices (where their use is approved) but excluding catenary wire & terminating wire. The contractor shall supply the following items for execution of the work. The quantity specified is required for One TKM OHE.

RI No. or latest	Description	Qty. Per TKM
1192	Catenary wire dropper clip complete with bolts, nuts and washer	140 Nos.
1120	Catenary wire ending clamp	As required
1140	Large span wire clamp	As required
1040-2/3	PG clamp for catenary to small jumper	10 Nos.
5020	9-Tonne Adjuster (Both side Eye type)	As required
5020/1	9-Tonne Adjuster (Eye & Clevis type)	As required
5020/2	9-Tonne Adjuster (Double Clevis type)	As required
-	5 mm Dropper wire	As required
5030	Anchor double strap assembly	02 Nos.
5191/5192	Compensating/Equalizing plate	01 No.
-	Jumper wire (G, H, ATJ, C, F, etc) with fittings clamps etc. complete	As required
1051-3	PG Clamp for feeder (150 sq. mm) to jumper (160 sq. mm)	As required
1031-3	PG Clamp for G- Jumper with associated fitting	As required
1161 (Mod E or latest)	Single suspension clamp with associated fittings with nuts and bolts at supports	04 Nos.
1171 (Mod F or latest)	Double suspension clamp with associated fittings with nuts and bolts at supports	01 No.

**Item no. NS-2: Stringing/Erection of OHE Catenary wire.**

The price shall cover Stringing/erection & termination of 65 Sq. MM Cadmium copper catenary wire by manual method for the full tension length required for replacement of existing Catenary wire in conventional type OHE. The price is including replacement of all components and wires, droppers, jumpers and terminating wires (if any). The price shall also include fabrication of in span droppers/5 mm dropper wire, termination of the wire temporarily before replacement and after replacement including clamping of the catenary wire at supports and replacement of existing droppers with new droppers and consequent adjustment of the affected equipments like cantilever, section insulators, cut-in-insulators at SI, IOL, UIOL locations, turn-outs, crossovers and associated components, fittings etc. to make up the unit of work as per standard.

Any arrangements required for the execution of the works will be at contractor's responsibility. If any components at the termination which is not in contractor's scope of supply are damaged during dismantling/stringing of the catenary wire, the same will be supplied by contractor and to be erected by the contractor without extra charge.

The price is including transporting, loading, unloading etc. of the conductor drums with the help of road crane. The price shall cover adjustment of the entire regulating equipment assembly, required to make up the unit of work, including consequent adjustment of the affected equipment assembly, required to bring into action with the counter weight at the correct height above rail level etc. corresponding to a temperature of 35 °C after completion of stringing of OHE and erection of droppers. However, price shall not include the complete change of 3 pulley ATD, if complete change of ATD required, the same to be paid under new non-schedule item erection of regulating equipment, 3 pulley type with counter weight. All planning for replacement of catenary wire should be done jointly before replacement for smooth replacement work. Final checking of OHE must be done with site incharge from tower wagon after replacement/adjustment of catenary wire, droppers etc. in the span/section. NOTE: Supply of catenary wire done by Railway.

**Item no. NS-3: Dismantling of OHE equipment including Catenary wire for replacement of Catenary wire.**

The price shall cover cost of dismantling of old catenary wire, other equipment including droppers, terminations and associated components and the materials. The price shall also cover transportation of the dismantled materials to the purchaser depots and handing over to the purchaser according to location of work.

***NOTE for NS-2 & 3: The price shall inclusive of work under power/traffic blocks. No extra payment will be made for the power/traffic blocks working.***

**ANNEXURE-Y**

Detail of Tentative Locations of Augmentation/Replacement of Catenary wire.

S.No.	Tentative Loaction	TKM
1	NDLS-DSB Yard	30
2	DLI Triangle Area	34.67
3	EMU Car Shed	12
4	GZB DN Yard	5
<b>TOTAL</b>		<b>81.67</b>

NOTE: Above Locations are tentative and subject to change as per decision of competent authority.

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**PART – II**  
**CHAPTER-I**  
**GENERAL SPECIFICATION**  
**SECTION-I**  
**GENERAL**

**2.1.1 Introduction**

(a) This part of Tender papers is divided into eight Chapters and contains general, technical and other specifications for design and erection of complete 25 kV A.C. 50 Hz single phase traction overhead equipment, switching stations, booster transformer stations, L.T. supply transformer stations complete with foundations, structures, return Conductors and 25 kV feeders, if any. This part also gives reference to technical specifications of materials and components, procedure for submission of designs and drawings of basic arrangements, components and fittings designs and other typical designs relating to overhead equipment, switching stations and booster transformer stations and Traction Sub-stations. A list of the standard drawings is included in Annexure-1, Part-IV.

**(b) SCOPE OF WORK:**

The sections of the Indian Railways to be equipped with traction overhead equipment in accordance with this specification are detailed in part-III where the particular features of the sections to be electrified and their special requirements are indicated .

**(c) Indian Railways Schedule of Dimensions:**

To avoid infringements of various parts of OHE {Structures, Foundation, live parts, equipments etc. included in Para - 2.1.12(d) " INSULATION CLEARANCE", 2.1.17 (a) "CLEARANCE" and 2.6.9 (c) "INFRINGEMENT TO STANDARD DIMENSIONS"} with standard dimensions mentioned in "Indian Railways Schedule of Dimensions 1676 mm Gauge (BG) Revised - 2004 with Addendum & Corrigendum slip Nos. 1 to 16 or its latest revision issued by Railway Board " shall be followed.

**2.1.2. Climatic Data** - The data pertaining to section are given in Part-III.

**2.1.3. Wind Pressure** - For design of layout of overhead equipment maximum span etc. Wind pressure shall be taken as specified in part-III. Structures, and foundations of overhead equipment, switching stations, booster transformer stations and L.T. supply transformer stations and Station Sub-stations shall be designed for the wind pressure indicated in part-III.

**2.1.4 System Particulars** - The nominal voltage of the overhead equipment will be 25 kV A.C. 50 Hz, single phase. The supply voltage may, however, rise upto 27.5 kV. One terminal of the 25 kV system will be solidly earthed at the traction sub-station and also connected to the running rails. The other terminal will be connected to the overhead equipment through switchgear provided at the traction sub-station and at the feeding station.

**2.1.5 Rolling Stock**

**(a) LOCOMOTIVES**

The electric locomotives will generally be equipped with DC motors fed through rectifiers installed on the locomotives.

**(b) OVERSIZE CONSIGNMENTS**

The specific requirement in regard to movement of steam locomotives and over size consignments for each section are indicated in part-III.

**2.1.6 POWER SUPPLY**

**(a) TRACTION SUB-STATIONS**

Electric power will be supplied at 25 kV A.C. 50 Hz. single phase from traction sub-stations to feeding stations spaced 50 to 80 km apart along the track.

**(b) SWITCHING STATIONS**

Power supply will be controlled to the different sections of traction overhead equipment by switching stations. At these stations the switching will be effected by means of "Interrupters" which are single pole, non-automatic oil circuit breakers capable of repeatedly interrupting normal full load current. There are three types of switching stations:-

- (1) Feeding stations;
- (2) Sectioning stations, and
- (3) Sub-sectioning stations.

**(c) FEEDING STATIONS**

Supply will be effected to the overhead equipment through switchgear installed at feeding stations. All feeding stations will be located normally near the track.

**(d) SECTIONING STATIONS**

The sub-stations cannot, as a rule be paralleled and consequently a neutral section of overhead equipment with insulated overlaps on either side will be provided approximately midway between two consecutive feeding stations. Neutral sections may also be provided at feeding stations. Facilities to bridge the neutral section between feeding stations will be provided at sectioning stations.

**(e) SUB-SECTIONING STATIONS**

In order to facilitate maintenance of overhead equipment and to permit isolation of faulty sections and expeditious restoration of power supply in healthy sections, sub-sectioning stations with insulated overlaps will be provided between the feeding stations and the sectioning stations.

**(f) RETURN CONDUCTORS**

In order to reduce interference to telecommunication circuits arising from A.C. 50 Hz. single phase traction current in the overhead equipment, a return conductor may be provided for each main running track. These return conductors shall be connected at intervals to booster transformers and to the rails. The sections in which return conductors shall be provided are indicated in part-III.

**(g) BOOSTER STATIONS**

Booster transformer stations are provided in conjunction with return conductors to reduce inductive interference to telecommunication circuits arising from single phase 25KV AC traction. The Booster stations are located along the track.

- (h) Supply and erection of traction sub-stations mentioned in sub-para (a) above do not come within the purview of this specification.

2.1.7 -Deleted-  
2.1.8 -Deleted-  
2.1.9 -Deleted-

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**PART-II**  
**CHAPTER-I**  
**SECTION-II**  
**OVERHEAD EQUIPMENT**

**2.1.10. Track**

- (a) **Gauge & Track Centers:** The track gauge is 1676 mm. In multiple track Zones the, normal distance between track centers varies between 4270 mm and 4420 mm.
- (b) **Speed:-** The overhead equipment which shall be of the simple polygonal type and pre-sag should be designed for a maximum speed of 160 Km/h if regulated and for a maximum speed of 80Km/h if un-regulated, unless otherwise specified in Part-III for any particular section.

NOTE: Latest Guidelines issued by Railway time to time shall be followed.

- (c) **Curves:-** The minimum radius permissible is 175 m (573 ft.) i.e. a 10° curve. Inside station limits, the curvature at a 1 in 8.1/2 turnout is 8° i.e. radius 219 m (716 ft.).
- (d) **Super Elevation:-** The maximum super elevation is 165 mm (6.5") On curves, the minimum setting of structures shall be decided on the basis of maximum super elevation (see para 2.3.10). For purposes of design and erection of overhead equipment, the actual super elevation as existing or as indicated to the Contractor shall be adopted.
- (e) **Low Joints: -** For low of loosely packed rail joints a difference of 25mm (1") in the level of opposite rails may be taken as the basis for estimating the displacement of the pantograph with respect to its normal position.
- (f) **Formation: -** Generally sections with more than one tracks have common formation. In certain lengths, however, the formation for different track may be separate (see relevant drawing).
- (g) **Displacement -** The general design of overhead equipment shall permit a displacement of  $\pm 100$ mm of tracks without difficulty and any adjustment of the overhead equipment on this account shall be of such a nature as could be done conveniently without changing any component of the overhead equipment.

**2.1.11 SECTIONING:**

**(a) INSULATED OVERLAPS**

Insulated overlaps are provided for facility of isolation. Some of the overlaps may be provided with manually operated isolators switches. In addition for connecting the overhead equipment to booster transformers, insulated overlaps are indicated in the sectioning diagrams.

**(b) YARD SUPPLY**

The sectioning diagram/s also indicate the tracks in stations yards and siding whose equipments is electrically independent from those of other tracks.

The overhead equipment in yards and sidings may be fed through isolator switch or interrupter in accordance with arrangement indicated in the sectioning diagram/s.

**(c) SECTION INSULATORS**

Section insulators shall be provided as indicated in the sectioning diagrams, or cross-over between main tracks and to isolate sections of overhead equipment in yards and sidings. Section insulators may also be used to form neutral sections at special locations as indicated in the approved drawings.

**(d) -Deleted-**

(e) **FEEDERS & RETURN FEEDERS 25 KV ALONG TRACK FEEDERS**

25 kV along track feeders may connect sections of overhead equipment to a switching station or an isolator switch or gantry. Such feeders will be run usually on traction structures and sometimes on independent masts. A single 'SPIDER' conductor shall be used for such feeders.

(f) **RETURN CONDUCTOR**

Return conductor may, be run on traction structures or masts. A single 'SPIDER' conductor shall be used for such return conductors.

(g) **SCHEMATIC ARRANGEMENTS**

The different arrangements of feeders, return feeders, 25 kV along track feeders and return conductors are shown in the drawing.

(h) **SECTIONING DIAGRAM**

The provisional sectioning diagram/s of the sections to be electrified is/are included in part-III.

**Note: Availability of 120 mts distance between Stop Signal and centre line of Insulated Overlap/section insulators shall be maintained or as per latest guidelines issued by Railway time to time shall be followed.**

2.1.12 **Pantographs:**

- (a) The outline of the pantograph, its dimensions and its current collecting area are shown in a drawing.
- (b) **Number and pressure:-** Each locomotive will be equipped with two pantographs, but only one pantographs generally the trailing one will be in the use at a time. The working pressure of the pantograph on the contact wire may vary between 5 and 15 Kg.
- (c) **Spacing in Multiple Headed Trains:-** The distance between adjacent running pantographs in the case of multiple heading would normally be 20m. This distance may however, be reduced to 7.9 m between two pantographs in very exceptional cases.
- (d) **Insulation clearance:-** The electrical clearance for the pantograph on tangent tracks and on curves for design and erection of overhead equipment shall be based on the schedule of dimensions, issued by the Ministry of Railway (Railway Board), Government of India and other orders that may be issued by the Railway Board from time to time.

2.1.13 **Overhead Equipment**

(a) **BRIEF DESCRIPTION**

Essentially the traction overhead equipment shall consist of a standard catenary wire from which a grooved contact wire is suitably suspended by means of droppers. In order to cater for a speed of 160 kmph the contact wire is given a pre-sag of about 50/100mm for 72 m span and reduced suitably for other spans.

(b) **CATENARY**

The catenary wire shall be either of cadmium copper 19/2.10mm, 65mm<sup>2</sup>.

(c) **CONTACT WIRE**

The contact wire shall be grooved and made of hard drawn copper having 107 sq.mm cross section.

(d) **DROPPERS**

Droppers shall be made of hard drawn round copper wire; approximately 5 mm dia. Droppers shall be spaced not more than 9 m apart (see Annexure-1 (Part-IV)).

**(e) ENCUMBRANCE**

As a general rule, the nominal "encumbrance" i.e. the center distance between the catenary and the contact wire at the support shall be 1.40 m. Deviation from this figure will be permitted in special cases (e.g. spans near over-bridges, structures with more than one cantilever etc.).

**(f) JUMPERS**

All jumpers connected to OHE conductors shall be of copper only. The in-span jumpers potential equaliser jumpers at insulated overlaps and neutral section, shall be of 50 mm sq. nominal, 19/1.8mm size. Flexible jumpers of nominal section 105mmsq, 19/7/1.06 mm size shall be used at overlaps, turnouts, crossings etc.

**(g) BRIDDLER WIRE**

Bridle wire for supporting contact wire for regulated tramway equipment shall be of Cadmium copper 7/2.10 mm in size.

**(h) ANTI THEFT JUMPER**

Anti theft jumper of 50 mm. sq. nominal, 19/1.8 mm in size shall be used in out of run wire of conventional OHE and copper cadmium anticreep wire as an anti-theft measure.

The jumper connecting the AL. Conductors to any other conductors terminal or clamp shall be made with the aid of suitable bi-metallic clamps. All Aluminum jumpers of size 19/7/1.4 mm bare 3/4 hard shall be used to connect other Aluminum conductors such as return conductor. The tail ends of feeder wires from the strain clamps at the termination of a feeder, return feeder or return conductor may be connected directly to a terminal or clamp where feasible to avoid the use of a separate jumper wire.

2.1.14 **Type of equipment** - The overhead equipment used shall normally be either of the regulated or unregulated type. Unregulated tramway type equipment (Contact wire only) may be adopted where specially indicated by the Purchaser.

**(a) REGULATED**

In the regulated type of overhead equipment, the tension of both the catenary and the contact wires shall be maintained at a constant value at all temperatures by means of automatic tensioning devices desired to take up the variation in the length of overhead equipment due to temperature variation.

An anti creep shall be provided at a point approximately midway between two tensioning devices and not more than 750 meters from any one of them. The general arrangement of an anti-creep is shown in a drawing. The arrangement shall generally consist of the galvanised steel wire anchored on the masts adjacent to the anti-creep central mast in accordance with the relevant drawing. Alternatively, the arrangement may consist of anchoring the catenary on either side of the boom of a portal with the contact wire running through and providing a jumper connection as per general arrangement shown in typical drawing. The Purchaser shall indicate the type of anti-creeps to be adopted in the pegging plans.

**(b) UNREGULATED**

The unregulated type of overhead equipment has no provision for automatic regulation of tension of either the catenary or the contact wire.

**(c) TRAMWAY TYPE EQUIPMENT REGULATED CONTACT WIRE ONLY**

In tramway type equipment regulated, only a contact wire is provided without a continuous catenary or droppers. The tension in the contact wire is regulated. At support, bridle wire is used for supporting the contact wire.

**(d)** The section in which different types of equipment should be provided are indicated in part-III.

#### **2.1.15 PLANE OF CONTACT:**

**(a) REGULATED**

The regulated overhead equipment shall be so erected that the contact wire has the designed sag.

**(b) UNREGULATED**

In the case of unregulated equipment the contact wire shall have no sag at an ambient temperature of 35°C.

**(c) TRAMWAY TYPE**

In tramway type equipment, the contact wire will have its own natural sag when erected.

**(d) DROPPER**

Dropper charts to be used for standard span of regulated and unregulated overhead equipment would be supplied by the Purchaser. Dropper for non-standard spans, span with section insulators and special locations shall be calculated by the Contractor in accordance with the method indicated by the Purchaser and submitted to the Purchaser for approval.

#### **2.1.16 TENSIONS:**

**(a) REGULATED**

(i) In regulated equipment the tension in the catenary and in the contact wire shall be 1,000 kgf in each conductor.

(ii) Deleted

**(b) UNREGULATED**

In unregulated equipment the tension in the catenary and in the contact wire at 35 degree C without wind shall be, 1,000 kgf in each conductor.

**(c) TRAMWAY TYPE**

In regulated type tramway equipment, the tension shall be 1,250 kgf.

#### **2.1.17 CLEARANCE:**

**(a) GENERAL**

The distance between live parts and parts at earth potential (for parts likely to be earthed) shall be as large as possible. In all cases, the clearances must not infringe the values given in schedule of Dimensions mentioned in Para - 2.1.1 (c) "Indian Railways Schedule of Dimensions".

**(b) OVER BRIDGES & TUNNELS**

The clearances which are to be made available at over bridges, signal, gantries and other over line structures shall be based on the above rules.

**(c) PLATFORM SHEDS AND OTHER STRUCTURES**

In the course of checking the overhead equipment pegging plans, the Contractor shall prepare a list of platform sheds and other structures in the vicinity of track to be wired. The clearances to these structures shall be in accordance with those shown in the relevant drawings. If these clearances are not available, the Contractor shall advise the Purchaser in time to enable the later to take up necessary modifications.

#### **2.1.18 HEIGHT OF CONTACT WIRE:**

(a) Normally, the minimum height of contact wire above rail level shall be 5.50 m at mid span under the worst temperature conditions. This height may be reduced under bridges and in tunnels to the extent

permitted by the purchaser. The minimum height shall be 4.80 m. In electric locomotive sheds and over electric locomotive inspection pits, the minimum height shall be 5.80 m. At level crossings the minimum height shall be 5.50 m. Any infringement restricting minimum height at level crossings will be removed by the Purchaser.

**(b) GRADIENT OF CONTACT WIRE**

Any change in the height of the contact wire shall be made gradually and the maximum slope shall not normally exceed 1 mm per metre on main lines and 10 mm per metre on sidings. The end span of any section with a gradient of contact wire shall have a slope not greater than half the main slope. Contact wire gradient should be 1 mm per meter and difference in contact wire gradient between two adjoining spans shall be 0.5 mm per meter.

**2.1.19 STAGGER:**

To ensure uniform wear of contact strips of pantographs, the contact wire shall normally be staggered in a manner which will be indicated by the Purchaser.

**2.1.20 TERMINATION :**

**(a) GENERAL**

Traction overhead lines shall be terminated using components specified to Chapter 2.4. The termination may be carried forward by one or two spans if anchoring facilities so require.

- (b)** Terminating wires shall be electrically connected to the conductors with which they are likely to approach closely or come into contact under normal conditions.

**(c) SUPPLEMENTARY INSULATION**

If a terminating wire passes a live conductor to which it should not be connected, i.e. in a different elementary section, the portion of the terminating wire close to the live conductor shall be separated by means of insulators. The insulators swept shall be located in such a manner as to clear the zone of the pantograph under the worst conditions and as far away as is possible from live conductors.

**2.1.21 TYPES OF STRUCTURES:**

- (a)** The overhead equipment of main tracks in case of multiple tracks section shall be electrically and mechanically independent of the one another by provision of independent cantilever masts to the maximum extent possible (as per general arrangement drawings).

- (b) HEADSPANS** Deleted

**(c) PORTALS**

In cases where the tracks in a multiple track section do not permit location of independent masts and where automatic tensioning of overhead equipment is required, rigid portals may be used. Also in the vicinity of points and crossings, portals may be used, provided it is not possible to have prescribed setting with independent cantilever masts. These structures shall be equipped with standard bracket assemblies for supporting individual equipment of different tracks. The use of such structures is to be avoided as far as possible and for this purpose, the Purchaser will arrange to slew the tracks, if practicable. A single portal shall normally not cover more than five tracks (See also 2.3.7). Portal structures shall also be employed at anticreep central locations and such portals will have necessary guy arrangement.

**(d) FOUNDATIONS**

Foundations for all structures shall be designed in an economical manner by following the methods of design indicated by the Purchaser and observing the schedule furnished by him (See part -II, Chapter-II)

**2.1.22 CANTILEVER ASSEMBLY :**

The bracket assembly carrying overhead equipment shall be of the swiveling type. The assembly shall be such that the tubes adopted will permit easy adjustment of the whole equipment after

erection to cater for displacement of the track during maintenance upto the extent of 100 mm on either side except as otherwise relaxed by the Purchaser (see Para 2.1.10 g). In special locations, pull-off arrangements may be used with the approval of the Purchaser (as per drawings of the bracket assembly and components).

#### **2.1.23 OVERLAPS :**

Overlaps shall be provided at suitable intervals such that neither the tension length exceeds 1,500 m nor the fixed anchor to balance weight anchor exceeds 750 metres.

##### **(a) GENERAL**

The two contact wires at the overlapping zone shall be parallel to each other in a plane parallel to the track and run separated from each other (as per general arrangement drawings).

##### **(b) INSULATED**

In the case of insulated overlaps, the separation between the two contact and the two catenary wires shall be 0.5m (as per general, arrangement drawings).

#### **2.1.24 POINTS & CROSSINGS:**

Arrangements of overhead equipment of different types e.g. regulated, unregulated or tramway at points and crossings shall be in accordance with the standard drawings.

#### **2.1.25 SECTION INSULATORS: (See also Para 2.1.11(c))**

##### **(a) BRIEF DESCRIPTION**

The section insulators shall provide effective electrical isolation of two elementary electrical sections of overhead equipment and permit smooth passage of the pantograph in either direction at all speeds upto 70 KM/H. The outline of a section insulator is shown in a drawing. The section insulators shall be of the single wire type.

##### **(b) SIZE AND WEIGHT**

The section insulator assembly shall be such that it should be possible to install the insulator in the overhead equipment provided the axial distance between the catenary and the contact wire with section insulator in position is not less than 450 mm. The weight of the complete assembly shall not be more than 45 kg for single wire type excluding the weight of the catenary insulator and the catenary ending clamps.

#### **2.1.26 ISOLATORS:**

Manually operated isolators single or double pole type, with or without earth contact assembly may be required to bridge certain section insulators or insulated overlaps ( See para 2.1.11.). In certain large yards, isolators controlling different lines may be grouped together on a gantry.

#### **2.1.27 RETURN CONDUCTORS :**

At all Booster stations, the return conductor shall be provided with cut-in-insulators. At point mid way between two booster stations, the return conductor shall be connected to the rail through suitable terminal lugs which will provide a means of isolation, when required. The drawings showing the general arrangement of connections to the return conductor. The connection from the isolating arrangement to the rail shall be by means of 2 M.S. flats, each of minimum size 40 mm x 6 mm and at feeding stations 4 M.S. flats each of minimum size 40 mm x 6 mm .The flats shall be given two coats of red oxide zinc chromate primer to IS:2074:1992 CNSL based and finished with two coats of Bitumen 85/25 blown grade. Return conductors may be taken under ground in special locations such as under overline structures with the approval of the Purchaser. The return conductor shall also be connected with buried rail on either side of the overlap before the feeding post and cut-in-insulator should be provided on the return conductor before the feeding post within the overlap limits and two independent rail connection links from the mast on either side on the cut-in-insulator. The same practice is to be adopted on all the sub-sectioning posts and sectioning posts for the return conductor.

## **2.1.28 BRIDGES AND TUNNELS :**

### **(a) OVERBRIDGES**

The complete overhead equipment (i.e. both the catenary and the contact wires) shall normally pass under over-line structures. Additional intermediate suspension points shall be provided, if necessary, to ensure the specified minimum height of contact wire being maintained. In special cases catenary may be anchored on either side of the overline structure and the contact wire carried underneath.

### **(b) TUNNELS AND CUTTINGS**

The arrangements proposed for the equipment in tunnels and cuttings shall take into account the special features of each location and shall be in accordance with general design specified in part -II.

### **(c) SAFETY SCREENS**

On over-bridges, metallic protective screens shall be provided in order to prevent any person from coming into contact with the live overhead equipment. Such screens shall be properly earthed.

### **(d) HEIGHT GAUGES AT LEVEL CROSSINGS**

Height gauges will be provided at all level crossings in accordance with the general arrangement drawings.

## **2.1.29 BONDING AND EARTHING :**

(a) Bonding and earthing shall be done in accordance with the code for bonding and earthing.

### **(b) LONGITUDINAL AND TRANSVERSE BONDING**

Longitudinal and transverse bonding of tracks, bonding of structures including traction structures to rails and associated earths shall be provided in accordance with the above code.

### **(c) TRACTION STRUCTURE BONDING**

Every traction mast or structure shall be bonded to a non-track circuited rail unless it is provided with a continuous earth wire or it is individually earthed by means of an earthing station. For general arrangement drawings, see Annexure-1.

### **(d) DOUBLE RAIL TRACK CIRCUIT**

Where track circuits are provided on both rails, traction masts/structures shall not be bonded to rails but shall be provided with an earth wire made of steel reinforced aluminum conductor consisting of 6 strands of aluminum and one strand of steel each of 4.09 mm dia.(RACCOON) [conforming to IS:398 Pt II (or latest)]. The earth wire shall be run on traction masts or structures. They shall be divided into different electrical sections not exceeding 1,000 m. long. The earth wire in each such section shall be connected at two traction structures, situated at a distance not exceeding 250 m on either side of the mid-point of the section to two 10 Ohm, earth stations which will be provided by the Contractor. Sections on which earth wire is required to be provided are indicated in Part-III.

## **2.1.30 L.T. SUPPLY TRANSFORMER STATIONS: (See para 2.1.40(c))**

## **2.1.31 LIGHTNING ARRESTORS:**

No lightning Arrestors will be provided on the traction over head equipment.

## **2.1.32 CERAMIC BEADED GLASS FIBER TYPE SHORT NEUTRAL SECTION ASSEMBLY:**

Ceramic beaded glass fiber type section insulator assembly shall consist of resin bonded fiber glass(or equivalent)insulators covered with either teflon (or equivalent) or ceramic beaded with PTFE spacers (or similar) adequately dimensioned and rated for the application. The insulators shall have suitable end fitting for connections to the contact wire through end fitting. For smooth

passage of pantograph without any shock from contact wire to insulator and vice-versa, suitable runners preferably of stainless steel shall be provided. The central position of the assembly along with arc trap shall be solidly earthed as the later with earthing clamp is provided to trap any arc current caused by break of contact between pantograph and live contact wire when it passes from contact wire to insulator. The distance between arc trap and nearest line position shall be adjustable upto a maximum of 320 mm Suitable means of suspension of the components of the assembly from the catenary conductor shall be provided. The complete assembly shall be as light as possible and so constructed that adjustments of components can easily be made during erection of maintenance and also for ensuring smooth passage of pantograph.

In the catenary conductor, resin bonded fiber glass insulators with suitable covering shall be provided. The insulators shall have suitable end fittings for connections to catenary wire through end fittings. The central portion shall be solidly earthed.

The neutral section assembly shall be suitable for erection symmetrically on either side of the cantilever bracket support with regulated or unregulated conventional/ composite OHE where one point each for suspension of catenary conductor and contact wire is available as also shown in general arrangement drawing.

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**PART-II**  
**CHAPTER-I**  
**SECTION-III**  
**SWITCHING STATIONS, BOOSTER TRANSFORMER STATIONS**  
**AND LT SUPPLY TRANSFORMER STATIONS**

**2.1.40 DESCRIPTION :**

**(a) Switching Stations**

Every switching station has a gantry with two or more main masts (Up-right). The interrupters are located behind the gantry. Isolators, Potential Transformers, station class lightning Arrestors and pedestal Insulators are mounted on a gantry. From the gantry, connections are made to various sections of overhead equipment by cross feeders and jumper connections. Switching stations are unattended and remote controlled from a remote control centre (see part-III). A small masonry cubicle, called the control cubicle, shall be constructed at each switching station to house control equipment, batteries, battery charger, S.&T. terminal equipment, a terminal board for terminating cables from the switching station equipment, a telephone and telephone equipment and A.C. 240V distribution board. In the case of the Feeding stations that are located within the Traction sub-stations premises, all the above equipment will be provided inside the sub-station control room. The switching station and its control cubicle shall be enclosed by fencing except at feeding stations that are located within the Traction sub-stations premises.

**(b) Booster Transformer**

Booster stations are provided for each track at the insulated overlap spans. The primary terminals are connected directly in series with the traction overhead equipment and the secondary terminals directly in series with the return conductors by means of flexible jumpers. Normally each booster station will be provided with one booster transformer which will be mounted on a gantry structure with two masts as indicated in a drawing.

Single booster station will be located on either side of the track in a double track section. In multi-track sections where space does not permit location of a booster station may be provided with cross feeders for connections to the overhead equipment and return conductors as indicated in the relevant general arrangement drawing. Two 7.5 kV lightning arrestors for each booster transformer are also erected on the gantry and connected to the L.T. terminals of the booster transformer.

**(c) L.T. supply transformer stations**

The low tension supply required at switching stations will be obtained through L.T. supply transformers included as part of switching stations, mounted on steel structures and connected to the 25 kV side through rigid bus-bars of aluminum. In special cases where the length of connection is small, 50 sq.mm copper wire may be used for connection, with the approval of the Purchaser. At locations other than at switching stations, wherever low tension supply is required, L.T. supply transformer stations included as a part of OHE may be provided along side the track at isolated location.

L.T. supply transformer stations shall essentially comprise of a mast mounted transformer connected to the traction overhead equipment through dropout fuse switches. The 240 V side shall be connected to a distribution board located at the remote control cubicle by means of 2 core 25 sq. mm aluminum cable (see 2.4.23(a)). The general arrangement drawing for L.T. supply transformer stations for single double and multi-track sections is included in Annexure-1.

**2.1.41 SCOPE OF WORK :**

**(a) Switching stations**

The switching stations shall be complete in all respects in accordance with specifications. The work shall include:-

- (i) Filling up and leveling of the ground to the extend necessary.
- (ii) Provision of control cubicles for installation of remote control equipment for switching stations.

- (iii) Provision of 240 V A.C. distribution board.
- (iv) Provision of lights, plug points inside the cubicles.
- (v) Trench work inside the cubicles.

**The work shall not include :**

- (i) S & T Terminal equipment, telephone and telephone equipment.
- (ii) Provision of bus-bars from the traction sub-station to the feeding station in the case of these feeding stations which are located within the traction substation premises. However, the provision of a tee connector in the feeding station bus-bars would form part of the switching station work (see the relevant drawing).
- (iii) Provision of 110 V battery and battery chargers and terminal boards in the feeding stations.
- (iii) Supply of equipments listed in Annexure-4.

**Note :** Supply and spreading of gravel at all Switching stations is included in the scope of work of the Contractor. It shall however be noted that no extra cost for this shall be payable to the contractor.

**(b) Booster Transformer Stations**

The booster transformer stations will be complete in all respects, in accordance with the specifications. The work, however, shall include :-

- (i) Filling up and leveling of the ground to the extent necessary, but exclude the supply of booster transformers and other equipments indicated in Annexure-4.
- (ii) L.T. supply transformer station shall be complete in all respects in accordance with the specifications. The work shall, however, not include (i) cable and cable connections in L.T. side except at switching stations, where this is included as a part of switching station work (ii) supply of L.T. supply transformer and other equipment as listed in Annexure-4.

**2.1.42 CLEARANCES :**

No part of the installations which is live at 25 kV shall be erected at a height less than 3 m from the datum level. Clearance between any part live at 25 kV and any part at earth potential (or part likely to be earthed) shall not normally be less than 500mm. This clearance may be reduced under special circumstances but in no case static clearance shall be less than 320 mm and any dynamic vertical and horizontal clearances 270 mm and 220 mm respectively. The clearance between any part live at 3 kV and any part at earth potential (or part likely to be earthed) shall be not less than 150 mm under static condition and 70 mm under dynamic conditions.

**2.1.43 SETTING OF GANTRIES :**

The gantries are normally aligned parallel to the track. The minimum distance of the face of the gantry from the center line of the nearest track is referred to as the 'setting' of the gantry. The setting shall normally be 3.5m. Setting of the individual gantries of different stations will be furnished by the Purchaser.

**2.1.44 DATUM LEVEL :**

The datum level will be the finished level of the gantry mast foundation. All vertical dimensions shall be stated with respect to this datum level. Datum levels of individual stations will be indicated on the location and connection diagrams.

**2.1.45 MOUNTING OF EQUIPMENT AND BUSBAR ARRANGEMENT :**

- (a) The interrupters and isolators shall be mounted in such a way that these can be manually operated conveniently by a person standing on the ground. The indicators showing the 'OPEN' or 'CLOSED' position of the equipment shall be so arranged as to be visible from out-side the fencing enclosure on the side of the main gantry.

- (b) The bus-bar arrangement for typical switching stations is schematically indicated in a relevant drawing.

#### **2.1.46 FENCING & ANTICLIMBING DEVICES :**

Every switching station, together with its associated control cubicle shall be enclosed by fencing except at feeding stations that are located within the traction sub-station premises. The fencing shall have an anti-climbing device also at top.

At booster transformer and L.T. supply transformer stations, suitable anti-climbing devices consisting of galvanised steel clamp fixtures shall be mounted on each mast. The device shall be fitted below the transformer supporting beam or steel work. The general arrangement drawings indicating the fencing and anti-climbing devices, are indicated in Annexure-1.

#### **2.1.47 NUMBERING :**

Each booster transformer, interrupter, potential transformer, L.T. supply transformer and isolator shall carry an enameled number plate of approved design (see Annexure-1). The Purchaser will furnish the actual numbers to be allocated to the various equipments as per specification No. ETI/OHE/53 (or latest).

#### **2.1.48 INTERLOCKING ARRANGEMENTS :**

An interlock shall be provided between each interrupter and its associated double pole isolator, to prevent operation of the isolator from the open to the closed position or vice-versa, unless the interrupter is locked in the open position and to prevent operation of interrupter either manually or by remote control unless the isolator is lock in the open or closed position. The interlocking device shall consist of a lock combined with an electrical contact to make or break the remote control circuit on the operating mechanism of the interrupter and a lock for the isolator operating mechanism and interlock key for the two locks.

#### **2.1.49 EARTHING ARRANGEMENTS :**

- (a) Earthing of switching stations, booster transformer stations and L.T. supply transformer stations shall generally comply with the code of practice for earthing IS: 3043 (or latest) except where otherwise specified below:

**(b) Earthing system**  
**(i) Switching stations**

At each switching station, two separate and independent earth circuits shall be provided, one for earthing the HT equipment and the other for earthing the L.T. equipment. The general arrangement of earthing connections at a typical switching station is shown in the relevant drawing.

**(ii) Earth Circuits**

Each earth circuit shall take the form of a closed ring and shall be provided with a minimum of two earth electrodes. Each earth electrode shall consist of galvanised iron pipe, 40 mm nominal bore at least 3.1 m long provided with a spike at one end and welded lug suitable for taking minimum size of 50x6 mm mild steel flat, directly at the other. The pipe shall be embedded into the ground. The earth electrodes of the HT and the LT earth circuits shall be located as far apart as it is possible. The drawing of typical earth electrode is included in Annexure-1.

**(iii) HT earth circuit**

The resistance to earth of the HT earth circuit shall be less than 2 ohms. If this value cannot be achieved with a maximum of four separate but inter connected earth electrodes then the additional earth electrodes shall have the surrounding earth treated with charcoal and salt filling. All masts, structures, fencing uprights and equipment pedestals shall be connected by the two separate and distinct connections to the closed loop of the earth bus. Earth bus and connections to it shall be of M.S. flats of a minimum size 50 mm x 6 mm. Potential transformers and lightning arrestors shall be bonded to masts/structures by 25 mm x 3 mm copper strips.

**(iv) LT earth circuits**

The LT earth circuit shall also comprise of a minimum of two inter-connected earth electrodes as described in para (iii) above and the total resistance to earth of the earth circuit shall be less than 2 ohms. This circuit will not form a part of this contract at those feeding stations that are located within the traction sub-station premises. All low tension equipment control boards, one terminal of the secondaries of the potential and LT supply transformers, metal casing of battery chargers, each connections of 8 SWG galvanised iron wire to the LT earth bus. The section of the LT earth bus shall be the same as that of the HT earth circuit.

**(v) Earth strips**

The earth bus and connections of HT earth circuit shall be painted with two coats of red oxide zinc chromate primer to IS 2074 (or latest) with a minimum thickness of 1.5 mils (40 microns) and with two finishing coats of bitumen 85/25 (blown grade to IS:702 (or latest) with 20% mica to a thickness of about 15 mils (375 microns) either by hot application or by brushing a solution of it with suitable viscosity to obtain the thickness in minimum number of coats and buried at a depth of 300 mm below the ground level.

The earth bus of the LT earth circuit shall run along the wall fixed on wooden gutties at a height of 300 mm from the floor. The connections to equipment will run from the bus along the wall and in recesses in the floor. All recesses will be covered with cement plaster after finishing the work. The connection of earth strips to each other shall be made by 10 mm dia. steel rivets or by welding. The connections to the various items of equipment and structures or fencing posts shall be made with G.I. bolts. The earth connection to the structural members shall be made at a height of about 150 mm above the foundation.

**(vi) Inter connection**

The HT and LT earthing systems shall be interconnected. In Addition, at all switching stations, the HT earth shall be connected by the two independent mild steel flats each of minimum size 50 mm x 6 mm painted with two coats of red oxide zinc chromate primer to IS:2074 (or latest) and finished with two coats of bitumen 85/25 blown grade as described above, to the non-track circuited rail in a single-railtrack-circuited section and to the neutral point of an impedance bond provided by the purchaser where double-rail-track circuiting is employed so as to limit high potential gradients developing in the vicinity of switching stations in the event of fault.

**(c) Booster Transformer stations**

**(i) Earthing system**

The earthing system shall comprise of a minimum of two inter-connected earth electrodes. The general arrangement of earthing connections at a typical Booster Transformer stations is shown in the relevant drawing. Each earth electrode shall consist of one galvanised iron pipe 40 mm nominal bore at least 3.1 m long provided with a spike at one end and welded lug suitable for taking a minimum size of 50 mm x 6 mm mild steel flat directly at the other end. The pipe shall be embedded into the ground. The earth bus inter-connecting the two earth electrodes shall consist of a minimum size of 50 mm x 6 mm mild steel strip. Each mast of the gantry shall be connected at the bottom to this earth bus by a minimum size of 50 mm x 6mm M.S FLAT. The resistance to earth of the earth circuit shall be less than 2 ohms as described in para (b)(iii) above. The transformers and the lightning arrestors shall be bonded to the gantry mast by means of copper strips of size 25 mm x 3 mm. In addition the earth circuit shall be connected to the non-track circuited rail in the case of single rail track circuit or to the mid point of impedance bond in case of double rail track circuit section.

**(ii) Earth strips**

The earth strips shall be painted with two coats of red oxide zinc chromate primer to IS:2074 (or latest) with a minimum thickness of 1.5 mils (40 microns) and with two finishing coats of bitumen 85/25 (blown grade to IS:702: (or latest) with 20% mica to a thickness of about 15 mils (375 microns) either by hot application or by brushing a solution of it with suitable viscosity to obtain the thickness in minimum number of coats and buries at a depth of 300 mm below the ground level. The connection of earth strips to each other shall be made by 10 mm dia. steel rivets or by welding. The earth connections to the structural members shall be made at a height of about 150mm above the foundation.

**(d) L.T. supply Transformer Stations.**

The earthing arrangement of a pole mounted LT supply transformer station shall comprise interconnected earth electrode/electrodes having a resistance not exceeding 10 ohms. If this value cannot be achieved with two electrodes, additional electrodes shall have surrounding earth treated with charcoal and salt filling. The transformer and lightning arrestor shall be connected to the supporting steel structure by means of 2 independent connections at the top by means of 25 mm x 3 mm copper strip. At the bottom, the steel structures shall be connected to the inter-connected earth electrodes and to the nearest traction rail by means of two independent connections of mild steel flats having a minimum size of 50 mm x 6 mm. In addition, the earth electrode should be connected to the traction rail by means of a minimum size of 75 mm x 6 mm mild steel flat. The mild steel flat shall be painted with two coats of red oxide zinc chromate primer to IS:2074 (or latest) with a minimum thickness of 1.5 mils (40 microns) and with two finishing coats of bitumen 85/25 (blown grade to IS :702 (or latest) with 20% mica to a thickness of about 15 mils (375 microns) either by hot application or by brushing a solution of it with suitable viscosity to obtain the thickness in minimum number of coats.

**2.1.50 CABLE CONNECTION :**

- (a) All PVC cables provided out-door shall be either laid in the trenches or neatly clamped to the structures as approved by the Purchaser.

**(b) Termination of cables**

The cable shall be terminated neatly and all the cores arranged and dressed properly. Suitable indexed terminal strips or ferrules shall be provided at all terminals to facilitate maintenance.

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**PART-II  
CHAPTER-I  
SECTION-IV  
TRACTION SUB-STATIONS**

**2.1.51 INTRODUCTION**

This part deals with general information and criteria for design, manufacture, supply, erection and testing of equipment at 220 or 132 or 110/25kV traction sub-stations, feeding stations and 25kV Shunt Capacitor Bank. These 220 or 132 or 110/25kV traction sub-stations are also referred to as "SUB-STATIONS" in the Tender Papers.

**2.1.52 DEFINITION**

The following definitions shall apply for the purpose of this specification, in addition to definitions applicable to standard equipments.

- a) "Grid Sub-station" means the sub-station of a power supply authority which is connected to the grid network in the area and from which 220kV or 132kV or 110kV power is supplied to the Railway for electric traction.
- b) "Interrupter" means a single pole single phase non-automatic circuit breaker capable of interrupting normal full load current.
- c) "Return Feeder" means the conductor of the feeder line from a traction sub-station to the corresponding feeding station which is connected to the earth terminal of the 220 kV or 132 kV or 110kV /25kV traction transformer secondary winding.
- d) "Traction overhead equipment" means the overhead conductors and other associated equipment and structures erected over the track to supply power to the electric locomotives.
- e) "Traction sub-station" means a 220 or 132 or 110/25kV sub-station for supply of power to traction overhead equipment (installed by the Purchaser), in accordance with this specification.
- f) "25 kV Feeder" means the conductor or feeder line from the traction sub-station to the corresponding feeding station and which is connected to the unearthed terminal of the 220 or 132 or 110/25 kV traction transformer secondary winding.
- g) "Feeding station" means the 25 kV interrupters and other associated equipment as also structures erected near the track, within or outside the sub-station boundary, for feeding different sections of the traction overhead equipment.
- h) "Shunt Capacitor Bank" means shunt capacitor equipment, along with control gear, protective relays, series reactor and accessories erected on 25 kV side of a traction sub-station for the purpose of improvement of power factor and reduction of maximum demand.

**2.1.53 FUNCTIONS**

The traction sub-stations covered by this specification will be installed to supply power for electric traction at 25 kV A.C. 50 cycles single phase through the traction overhead equipment.

**2.1.54 LOCATIONS**

The locations of the traction sub-stations are given in Part-III.

**2.1.55 SYSTEM PARTICULARS**

- a) Power will be received at 220 or 132 or 110/25 kV single phase, 50 cycles at the traction sub-stations as indicated in Part-III and stepped down to 25kV by means of single phase traction transformer. On the primary side the traction transformers will be connected across two phases of the 220 kV or 132 kV or 110 kV, 3 phase system. On the secondary side one terminal of the transformer will be solidly earthed and also connected to the traction rails, the other terminal will be connected to the traction overhead equipment through 25kV switchgear.

- b) Adjacent sub-stations will normally be connected across different phases to reduce the unbalance on the three phase power supply system. In order to keep the supply from two adjacent sub-stations separate, a neutral section is provided on the traction overhead equipment approximately midway between them. The neutral section is normally kept dead. Electric locomotives coast through the neutral section with power off.
- c) The traction sub-stations, will normally be unattended and all switching operations will be carried out by remote control from a Remote Control Center.
- d) The capacitor bank shall be of outdoor type, mounted on steel racks for connection to the 25kV bus through single pole isolator and circuit breaker. The capacitor bank shall consist of groups of individual capacitor units, connected in series parallel combination to deliver the rated output, at normal rated system voltage, rated frequency and other rated system conditions.
- e) **Series reactor (Harmonic suppression reactor)**  
  
A series reactor shall be provided to limit the inrush current and surge voltage at the time of switching in the capacitor bank. The switching surge voltage shall not exceed 70kVP. The series reactor which is also meant to filter a part of the harmonics generated by the traction loads shall have inductive reactance ( $X_L$ ) equal to or greater than 13% of capacitive reactance ( $X_C$ ) of the capacitor bank. The series reactor shall be natural air cooled, air Cored, dry insulated and outdoor type. The reactor shall be rated for maximum current including harmonic current that would flow through the capacitor bank under operating condition.

## **2.1.56 DESCRIPTION**

### **A) TRACTION SUB STATION**

- a) At the traction sub stations, normally one transformer will be in service to supply power to the overhead equipment while the other will be kept as standby. However, with the development of load at these traction substations, two transformers either existing or by installation of another where necessary may be connected and worked in parallel. The control and protection circuits shall be designed suitably to permit any change over or parallel working of transformers. The transformers are designed to take 50% overload for 15 minutes and 100% overload for 5 minutes.
- b) The incoming 220 kV or 132 kV or 110 kV transmission line will be terminated by the supply authorities on gantries erected inside the traction substation. The supply to the transformers will be controlled through single phase double pole circuit breakers. On the secondary side the transformers will be connected to the 25 KV bus through single phase single pole circuit breakers and associated isolators. From the busbars 25 KV supply will be extended to feeding station through circuit breakers called feeder circuit breakers. The feeder circuit breakers will form a part of the substation and will be covered by the specification.
- c) At the feeding station, the 25 kV supply will be fed to different sections of the traction over head equipments by means of interrupters. All interrupters will be remote controlled.
- d) Normally, the traction substation will be located along side the Railway track. The feeding stations will be located within the substation boundary and connected to the traction substation by extension of the 25 kV busbars. Where the traction substation is located some distance away from the track, the 26 kV supply will be extended to the feeding station by means of two overhead feeders carried on tower/masts. Each feeder line will comprise two conductors one called the 25 kV feeder and the other return feeder.
- e) A small masonry building called the control room will be provided at each substation to house the control and instrument panels, remote control equipment, batteries, battery chargers, telecommunication terminal equipment, telephones and AC and DC LT distribution boards.
- f) Fire protection baffle wall will be provided in between the two bays of the power transformer.
- g) The entire traction substation and the control room will be protected by a fenced enclosure. A Railway siding from the nearest Railway station will be terminated inside each substation, where feasible, to enable unloading of heavy equipment at site. Road access will also be provided wherever possible.

## **B) FEEDING STATION**

Every feeding station has a gantry with two or more main masts (Up-right). The interrupters are located behind the gantry. Isolators, Potential Transformers, station class lightning Arrestors and pedestal Insulators are mounted on a gantry. From the gantry, connections are made to various sections of overhead equipment by cross feeders and jumper connections. Feeding stations are unattended and remote controlled from a remote control center (see part-III). Feeding stations will be located within the traction sub-station premises. Control equipment, S&T terminal equipments, arrangement for termination of cables from feeding station equipments will be provided inside the sub-station control room.

## **C) SHUNT CAPACITOR BANK**

Capacitor Bank, alongwith associated equipments, will be located inside traction sub-station premises. Capacitor Bank and series reactor shall be mounted on steel racks for connection to 25kV bus through single pole isolator and circuit breaker. The control panel for the capacitor bank shall be installed inside the control room of the traction sub-station.

### **2.1.57 AUXILIARY SUPPLIES**

- a) The following auxiliary supplies shall be provided at each traction sub-station
  - i) 110 V, 200 Ah battery for operation of switchgear
  - ii) Single phase 240 V AC supply

### **2.1.58 SCOPE OF WORK**

- a) The traction sub-stations, feeding stations and 25 kV shunt capacitor banks when erected shall be in accordance with the specification and functionally complete in all respects. All works required in this connection shall be deemed to be a part of the contract, whether specifically stated or not in this Specification. The following works, however, are excluded from the contract.
  - 1) Supply of items of equipment listed in Annexure-4.
  - 2) 220 kV or 132 kV or 110 kV incoming lines and their termination on the gantries within the sub-station. The connections from the transmission line to the sub-station equipment shall, however, be made by the Contractor.
  - 3) Filling and leveling of the ground to the extent necessary.
  - 4) Provision of Railway siding where necessary and road access.
  - 5) Control Room building.
  - 6) Lights, fans and plug points inside the control room and yard lighting.
  - 7) Telecommunication terminal equipment and telephones.
  - 8) The works covered by item 2 to 8 will be arranged by the Purchaser or his agent at the cost of the Purchaser.
- b) The supply and erection of feeding station will come within the purview of this Contract. However, the gantry erection at feeding stations outside the premises of traction sub-stations will be done by the OHE contractor. Stringing of cross feeders and jumper wires at feeding stations shall, however, be done either by OHE contractor or TSS contractor whosoever does the work later or as decided by the purchaser depending upon the ground situation during the course of progress of OHE/TSS work. Necessary materials (other than Railway supply items) for the above stringing works will, however, be required to be arranged by OHE contractor in any case.
- (C) Supply and erection of 25kV shunt capacitor bank alongwith series reactor and other accessories will come within purview of the contract.

### **2.1.59 CLEARANCES**

- a) No part of the installation which is ordinarily live shall be erected at a height less than:



- i) 4.6 m on the 220 KV or 132 KV or 110 KV side.
  - ii) 3 m on the 25 KV side.
- from the datum level. The equipment will be so mounted that the bottom most portion of any insulator or bushing in service is not less than 2.5 metres above ground level.
- b) Clearances between any live part and parts at earth potential (or parts likely to be earthed) shall not be less than 1800 mm and 500mm for 220 KV or 132 KV or 110 KV and 25 KV respectively.
  - c) On the 220 kV or 132 KV or 110 KV side clearance between phases shall not be less than 4 m. The centre distance of 220 KV or 132 KV or 110 KV bays shall not be less than 14 m.
  - d) The layout of the sub-station shall be such as to provide suitable clearances to permit work on the equipment in one bay safely with the adjacent bay alive.

#### **2.1.60 EQUIPMENT AND BUSBAR LAYOUT**

The layout of equipment and busbar arrangement for typical sub-stations is shown schematically in drawing.

#### **2.1.61 NUMBERING**

Each circuit breaker, potential transformer, current transformer, Traction Power Transformer, L.T. Supply Transformer, Isolator and Lightning Arrestor shall carry a vitreous enameled steel number plate of approved design (See Annexure-1). The Purchaser will furnish the actual numbers to be allotted to the various switchgear installed at the sub-station.

#### **2.1.62 BUSBARS**

All equipment to equipment connections on the 220 KV or 132 KV or 110 KV side as well as busbars strung between gantries/ portals to which the HV terminals of the transformers shall be connected, shall comprise ACSR conductors and aluminum alloy tubes. The busbars and busbar connections on the 25 kV side shall consist of aluminum alloy tubes supported on pedestal insulators wherever necessary at intervals of not more than 4.5m.

#### **2.1.63 EARTHING**

- a) Earthing of traction substation shall generally comply with the code of practice for earthing IS: 3043-1987 and RDSO's code of practice No.ETI/PSI/120 (2/91) with A&C Slip No.1 or latest except where otherwise specified. The earthing system shall also conform to Indian Electricity Rules 1956 with latest amendments.

- b) **Earthing System**

At each substation, two separate earth circuit will be provided, one for earthing the HT Equipment and the other for earthing the LT Equipment inside the control room.

- c) **HT earthing grid.**

A combined resistance of earthing system, in any sub-station shall not be more than 0.5 Ohms. To ensure this, the HT earthing grid shall be formed by means of bare mild steel rods of appropriate size as indicated in Clause (d) below buried at a depth of about 600 mm below the ground level and connected to earth electrodes by means of two separate and distinct connections made with 75 mm x 8 mm MS flats. The connection between the MS flat and MS rod shall be made by welding, while that between, the earth electrodes and the MS flats through MS links by bolted joints. As far as possible the earthing grid conductor shall not pass through the foundation block of the equipments. All crossings between longitudinal conductors and transverse conductors shall be jointed by welding. The transverse and longitudinal conductors of the earthing grid shall be suitably spaced so as to keep the step and touch potentials within acceptable limits. The overall length of the earthing grid conductor shall not be less than the calculated length as per the code of practice. The earth electrodes shall be provided at the outer periphery of the grid as indicated in the sketch enclosed in Specification No. ETI/PSI/120 (2/91) with A&C Slip No.1 or latest. The earth electrodes shall be embedded as far away as possible from each other. Mutual separation between them shall usually be not less than 6m. The contractor shall submit detailed design calculation for the earthing system and obtain approval of the design/drawings.

d) **Earthing Grid Conductor.**

The size of the earthing grid conductor shall be decided based on the incoming system voltage and fault level. The size of the grid conductor for fault level upto 12000 MVA will be 32mm dia and above 12000 upto 160000 MVA 36mm dia and above 16000 upto 20000 MVA, 40 dia MS rod respectively.

e) **Earth Electrodes.**

The earth electrodes shall normally be of mild steel galvanised perforated pipe of not less than 40mm nominal bore of about 3m length provided with a spike at one end and welded lug suitable for taking directly MS flat of required size at other end. The pipe shall be embedded vertically into the ground as far as possible except in case of hard rock, it may be buried inclined, the inclination being limited to 30 degree from the vertical. The connection of MS flats to each electrode shall be made through MS links by bolted joints. A typical drawing of one earth electrode installation is indicated in Annexure-1. If the value of earth resistance specified may not be achieved with a reasonable number of electrodes connected in parallel such as in rocky soil or soil of high resistivity, the earth surrounding the electrodes shall be chemically treated by alternative layers of finely divided coke, crushed coal or charcoal and salt at least 150mm all around. However, coke treatment shall be used only where absolutely necessary and such electrodes shall not be situated within 6 m of other metal work. In high embankments, use of electrodes longer than 3 m shall be considered so as to reach the parent soil to achieve earth resistance as specified.

f) **Buried Rail.**

A steel rail of section 52 Kg/m and length about 13 m shall be buried near the track at the traction sub-station at a depth of about 1 m to form part of the earthing system. Two separate and distinct connections shall be made by means of 75 mm x 8 mm MS flats between the earthing grid and the buried rail. The buried rail shall also be connected by means of two separate and distinct connections made with 75 mm x 8 mm MS flats to the non-track circuited rail in a single rail track - circuited section and to the neutral point(s) of impedance bond(s) in a double- rail track circuited section. In case where the feeding post is located separately away from the traction substation, the buried rail shall be provided at the feeding post (where one terminal of the secondary winding of the traction power transformer is grounded).

g) **System earthing .**

One terminal of the secondary winding of each traction transformer shall be earthed directly by connecting it to the earthing grid by means of a 75mm x 8mm MS flat and to the buried rail by means of another 75 mm x 8 mm MS flat. One designated terminal of the secondary of each potential, current and LT supply transformer shall also be connected to the earthing grid by means of two separate distinct earth connections made with 50 mm x 6mm MS flat.

h) **Equipment earthing.**

The metallic frame work of all outdoor equipments such as transformers, circuit breakers, Interrupters & Isolators. As well as steel structures shall be connected to the earthing grid by means of two separate and distinct connections made with MS flat of size 50 mmx 6 mm upto 10000 MVA and by 75 mm x 8 mm MS flats above 10000 MVA upto 20000 MVA. Equipments on the secondary side of the traction power transformer and steel structures shall be connected to the earthing grid by means of two separate and distinct connections made with MS flats of size 50 mm x 6 mm. One connection shall be made with the nearest longitudinal conductor while the other shall be connected with the transverse conductor.

i) **Earthing inside the control room.**

An LT earth circuit shall be provided inside the Control Room by means of 50 mm x 6 mm mild steel flat and connected to the main earth ring by two independent connections made with 50 mm x 6 mm mild steel flat. The metallic frame work of control panels, L.T., AC and DC distribution boards, battery chargers, remote control equipment, cabinets, etc. shall be connected to the earth ring by means of 8 SWG galvanised steel wire.

j) **Earthing of lightning arrestors.**

In addition to the earth electrodes provided for the main earthing grid, an independent earth electrode shall be provided for each lightning arrestor. The earth electrode shall be connected to the ground terminal of the lightning arrestor as well as the main earthing grid by means of two separate and distinct connections made with 50 mm x 6 mm MS flat for 25kV side lightning arrestor, and with 75mm x 8 mm MS flat for the primary side lightning arrestor. The earth electrode shall be provided as close as possible to the lightning arrestor and the connection shall be as short and straight as possible avoiding unnecessary bends. For lightning arrestors provided for the traction transformers, there shall also be a connection as direct as possible from the ground terminal of the lightning arrestor to the frame of the transformer being protected by means of two separate and distinct connections made with 50mm x 6 mm MS flat for 25kV side arrestor and with 75mm x 8mm MS flat for primary side arrestor.

k) **Earthing of fencing uprights and panels.**

Each metallic fencing uprights shall be connected to the main earthing grid by means of two separate and distinct connection made with 50 mm x 6 mm MS flat. In addition, all the metallic fencing panels shall be connected to the uprights by means of two separate and distinct connections made with 6 SWG GI wire. All the metallic door panels shall also be connected to the supporting uprights by means of two separate and distinct connections made with 6 SWG GI wire.

l) **Method of jointing**

All the joints between the MS flats, MS rods or between MS flat and MS rods shall be made by welding only. No soldering shall be permitted. For protection against corrosion, all the welded joints shall be treated with red lead and afterwards thickly coated with bitumen compound.

m) **Painting of MS Flats.**

For protection against corrosion, all the exposed surfaces of earthing connections (MS flats) above ground level shall be given all around two coats of painting to colour grass green, shade-218 of IS:5.

**2.1.64 EARTH SCREEN.**

The area covered by outdoor sub-station equipment shall be shielded against direct strokes of lightning by an overhead earth screen comprising 45 tone quantity 7/9 SWG, 19/2.5mm galvanised steel stranded wire strung across pinnacles of the metallic structures as indicated in the drawings included in Annexure-1. The earth screen wires shall be fixed not less than 2.5 Mt above the live conductors so as to provide an angle of protection, not exceeding 30 degree to the equipment/busbar below and shall be solidly connected to the sub-station earth circuit by means of 50 mm x 6 mm MS flats.

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**PART-II**  
**CHAPTER-I**  
**SECTION-V**  
**SCADA Works**

**-DELETED-**

**PART-II  
CHAPTER-II  
FOUNDATION**

**2.2.1 SCOPE :**

- (a) This chapter deals with the design of foundations and anchor blocks for traction structures carrying overhead equipment (including those on bridges), structures at switching stations and booster stations and other concrete work. It also deals with the specification for concrete.
- (b) While casting a foundation, care shall be taken to ensure that no part of it and mast erected therein do not infringe the dimensions given in Schedule of Dimensions as mentioned in Para - 2.1.1 (c) "Indian Railways Schedule of Dimensions".

**2.2.2 DESIGN OF FOUNDATION:**

**(a) SOIL PRESSURE**

For design of foundations for traction structures carrying overhead equipment, the Contractor shall determine the type and allowable bearing pressure of soil at suitable intervals and adopt the type and size of foundations, suitable for particular locations with the help of the approved employment schedules. In cases of particularly weak soil, the bearing pressure may have to be determined for each location where so advised by the Purchaser. Soil bearing pressure, using SPT (falling weight equipment) should be determined generally for every 5 kilometer interval or less wherever change of soil is encountered. In general IS code of practice (IS 6403:1981) should be followed. In addition, at every 250 m the soil bearing pressure should be determined by dial gauge type penetrometers. Dial gauge type penetrometers shall also be made available by the Contractor at each foundation site so as to facilitate cross check at each individual location.

For design of foundation for masts and gantries at switching stations and booster stations, the Contractor shall determine the type and allowable bearing pressure of soil at the locations of such stations and shall prepare designs for the foundations suitable for each location to suit the bearing pressure of the soil in consultation with the Purchaser.

**(b) STRUCTURES CARRYING OVER-HEAD EQUIPMENT**

Foundations for traction structures carrying overhead equipment shall be either of the side bearing side gravity or new pure gravity type according to their location, formation of the sub-grade and bearing pressure of the soil. In new filled up soil or cinder formation, pure gravity sand-filled core foundations, or foundations with cast-in-site reinforced concrete piles, or cantilever types foundation with counter-weights or guyed foundations may be adopted.

**(c) ON BRIDGE PIERS**

Complete design of foundations for traction structure on bridges to suit different locations and local conditions will be furnished by the Purchaser.

**(d) MASTS & FABRICATED STRUCTURES AT SWITCHING STATIONS/TSS**

Foundations for the masts of gantries at switching stations and TSS shall be of the pure gravity type, the base of which shall rest on consolidated soil.

**(e) FENCING POSTS**

Foundation for fencing posts shall rest on consolidated soil if the depth of unconsolidated soil is less than 1.5 m below the datum level and shall be rectangular parallel piped in shape. If the depth of unconsolidated soil is more than 1.5 m the foundation block shall rest on reinforced concrete piles cast-in-site or reinforced concrete foundation may be adopted as desired by the Purchaser.

**(f) TYPICAL DESIGN**

Typical design and drawings of side bearing and new pure gravity and side gravity type foundations are included in the drawings. Employment schedules for standard foundations for traction structures for various locations and types are also included in the drawings.

**(g) SPECIAL FOUNDATIONS**

- (i) In the case of foundations at locations not covered by the employment schedules furnished by the Purchaser, the Contractor shall prepare special designs and furnish full design calculations justifying the choice of the type of foundations for such locations. In black cotton soil especially pile foundations of under reamed type as per RDSO'S standard designs (Reference RDSO'S Drawings No.ETI/C/0062 MOD-B or latest) or any other approved design may have to be cast at limited locations for trial purpose. The tenderer may furnish the technical details of alternative design, construction methods proposed to be adopted and their previous background/experience if any.

**(ii) Foundation in Contact/Buried under Non-aggressive Soil/Ground Water :**

The Foundation Concrete shall be of M-15 Grade. The Core concrete shall be M-20 Grade. It shall be adopted in the areas where concrete is in contact/buried under Non-aggressive soil/Ground water as per IS: 456-2000.

**(iii) Foundation in Coastal Areas:**

The Foundation Concrete shall be of M-20 Grade. The Core concrete shall also be M-20 Grade. It shall be followed in the areas where concrete is exposed to Coastal Environment as per IS: 456-2000.

- (iv) For casting the OHE foundation in Soft Rock and Hard Rock, RDSO drawings mentioned at Sl. No. - 123 of LIST OF STANDARD DRAWINGS AND SPECIFICATIONS of tender Document.

The decision of the Purchaser with regard to feasibility and suitability of adoption of the alternative design for each type of foundation will be final.

**(h) EQUIPMENT PEDESTALS**

Pedestals for interrupters and L.T. supply transformers where required, shall be of mass concrete with the base resting on consolidated soil. Pedestal for Power transformers shall be made of mass concrete with base resting on consolidated soil. Foundation for circuit breakers supported on steel structures and for other items of equipments such as isolator, instruments transformers, bus bar support insulators etc. shall be of the pure gravity type, the base of which shall rest on consolidated soil, and shall be left with core holes into which the legs of the supporting structures shall be suitably fixed by grouting.

**(j) CABLE TRENCHES**

The cable trench shall rest on original ground if the depth of unconsolidated soil is less than 0.5 m. If the depth of the unconsolidated soil is more than 0.5 m., the cable trench shall be made of reinforced cement concrete of approved design supported at suitable intervals on concrete pillars.

**2.2.3 BEARING PRESSURE:**

**(a) GUIDING INFORMATION**

Subject to Para 2.2.2 (a) above, the following allowable bearing pressures may generally be expected for various kinds of soil. The information is given for general guidance only.

- |       |  |                     |
|-------|--|---------------------|
| (i)   | Average good soil in banks and cutting     | ... 11,000 kg/sq.m. |
| (ii)  | Moorum soil in cutting                     | ... 22,000 kg/sq.m  |
| (iii) | New banks & bad soils in banks and cutting | ... 5,500 kg/sq.m.  |

- (iv) Black cotton soil-pure gravity foundation shall normally be adopted. However, under reamed pile foundations may be adopted at the option of the Purchaser in limited locations for trial purpose. In the case of dry black cotton soil, the soil should be subjected to a bearing pressure as close as possible but not exceeding 16,500 kg/sq.m. the depth of the foundation block being not less than 2.8m. In the case of wet black cotton soil, the soil should be subjected to a bearing pressure as close as possible but not exceeding 8,000 kg/sq.m.

In the case of hard rock, a hole should be blasted in the rock, or by means of any other drilling and pneumatic method and the mast sealed into it with concrete.

#### 2.2.4 CONCRETE:

Concrete for foundations shall be nominal mix / Ready mix of grade M 10 (or M 15) obtained by mixing cement, coarse aggregate, fine aggregate and water in accordance with proportions given vide Table 3 of IS:456 (or latest) reproduced below. For grouting, muffing, embedding of structures in foundations and for cable trenches at switching stations, nominal mix concrete M 15 (or M 20) obtained by mixing materials in proportions as indicated in Table-3 of IS:456 (or latest) shall be used. Volume batching may be adopted vide clause 9.2.2. of IS:456 (or latest) reproduced below :-

**IS: 456-2000** (or latest)

**TABLE - 3:** PROPORTIONS FOR NOMINAL MIX / READY MIX CONCRETE  
(Clause 9.3 and 9.3.1)

Grade of concrete	Total quantity of dry aggregate by mass per 50 kg of cement, to be taken as the sum of the individual masses of the fine and coarse aggregates kg max.	Proportion of fine aggregate of coarse aggregate (by mass)	Quantity of water per 50 kg of cement (max. Liters)
1	2	3	4
M 5	800	Generally 1:2 but subject to an upper limit of 1 : 1.5 and a lower limit of 1 : 2.5	60
M 7.5	625		45
M 10	480		34
M 15	350		32
M 20	250		30

**NOTE:** (i) The proportions of the fine to coarse aggregates should be adjusted from upper limit to lower limit progressively as the grading of the fine aggregates becomes finer and the maximum size of coarse aggregate becomes larger. Graded coarse aggregate shall be used.

(ii) Minimum grade of concrete shall be not less than M - 20 in reinforced concrete work.

#### Example:

For an average grading of the fine aggregate (that is zone II of Table 4 of IS : 383 (or latest) the proportions shall be 1:1.5, and 1:2 and 1:2.5 for maximum size of aggregate 10 mm, 20 mm and 40 mm respectively.

\* Specification for coarse and fine aggregates from natural sources for concrete (second revision).

"Volume batching may be allowed only where weigh-batching is not practical and provided accurate bulk densities of materials to be actually used in concrete have earlier been established. Allowance for bulking shall be made in accordance with IS: 2386 (Part-3) (or latest). The mass volume relationship should be checked as frequently as necessary, the frequency of the given job being determined by Engineer – In charge to ensure that the specified grading is maintained."

In judging the acceptability of the materials, quality of concrete and the method of work, the Purchaser will generally observe the provisions of the "Indian Standard code of Practice for Plain and Reinforced Concrete, IS:456 (or latest). The crushing strength of concrete shall not be less than the limits given below:-

#### Specified characteristic Compressive strength of 15 cm cubes at 28 days.

Grade of Concrete	At 28 days age
(a) M. 10	10 N/mm <sup>2</sup>
(b) M. 15	15 N/mm <sup>2</sup>
(c) M 20	20 N/mm <sup>2</sup>

**NOTE:** (a) Test specimen of works tests shall be taken at the site of work from mixture of concrete ready for pouring into the foundation hole. All tests shall be carried out in accordance with IS: 516 (or latest) . The sample of concrete from which test specimens are made shall be representative of the entire batch.

(b) Age is reckoned from the day of casting.

#### **2.2.5 SIZE AND GRADING OF AGGREGATES :**

The graded coarse aggregate 40 mm nominal size (table 2 of IS: 383 (or latest)) shall be used for foundation. A coarse aggregate for grouting muffs and embedding shall be of 20 mm graded nominal size as per table 2 of IS: 383 (or latest) (specification for coarse and fine aggregate from natural sources for concrete).

Fine aggregate shall be graded from 10 mm downwards. The maximum size of aggregate for under reamed pile foundation shall be 20 mm graded nominal size.

#### **2.2.6 SAND CORED FOUNDATIONS :**

After erection of masts in sand-cored foundations, the core hole of the foundation blocks shall be filled with dried sand and covered with a layer of bitumen of 80 mm thickness below 30 mm from top level of the block. . A hemispherical shaped muff shall be provided on such foundations in lieu of standard type.

#### **2.2.7 SINKING OF CONCRETE SHELLS:**

Where the water-table is high, one or more sections of reinforced concrete shells may have to be sunk before casting concrete. The size of each of shell shall be 1,200 mm outside dia x 50 mm thick x 600mm high reinforced with 6 mm (1/4") dia rods spaced 150 mm apart, both longitudinally and circumferentially, the concrete shall be of grade M.20 as per provisions of para 2.2.4.

#### **2.2.8 TYPE OF FOUNDATION IN BLACK COTTON SOIL :**

The foundations in dry black cotton soil should be of type BC or NBC or any other type as approved by the Purchaser.

#### **2.2.9 CEMENT:**

The cement to be used in the construction of PCC / RCC structures should be of Ordinary Portland Cement to IS:269 (or latest) or Portland Pozzolana cement (fly ash based) as per IS: 1489 Pt-I (or latest).

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**PART II  
CHAPTER III  
STRUCTURES**

**2.3.1 SCOPE :**

- (a) This chapter deals with the design of steel structures and steel work for overhead equipment, switching stations, booster transformer stations and L.T. supply transformer stations and the specification for steel and prestressed concrete trial mast.
- (b) This Chapter deals with the design of all structural steel work including gantry structures, supporting structures and small parts steel work including chairs, brackets and other fabricated steel-work for mounting various equipments, busbars, cables etc. at Traction sub-stations, feeding stations and shunt capacitor banks

**2.3.2 TYPES :**

Structures and gantries may consist of any or more of the following types :-

- (i) Broad flange beams.
- (ii) Rolled steel joists (I section).
- (iii) Fabricated steel Structures (welded/bolted).

Structure/uprights shall generally be embedded in concrete foundation blocks in special cases Structures may be secured by means of holding down bolts. Limited quantity (approx. 700 nos.) of circular spun prestressed concrete masts may also be used at the sole discretion of the Purchaser.

**2.3.3 DESIGN :**

**2.3.3.1 FOR OHE :**

**(a) STEEL STRUCTURES**

Designs for steel Structures shall, except where otherwise Provided, comply with the Indian standard code of practice for use of structural steel in General Building Construction- IS: 800 (or latest). The thickness of smallest steel sections used shall be 5 mm for galvanised members.

- (b) All the steel Structures and small part steel for carrying overhead equipment are to be fully galvanised after drilling and fabrication as per specification **ETI/OHE/13 (4/84)** (or Latest) and no painted structures are to be used.

**2.3.3.2 FOR TSS :**

**(a) GENERAL**

The steel structures may be of riveted, bolted or welded construction as convenient for installation. The thickness of smallest steel section used shall not be less than 6 mm (or 1/4"). Legs of gantry structures/portals and supporting steel work and uprights or busbar supports shall generally be embedded in concrete foundation blocks and for equipment and in special cases secured by means of holding down bolts.

**(b) DESIGN**

- a) All the steel structures like gantries/portals, other supporting members, small part steel work etc. shall be galvanised after fabrication with a minimum value of average mass of zinc coating being not less than 610 g/m<sup>2</sup> as per RDSO's specification No.ETI/OHE/13 (4/84) with Amendment No.1,2 & 3 or latest.
- b) All designs for special steel work shall be furnished by the Contractor, for approval of the Purchaser. Designs for steel structures shall except where otherwise provided, comply with the "Indian Standard Code of Practice for use of Structural steel in General Building Construction" - IS : 800 - 1984, other relevant IS Specifications and statutory regulations.
- c) For purposes of design, all possible loads which may occur in the worst combination shall be considered.

d) **Steel Structures**

For calculation of wind load on structures, conductors and equipment, the basic wind pressure shall be taken as 112.5 Kg/sq.m.

- e) For purposes of design of gantries, the tension in the 220 kV incoming/outgoing lines shall be taken as 200 kg. at 4 degree C (without wind) in each conductor and 150 kg. at 4 °C (without wind) in the earthwire. The tension in the 66 kV strung busbars and earth screen wire at 66/25 kV sub-stations shall not exceed 200 kg. at 4 °C (without wind).

f) **Uprights and fencing posts.**

Uprights carrying equipment such as potential transformers, current transformers, lightning arrestors, busbar support insulators, shall be made from standard metric steel sections viz. channels, angles or small joists, either single or fabricated.

- g) Notwithstanding the provisions contained in I.S. and other regulations referred to in Para 2.3.3.2(b) above regarding permissible deflection, the following should apply.

The deflection at the top of the mast or structure shall be limited to one eightieth (1/80) of its height above foundation.

- h) The torsional rotation of the mast due to permanent loads shall not exceed 0.1 radian.

**2.3.4 CANTILEVER MASTS:**

**(a) LOAD**

For purposes of design the worst possible combination of all loads that may occur shall be considered.

The load shall include the following (weights to be assumed for design of Structures are shown against important items).

- (i) Weight of overhead equipment (1.60 kg/metre for each conventional and 1.32 kg/metre for each composite OHE).
- (ii) Weight of bracket supporting the overhead equipment (60 kg/normal bracket)
- (iii) Weight of a man (60 kg)
- (iv) Weight of an earth wire (0.32 kg/metre).
- (v) Weight of feeder, return conductor or other special equipment wherever they occur.
- (vi) The effect of eccentricity of vertical and horizontal loads on the bracket due to variation in temperature.
- (vii) Wind loads perpendicular and parallel to the track. The wind pressure adopted shall be taken as that indicated in part-III.
- (viii) Radial forces on the mast, due to stagger, curvature, anchorage etc.
- (ix) Weight of the mast itself.
- (x) Any other load or loads that may occur due to special location of the Structures.

**(b) DEFLECTION**

Notwithstanding the provisions contained in IS:800 (or latest) referred to in para 2.3.3 above regarding permissible deflection, the following shall apply.

- (i) The deflection at the top of the mast due to permanent loads shall not exceed 8 cm and the mast shall be so erected that it becomes reasonably vertical after application of permanent loads.

- (ii) The additional deflection under maximum wind pressure shall not exceed 8 cm at the level of the contact wire.

**(c) TORSION**

The torsional rotation of the mast due to permanent loads shall not exceed 0.1 radian.

**(d) TYPICAL DESIGN**

The typical design of a traction mast is included in the set of standard drawings. Employment schedules for standard masts for various locations and types are included in the standard drawings, to enable selection of suitable type for different locations and local conditions.

**2.3.5 ANCHOR MASTS:**

- (a) Masts at which overhead equipment will be anchored shall also normally be of the same type as those in other locations. Anchor masts shall normally be provided with suitable guys but struts may be permitted in special cases.

**(b) DWARF MASTS**

At certain locations where due to local conditions it is not feasible to anchor the guy rod on a foundation block in the ground, a dwarf mast shall be used in accordance with approved designs.

**2.3.6 HEAD SPANS : (See paras 2.1.21 and 2.4.19)**

**(a) LOAD**

The loads to be considered shall be as detailed in para 2.3.4 (a) as far as applicable and at their worst combination.

**(b) SAG FOR HEAD SPAN WIRE**

The sag of the head span wire shall be approx. one-tenth (1/10) of the span.

**(c) MINIMUM TENSION IN CROSS SPAN & STEADY SPAN WIRES -**

For purpose of design, a minimum tension of 200 kg, shall be ensured in the span wires for worst combination of temperature and wind load.

**(d) DEFLECTION OF MAST**

Deflection at the top of the mast or Structure shall be limited to one-eightieth (1/80th) of its height above foundation.

**(e) TYPICAL DESIGN**

Typical design for head span mast carrying overhead equipment for 4 tracks will be furnished to the contractor.

**2.3.7 PORTALS : (See 2.1.21)**

**(a) GENERAL**

Portals shall be of fabricated steel of standard types of purchaser's designs. The most important designs are covered by Drawings.

**(b) LOAD**

The load shall be as detailed in para 2.3.4 (a) as applicable.

**2.3.8 STRUCTURES ON BRIDGES:**

- (a) The structure may be either cantilever masts or portals (hinged or fixed at base) depending on the type and condition of bridge pier capping. As far as possible cantilever masts grouted in foundations

blocks on pier will be used. Where this is not possible cantilever masts with holding down bolts or suitable portals (hinged or fixed at the base) may be adopted.

- (b) Designs of structures on bridges to suit different locations and local conditions will be furnished to the contractor by the Purchaser.

#### **2.3.9 SPECIAL STRUCTURES :**

In the case of structures at locations not covered by the employment schedules furnished by the Purchaser, the contractor shall furnish complete design calculations justifying the choice of the type of structures for such locations.

#### **2.3.10 SETTING OF STRUCTURES:**

- (a) The setting is the distance from the Central line of the track, on straight or curve to the face of the mast/structure of fitting located on the mast.
- (b) On straight and outside of curve, the standard setting shall be as per the relevant drawing included in Annexure-1, Part IV. Minimum setting of structures shall be 2.8 M plus curve allowance as required. Whenever this distance can not be provided, specific approval of Purchaser shall be obtained before erection. Setting of portal upright overlap/ turn-out structures, anchoring structures and other masts carrying more than one OHE will be 3.0 m wherever possible.

- (c) **EXTRA CLEARANCE ON CURVES**

The minimum setting of structures on curves shall be determined by adding to the above minimum figures an extra clearance indicated in the table included in the set of standard drawings listed in Annexure-1, Part-IV.

- (d) **STRUCTURES WITH COUNTER WEIGHTS**

In case of structures carrying counter-weight assemblies, the term "setting" shall refer to the minimum distance of the counter-weight from the track center under the worst conditions of wind.

- (e) **STRUCTURES ON PLATFORM**

The setting of structures on platform shall be not less than 4.75 m.

- (f) **STRUCTURES NEAR SIGNALS**

In the vicinity of signals, structures shall be located in a manner which shall ensure good visibility where necessary, the setting shall be increased as per the relevant drawing.

- (g) **SETTING OF STRUCTURES**

The value of setting of masts/structures shall be painted on each mast/ structure. The figure shall be 25 mm in size in white on a red background. In addition, the track level shall also be marked on the mast/structure by a horizontal red painted stroke.

#### **2.3.11 NUMBERING OF STRUCTURES CARRYING OVERHEAD EQUIPMENT :**

All structures shall be numbered in accordance with the numbering given in the approved overhead equipment layout plans. Enameled/Retro-Reflective number plate shall be provided on each mast or structure as per approved designs (See Annexure-1, Part-IV).

#### **2.3.12 STEEL WORK FOR SWITCHING STATIONS AND GANTRIES:**

- (a) **HORIZONTAL MEMBERS OF GANTRY**

Horizontal member of main as well as auxiliary gantry carrying isolator switches, insulators, potential transformers etc. shall be made from steel sections viz. channels, angles and small joists, single or fabricated. They shall preferably be attached to masts by means of clamps to avoid drilling of masts sections.

- (b) For purpose of design, all possible loads which may occur in the worst combination shall be considered. The loads shall include the followings:-
  - (i) Weight of insulators, instrument transformers, isolator switches, busbars, and their accessories.
  - (ii) Loads caused by feeders, along and across tracks, return feeders etc.
  - (iii) Loads caused by anchorage due to guying of anchored masts (where applicable).
  - (iv) Pull or Push on the structures due to anchorage and radial tension (where applicable).
  - (v) Wind load on the different structures, conductors and equipment. The wind pressure shall be taken as that indicated in part-III.
  - (vi) Weight of men working on the structures.
  - (vii) Weight of structure itself.
  - (viii) Erection loads.
  - (ix) Any other load or loads which may occur due to special equipment wherever they occur.

**(c) TENSION OF CONDUCTORS**

For purpose of designs, the maximum tension of different conductors, without wind load, shall normally be as under:-

- (i) Deleted.
- (ii) Maximum tension in the cross feeders at switching stations under worst conditions:-
  - (1) For spans less than 18 m ... 100 kgf.
  - (2) For spans more than 18 m ... 200 kgf.
- (iii) Maximum tension in longitudinal feeders running parallel to the track at the switching stations under worst conditions. 1500 kgf.
- (iv) Tension in anchored overhead equipment in case of sectioning and paralleling stations 2,000 kgf.

**(d) DEFLECTION OF GANTRY MASTS**

Deflection under the permanent loads (at an average temperature of 35°C without wind) at the top of the fabricated structures of mast shall be limited to one eightieth (1/80) of its height above foundation.

- (e) Masts of the gantry at which feeder or overhead equipment will be anchored at the switching stations shall normally be provided with suitable guys, but struts shall not be permitted.

**(f) CHAIRS AND BRACKETS**

Chairs, brackets and supporting steel work carrying potential transformers, lighting arrestors, insulators, etc, shall be made of fabricated steel and be mounted on the main auxiliary gantry preferably by means of clamps to avoid drilling of mast sections.

**(g) UPRIGHTS AND FENCING**

Uprights carrying operating handles of isolators and fencing posts shall be made from steel sections, viz. channels, angles or small joists, either single or fabricated.

**2.3.13 STEEL:** Steel conforming to IS: 2062 (or Latest) shall be used for all fabricated steel work.

XXXXX

**PART II**  
**CHAPTER IV**  
**Equipments, Components & Materials**

**2.4.1 GENERAL:**

- (a) This chapter deals with the details and specifications of the equipment, components and materials to be used for traction overhead equipment, switching stations, booster transformer stations and L.T. supply transformer stations. This chapter does not cover structures and foundations, which are dealt with in Part-II, Chapter-II and III. In general based on the specifications issued by various bodies, such as Bureau of Indian Standards, British Standard Institution etc. Specifications have been issued by the Purchaser. Such specification may be bought separately from the office of the Purchaser. All these specifications are included in the set of drawings and specifications referred to Annexure-1.
- (b) This chapter deals with details and specifications of the equipments, components and materials to be used at the traction sub-station, feeding station and shunt capacitor bank. It does not cover foundations and structures which are dealt with in Chapters II and III respectively. The detailed specifications for various items of equipment and materials issued by the Purchaser may be bought separately from the design office of the Purchaser's Engineer or referred to Annexure-1.

**2.4.2 COMPLIANCE WITH STANDARD SPECIFICATION :**

In the technical specifications of equipments, components and materials, references are made to the following standard specifications:

- (i) International Electro Technical Commission (abbreviated as IEC) publications.
- (ii) British Standards (abbreviated as BS)
- (iii) Bureau of Indian Standards (abbreviated as IS or BIS)

Tenderers may, however, offer equipment in accordance with the appropriate national standard specifications of the country of manufacture, but such offers will be treated as deviations and should be quoted for in the manner specified in FORM-3 rendering of the text and illustrations of the national standard specifications and explanatory notes on the specific deviations from IEC, British or Bureau of Indian Standards in question, shall also be submitted in FORM-3. In case of doubt, the Purchaser shall decide the clause and specification applicable and the contents of the specification and standard mentioned above shall guide such decisions.

**2.4.3 QUALITY ASSURANCE:**

The provisions of part-I for quality assurance will apply, including facilities to be provided by the manufacturer (See para Quality Assurance)

**2.4.4 PROTO TYPE TESTS :**

**(a) FITTINGS, COMPONENTS AND MATERIALS**

All the fittings, components and materials to be supplied by the contractor, in terms of this contract, the requisite number of prototypes of components shall be supplied free of cost to the Purchaser for tests and approval. The tests will be conducted in a laboratory selected by the Purchaser.

**(b) EQUIPMENTS**

This comprises inspection and tests conducted on the first equipment of a specified manufacturer, which the Purchaser considers sufficient to prove that the design is in conformity with the specification at the manufacturer's factory. The type tests shall be conducted on each equipments as indicated in the individual specifications referred to in para 2.4.1 above, in the presence of the Purchaser's representative. The contractor shall arrange to get these tests conducted at his own cost.

**(c) RESPONSIBILITY**

Any testing and approval by the Purchaser of prototype shall in no way absolve the contractor of his responsibility under the terms of the contract for the equipment supplied and erected.

**(d) EXEMPTION FROM PROTOTYPE TESTS**

If prototype samples of equipments, components or fittings of any manufacturer have already been approved in connection with the electrification of other sections of Indian Railways, on the 25 KV 50 HZ single phase A.C. system prototype samples of such equipments, components or fittings will be exempted from the tests. Supply of bulk quantities shall, however, be effected only after the Purchaser's prior approval is obtained in writing.

- (e) The results of prototype tests will be communicated to the Contractor as expeditiously as possible. Any delay in this respect will be ground for extension of time for completion of work under para Extension of time.

**2.4.5 INSPECTION AND TESTS:**

These comprise inspection and tests conducted at the manufacturer's factory for ensuring quality of manufactured items as part of the quality Assurance Programme.

**2.4.6 TEST CERTIFICATES:**

Three copies of the test certificates of successful prototype tests carried out at the manufacturer's factory on all equipments shall be furnished to the Purchaser within a month after completion of the prototype tests. Three copies of the routine tests carried out on each equipment shall also be furnished, after the equipment is passed by the Purchaser's representative for inspection (See para Quality Assurance).

**2.4.7 BULK MANUFACTURE:**

Bulk manufacture may be undertaken only after specific written approval of the Purchaser or his representative has been obtained indicating that tests on the prototypes are satisfactory. Where prototypes have already been approved in connection with it manufacturer may proceed after exemption from prototype tests is received from the Purchaser in writing.

**2.4.8 INTER CHANGEABILITY :**

All equipments, components and fittings shall be inter-changeable and supplies shall be in accordance with the Purchaser's designs unless otherwise specifically approved by him. Components such as fuses, indication lamps etc. should be replaceable with substitutes available indigenously, as far as possible. Important components and fittings and their drawings have been listed in Schedule-3.

**2.4.9 TECHNICAL SPECIFICATIONS:**

Please see at **Anexure-1** (A, B, C, D, E, F & G). List of standard RDSO drawings, RDSO specifications and IS specifications for important materials, components and equipments (As per latest version).

**2.4.10 NOMENCLATURE AND MARKING :**

- (a) All components and fittings supplied by the Contractor's shall bear the respective identification number and a mark to identify the source of supply except in the case of galvanised tubes, bolts and nuts and/or any other fittings as may be agreed to by the Purchaser.
- (b) In case of insulators, galvanised steel tubes, stainless steel wire rope and conductors, name of manufacturer shall be specified in "As Erected" drawings for identification.

**2.4.11 STEEL WORK AND PROTECTION AGAINST RUST :**

**(a) GALVANISING**

All ferrous materials and fittings shall be hot dip galvanised according to the specification ETI/OHE/13 (4/84) (or latest).

**(b) PAINTING**

Some components or parts may, with the approval of the Purchaser, be protected only by paint and parts so protected shall be given two coats of composite Aluminium primer and two coats of Aluminium paints. The second coat of Aluminium paint shall be applied after erection.

**(c) RECTIFICATION AT SITE**

In case of modifications which would damage the protective coat, repairs to such damage would be allowed only in exceptional circumstances. The part damaged shall be protected in accordance with the method indicated in specification **ETI/OHE/13 (4/84)** (or latest) or any other method approved by the Purchaser. The Contractor shall in all such cases obtain prior permission from the Purchaser before carrying out repairs.

**2.4.12 BRACKET ASSEMBLY COMPONENTS : (see para 2.1.22)**

**(a) ARRANGEMENT FOR NORMAL OHE**

The arrangement of the different fittings and structural components of bracket assemblies are shown in drawings listed in Annexure-1, Part-IV. The employment schedule of bracket will be furnished to the Contractor.

**(b) BRACKET**

Bracket tubes shall be of seamless cold drawn or electric resistance weld steel complying with **ETI/OHE/11 (5/89)** (or latest) with an insulator near the support. The length of the tubes shall be such that there is a free length of about 200 mm beyond the catenary suspension bracket. To facilitate adjustment during track maintenance [(see para 2.6.10 (b))].

**(c) TUBULAR STAY ARM**

Steel tubes with adjustable steel rods shall be used for tubular stay arm of all bracket assemblies.

**(d) REGISTER ARM**

The register arm shall also be electrical resistance weld or cold drawn steel tubes or proper dimensions duly formed. It shall be suspended by a dropper from the catenary suspension clamp/bracket tube. A hook and eye arrangement shall be used at the bracket end to permit free movement in every directions.

**(e) STEADY ARM**

Steady arm shall normally be fitted in all assemblies for overhead equipment in running. The steady arm shall be of light alloy BFB section arranged to work always in tension in accordance with **ETI/OHE/21(9/74)** (or latest). Steady arms of secondary tracks may be of solid galvanised steel rodding. The contact wire shall be fixed by a simple swivel clip without threaded parts. Steady arms shall normally be 1.0 m long» but for special locations such as turnouts, diamond crossing etc. Steady arms shall be longer as indicated in the relevant drawings listed in Annexure-1, part- IV.

Bent steady arms of aluminum alloy tube conforming to Spec.ETI/OHE/21 (9/74) (or latest) shall be used for neutral section overlap and in the central mast of a 4 span insulated overlap.

**(f) BRACKET FOR UNREGULATED TRAMWAY TYPE EQUIPMENT**

Brackets provided on cantilever masts for tramway type unregulated equipment shall normally span two tracks and the contact wires carried on V-type clamps suspended from a span wire. The span wire shall be provided with a turn buckle at only one end.



#### **2.4.13 DROPPERS : (see para 2.1.13)**

##### **(a) GENERAL DESIGNS**

The droppers shall generally be designed as shown in standard drawings and made of copper wire about 5 mm diameter conforming to **IS:282** (or latest) and shall be attached to the catenary wire by a copper dropper clip. The contact wire shall be held by a clip of aluminum bronze as shown in the standard drawings. The distribution of dropper shall be in accordance with standard designs.

##### **(b) LOADING**

The droppers shall be able to withstand a vertical load of 200 kg at the point of attachment to the contact wire and the clip shall not slide under a horizontal load of 120 Kgf.

(c) The permissible tolerance in the over all length of a dropper will be  $\pm 5$  mm.

#### **2.4.14 INSULATORS :**

(a) All insulators except those on return conductors and earth wires shall be of the solid core type. Disc insulators shall be used on return conductors and earth wires or other locations as desired by the Purchaser. All solid core insulators shall conform to TI/SPC/OHE/INS/0070 (or latest) or Specification No.TI/SPC/OHE/INSCOM/0991 (or latest) is for Composite Insulators wherever applicable.

##### **(b) INTER-CHANGEABILITY**

For free inter-changeability only the following types of insulators shall be used. While the shapes of the insulators may vary slightly from those shown in the drawings, the essential dimension of the galvanised malleable cast iron caps as given in standard drawings shall be adopted.

(i) **Stay arm Insulators:** These insulators will be used in conjunction with The tubular stay arm of all bracket assemblies.

(ii) **Bracket Insulators:** These will be used at the base of each bracket assembly in conjunction with bracket tubes.

(iii) **9-Tonne Insulators:** These will be used at all places for cut-in and Terminal insulation including those in return conductors, but excluding those in earth wire.

iv) **Solid core post insulators :** These will be used at all places for supporting isolators mechanisms,-bus-bars,-jumpers etc. of 25 kV.

(v) **Disc insulators 255 mm :** Clevis type 255 mm disc insulators will be used for return conductor suspension and for earth wire cut-in insulator.

(vi) **11 kV post insulators :** These will be used at all places for supporting bus-bars, jumpers etc. In conjunction with return conductor/return feeders.

(c) The pedestal insulators for service voltage of 220/132/110 kV shall be of Solid Core type conforming to specification as indicated in Annexure-1. The pedestal insulators for service voltage of 25 kV shall be of the solid core type conforming to specification as indicated in Annexure-1.

#### **2.4.15 ENDING FITTINGS AND SPLICES:**

##### **(a) GENERAL DESIGNS**

(a) Terminating or ending fittings and splices on copper conductor shall be of the cone type clamping on both the inner and outer strands of conductor except for contact wire ending clamps which may be of wedge type. The arrangement shall be easy to install and also be such as would apply the clamping pressure gradually without shock (See **TI/SPC/OHE/Fittings/0130**) (or latest). For Aluminum Alloy/conductor, the end fittings shall be either cone type, strain clamp type or any other type as approved by the Purchaser.

**(b) LOADING**

All the parts shall be capable of withstanding without damage, a load greater than the ultimate strength of the wires to which they are fitted. In the case of thread no damage shall occur when they are subjected to a load equal to two third of the ultimate strength of the wires.

**(c) RESTRICTED USE OF SPLICES**

The use of splices shall generally be avoided and their use shall be restricted to the minimum necessary. Over main tracks, there shall be no splice in the contact wire on first erection. Elsewhere, not more than one splice be used in any tension length (i.e. anchor to anchor) for which prior approval shall be taken from the Purchaser. Additional splices may, however, be provided to enable retention of conductors which are found defective during and/or after erection. Splices may also be permitted for repair of damage due to thefts or Railway accidents.

**(d) STRENGTH OF ASSEMBLED FITTINGS**

The strength of fittings assembled with appropriate conductors or wires shall be not less than that of the conductor or wire itself.

**(e) ADDITIONAL TERMINATING WIRES**

Cadmium copper stranded wire of 65 sq. mm nominal section or 37/2.1 mm (as used in head span construction). may be used as additional terminating wires for extending single and double conductors respectively, if termination at the nearest structure is not feasible .

**2.4.16 ELECTRICAL CONNECTIONS FOR OHE:**

**(a) GENERAL DESIGNS**

All electrical connections between conductors shall be made by parallel clamps. The general arrangements of connections are shown in the standard drawings, listed in Annexure-1.

**(b) JUMPERS**

Copper jumpers shall be of any of the followings:

(i) Large jumpers of annealed copper in accordance with specification **ETI/OHE/3 (2/94)** (or latest).

(ii) Small jumper of annealed copper in accordance with the specification **IS:9968 (PT.2)** (or latest).

Aluminum jumpers wherever used, shall be of all Aluminum stranded conductor 19/7/ 1.4 mm bare 3/4 H generally conforming to IS:8130 (or latest).

**(c) BUSBARS**

Bus-bars or rigid jumpers of copper where used shall be of 18mm dia copper rod in accordance with RE/30/OHE/5(11/60) (or latest). Aluminium bus-bars wherever used shall be of 36/28 mm tubing (See 2.4.22). Aluminium tubular bus-bars shall be made of Al. Alloy grade 63401 (WP condition) to IS:5082 (or latest). The tolerance on diameter and thickness shall be as per class I, IS:2673 (or latest).

**(d) FEEDERS**

Feeders shall be of all Aluminum conductor 19/3.99 mm (SPIDER).

**(e) RETURN CONDUCTOR**

The return conductor shall be of all Aluminum conductor 19/3.99 mm (SPIDER). The arrangement of return conductor carried on traction structures is shown in a drawings listed in Annexure-1, Part IV.

**(f)** The general characteristics of all wires and conductors is included in a drawings listed in Annexure-1, Part IV.

- (g) Earth wire shall be of steel reinforced Aluminium conductor 7/4.09 mm (RACCOON) conforming to **IS:398-(part-II)** (or latest).

**2.4.17 TERMINAL CONNECTORS FOR EQUIPMENTS:**

Booster Transformer along with the terminal connectors suitable for taking jumpers/ bus bar as required shall be supplied by the Purchaser.

However, Power Transformer, Circuit Breaker, and L.T. supply Transformer shall be supplied by the Contractor along with the terminal connectors suitable for taking jumper/bus-bar as required including Al-Cu strips for bimetallic connections wherever required. The Al-Cu strips required for the connection of Booster Transformers shall also be provided by the Contractor if following equipment will be under the scope of Supply as per Annexure-4, otherwise Tenderer shall make its own arrangement to provide.

**2.4.18 REGULATING EQUIPMENT :**

**(a) GENERAL**

A general arrangement is shown in the standard drawings listed in Annexure-1, Part IV. The regulating equipment should have a minimum adjustment range of 950 mm. Stainless steel wire rope in accordance with TI/SPC/OHE/WR/1060 (or latest) shall be used in these equipments and these shall be sufficiently flexible for the purpose.

**(b) COUNTER WEIGHT**

Counter weights and arrangements used shall be such that these could be accommodated within 330 mm (13 inches) measured transverse to the track under the worst conditions of wind. The vertical upward movement shall be limited with a fixed top.

**(c) REDUCTION RATIO**

Reduction ratio in the arrangement used shall be five for winch type and three in case of three pulley type.

**2.4.19 HEADSPAN CONSTRUCTION: (See para 2.1.21.and 2.3.6.)**

**(a) SIZE AND FACTOR OF SAFETY**

All span wires used in head-span construction shall be of stranded cadmium copper conductor 65 sq. mm or 130 sq. mm cross section. All the wires shall be designed with a factor of safety of not less than 4 under the most unfavorable conditions.

**(b) TURN BUCKLES**

Each span wire shall be equipped with a turn buckle at each end of the span.

**(c) ADDITIONAL INSULATORS**

Additional insulators shall be provided as necessary in head span, cross span and steady span, wires to ensure electrical independence between the equipment in different elementary electrical sections.

**2.4.20 ISOLATORS:**

25 kV Isolator switches shall comply with specifications as indicated in para 2.4.9.

**2.4.21 INSULATION LEVEL :**

- (a) Interrupters, Potential Transformers line indication type, 42kV Lightning Arrestors and other equipments shall be suitable for insulation levels indicated in the relevant specifications.
- (b) All equipment including insulators to be used at the traction sub-stations, feeding station and shunt capacitor banks shall be suitable for the insulation level specified below:-

		SERVICE VOLTAGE				
		220 kV	132 kV	110 kV	66 kV	25 kV
i)	Power frequency 1 min. wet withstand test-kV (rms)	460 kV	275 kV	230 kV	275 kV	100 kV
ii)	Impulse (1.2/50 microsecond) withstand test positive and negative polarity(crest value) -KV (peak)	1050 kV	650 kV	550 kV	650 kV	250 kV

#### 2.4.22 BUSBARS:

- (i) ACSR Conductors used as bus-bar or bus-bar connections shall be of ZEBRA ACSR size 61/3.18mm (28.62 mm dia) at 220 or 132 or 110/25 kV Traction Sub-station.
- (ii) Aluminum tubes used as bus-bars or bus-bar connections shall be of dia 50X39 mm for Traction sub-station and Shunt Capacitor banks and of size 36/28 mm for Feeding Stations. Aluminum tubular bus-bars shall be made of Al. Alloy grade 63401 (WP condition) to IS:5082 and IS: 6051-1970 (or latest). The tolerance on diameter and thickness shall be as per class I, **IS: 2673** (or latest).
- (iii) Bus-bar junctions and connectors shall be made with aluminum allow Grade 4600 M to IS: 617-1994 or equivalent. The bus-bar shall be clean, smooth mechanically sound and free from surface and other defects. No splices will be allowed in the bus-bar unless the length of bus-bar exceeds 6m. The ends of the tubular bus-bar shall be covered with suitable end caps. The joints in bus-bars where unavoidable, shall be mechanically and electrically sound so that the temperature rise under normal working conditions does not exceed 40 degree centigrade for a max. ambient temp. of 45 degree centigrade.

#### 2.4.23 CABLING:

##### (a) CABLE FOR L.T. SUPPLY

240 V A.C. supply from L.T. supply transformer at switching stations shall be brought and terminated on the L.T. A.C. distribution board in the remote control cubicles at the switching stations by 1100 Volt 25 sq.mm aluminum two-core PVC insulated PVC sheathed and steel armoured heavy duty cable conforming to IS:1554(part-I) (or latest).

##### (b) CONTROL AND INDICATIONS CIRCUITS

All other cables for control and indication at switching stations shall be 1100-V grade PVC insulated and sheathed un-armoured (heavy duty) complying with IS: 1554 (part-I (or latest). The cables shall be provided as indicated in the Table below:-

PURPOSE	RUN	CIRCUIT VOLTAGE	CORE SIZE & MATERIAL	NO OF CORES
<b>FOR SWS:</b>				
Control & indication of interrupters	From each Interrupter to terminal board	110 V/D.C.	2.5 sq.mm copper	7
Catenary indication	From each P.T. line indication type to terminal board	110 V/A.C.	2.5 sq.mm copper	2
Heater supply for interrupters control mechanism cabinet	i) From interrupter to interrupter	240 V A.C.	4.0 sq.mm Aluminium	2
	ii) From each interrupter to fuse box.	-do-	-do-	-do-
	iii) From fuse box. to distribution board.	-do-	-do-	-do-
Battery supply	i) 110V battery charger to 110V battery	110 V/D.C.	2.5 sq.mm copper	-do-
	ii) 110V battery to 15A, DC fuse box.	110 V/D.C.	2.5 sq.mm copper	-do-
	ii) 15A, DC fuse box to terminal board.	-do-	-do-	-do-

<b>FOR TSS:</b>				
Control and indication of circuit breakers	From each circuit breaker to control board.	110 V DC	7x2.5	Three cables to be used.
Transformer alarm/trip circuits & tap changer control	From each transformer to control board.	110 V DC	10x2.5	Five cables to be used.
Transformer protection (bushing transformer to current transformer connections)	From each transformer to control board.	110 V DC	4x4.0	One cable for each bushing CT to be used.
Current transformer & neutral connections	From each current transformer to control board.	110 V DC	2x4.0	One cable for each core of CT/Neutral CT
Potential transformer connections	From each potential transformer to control board.	110 V DC	2x2.5	One cable to be used
110V DC supply	(i) Connection between battery chargers & DC distribution board.	110 V DC	4x4.0	One cable to be used with two core connected in parallel
	(ii) Connection between batteries & DC distribution board.	110 V DC	4x4.0	One cable to be used with two core connected in parallel
	(iii) Connection from DC distribution board to control board.	110 V DC	4x4.0	Two cables to be used with each circuit breaker and one cable for DC supply to control boards.
Control & indication of bus coupler interrupter	From interrupter to control board.	110 V DC	7x2.5	Two cables to be used.
240V AC supply	Connection from AC distribution board to control board.	240 V AC	2x2.5	One cable to be used

c) **Cables for heater circuits.**

The 240 V AC supply to space heaters provided in control cabinets of various equipments shall be provided by means of 4 sq.mm. 2-core aluminum PVC insulated (heavy duty) cables complying with IS: 1554 (Part-I)-1988. Three circuits shall be provided on the LT A.C. distribution board for this purposes, one for the heaters in the control cabinets of 220/132/110 KV circuit breakers, the second for the heaters in the control cabinets of 25 KV circuit breakers and bridging Interrupters and the third for heaters in marshalling box of traction transformers. Each circuit shall be provided with a fuse of approved type and suitable rating in the LT A.C. distribution Board.

d) **Cables for battery charger.**

240 V A.C. supply to each of the battery chargers in the Control Room shall be provided by means of 4 sq.mm. 2 core PVC insulated, PVC sheathed (heavy duty) copper cables complying with IS: 1554 (Part-I)-1988 or latest. Two circuits each with a fuse of approved type and suitable rating in the LT A.C. distribution board shall be provided for the two battery chargers in the Control Room. The 240 V A.C. supply to Control Board from A.C. distribution board shall be provided by means of 2.5 sq.mm. 2- core PVC insulated PVC sheathed (heavy duty) copper cable complying with IS:1554(Part-I)-1988 or latest.

e) **Cables for blower fans.**

240 V A.C. supply to blower fans fixed on the traction transformer shall be provided by means of 2 core 25 sq.mm. aluminum conductor cables. The cables shall be PVC insulated, PVC sheathed and armored cables of 1100 V grade complying with IS:1554(Part-I)-1988 or latest. Separate cables shall be laid from the L.T. A.C. distribution board in the control room to marshalling box of each traction transformer. Individual circuits from the LT A.C. distribution board shall be provided for this purpose with each circuit protected by a fuse of suitable rating.

f) The cable shall be resistant to decay, mechanical abrasion, acids, alkaline and other corrosive materials.

**NOTE:** (i) In case of feeding stations which are located within the traction sub-station premises, the cables shall be run from individual equipment and terminated inside the sub-station control room.

(ii) Notwithstanding the sizes of cables given above, the Tenderer shall assure himself that various cables would suit the ratings of equipments offered by him.

(g) **SPECIFICATION**

The cables shall be resistant to decay, abrasion, acids, alkalies and other corrosive materials. All indoor wiring on walls shall be clamped neatly on teak wood battens fixed to the wall by means of wall plugs/wooden pegs. The cable run layout at a typical switching stations is shown in the relevant drawing already included in Annexure-1.

**2.4.24 LITERATURE FOR EQUIPMENT:**

The Contractor shall, within six months of issue of Letter of Acceptance of Tender, supply 5 copies of booklets containing manufacturer's instructions for operation and maintenance of each of the items of equipments the supply of which is, Herded by the contract. In addition, 25 copies of detailed schedule of components, catalogues and drawing of all parts of the equipment shall also be supplied.

XXXX

**Part - II**  
**CHAPTER -V**  
**DESIGNS AND DRAWINGS**

**2.5.1 GENERAL :**

- (a) This chapter deals with the procedure for approval of designs and drawings.
- (b) The type designs shall be as few as possible to cover the largest field of application consistent with economic consideration.
- (c) In all drawings as far as possible only such symbols as are in international use, shall be used.

**2.5.2 CONTRACTOR'S DRAWINGS :**

- (a) The Contractor shall submit to the Purchaser for approval except where otherwise specified below, all detailed designs and drawings which are necessary to ensure correct supply of equipments, components and materials and to enable correct and complete erection of overhead equipment, switching stations, booster transformer stations and L.T. Supply transformer stations and complete supply and erection of Traction Sub-Stations in an expeditious and economic manner.

**(b) RESPONSIBILITY**

It is to be clearly understood that all original designs and drawings shall be based on a thorough study. General designs and dimensions shall be such that the Contractor is satisfied about the suitability of the designs for the purpose. The Purchaser's approval will be based on these considerations and notwithstanding the Purchaser's acceptance; the ultimate responsibility for the correct design and execution of the work shall rest with the Contractor in terms of the conditions of Contract.

**2.5.3 STANDARDS FOR DRAWINGS :**

All designs, legends notes on drawings and schedules of materials shall be in English and shall be prepared in the metric system. All designs and drawings shall conform to specification RE/OHE/ 25 and ETI/PSI/31(5/76)(or latest).

**2.5.4 BASIC DESIGNS :**

**(a) STANDARD DESIGNS**

Where the Contractor adopts designs and drawings conforming to the standard designs, drawings, and specifications of the Research, Designs and Standards Organisation. Manak Nagar, Lucknow (RDSO) for basic arrangements, equipments, components and fittings of traction overhead equipment, switching stations booster transformer stations and LT supply transformer stations and TSS adopts employment schedules furnished by the Purchaser, he shall verify such designs, drawings and employment schedules and satisfy himself that these are correct before use. Within two months of the issue of letter of Acceptance of Tender the contractor shall indicate to the Purchaser, the list of standard basic arrangements, components and fittings drawings and employment schedules, which he will adopt for the purpose of the work. The procedure outlined in para Contractor's Drawings etc. shall be followed for approval of basic designs. The contractor for his use and reference shall obtain Ferro copy each of such standard basic arrangement, component and fittings drawings and employment schedules from Chief Administrative Officer, Railway Electrification, Prayagraj (U.P.) on payment as per the prescribed rates.

**(b) DEVIATIONS**

Normally deviations from the standard drawings of the Purchaser will not be accepted. However, in exceptional cases where the Contractor desires to suggest improvements as a results of his experience or other development, he shall justify his proposals with supporting explanatory notes.

**(c) STANDARD DRAWINGS EMPLOYMENT SCHEDULES ETC. DELETED.**

## **2.5.5 SPECIAL DESIGNS : 2.5.5**

- (a) In cases where standard designs, drawings or employment schedules do not cover requirement of special locations or site conditions, the Contractor shall submit his own designs or drawings alongwith supporting calculations and notes for scrutiny and approval of the Purchaser.
- (b) Such special designs shall generally be in conformity with basic designs furnished by the Purchaser and in accordance with the specifications. If the Contractor wishes to adopt special designs which do not conform to the general basic designs of the Purchaser, he shall submit alternative designs and drawings justifying his proposals.

## **2.5.6 PARTICULAR DESIGNS & WORKING DRAWINGS:**

### **2.5.6.1 FOR OHE:**

#### **(a) PURCHASER'S PEGGING PLANS**

The pegging plans for sections to be equipped indicating the type of overhead equipment, locations of masts and other general particulars prepared on the basis of the latest survey will be furnished by the Purchaser. The Contractor shall verify and check these plans at site.

#### **(b) CONTRACTOR'S PEGGING PLANS**

If the Contractor is called upon to carry out survey and prepare overhead equipment pegging plans, he shall submit such plans for approval after checking their feasibility at site.

#### **(c) PRINCIPLES OF LAYOUT**

The Contractor shall in all cases ensure that the final pegging plans are in conformity with the latest 'Principles of preparation and checking of OHE layout plans and sectioning diagram' issued by RDSO.

#### **(d) PROVISIONAL LAYOUT PLANS**

The Contractor shall prepare and submit overhead equipment layout plans incorporating the following information:-

- (i) The run of wires in different thickness or colour in special cases and termination.
- (ii) The run of wires for future wiring indicated to the Contractor, in dotted lines.
- (iii) Exact position of all cut-in-insulators, including section insulators.
- (iv) Direction and value of stagger at each traction structure location.
- (v) Clearance of live conductors to Structures in the vicinity including bridges, signals gantries etc.
- (vi) Layout of feeders.
- (vii) Jumper connections and connection to switches and switching stations.
- (viii) List of infringements.
- (ix) Kilometer numbers and type of Structures.
- (x) Location and numbers of switches.
- (xi) Schematic sectioning diagram drawn to convenient scale showing section insulator, number of switches, elementary sections and connections to switches and switching stations.
- (xii) Table giving references of approved profile drawings, feeder layout plans and other relevant drawings.



(e) **OHE PROFILE DRAWINGS**

After completion of the overhead equipment layout plans, the Contractor shall prepare an overhead equipment profile drawings showing the actual height of the contact wire under each overline Structure the gradient and height of the contact wire on either side of the Structure and the encumbrances at Structures until normal height of contact wire and encumbrances are restored.

(f) **CROSS SECTION DRAWINGS**

While the layout plans are being finalised, the Contractor shall submit for approval, in-so-far as yards between outer most points and crossing are concerned, cross-section drawings for each Structure showing guy rods, if any, indicating the cross-section of the formation, height and nature of soil, type of foundation block, structure proposed, reverse deflection of the Structure and all necessary particulars for erection of the foundation and the Structures. In the preparation of drawings, care shall be taken to show all obstructions such as signal wires, points rods and their correct location in references to track/tracks as well as underground obstructions like pipes cables, etc. after collecting such information from the site.

In open line sections, cross-sections shall be submitted in the following proforma, separately for each Railway line for special foundation drawings with all necessary details shall be submitted to the Purchaser. In case of side bearing foundation with extra depth, formation details at such location and necessary details of anchor foundation will be submitted.

CROSS SECTION FOR THE OPEN ROUTE SECTION -----Km. ----- to -----

Sl. No.		1	2	3	4	5	6	7	8	10	11	12	13	14	15
LOCATION No.															
CHAINAGE															
D E T A I L S	SETTING DISTANCE IN 'm'														
	STEP DISTANCE IN 'm'														
	F.B.M. CODE														
	SOIL TYPE & PRESSURE														
	FOUNDATION TYPE AND SIZE														
	MAST SIZE & LENGTH IN 'm'														
	MAST EMBEDDED LENGTH 'M'														
	REVERSE DEFLECTION in cm														
	SUPER MAST LENGTH (m)														
	CROSS ARM LENGTH (m)														
	ANY OBSTRUCTION														

(g) **FINAL LAYOUT PLANS**

After all the cross section drawings in a section covered by the layout plan are finalised and foundations are cast, the Contractor shall revise the layout plans to take into account any modifications to the locations of Structures during the process of casting of foundations.

(h) **STRUCTURE ERECTION DRAWINGS**

The Contractors shall then submit Structure erection drawings for each structure incorporating all the details included in the cross section drawing for the structure and as erected at site and the details of the bracket assembly, mast extensions, isolator mounting frame and anchorage of overhead equipment, feeder or return conductors proposed for each structure together with all particulars necessary for the correct erection of overhead equipment at the structure. For structure with isolators, the details of electrical connections shall also be incorporated. In open line sections the Contractor shall submit structure erection particulars in the typical proforma as given below separately for each main line track in addition to particular details as indicated in the proforma

for cross-section drawings. Modification to this proforma is found necessary will be finalised at time of structure erection drawings.

Sl.No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
LOCATION No.															
CHAINAGE															
1. ENCUMBRANCE															
2. CONTACT WIRE HEIGHT.															
3. STAGGER i) CATENARY ii) CONTACT															
4. STAY ARM i) (a) ii) CODE															
5. BRACKET i) (b) M ii) CODE															
6. REGISTER : i) C/D (M) ii) CODE															
7. STD/BENT CODE															
8. IDENTIFICATION MARK (SEE PARA 2.5.11)															
OTHER REFERENCES/CODES FOR MISC. ITEMS LIKE STEEL WORK FOR STAY/BRACKET ATTACHMENT MISC. SINGLE/DOUBLE CAT. ETC. WILL BE INDICATED. ITEMS :-															

**Tolerances to be adopted while Erection of Bracket Assembly, conducting SED checking & Tower Wagon checking:**

Sl. No.	Item	Limits/Tolerances
(i)	Register Arm Tube Projection	150 - 200 mm in case of Push off locations. For Pull off locations, it shall project over Contact Wire Plane.
(ii)	Bracket Tube Projection	150 - 200 mm
(iii)	Dip between Register Arm Tube & Steady Arm	200 - 250 mm on Tangent Track. (BFB Steady Arm). 250 - 320 mm on Curves. (BFB Steady Arm & Bend Tubular Steady Arm).
(iv)	Encumbrance	± 50 mm
(v)	Length of 'A' Dropper (1 <sup>st</sup> Dropper from Support)	± 5 mm
(vi)	Spacing of 'A' Dropper (1 <sup>st</sup> Dropper from Support)	± 30 mm
(vii)	Length of Other Droppers	± 5 mm
(viii)	Spacing of Other Droppers	± 50 mm
(ix)	Stagger of Catenary Wire	± 30 mm
(x)	Height of Catenary Wire	± 50 mm
(xi)	Stagger of Contact Wire	± 10 mm
(xii)	Position of Compensation Plate	It shall be in vertical plane.
(xiii)	Difference between mainline Contact wire and the Crossover Contact Wire at Support.	50 mm (minimum)

(j) **SUB-STATION FEEDER DRAWINGS** - Deleted.

**NOTE:** The proforma for SED at individual locations shall be as per standard proforma already circulated and to be adopted in consultation with Purchasers.

#### **2.5.6.2 FOR TSS:**

a) **Purchaser's location plans**

(A) **FOR TRACTION SUB-STATIONS**

The location plans and schematic diagram of connections for each of the traction sub-stations will be furnished by the Purchaser to the Contractor. These will indicate.

- i) Position of incoming lines on the gantries to be erected inside the traction sub-station.
- ii) Location of switching station gantry showing where the 25kV outgoing feeders will be terminated.
- iii) Schematic diagram of connections of Transformers, Circuit breakers Isolators etc.
- iv) Position of the control room with respect to the traction sub-station.
- v) Fencing outline with gates.

(B) **FOR FEEDING STATIONS**

The location plans and schematic diagrams of connections for all the feeding stations will be furnished by the Purchaser to the Contractor. These will indicate the following as applicable:-

- i) Overhead equipment layout in the vicinity of feeding stations.
- ii) Location of main masts.
- iii) Arrangement of cross feeders and longitudinal feeders to be anchored on the gantry if any, including jumper connections to the overhead equipment.
- iv) Scheme of connections of interrupters.
- v) Position of the remote control cubicle with respect to the feeding stations.

C) **SHUNT CAPACITOR BANK**

The location plans and schematic diagram of connections for capacitor bank installation at each of the traction sub-stations will be furnished by the Purchaser to the Contractor. These will indicate.

- i) Schematic diagram of connections of circuit breakers, isolators, L.As etc.
  - ii) Position of the control room with respect of the traction sub-station.
  - iii) Fencing outline with gates.
- b) Contractor's responsibility.

The Contractor shall satisfy himself about the correctness and applicability of the location plans given by the Purchaser before adopting them for detailed designs.

#### **2.5.7 PARTICULAR DESIGNS & WORKING DRAWINGS FOR SWITCHING STATIONS & BOOSTER STATIONS:**

(a) **PURCHASER'S LOCATION PLAN ETC.**

The location plans and schematic diagrams of connections for all the switching stations, booster transformer stations and L.T. supply transformer stations will be furnished by the Purchaser to the Contractor. These will indicate the following as applicable:-

- i) Overhead equipment layout in the vicinity of switching or other stations.
- ii) Location of main masts.

- iii) Arrangement of cross feeders and longitudinal feeders to be anchored on the gantry if any, including jumper connections to the overhead equipment.
- iv) Scheme of connections of interrupters.
- v) Position of the remote control cubicle with respect to the switching stations.
- vi) Fencing outline at the switching stations.

The Contractor shall satisfy himself about the correctness and applicability of the location plans given by the Purchaser before adopting them for detailed designs.

**(b) DETAILED DRAWINGS**

**(A) OHE WORKS :** The Contractor shall submit for approval of the Purchaser the following drawings:-

- (i) Cross-section drawings for each switching stations indicating the cross section of the formation transverse to the track at each location of main mast and longitudinal section parallel to the track along the center line of the interrupters. These drawings shall be prepared after an accurate survey at site and shall indicate the nature of the soil, its bearing capacity, compactness and in case of loose soil, transverse section of the parent soil. In the preparation of the drawings care shall be taken to show all obstructions to be removed, such as signal wires, rods and their correct location with reference to the track/s as well as under-ground constructions like pipes, cables etc. after collections such information from the site.

**(ii) GENERAL ARRANGEMENT DRAWINGS**

General arrangement drawings for switching stations indicating the general arrangement of all equipments, run of bus bars, position of pedestal insulators, steel frame work and fencing. The drawings shall also give a schematic connection/diagram and an isometric view of busbars and connections. The drawings shall include an elevation view of the switching stations from behind a transverse cross section and plan sectional views at the level of feeder anchors insulator beams, potential transformer beams and ground. Each drawing shall have a schedule of all equipments required at the switching station along with drawing references of details of these equipments.

**(iii) STRUCTURAL DRAWINGS**

Structural assembly drawing for switching stations indicating the steel frame work assembly. The drawings shall include one elevation view of the steel frame work assembly from behind, a transverse cross-section and plan views at various levels such as at the level of feeder anchors, insulator beams/and ground. In the assembly each component member shall be marked with its reference number. The drawing shall also have a schedule of component members alongwith drawing reference various members. The weight of the component members shall be indicated in a separate weight schedule. The drawings shall be prepared for the various structural components. An individual drawing shall be made for each component and this shall include all fixing bolts, nuts and washers whose sizes will be mentioned on the drawings. Unit isolator beams, potential transformer beams weight of the component shall also be given in the drawings.

**(iv) FOUNDATION LAYOUT AND CROSS-SECTION DRAWINGS**

Foundation layout & cross-section drawings for each switching station indicating layout of all foundations in plan, transverse cross-section of various foundations through center line of main masts, interrupters, fencing uprights and L.T. supply transformers, if any, and longitudinal sections parallel to tracks through the center line of the cable trench. All foundations shall be marked serially on the drawing and listed in a schedule on the drawing indicating the volume of concrete for each foundation block.

**(v) FENCING LAYOUT DRAWINGS**

Fencing layout drawings for each switching station indicating the layout of the entire fencing and anti-climbing device in plan. Each upright, fencing panel and fixture on the upright shall be indicated on the drawing by its reference number. A schedule of components viz. Uprights, panel's fixer, and barbed wire shall be included in the drawings indicating the drawing references of components. An individual drawing shall be made for each type panel, fencing post and fixture for mounting the anti-climbing device. The drawing of each fencing post shall indicate the unit weight of the fencing post.

**(vi) EARTHING LAYOUT DRAWINGS**

Earthing layout drawing for each switching station indicating the layout of full earthing system in plan. The drawing shall show the location of earth electrodes and mark the runs of earthing strips and connections to each equipment, mast, fencing post and fencing panel. All components shall be marked with their reference numbers, for further details of the run of conductors and connections, separate drawings which may be common to all switching stations may be made and references to these drawings marked on the layout. A schedule of components shall be made out in the drawing giving drawing references of components.

**(vii) CABLE RUN LAYOUT.**

Cable run layout of each switching station indicating inter-connection between various equipments, indoor and outdoor, along with schematic arrangements and physical disposition of equipments, colour coding or code number and the index scheme adopted for terminals. The drawings shall also indicate the cable size and grades of insulation. The quantity of various cables required shall be indicated on the drawings.

**(viii) EQUIPMENT DRAWINGS**

Equipment drawings applicable to all switching station except the ones for the equipments to be supplied by the Purchaser. Drawings should be dimensioned and should indicate:-

1. Fixing or mounting hole dimensions and arrangement;
2. Net weight of the equipment.
3. Characteristic and rating of equipment
4. Circuit diagrams;
5. Overall dimensions and other important dimensions;
6. Height and vertical and horizontal dimensions of all exposed live parts; and
7. Notes explaining the operation of the equipment

**(ix) MISCELLANEOUS DRAWINGS**

Miscellaneous drawings applicable to all switching stations. These drawings shall include drawings or sketches made for study of clearances, isolator alignment details, scheme of interlocks, number plates of various equipments and "U" bolts for cable mounting, caution or instruction boards, outriggers for busbar supports and non-standard busbar connectors.

**(x) EMPLOYMENT SCHEDULES AND CHARTS**

Employment schedules and charts applicable to all switching stations. These will include:

1. Employment schedule for pure gravity type of foundations for main masts for various direct loads and bending moments;
2. Employment schedule for all other foundations for various depths of parent soil from the datum level.
3. Sag tension charts for cross feeders for various spans and tensions.

**(B) FOR TSS WORKS:**

Contractor shall submit for approval the following drawings.

**a) Cross section drawings.**

Cross section drawings for each traction sub-station, indicating the transverse and longitudinal cross-section of the soil along the center line of the equipments, busbar supports and cable trenches. These drawings shall be prepared after an accurate survey at site and shall indicate the nature of the soil, its bearing capacity, compactness and in case of loose soil, cross-section of the parent soil. In the preparation of the drawings, care shall be taken to show all obstructions to be removed, such as telegraph posts, underground pipes, cables etc. after collection of such information from the site.

b) **General arrangement drawings.**

General arrangement drawings for each traction sub-station shall indicate the general arrangement of all equipments, run of busbars, position of pedestal insulators and steel frame work. The drawings shall also give a schematic connection diagram and an isometric view of busbars and connections wherever required. The drawings shall include an elevation view of the traction sub-station, transverse cross section and plan views. The drawings shall have a schedule of all equipments required at the traction sub-station alongwith drawing references of the details of these equipments.

c) **Structural drawings**

Structural drawings for each supporting steel frame work of pedestal. The drawing shall include one elevation view of the steel frame work assembly from behind, a transverse cross section and plan view. In the assembly each component member shall be marked with its reference number. The drawing shall also have a schedule of components members along with drawing references of various members. The weight of the component members shall also be indicated. The drawings shall be prepared for the various structural components. An individual drawing shall be made for each component and this shall include all fixing bolts, nuts and washers whose sizes will be mentioned on the drawing. Unit weight of the components shall also be given in the drawing.

d) **Foundation layout and cross section drawings.**

Foundation layout and cross section drawings for each traction sub-station indicating layout of all foundations in plan, longitudinal and transverse cross-sections of various foundations through centre line of gantry/portal legs, various equipment busbar supports, fencing uprights and cable trenches. All foundations shall be marked serially on the drawing indicating the volume of concrete for each foundation block.

e) **Earthing layout drawings.**

Earthing layout drawing for each traction sub-station indicating the layout of full earthing system in plan. The drawing shall show the location of earth electrodes and mark the runs of earthing leads and connections to equipment, gantry/portal columns, fencing uprights, structural supports etc. All components shall be marked with their reference numbers. For further details of the run of conductors and connections, separate drawings which may be common to all traction sub-stations may be made and references to these drawings marked on the layout. A schedule of components shall be made out in the drawing giving drawing references of components. These drawings shall be prepared duly taking into account the actual soil resistivity of the respective traction sub-station area, measured in the presence of the Purchaser's representative in accordance with the procedure laid down in IS:3043 -1966. The necessary design calculations for the proposed earthing system of the traction sub-station shall also be submitted by the Contractor for Purchaser's approval.

f) **Cabling & Wiring drawings.**

Cabling and wiring diagrams for each traction sub-station indicating the schematic arrangement and physical disposition of equipment, run of cables and wires for inter-connections between various equipments indoor and outdoor, colour coding and the index scheme adopted for terminals. The drawings shall also indicate the sizes of wires and grades of insulation. The quantity of various cables required shall be indicated on the drawings.

g) **Fencing layout drawings.**

Fencing layout drawings for each traction sub-station indicating the layout of entire fencing and anticlimbing device in plan. Each upright, fencing panel and fixture on the upright shall be indicated on the drawing by its reference number. A schedule of components viz. uprights, gates, panels fixtures and barbed wires shall be included in the drawing indicating the drawing reference of the components. Type drawings shall be prepared for the various fencing components. An individual drawing shall be made for each type of panel, fencing post, gate and fixture for mounting the anticlimbing device. The drawing of each fencing post shall indicate the unit weight of the fencing post.

h) **Equipment drawings applicable to all traction sub-stations complete with drawings of components parts except the ones for the equipment to be supplied by the Purchaser. The**

Contractor shall submit 5 copies for distribution to field office and one transparent print for the equipments to be supplied by Contractor. Drawings should be dimensioned and should indicate.

- 1) Fixing or mounting hole dimensions & arrangement.
- 2) Net weight of the equipment.
- 3) Characteristics and ratings including those of motors and resistors etc.
- 4) Schematic and detailed circuit diagrams.
- 5) Overall dimensions and other important dimensions.
- 6) Height and disposition of all exposed live parts, height of the bottom most point of all bushings and insulators.
- 7) Notes explaining the operation of the equipment.

For equipment to be supplied by the Purchaser, drawings showing the above particulars will be furnished to the Contractor to enable him to carry out the installation, wiring and commissioning of such equipment.

**i) General Drawings.**

General drawings applicable to all traction sub-station. These drawings shall include the drawings or sketches made for study of clearances, Isolator alignment details, number plates of various equipments, caution or instruction boards, non-standard busbar connectors, clamps and U-bolts for cable mounting etc.

**j) Schedule of quantities.**

On receipt of approval of relevant drawings for each traction sub-station, the following schedules of quantities relating to each traction sub-station shall be submitted within a fortnight of receipt of approval.

- i) Schedule of foundations, showing volume of each type and total volume.
- ii) Schedule of steel work, types, weights of each member and total weight.
- iii) Schedule of quantities of various items of work of Schedule-1, Section-8 & 9 not included in item (i) & (ii) above.

**(C) FOR FEEDING STATIONS**

The Contractor shall submit for approval of the Purchaser the following drawings:-

**a) CROSS SECTION DRAWINGS**

Cross-section drawings for each feeding stations indicating the cross section of the formation transverse to the track at each location of main mast and longitudinal section parallel to the track along the center line of the interrupters. These drawings shall be prepared after an accurate survey at site and shall indicate the nature of the soil, its bearing capacity, compactness and in case of loose soil, transverse section of the parent soil. In the preparation of the drawings care shall be taken to show all obstructions to be removed, such as signal wires, rods and their correct location with reference to the track/s as well as under-ground constructions like pipes, cables etc. after collections such information from the site.

**(b) GENERAL ARRANGEMENT DRAWINGS**

General arrangement drawings for feeding stations indicating the general arrangement of all equipments, run of bus bars, position of pedestal insulators, steel frame work and fencing. The drawings shall also give a schematic connection/diagram and an isometric view of busbars and connections. The drawings shall include an elevation view of the feeding stations from behind a transverse cross section and plan sectional views at the level of feeder anchors insulator beams, potential transformer beams and ground. Each drawing shall have a schedule of all equipments required at the feeding station alongwith drawing references of details of these equipments.

**(c) STRUCTURAL DRAWINGS**

Structural assembly drawing for feeding stations indicating the steel frame work assembly. The drawings shall include one elevation view of the steel frame work assembly from behind, a transverse cross-section and plan views at various levels such as at the level of feeder anchors,

insulator beams/and ground. In the assembly each component member shall be marked with its reference number. The drawing shall also have a schedule of component members alongwith drawing reference various members. The weight of the component members shall be indicated in a separate weight schedule. The drawings shall be prepared for the various structural components. An individual drawing shall be made for each component and this shall include all fixing bolts, nuts and washers whose sizes will be mentioned on the drawings. Unit isolator beams, potential transformer beams weight of the component shall also be given in the drawings.

(d) **FOUNDATION LAYOUT AND CROSS-SECTION DRAWINGS**

Foundation layout & cross-section drawings for each feeding station indicating layout of all foundations in plan, transverse cross-section of various foundations through center line of main masts, interrupters, fencing uprights and L.T. supply transformers, if any, and longitudinal sections parallel to tracks through the center line of the cable trench. All foundations shall be marked serially on the drawing and listed in a schedule on the drawing indicating the volume of concrete for each foundation block.

(e) **EARTHING LAYOUT DRAWINGS**

Earthing layout drawing for each feeding station indicating the layout of full earthing system in plan. The drawing shall show the location of earth electrodes and mark the runs of earthing strips and connections to each equipment, mast, fencing post and fencing panel. All components shall be marked with their reference numbers, for further details of the run of conductors and connections, separate drawings which may be common to all feeding stations may be made and references to these drawings marked on the layout. A schedule of components shall be made out in the drawing giving drawing references of components.

(f) **CABLE RUN LAYOUT**

Cable run layout of each feeding station indicating inter-connection between various equipments, indoor and outdoor, alongwith schematic arrangements and physical disposition of equipments, colour coding or code number and the index scheme adopted for terminals. The drawings shall also indicate the cable size and grades of insulation. The quantity of various cables required shall be indicated on the drawings.

(g) **EQUIPMENT DRAWINGS**

Equipment drawings applicable to all feeding station except the ones for the equipments to be supplied by the Purchaser. Drawings should be dimensioned and should indicate:-

1. Fixing or mounting hole dimensions and arrangement
2. Net weight of the equipment.
3. Characteristic and rating of equipment
4. Circuit diagrams
5. Overall dimensions and other important dimensions
6. Height and vertical and horizontal dimensions of all exposed live parts
7. Notes explaining the operation of the equipment

(h) **MISCELLANEOUS DRAWINGS**

Miscellaneous drawings applicable to all feeding stations. These drawings shall include drawings or sketches made for study of clearances, isolator alignment details, scheme of interlocks, number plates of various equipments and "U" bolts for cable mounting, caution or instruction boards, outriggers for busbar supports and non-standard busbar connectors.

(i) **EMPLOYMENT SCHEDULES AND CHARTS**

Employment schedules and charts applicable to all feeding stations. These will include:

1. Employment schedule for pure gravity type of foundations for main masts for various direct loads and bending moments;
2. Employment schedule for all other foundations for various depths of parent soil from the datum level.
3. Sag tension charts for cross feeders for various spans and tensions.



(j) **SCHEDULE OF QUANTITIES**

Within a fortnight of receipt of approval of relevant drawings for each feeding station, the following schedules of quantities shall be submitted.

- i) Schedule of number of foundations, types, volume of different foundation and total volume. foundations will be treated as one foundation;
- ii) Schedule of number of masts, types, weight of different masts, and the total weight of masts of each gantry.
- iii) Schedule of steel work, types, weight of each member and total weight; and
- iv) Schedule of quantities of various items of work of schedule 1, Section-8 & 9 not included in Item (i), (ii), and (iii) above.

(D) **FOR SHUNT CAPACITOR BANK**

Contractor shall submit for approval of the following drawings:-

a) **Cross section drawings**

Cross section drawings for each capacitor bank installation indicating the transverse and longitudinal cross-section of the soil along the centre line of the equipments, busbar supports and cable trenches. These drawings shall be prepared after an accurate survey at site and shall indicate the nature of the soil, its bearing capacity, compactness and in case of loose soil, cross section of the parent soil. In the preparation of the drawings, case shall be taken to show all obstructions to be removed, such as telegraph posts, underground pipes, cables etc. after collection of such information from the site.

b) **General arrangement drawings**

General arrangement drawings for each capacitor bank installation indicating the general arrangement of all equipments run of busbars, position of pedestal insulators and steel framework. The drawings shall also give a schematic connection diagram and an isometric view of busbars and connections wherever required. The drawings shall include an elevation view of the capacitor bank installation transverse cross section and plan views. The drawings shall have a schedule of all equipments required at the sub-station along with drawing references of the details of these equipments.

c) **Structural drawings**

Structural drawings for each supporting steel framework of pedestal. The drawing shall include one elevation view of the steel framework assembly from behind, a transverse cross section and plan view. In the assembly each component member shall be marked with its reference number. The drawing shall also have a schedule of components members along with drawing references of various members. The weight of the component shall also be indicated. The drawings shall be prepared for the various structural components. An individual drawing shall be made for each component and this shall include all fixing bolts, nuts and washers whose sizes will be mentioned on the drawing. Unit weight of the components shall also be given in the drawing.

d) **Foundation layout and cross-section Drawings**

Foundation layout and cross section drawings for each capacitor bank installation indicating layout of all foundations in plan, longitudinal and transverse cross-sections of various foundations through centre line of various equipment busbar supports, and cable trenches. All foundations shall be marked serially on the drawing indicating the volume of concrete for each foundation block.

e) **Earthing layout drawings**

Earthing layout drawing for each capacitor bank installation indicating the layout of full earthing system in plan. The drawing shall show the location of earth electrodes and mark the runs of earthing leads and connections to equipment, structural supports etc. All components shall be marked with their reference numbers. For further details of the run of conductors and connections, separate

drawings which may be common to all traction sub-stations may be made and references to these drawings marked on the layout. A schedule of components shall be made out in the drawing giving drawing references of components. These drawings shall be prepared duly taking into account the actual soil resistivity of the respective traction sub-station area, measured in the presence of the Purchaser's representative in accordance with the procedure laid down in IS:3043 -1966. The necessary design calculations for the proposed earthing system of the traction sub-station shall also be submitted by the Contractor for Purchaser's approval.

**f) Cabling and Wiring drawings**

Cabling and Wiring diagrams for each traction sub-station indicating the schematic arrangement and physical disposition of equipment, run of cables and wires for inter connections between various equipments indoor and outdoor, colour coding and the index scheme adopted for terminals. The drawings shall also indicate the sizes of wires and grades of insulation. The quantity of various cables required shall be indicated on the drawings.

**g) Equipment drawings applicable to all traction sub-stations complete with drawings of components parts except the ones for the equipment to be supplied by the Purchaser. Drawings should be dimensioned and should indicate:**

- i) Fixing or mounting hole dimensions and arrangement
- ii) Net weight of the equipment.
- iii) Characteristics and ratings including those of motors and resistors, etc.
- iv) Schematic and detailed circuit diagrams.
- v) Overall dimensions and other important dimensions.
- vi) Height and disposition of all exposed live parts, height of the bottom most point of all bushings and insulators.
- vii) Notes explaining the operation of the equipment.

For equipment to be supplied by the Purchaser, drawings showing the above particulars will be furnished to the Contractor to enable him to carry out the installation, wiring and commissioning of such equipment.

**h) General drawings**

General drawings shall be applicable to all capacitor bank installation. These drawings shall include the drawings of sketches made for study of clearances, isolator alignment details, number plates of various equipments, caution or instruction boards, non standard busbar connectors, clamps and U-bolts for cable mounting etc.

**2.5.8 BOOSTER & L.T. SUPPLY TRANSFORMER STATIONS DRAWINGS:**

The Contractor shall submit for approval to the purchaser drawings for booster transformer stations and L.T. supply transformer stations, similar to those detailed for switching stations in 2.5.7(b). The following drawings may, however, be combined together:

- (i) Cross-section and foundation layout drawings;
- (ii) General arrangement, structural and earthing layout drawings.

**2.5.9 SCHEDULE OF QUANTITIES:**

- (a) Within five months of issue of Letter of Acceptance of Tender, the Contractor shall assess the quantities of various items of work including various components and fittings as covered in Schedule 1 and submit Schedule 1 (Assess.1) along with the corresponding quantity of various fittings and components included in Schedule 3 for approval of the Purchaser. Such an assessment shall be revised at suitable intervals after the first assessment is approved till the work is completed. Such re-assessments denominated as Schedule 1 (Assess. 2) (Assess. 3) etc., shall also be submitted for approval of the purchaser.

On receipt of approval of each final layout plan from the Purchaser, the followings Schedules of quantities relating to each layout plan shall be submitted within a fortnight.

- i) Schedules of number of masts, types, weight of different masts and total weight of masts;

- ii) Schedules of number of foundation, types, volume of different foundations and total volume;
- iii) Schedule of quantities of various items of work other than masts and foundation under Schedule-1.
- iv) Schedule of net tension lengths of contact, catenary and feeder wires and lengths required to be ordered;
- v) Schedule of lengths of other wires and conductors required to be ordered;
- and**
- vi) Schedules of small parts steel work to be supplied; either by the Contractor or the Purchaser.

**(b) SWITCHING/BOOSTER STATIONS**

Within a fortnight of receipt of approval of relevant drawings for each switching/ booster station, the following schedules of quantities shall be submitted.

- i) Schedule of number of foundations, types, volume of different foundation and total volume. Overlapping foundations will be treated as one foundation;
- ii) Schedule of number of masts, types, weight of different masts, and the total weight of masts of each gantry;
- iii) Schedule of steel work, types, weight of each member and total weight; and
- iv) Schedule of quantities of various items of work of schedule1 not included in Item (i), (ii), and (iii) above.

**(c) TRACTION Sub-Stations:**

On receipt of approval of relevant drawings for each Traction Sub-Station, the following schedules of quantities relating to each Traction Sub-Station, shall be submitted within a fortnight of receipt of approval.

- i) Schedule of foundations, showing volume of each type and total volume.
- ii) Schedule of steel work, types, weights of each member and total weight.
- iii) Schedule of quantities of various items of work of Schedule-1 not included in item (i) and (ii) above.

**2.5.10 SUBMISSION OF DRAWINGS & SCHEDULES:**

- (a) The submission of designs and drawings for approval shall be done in the manner indicated (See also para Contractor's Drawings etc.) . In case Contractor wish to deviate from standard drawings he should submit to the purchaser revised drawings with full details of deviation sought explaining the necessity of deviation, calculations and other supporting documents. The purchaser, if satisfy about the necessity and adequacy of deviations, shall refer the matter to RDSO for necessary approval. In case of deviations on working drawings- decision shall be communicated by the purchaser to the Contractor. The numbers of copies of drawings which shall be submitted are indicated in the following sub-paras. The purchaser will return one copy of the drawings either with approval subject to modification where necessary or with comments. The purchaser shall endeavor to return this copy within a period of fifteen days from the date of receipt and shall normally return the copy within a month. Where drawings are returned with comments or approval subject to modifications, the Contractor shall submit to the purchaser within fifteen days of receipt of such advice revised drawings for approval taking into account the comments or modifications. Also the Contractor shall as far as possible avoid correspondence on such comments and shall endeavor to settle any difference of opinion on the comments by discussions with the purchaser's Engineers. No drawings shall be resubmitted without incorporating the modifications required by the comments of the purchaser, unless the purchaser has agreed to the deletion of such comments.

**(b) DEVIATION FROM STANDARD DESIGN**

In case of deviation from standard designs and drawings, copies of correspondence and drawings shall be sent in duplicate to the Chief Administrative Officer, Railway Electrification, Prayagraj (U.P.) or his successor/nominee (whose address will be intimated in due course). In the particular case of deviations in the design of fittings the drawings submitted by the Contractor shall be actual manufacturing drawings complete with tolerances and full specifications of the materials used. In

addition, four samples of the modified fittings shall also be submitted, after the drawings are approved (see para Contractor's drawings etc.).

**(c) SPECIAL DESIGNS**

Special designs to meet the requirement of particular locations and local conditions shall be submitted in due time in duplicate for approval.

**(d) PURCHASER'S PEGGING PLANS**

Two copies of the purchaser's pegging plans shall be sent back after verification if found correct. If modifications are required, fresh pegging plans incorporating the modifications shall be submitted in two copies for approval (see para 2.5.6).

**(e) CONTRACTOR'S PEGGING PLANS**

When the Contractor is called upon to survey and prepare pegging Plans, he shall send three copies of such plans, while submitting them for approval.

**(f) CROSS-SECTION DRAWINGS**

Cross-section drawings shall be submitted for approval in two copies for a convenient section at a time separately for sections within station limits and section outside station limits. Such drawings shall be submitted progressively and as far as possible without gaps (see para 2.5.6).

**(g) OHE LAYOUT PLANS AND PROFILE DRAWINGS**

Overhead equipment layout plans, provisional and final and profile drawings shall be submitted for approval in three copies (See para 2.5.6).

**(h) STRUCTURE ERECTION DRAWINGS**

Structure erection drawings shall be submitted for approval in two copies for a section at a time separately for sections within station limits and sections outside station limits, progressively and without gaps.

**(j) SCHEDULE OF QUANTITIES**

Schedules of quantities for each approved layout plan/switching station shall be submitted for approval in two copies.

**(k) SUB-SECTION FEEDER DRAWINGS** -Deleted.

**(l)** All drawings for switching stations, booster transformer stations and L. T. supply transformer stations shall be submitted for approval in three copies.

**(m) DISTRIBUTION COPIES**

On receipt of purchaser's unqualified approval to the Contractor's Drawings, Schedule of quantities, the Contractor shall submit original tracings of those drawings and schedules for the signature of the purchaser in token of approval within seven days of the receipt of approval and the purchaser shall as far as possible return the same to the Contractor within 7 working days thereafter. On receipt of these tracings from the purchaser, the Contractor shall submit copies for distribution to field officers and other departments as indicated below within 7 days of receipt of approved tracings:

i)	Standard designs including fittings drawings as per para 2.5.10(b)	8 copies
ii)	Special designs	8 copies
iii)	Final peggings plans	8 copies
iv)	Structure Cross-section drawings	6 copies
v)	OHE layout plans	14 copies

vi)	OHE profile drawings	8 copies
vii)	Structure erection drawings	8 copies
viii)	Deleted	
ix)	Schedule of quantities	6 copies
x)	Drawings for switching stations, booster transformer stations & L.T. transformer stations.	9 copies

In all the above cases, the Contractor has the option to supply only six copies of the approved drawings provided one of them is a transparent paper print.

#### **2.5.11 COMPLETION DRAWINGS & SCHEDULES:**

After completion of works, all drawings and designs submitted by the Contractor for OHE, TSS & SCADA works and approved by the purchaser shall be made upto date incorporation actual supply and erection particulars including the name and make of insulators, galvanised steel tubes, stainless steel wire rope, Transformers, Circuit Breakers, ATs, CTs, PTs, Interrupters, RTUs etc. The mark of conductors shall be specified in the "As erected" OHE layout plans, SED and other relevant drawings for identification. Such drawings and schedules shall then be verified and corrected, if necessary, by the Contractor jointly with the purchaser's representatives. The verified and corrected drawings shall be supplied in four sets, one of which shall be transparencies of linen or film reproduction or any other durable material approved by the purchaser. In addition, the contractor shall also supply the soft copy of approved drawings. The soft copy shall be in Auto Cad, Coral draw or any other similar format as mutually agreed between the contractor and the purchaser.

#### **2.5.12 ADDRESSES:**

Addresses to which designs and drawings should be submitted are indicated in part-III.

XXXX

**PART - II**  
**CHAPTER –VI**  
**ERECTION AND INSTALLATION OF EQUIPMENT**  
**SECTION – I**  
**PRINCIPLES**

**2.6.1 SCOPE :**

This chapter deals with the methods of erection and installation of traction equipment, including casting of foundations and erection of structures.

**2.6.2 METHODS OF ERECTION :**

All work shall be done in accordance with methods of erection and installation of equipment approved by the Purchaser. In the case of switching station, booster transformer stations, L.T. supply transformer stations and Traction Sub-Stations, standard methods adopted for erection and installation of electrical equipment shall be adopted.

**2.6.3 SECTIONING :**

The entire equipment shall be erected in accordance with the finally adopted sectioning diagram and in such a way so as to facilitate sectioning which may be required in future and which will be indicated by the purchaser.

**2.6.4 INSPECTION :**

All erection and installation work shall be subject to inspection by the purchaser to ensure that the work is done in accordance with the specification, approved designs and drawings and is of the best quality suitable for the purpose.

**2.6.5 MEASUREMENTS :**

All measurements for location of structures and foundations shall be made with the aid of steel tapes. On curves, these measurements shall be taken on the outer rail of the middle track in the case of odd number of tracks and on the inner rail of the first outer track from the centre of the formation in the case of an even number of tracks, structures on curves shall be located in the radial offset of the location as determined.

**2.6.6 BOLTS, NUTS ETC . :**

All bolts, nuts, locknuts, screws, locking plates & split cotter pins etc. shall be properly tightened and secured. Contractor shall carry out systematic inspection of this aspect of work after all adjustments to overhead equipment/installation are completed and prior to offering completed sections of equipment/Sub-Station to the purchaser for inspection and testing. No bolts may project more than 10mm beyond the nut/locknut after full tightening.

**2.6.7 DAMAGE TO GALVANISING PAINTING :**

In loading, transport and erection, all galvanized/ painted materials shall be handled with care to avoid damage to galvanising/painting. If galvanising/painting is damaged inspite of all care taken, the damaged part of component shall be put up for inspection, to obtain permission from the purchaser to carry out repairs as per para 2.4.11(c).

**2.6.8 FOUNDATIONS :**

- (a) The Contractor shall carry out soil pressure tests in accordance with methods approved by the purchaser to determine permissible bearing pressure of various representative types of soils in the presence of the purchaser's representative during the pegging out of site inspection. He shall adopt only those values as accepted by the purchaser for the design of foundations.

**(b) LOCATION**

The location of each foundation or anchor block shall be set out correctly in accordance with approved structure cross-section drawings or foundations layout drawings, as the case may be, in the presence of the Purchaser's representative.

**(c) METHOD OF INSTALLATION**

As per provision in Clause 10.3 of IS: 456/2000 or latest, only mechanical mixers are to be used for mixing of concrete required anywhere in RE works including concrete for OHE foundation.

In exceptional circumstances, such as mechanical breakdown of mixer, work in remote areas or power breakdown and when the quantity of concrete work is very small, hand mixing may be done with the specific prior permission of the Engineer in writing subject to adding 10% extra cement. When hand mixing is permitted, it shall be carried out on a water tight platform and care shall be taken to ensure that mixing is continued until the concrete is uniform in colour and consistency.

He may erect traction masts or structures in the same operation as casting of foundations or erect them subsequently in cored holes left in foundation blocks and grout them separately in line with payment clause. In any case, the method of casting of foundation blocks and erection of masts or structures shall be subject to the approval of the purchaser.

**(d) EXCAVATION**

Normally, excavation of soil for foundations or anchor blocks along side the tracks may be done upto length of 1 to 1.2 m and depth of 0.8 to 1 m without shoring, provided the excavated hole is concreted immediately and not left overnight. Shoring shall otherwise be done unless the hole is re-filled with soil and temped. In case the length of excavation is 1 to 1.2 m and depth of excavation for foundations and anchor blocks alongside the tracks is more than 0.8 to 1 m, the excavation may be undertaken only after certification by the purchaser's representative to be safe and concrete is cast on the same day. Shoring shall be done to the satisfaction of the purchaser's representative, if the excavated hole is left overnight. All water logged locations will come under the purview of this para. In poor soil or ash banks, no excavation shall be done without adequate shoring and piling. For large foundations and water logged locations shoring shall be done in accordance with drawings submitted by the Contractor and approved by the purchaser. Shoring/ shuttering of the pits should be provided effectively to the satisfaction of the purchaser. Core hole covers should be provided promptly on casting of foundation (within 48 hours) and their edges cemented to the foundation blocks. Prior to doing so, water should be filled in the core hole so as to assist in curing. The date of casting should be inscribed on the foundation block. In case of platform areas and Level crossings, the core holes should be filled with sand before provision of core hole covers so as to prevent any injury to rail users even if the core hole cover gets damaged or is displaced. The track ballast should be restored to its original form promptly after casting of the foundation block. The excavated earth should be removed well clear of the area so as to avoid any mixing up with the track ballast or any obstruction to the track drains. In case of cuttings, the earth should be thrown well away from the shoulders so that there is no risk of its flowing back to the drain during the rains.

**(e) CONCRETING**

All concreting or grouting shall be done in accordance with para 2.2.4 with ballast graded for the purpose specified in para 2.2.5. The concrete shall be poured and temped properly in accordance with the method approved by the purchaser. The Contractor shall arrange to provide concrete testing samples for tests once every week or as and when required by the Purchaser, to determine crushing strength after 7 days or 28 days curing as required. Testing shall be arranged by the Purchaser at his own cost.

**(f) MUFFS**

**(i) FOR OHE:**

All anchor blocks and foundations of structures carrying overhead equipment shall be provided with concrete muffs. The top of these muffs shall be above the level of ground of the track formation and of adequate height of not less than 15 cm to afford reasonable protection during rainy weather. Muffs may be installed at the same time masts are grouted or after the mast/structure is loaded with equipment. The foundations of structures for switching stations need not, however, be provided with muffs. The top of such foundations shall be given a slope of 1 in 50 towards the edge to ensure that water does not collect at the base of the structure of the frame work of the equipment.

**(ii) FOR Foundation Level of TSS:**

The top of all foundations and anchor blocks shall always be above the level of the ground and of adequate height, not less than 15 cm. to afford reasonable protection during rainy season. The top of foundation shall be finished to make a smooth surface sloping 1/20 outwards to drain rain water.

- (g) Suitable grooves or niches shall be provided in the foundation blocks, wherever required, at the time of casting, to enable embedment of earth strips etc. to avoid the necessity of chipping of concrete.
- (h) Conduits for cables should be embedded in the foundation blocks, wherever required, to avoid subsequent chipping off and breaking of the foundation blocks.
- (i) All foundations will be cast in the presence of the Purchaser's representative with regard to fixed datum level.

**2.6.9 MASTS AND STRUCTURES :**

**(a) ERECTION**

In case traction masts or structures are erected in cored foundations, till such time they are grouted, they shall be properly wedged to prevent them leaning towards the track and endanger safety of moving vehicles. In case traction masts or structures are erected simultaneously with the casting of the foundations, the Contractor shall provide suitable temporary supports approved by the Purchaser. The masts/structure shall be embedded in the foundation blocks for the correct length specified in approved drawings.

**NOTE:** Mast/uprights should be grouted on the same day they are dropped in the foundations.

**(b) REVERSE DEFLECTION**

All traction masts and structures shall be erected with the correct reverse deflection so that they become reasonably vertical after they are loaded. The method of erection of masts with the correct reverse deflection shall be submitted to the Purchaser for approval.

**(c) INFRINGEMENT TO STANDARD DIMENSIONS**

In erection, care shall be taken to ensure that no part of the traction mast, structure or any fitting located on such mast or structure infringe the Schedule of Dimensions mentioned in Para - 2.1.1 (c) " Indian Railways Schedule of Dimensions".

**(d) ALINGMENT OF MAST AT GANTRIES**

The main masts of gantries shall be carefully aligned to enable easy and good assembly of fabricated steel work.

**2.6.10 OVERHEAD EQUIPMENT :**

- (a) A suggested method for erection of traction overhead equipment which would ensure good speed and quality erection is included in section 2 of this chapter. The Contractor may, however, follow other methods which they consider would speed up and ensure good quality work, subject to the approval of the Purchaser. Any wiring method should take into consideration appreciable stretch of the catenary and contact wires in the initial days after they are strung and put under tension.

**(b) BRACKET TUBES**

In the erection of bracket assemblies, it shall be ensured that the free length of the bracket tube beyond the catenary suspension bracket is at least 200mm to facilitate adjustment during maintenance.

**(c) STAY ARMS**

The choice of stay arms shall be such that their adjuster are capable of adjustments of minimum of 90 mm in either direction except as otherwise relaxed.



**(d) INSULATORS**

Before insulators are used in bracket assemblies or dispatched to work site for erection from Contractor's Stores Depot, they shall be tested as specified for routine mechanical test. NO chipped or cracked insulators shall be installed. All insulators shall be cleaned before offering complete sections of equipment for inspection and testing.

For testing of all types of Insulators, RDSO's Guidelines No. TI/MI/0011 (05/01) Rev.1 or latest & TI/MI/ 0042 (12/2008) Rev. 0 or latest are to be followed.

**(e) STRINGING CATENARY**

Care shall be taken to avoid kinking or bird caging of the catenary wire in stringing and subsequent operations. While stringing the wire shall be suspended from pulley blocks hung from the suspension clamp eye of bracket assemblies. The pulleys shall be fitted with ball bearing and shall be of the swivelling type to permit free movement in all directions to prevent damage to the strands of the wire. The design shall also be such that it will prevent slipping off of the wire during stringing operations. The designs of the pulley shall be submitted to the Purchaser for approval. After initial stringing of the catenary, it shall be maintained at the 'no load tension' (see section 2 of this chapter) for a minimum duration of 48 hours before the pulley blocks are removed and the catenary is clamped to suspension clamps of bracket assemblies. Shorter periods may, however, be allowed by the Purchaser.

**(f) STRINGING CONTACT WIRE**

Care shall be taken to avoid formation of kinks, twists and damage to contact wire in stringing and subsequent operations. While stringing the contact wire, it shall be suspended from pulleys hung from droppers fitted to the catenary in their final position. In curves, the contact wire shall be run in pulleys located at traction masts or supports, corresponding to the approximate final position of the wire.

**(g) LOCATION OF DROPPERS**

Droppers shall be correctly positioned in each span to ensure correct level of contact wire as per dropper chart applicable to the span.

**(h) CLIPPING DROPPERS**

The dropper shall be clipped on the contact wire only after a minimum duration of 48 hours from the time the automatic tensioning device is brought into action. Shorter periods may, however, be allowed by the Purchaser.

**(i) -NIL-**

**(j) AUTO TENSIONING DEVICE**

The auto-tensioning device shall be erected with the correct height of the counter-weight above rail level with corresponding distance between the pulleys of the device for a temperature of 35° C before it is connected to the overhead equipment and put into action. The installation of the device shall be such as to permit free, easy and unobstructed movement of counter-weight. RDSO's Guidelines No. TI/MI/0035 (09/01) Rev. 1 or latest shall be followed at crossovers and short tension length ATDs.

**(k) CUT-IN-INSULATORS**

All insulators in out of run shall be so positioned that they are away from the swept zone of the pantographs and will not foul with them. The live parts of these insulators shall also be so located that they are at least 2 m away from Structures other than those supporting traction overhead equipment.

**(l) SECTION INSULATORS**

All section, insulators shall be so located that they are beyond the swept zone of the pantograph running on adjacent tracks and there is no unusual sag due to the same. Where section insulators are installed, the contact plane of the runners of the insulators as well as those of overhead equipment connected to it shall be parallel to the track plane.

**(m) ANTI -WIND CLAMP**

Anti-wind clamp shall be provided as shown in drawing.

**(n) CONNECTIONS**

All jumper connections including anti-theft jumpers shall be made properly with parallel clamps and finished neatly without any loose wire or cables. The length of flexible jumpers shall be adequate to avoid any disturbance to overhead equipment or restraint in the relative movement of conductors, but the jumpers should not be excessively long. The ends of jumpers shall be tinned, including the portion inside the first parallel clamp.

**(o) SEPARATION BETWEEN OHE**

In erection, the physical separation required between overhead equipments and bracket assemblies on the same Structure at insulated overlaps shall be ensured.

**(p) GRADIENT OF CONTACT WIRE**

The gradient of the contact wire on either side of overline Structures with restricted clearances shall be correctly adjusted and adequate clearance maintained between the overline Structure and live equipment.

**(q) ADJUSTMENT AT TURNOUTS ETC**

Careful adjustment of equipment shall be made on equipments at Turnouts, cross overs, diamond crossings, overlaps and special Locations, for position of bracket assemblies, stay arms and height of contact wire to ensure that pantographs of electric rolling stock on the run will not foul with any parts of the bracket assemblies and change over of the contact wire is effected smoothly.

**(r)** For wiring in large Yards, the Contractor shall, prior to the execution of works, submit to the Purchaser's Engineer for the approval the sequence of stringing of catenary and contact wires to arrange for proper crossing of wires. Endeavor will be made to arrange for traffic blocks to suit approved sequence of wiring.

**2.6.11 ISOLATORS :**

Isolator switches shall normally be so mounted that when the switches are operated, the operator faces the directions of the motion of trains. The operating handles and contact blades shall be correctly aligned for easy operation.

**2.6.12 BUS BARS AND CONNECTIONS :**

- a) The busbar connections on the incoming side, shall be as tight as possible, all similar connections in adjacent bays being uniformly shaped and bent to give a good appearance. The tubular Aluminium busbars shall be supported at a uniform height throughout. Wherever tubular busbars are required to be bent, the radius of the bend shall not be less than 375 mm.
- b) All Aluminium busbar joints shall be made carefully. The contact surfaces of the busbars and the connectors shall be cleaned vigorously either by hand with a dry coarse emery cloth or by power driven wire wheel brush. The surfaces shall be smeared with a suitable corrosion inhibiting joint compound approved by the Purchaser. The joint closed-up as soon as possible thereafter and a final light application of joint compound shall be made. Similar procedure shall be followed while connecting the equipment terminals to be busbar by means of bi-metallic connectors.

### **2.6.13 EARTHING :**

#### **FOR OHE:**

The copper earth strips or MS flats used for earthing shall be bent and shaped neatly before connection to the structure or frame work of equipment. The connection of MS flats to steel work shall be made at a height not exceeding 15 cm from the datum level of a switching station. Before making earth connections the ends shall be cleaned thoroughly and tinned for copper strips. All junctions shall be properly secured to avoid loose contact. Portions of copper earth strips which remain visible above the ground level should be painted with suitable paint to make them inconspicuous.

#### **FOR TSS:**

Typical clamping arrangement of M.S Flat inside Control Room is shown in the relevant drawing in Annexure-1. The joints on mild steel flats shall be welded type. The welds shall be treated with barium chromate before painting the welded surfaces. The connections to the various items of equipments shall be made with galvanised steel bolts (16mm dia), nuts with locknuts or spring washers as required. The earth connections to the structural members shall be made at height not exceeding 150 mm from the ground level. The steel flats shall be bent and shaped neatly before connection to the structures or frame work of equipment. The earth flats to run along the structures for connections of equipments to earth mat shall be properly supported on the structures with galvanised steel bolts (12mm dia), nuts with lock-nuts or spring washers, as required, at suitable intervals.

### **2.6.14 TOLERANCE :**

The permissible tolerance in dimensions for erections from those included in the appropriate drawings or schedules for different items are given below :-

#### **(a) MEASUREMENTS**

The span length shall not vary more than  $\pm 50$  mm as measured along the appropriate rail (see para 2.6.5).

The cumulative error of measurement of all spans in a kilometer shall be not more than 1000 mm.

#### **(b) SETTING OF STRUCTURES**

The setting of structures shall be not less than that included in the appropriate cross section drawings, especially those with the minimum setting of 2.36m. A tolerance of  $\pm 20$  mm will be permitted subject to minimum specified value, if the structure is not located in between tracks.

#### **(c) HEIGHT OF CONTACT WIRE**

$\pm 20$  mm will be permitted on the height of contact wire at points of supports as shown in the relevant structure erection drawings, except under over line structures where no tolerance will be permitted.

#### **(d) STAGGER :** Generally $\pm 200$ mm will be permitted for stagger.

#### **(e) DROPPER LENGTHS :** $\pm 5$ mm will be permitted for dropper lengths.

#### **(f) DROPPER LOCATION :** $\pm 100$ mm will be permitted for dropper locations.

### **2.6.15 SUPPLEMENTARY INSTRUCTIONS :**

Further working instructions will be issued if considered necessary by the Purchaser should be considered that the standard of work of the Contractor requires to be improved.

### **2.6.16 EQUIPMENT :**

The installation of the equipment shall be carried out strictly in accordance with the instructions issued by the Manufacturer. The equipment shall be leveled carefully before being fixed finally in position. The bushings of insulators shall be protected adequately during erection of equipment to

avoid chipping or damage to the porcelain. The following methods shall be adopted for mounting the various equipments.

	Equipment	Method of mounting.
i)	Main Power transformer	On two 90 lb/yd flat-footed rails laid on concrete foundations with a spacing of 1676 mm between the inner face of the rails
ii)	220/132/110 kV Circuit breaker	On steel supports mounted on concrete foundation with operating mechanism kiosk on concrete pedestal where necessary
iii)	25kV Circuit breakers and interrupters	On fabricated steel supports erected on concrete foundations
iv)	Isolators, potential transformers, Current transformer L.T supply transformers, 25 kV fuse Switches & Lightning arrestors.	On steel supports mounted on concrete foundations
The Circuit breakers, interrupters and Isolators shall be mounted in such a way that they can be manually operated conveniently by a person standing on the ground or on a concrete pedestal of suitable height.		
v)	Shunt capacitor bank & series reactor	On steel racks which in turn shall be mounted on a concrete plinth with suitable base frame.

#### 2.6.17 CABLING :

##### a) Laying of cables.

All PVC cables provided out-door shall be either laid in trenches or neatly clamped to the structures as approved by the Purchaser. If it becomes necessary to take the cable connections along the steel supports for the equipment, the cables shall be laid through bent or shaped G.I. pipes embedded in concrete while the foundations are being cast. All cables in the cable trenches and along the structures shall be neatly secured with proper clamping arrangement at suitable intervals. Each cable in the cable trench/on the structure shall also be provided at suitable intervals with identification labels of durable material bearing indelible engraved or punched markings to facilitate easy identification.

##### b) Termination of cables.

The cables shall be terminated neatly and the cores arranged and dressed properly. Suitable terminal strips and ferrules made of PVC or other durable materials shall be provided on terminals and wire ends respectively to facilitate identification. The marking on the terminals strips and ferrules shall be either engraved or punched so as to be indelible.

##### c) Indoor wiring.

As far as possible all cables shall be laid in the trenches/ pipes provided for the purpose in the Control Room. Wherever necessary indoor wiring on walls shall be clamped neatly on teak wood battens/M.S flats fixed to the wall by means of rag bolts grouted in the wall. The typical clamping arrangement is shown in the relevant drawing in Annexure-1.

#### 2.6.18 -Deleted-

#### 2.6.19 -Deleted-

XXXXX

**PART-II  
CHAPTER-VI  
SECTION - II  
WIRING PROCEDURE**

**2.6.20 WIRING PROCEDURE :**

This sections deals with wiring procedure which may be adopted for erections of normal overhead equipment.

The following procedure for erection of overhead equipment has been formulated with a view to ensure that

- (i) Bracket assemblies (brackets) and regulating equipment are correctly installed in their final position.
- (ii) The conductors are correctly tensioned, and
- (iii) The need for final adjustments of overhead equipment immediately before energisation and commissioning is virtually eliminated.

**2.6.21 GENERAL :**

In the case of regulated overhead equipment when the regulating equipments are in action, the tension in the conductors should remain constant, irrespective of variations in the ambient temperature. As the regulating equipments are brought into action a few days after the stringing of conductors the equipments is unregulated in the intervening period. Any of the following two procedure may be followed for tensioning and clamping of conductors of regulated overhead equipment during stringing operations, i.e. before the regulating equipments are brought into action.

- (i) The catenary is tensioned to 1,000 kgf, the stipulated tension at the mean temperature of 35° C, whatever may be the ambient temperature during the stringing operations. In this case, at the time of clamping the catenary to the bracket, the brackets should be placed at angular positions corresponding to temperature at the time of clamping, and proportionate to their distance from the anti-creep.
- (ii) The aluminum alloy catenary is tensioned at the calculated tension to correspond to 1000 kgf, the stipulated tension at the mean temperature of 35°C whatever may be the ambient temperature during the stringing operations.
- iii) The catenary is strained to a stringing tension corresponding to the ambient temperature for the equipment span of the tension length. In this case, the brackets are placed in the mean position, i.e. at right angles to the track, when the catenary is clamped or the regulating equipment commissioned.

The advantage of the second method is that once the catenary is strung at the proper tension, there would be no necessity to adjust each bracket separately at the time of clamping the catenary or commissioning the regulating equipment. The erection work is, thus considerably simplified and the possibility of errors greatly reduced. This is also applicable to erection of unregulated overhead equipment.

**2.6.22 ERECTION OF BRACKETS :**

After the brackets are fabricated correctly in the Contractor's Depot, in accordance with the approved structure erection drawings, and provided with indelible labels or/painted marking indicating the intended locations for each bracket, they are removed to the site of work and erected on traction masts or supports. The brackets are swiveled to a position at the right angles to the track and secured in that position by means of steel wires tied to similar brackets located on the opposite side of the track or other suitable means.

**2.6.23 ANTICREEP :**

The anti-creep of the tension length is then installed in its final positions.

#### **2.6.24 LOCKING THE REGULATING EQUIPMENT :**

In the case of regulated overhead equipment, the regulating equipments are erected on the terminal masts or structures and their movement locked by suitable means in the middle position, with the distance between the pulleys of the regulating equipment corresponding to 35 degree centigrade.

#### **2.6.25 TEMPORARY ARRANGEMENT :**

A pulley approximately 30 cm. dia. is attached to the overhead equipment and of the regulating equipment by means of temporary accommodation fittings at both ends of the tension length to be wired. Over this pulley a flexible stranded wire is passed over. At each end of the wire two ending clamps, one for catenary and one contact wire, are attached. The wire is also clipped in the middle by 'U' clamps. The length of this temporary arrangement from the regulating equipment to the extremities of the stranded wire passing over the temporary pulley shall be a little longer than the distance between the regulating equipment and the ends of the catenary and contact wires in their final position, to permit easy clamping of terminal fittings during the final termination of the wire.

#### **2.6.26 STRINGING CATENARY :**

The catenary is initially terminated in the ending clamp of the temporary arrangement at one end of the tension length. The catenary is then paid out from the reel of the wiring train and run on pulley blocks hung from the suspension clamp eyes of brackets until the terminating point at the other end of the tension length is reached.

#### **2.6.27 TENSIONING OF CATENARY :**

The catenary is strained up to the 'Stringing tension' corresponding to the 'equivalent' span of the tension length and the ambient temperature at the time of stringing with the aid of a dynamometer, and terminated at the tension. For this purpose, the ambient temperature shall be deemed to be the temperature registered by a thermometer tied to a length of catenary wire 3 to 4 meters long, laid flat on the top platform, on one of the wagons of the wiring train. Subsequently, the tension in the wire is checked by measurement of sag with the help of leveling the attached to suspension points and to the catenary at midspan by a ladder working party. The sag shall be measured in two spans, each preferably greater than 54 meters, and situated on either side of anti-creep approximately midway between the anti-creep and the termination points. The value of sag measured by this method should be within  $\pm 5\%$  of the theoretical value for the corresponding stringing tension, and the temperature at the time of this measurement. In case the discrepancy is more, the tension should be adjusted again and sag re-checked as above (see note 1). After the sag is checked the catenary is terminated at the ending fitting of the temporary arrangement at the terminating point.

In order to restrict the duration of traffic blocks to the minimum, into first block, the catenary is strained to the stringing tension with the aid of dynamometers and the catenary is terminated. In a subsequent block, the sag is checked and the tension readjusted with ladders, if necessary.

#### **2.6.28 CLAMPING THE CATENARY :**

The catenary is clamped on the brackets placed at right angles to the track " See Note 2 under Para 2.6.34).

#### **2.6.29 DROPPERING :**

Droppers are fitted to the catenary at the correct locations. At the contact wire ends these droppers may be provided with small pulleys or hooks to act as temporary supports when the contact wire is strung.

Hooks made of scrap contact wire, suspended from the catenary Wire, may also be used as temporary supports.

#### **2.6.30 STRINGING CONTACT WIRE :**

The contact wire is initially terminated in the contact wire ending clamp of the temporary arrangement at one end of the tension length. The wire is then paid out from the reel wagon of the wiring train and supported on the pulleys hung from droppers or on hooks until the terminating point

at the other end of the tension length is reached (See Note 3). In curves, the contact wire shall be registered on pulleys located at traction masts or supports corresponding to the approximate final position of the wire. The axes of these pulleys should be more or less vertical.

#### **2.6.31 TENSIONING OF CONTACT WIRE :**

The contact wire is strained to a tension on approximately 1.2 times the tension corresponding to the ambient temperature and terminated in the ending clamp of the temporary arrangement.

#### **2.6.32 REGULATING EQUIPMENT IN ACTION :**

The regulating equipment is put into action with the counter weight at the correct height above rail level and with distance between pulleys or the regulating equipment corresponding to a temperature of 35°C. The regulating equipment is then released and brought into action. The 'U' clamp connecting the flexible stranded wire passing round the temporary pulley is also removed.

#### **2.6.33 FINAL ADJUSTMENT :**

The entire installation is left in this condition as long as it is possible, preferably for a period not less than 15 days (See Note 4). The temporary pulleys are removed and the conductors terminated in the permanent ending fittings, compensating plates, insulators and turn buckles (See Note 5). The equalizer plate is kept vertical or at a slightly inclined position (by 2 or 3 cm the contact wire being shorter than the catenary) and the position of the regulating equipment is checked in relation to, the temperature at the time. The contact wire is clipped on to the droppers (in the vertical position) and on the steady arms. Contact wire height at the bracket is adjusted as also the stagger and register arm clearance.

#### **2.6.34 CONCLUDING REMARKS :**

If the above method is followed with care no further adjustment may be needed.

##### **NOTE:**

(1) It should be ensured that sagging is done carefully and accurately. The adjustment of tension in the catenary after checking of sag, if required, would be easy if a temporary, turn buckle is inserted in the temporary termination.

The use of leveling lathes is recommended for the following reasons:

- (i) The accuracy of adjustment is greater than that with a dynamometer.
  - (ii) No traffic block is required for this operation.
  - (iii) It obviates the necessity initial tensioning of the catenary accurately thus permitting a deduction in the period of traffic block required for the wiring train.
- (2) If feasible, without any hindrance to progress of works, the catenary may be maintained at stringing tension for a period of 48 hours before checking sag and clamping it to the brackets. This would ensure equalisation of tension in the different spans.

Before clamping the catenary to the brackets, the sag should however, be checked in two spans as indicated in Para 2.6.27.

(3) If it is difficult to obtain a separate traffic block for stringing contact wire, the wire may be paid out at the same time, as the catenary, with the following precaution.

- (i) The contact wire is run and suspended from independent pulleys hooked on to the brackets, separately from the catenary pulleys, to avoid twisting together of the two conductors a special hook designed for this purpose.
- (ii) The contact wire should not be suspended from the catenary until the latter is clamped on to the brackets.
- (iii) The tension in the contact wire before termination should be about 1,500 kgf. This will ensure that sag is not excessive.

(iv) The adjustment of tension and checking of sag of the catenary wire is carried out as if the contact wire had not been strung. Only after adjustment of tension and checking of sag is completed, the contact wire is transferred to the pulleys attached to the droppers or to hooks suspended from the catenary and the tension is adjusted as indicated in Para 2.6.31.

(4) When the contact wire is under tension, creep takes place which results in a increase in the length of wire and, consequently, the droppers and the equaliser plates would become oblique.

Though creep may continue for a long time, about a year, the bulk of it would occur during the days following stringing. If sufficient period of time is allowed the contact wire may be clipped to the droppers and the equaliser plates, all in the vertical position, and the necessity for any further adjustments before energisation and commissioning of the OHE may be reduced to a great extent. If this precaution is not taken, at the time of energisation of the OHE, the droppers may not all be vertical and staff would have to be detailed for shifting the dropper clips which is attendant with risk of damage to the contact wire.

(5) Before the temporary arrangement is removed a reference mark should be made on each conductor. After final termination of the conductors, It should be ensure that two marks are in the same relative longitudinal position as they were before the removal of the temporary arrangement.

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**PART - II**  
**CHAPTER - VII**  
**INSPECTION AND TESTING**

**2.7.1 SCOPE :**

This chapter deals with the inspection and testing of completely erected overhead equipment, switching stations, booster transformer stations, L.T. supply transformer stations and Traction Sub-Station as provided in Part -I.

**i. Workmanship and Testing**

The whole of the works and/or supply of materials specified and provided in the contract or that may be necessary to be done in order to form and complete any part thereof shall be executed in the best and most substantial workman like manner with materials of the best and most approved quality of their respective kinds, agreeable to the particulars contained in or implied by the specifications and as referred to in and represented by the drawings or in such other additional particulars, instructions and drawings given during the carrying on of the works and to the entire satisfaction of the Engineer according to the instructions and directions which the Contractors may from time to time receive from the Engineer. The materials may be subjected to tests by means of such machines, instruments and appliances as the Engineer may direct and wholly at the expense of the Contractor.

**ii. Facilities for Inspection:** The Contractor shall afford the Engineer and the Engineer's Representative every facility for entering in and upon every portion of the work at all hours for the purpose of inspection or otherwise and shall provide all labour, materials, planks, ladders, pumps, appliances and things of every kind required for the purpose and the Engineer and the Engineer's Representative shall at all times have free access to every part of the works and to all places at which materials for the works are stored or being prepared.

**iii. Examination of Work before Covering Up:** The Contractor shall give 7 days' notice to the Engineer or the Engineer's Representative whenever any work or materials are intended to be covered up in the earth, in bodies or walls or otherwise to be placed beyond the reach of measurements in order that the work may be inspected or that correct dimensions may be taken before being so covered, placed beyond the reach of measurement in default whereof, the same shall at the option of the Engineer or the Engineer's Representative be uncovered and measured at the Contractor's expense or no allowance shall be made for such work or materials.

**2.7.2 OVERALL PERFORMANCE :**

The overall performance of the overhead equipment should be such as would permit collection of current by electric rolling stock with full load at speeds, upto and including the maximum specified for the design of overhead equipment, smoothly, without mechanical shocks or prejudicial sparks (See para 2.1.10) and without undue heating in the case of other equipments.

**2.7.3 RESPONSIBILITY :**

The general tests of overall performance stipulated below are only supplementary to other tests on structures, foundations, equipment, components and fittings as specified in Part - II, Chapter - II, III and IV. Any testing and acceptance by the Purchaser of overall performance shall be subject to the general terms of guarantee which shall continue to be valid as provided for in Part - I, Chapter - II.

**2.7.4 TESTS OF OHE :**

**(a) GENERAL**

As soon as a section is ready for inspection and testing, the Contractor shall advise the Purchaser in writing. Tests to be carried out by the Purchaser will be done in the presence of the Contractor's representative and shall include the following apart from other reasonable tests that the Purchaser may like to conduct with a view to ensure, himself of the soundness of the equipments and their erection in strict compliance with the specifications.

**(b) INSULATION**

The strength of the insulation and the dielectric strength of the entire equipment as installed shall be tested with a 2500V Megger.

**(c) CONTINUITY**

The electrical continuity of the line and the existence of bad Contacts, if any, will be tested with a Megger.

**(d) ELECTRICAL INDEPENDENCE**

The electrical independence of individual elementary sections in relation to one another shall also be tested with a Megger.

**(e) SWITCHES**

All isolators shall be tested for smooth and trouble free operation.

**(f) TENSION DEVICES**

All automatic Tensioning devices installed shall be tested for sensitive functioning and adjustment.

**(g) STAGGER AND HEIGHT**

The stagger and height of contact wire over the entire section of completed overhead equipment and the clearances available shall be measured and the measurement shall be checked against approved drawings. These measurements shall be carried out at low speed with a vehicle or device to be arranged by the Purchaser, the movement of which will follow the track levels as closely as possible. Tolerance that will be permitted on the dimensions indicated in the approved drawings are shown in Part - II, Chapter - VI.

The actual position of the two contact wires, relative to each other, at overlaps and turnouts shall also be checked. Special attention shall be paid to a smooth movement of Pantographs over section insulators, particularly those which are likely to be frequently traversed.

**(h) MECHANICAL BEHAVIOR**

The mechanical behavior of the entire equipment shall be tested at various speeds under normal pantographs pressure without energising the overhead equipment.

**(i) ENERGISING**

If the overhead equipment, after being subjected to the above tests in an un-energised condition, is found to be satisfactory, it will be energised with the normal 25 KV A.C. supply.

- (j)** Tests shall then be conducted to check if the power collection performance of the overhead equipment is satisfactory after ensuring that the contact wire is adequately clean. For this purpose, an observation car shall be attached next to the electric locomotive. The behavior of the overhead equipment will be watched at various speeds. Power collection shall be considered unsatisfactory if a long blue flash is observed, indicating that the contact between the contact wire and the pantograph is not continuous.

**2.7.5 INSPECTION AND TESTING OF SWITCHING STATIONS ETC.:**

**(a) GENERAL**

As soon as a switching station, booster transformer station or LT supply transformer station and Traction Sub-Station is ready for inspection and testing, the Contractor shall advise the Purchaser in writing. Testing will be carried out by the Purchaser at his cost jointly with the Contractor. These shall include the tests which the Purchaser may like to conduct with a view to assure himself of the soundness of the equipments and their erection in compliance with these specification. However, testing equipments such as those indicated below and staff required for the tests shall be provided by the Contractor free of charge.

- (i) Oil testing equipment.
- (ii) 5000V/2500 V & 500 V meggers.
- (iii) Earth megger and accessories.
- (iv) Continuity test apparatus.
- (v) Avometer
- (vi) Relay testing kit.
- (vii) Primary injection test set.

The Contractor shall take full responsibility for these tests inter-alia his other responsibilities.

**(b) VISUAL INSPECTION**

Visual inspection which shall include check for satisfactory workmanship shall cover all connections, Painting, Plastering, Cleanliness of all insulators etc. and compliance with Indian Electricity Rules.

**(c) OPERATIONS TEST**

This tests will be conducted on every individual items of equipment such as interrupters, isolators, relays etc. to ensure that the equipment as a whole is functioning properly and is mechanically sound, i.e. in the particular case of isolators the fixed contact and knife blade have been correctly aligned and operations does not cause undue strain on the equipment. The operation tests will be carried out with the high tension installation dis-connected from the supply, but by actuating power devices where such are provided. Continuity test of high tension connections after setting such interrupter and isolator in their respective positions shall also be conducted as part of the operation test.

**(d) INSULATION**

The strength of insulation of the various items of equipment and of the entire installation as a whole shall be tested with a 5000V/2500 V/500 V megger, as required.

**(e) DI-ELECTRIC STRENGTH OF OIL**

The di-electric strength of the oil of the Instrument Transformers (except if they are of sealed construction), Booster transformer Circuit Breaker & LT supply transformer, at each station shall be tested before commissioning in accordance with IS:335 (or latest) should this be found not correct, the Contractor shall arrange at his own expenses to have it rectified.

**(f) ISOLATORS**

All isolators will be tested for smooth and trouble free operation. Correct function-ing of interlocking device shall be checked.

**(g) INTERRUPTORS**

Operation of trip and close coils for interrupters shall be tested for satisfactory performance with the respective equipments de-energised.

**(h) Instrument transformer**

Tests shall be conducted to check the polarity of current and potential transformers.

**(i) Ammeter and Voltmeter**

The Calibration of ammeters and voltmeters provided on the control board shall be checked.

**(j) Protective relays**

The Contractor, shall arrange for all protective relays to be tested and calibrated in a recognised test laboratory at his own cost, just prior to installation on the control board, and shall submit six copies of the test certificates to the Purchaser.

**(k) Primary & secondary injection tests**

Operation of all protective relays, auxiliary relays and trip and close coils for circuit breakers shall be tested for satisfactory performance with the respective equipments de-energised. Correct functioning of all electrical interlocks inter-tripping etc. shall also be checked during these tests.

**(l) Performance tests**

To verify the performance of the complete capacitor bank, tests as specified in respective clause of RDSO specification No. TI/SPC/PSI/FC or latest & SR/0100 (01/2010) or latest shall be carried out at site after installation.

**2.7.6 EARTHING :**

- (a) Earth wires will be checked for continuity and electrical isolation every 1000 m approx.
- (b) Clearances between earth wires and out-of-run wires of overhead equipment and signals shall be checked.
- (c) Earth resistance shall be measured separately for each earth electrode. In the case of interconnected earth electrodes, the nett resistance of the inter-connected electrodes shall also be measured.
- (d) Earth resistance will be measured separately for each earth electrode and when they are connected together and to the equipment at each sub-station, feeding station and shunt capacitor bank.

**2.7.7 DETAILS PROCEDURE FOR TESTS :**

The detailed procedure for inspection and testing will be furnished to the contractor. The contractor shall submit the results of tests in the proforma which will be furnished by the Purchaser, in quadruplicate.

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**PART - II**  
**CHAPTER - VIII**  
**SWITCHING STATION BUILDING**

**2.8.1 GENERAL :**

This chapter deals with details and specifications for design and construction of switching station buildings and associated electrical works. This chapter also gives reference to technical specifications of materials and components and procedure of designs and drawings for above works. A list of standard drawings is included in Annexure-I, Part IV.

**2.8.2 EARTH WORK:**

- (a) Earth work in cutting or embankment in the premises of switching station buildings is included in the scope of construction of building. The buildings will be adequately levelled with earth duly consolidated in the premises or as directed by the purchaser.

(b) **Mechanical Compaction:**

Depending upon the height of the embankment, the type of soil, time available for completing the embankment and other relevant factors, purchaser's Engineer shall decide whether mechanical compaction is to be done for the full or part height of embankment. Suitable method for compaction as decided by purchaser, shall be adopted.

(c) **Excavation:**

All cuttings shall be taken down carefully to the precise level and section as shown in the drawings or as ordered by the purchaser. In case, the bottom of the cutting is taken down deeper than is necessary by oversight or neglect of the contractor, the hollow must be filled up to true depth with selected material and rammed, if approved by purchaser. Cuttings with the formation in rock will be excavated to 15 cm below the true formation and filled upto true level with cutting spoil to ensure that no lumps of solid rock project above formation level.

(d) **Drainage of cuttings:**

In excavating cuttings, special precautions are to be taken to ensure that the excavations drain themselves automatically. To ensure this, the central block of earth or gullet is to be excavated first. This will be done in such a manner that the bottom of the excavation shall where possible, slope downwards from the center of the cutting towards the ends. It will be made in such cuts or steps as may from time to time, be directed. Generally, in deep cuttings the first cut or step will approximately follow the surface of the ground where this will secure the necessary slope for drainage, and will be excavated to such depth not exceeding 3 m as may be ordered, with perpendicular sides leaving pathways for workmen along the sides of the cut parallel to the central line about every 15m. In shallow cuttings, not exceeding 2m in the deepest part, the gullet may be cut out at once to formation level.

(e) **Catch water drains:**

Where required, catch water drains shall be constructed on the up hill side leaving a berm of one metre from the boundary of the railway land. The cross sectional area of the catch water drain shall normally not exceed 0.75 sq.m. The spoil from the catch water drain will be thrown up on the side towards the cutting.

(f) **Berms and spoil banks:**

No spoil shall be deposited within a distance of 6 m from the top edge of the slope of any cutting.

- (g) The spoil heap shall be roughly but neatly dressed off to a slope of 1-1/2:1 and shall form a continuous bund along the top of the cutting. In country where there is any cross fall sufficient spoil shall be thrown on the uphill side of the cutting to supplement the catch water drains and assist in keeping drainage out. This work must be done first.

- (h) All material excavated from cutting suitable for pitching, ballast, masonry or any other purpose whatever, shall be the property of the Railway, and shall be stacked, as also disposed of, as directed by the Purchaser.

(i) **Springs or Inflow:**

Should springs or inflow of water appear in cuttings, or should they be flooded the contractor must arrange for bailing, pumping or drainage of water, without obstruction to adjacent works.

(j) **Blasting:**

If any blasting operations are necessary, they shall be carried out in accordance with para safety measures of Chapter II, Part-I of this tender document.

**2.8.3 FOUNDATIONS :**

- (a) Foundations shall be designed by the contractor in accordance with Chapter II, Part II of this tender document. The contractor shall get the relevant drawings approved by the purchaser. The foundation work may involve wet excavation also, for which all due precautions by way of pumping and other operations, preventing blowing are to be adopted.

(b) **Plinth filling:**

Plinth filling shall be done with earth in 15 cm layers, duly consolidated, watered & rammed unless otherwise specified. In black cotton soil, the soil shall be removed for a depth of 60 cm and top 30 cm filling shall be done with sand.

- (c) Wherever it is necessary in case of deep trenches, shoring or timbering for such trenches shall have to be provided to avoid collapsing of earth.

(d) **Apron:**

For protection of plinth, an apron as specified in drawing **No.RE/Civil/BS-11/95** (or latest) shall be provided.

**2.8.4 REINFORCED CEMENT CONCRETE WORK :**

- (a) R.C.C. of the switching station shall be cast on the controlled concrete technology for M-20 grade conforming to IS:456 (or latest). The design of all R.C.C. work shall be prepared by the contractor and got approved from purchaser well in time.

Test concrete specimen shall be casted at the site of work and tested in accordance with the relevant specification.

- (b) If unavoidable due to site conditions, concrete may have to be laid in water as per laid down procedure.  
(c) All RCC works shall be finished smooth.

**2.8.5 SUPER STRUCTURES :**

- (a) Brick work

Besides following relevant specification, well burnt bricks shall only be used. The brick work shall be laid in ENGLISH BOND. The brick work below plinth shall be done in Cement mortar of ratio 1:4 (1 cement, 4 sand). The brick work above plinth shall be done in cement mortar of ratio 1:6. Curing of the brick work shall be done for a minimum period of fourteen days.

- (b) Plastering on inside and outside surface shall be done in Cement mortar of ratio 1:3 and shall have a thickness of 10 mm.

- (c) All external surface shall be treated with snowcem over two coats of cement primer of approved quality and all internal surfaces of wall and ceiling shall be white washed with three coats.

**2.8.6 FLOORING:**

- (a) Following pattern of the flooring shall be adopted:

- (i) **Base concrete** - 100 mm thick cement concrete of ratio 1:4:8 with under layer of 100 mm thick sand filling over well compacted earth.

- (ii) **Top layer** - 40 mm thick cement concrete of ratio 1:2:4, laid in panels with glass dividing strips of 25 mm x 3 mm.

Top surface of the flooring shall be finished smooth.

- (b) Suitable anti termite treatment, pre and post treatment as approved by the purchaser, shall be provided.

#### **2.8.7 ROOFING :**

R.C.C. roof, complete in all respects in accordance with RDSO drawing No.ETI/C/0067 (or Latest) shall be provided. Water proofing of roof shall be responsibility of the contractor. Type of water proofing treatment if required, will be got approved from the purchaser. The contractor shall ensure at the time of handing over of the building that roofs are leak proof and water tight. The contractor shall also provide C.I. rain water pipes of specified size.

#### **2.8.8 DOORS, WINDOWS, VENTILATORS :**

Pressed steel doors, windows, ventilators and grills etc. shall be provided in accordance with the drawing No.RE/Civil/S-129/2001(or latest). All steel work shall be painted with two coats of ready mixed paint of approved quality and shade with Red Oxide primer coat.

#### **2.8.9 BUILDING MATERIALS:**

Building materials if not already specified above, shall be used in accordance with Chapter II, Part-II of this tender document.

#### **2.8.10 WIRING:**

- (a) The contractor shall follow recessed conduit wiring system for internal wiring of the switching station buildings. Stove enameled, jet black, steel seamless conduit pipes of standard diameter, conforming to IS:9537(Part-2)/ (or latest) with latest amendments shall be used. No conduit pipes having a diameter of less than 19 mm shall be used. All conduit accessories like bends, inspection boxes, elbows, draw boxes, junction boxes shall be of threaded type and shall conform to **IS:3837** (or latest) with latest amendments. The conduits shall be recessed in the wall/ceiling.

The conduit of each circuit or section shall be complete before conductors are drawn in. The entire system of conduit after erection shall be tested for mechanical and electrical continuity throughout and permanently connected to earth by means of a special approved type of earthing clamp efficiently fastened to conduit pipe. A G.I. wire of 6/8 SWG and conforming to IS:4826 (or latest) shall be provided alongwith laying of recessed conduit to facilitate drawing of wires in the conduit.

- (b) The wiring shall include circuit wiring and point wiring. The circuit wiring shall include wiring from distribution board upto first switch board along the run of wiring. The point wiring shall include complete wiring of a switch circuit from tapping point on the distribution circuit to the following via the switch.

- (a) Connector in case of exhaust fan point.
- (b) Ceiling rose.
- (c) Socket outlet.
- (d) Lamp holder.

Looping system shall be used for the wiring. Phase or live conductors shall be looped at switch box and neutral conductor can be looped from the light, fan or socket outlet. All switches shall be placed in the live conductor of the circuit. Power/heating wiring shall be kept separate and distinct from lighting and fan wiring. Light and fan circuit shall not have more than ten points of light, fan & 5 Amp socket outlets or a load of 800 watts whichever is less. A power circuit shall be designed for a maximum of two outlets of a load of 1000 watts each. The contractor shall prepare a wiring diagram, indicating clearly in plan, main & distribution board, position of all points with their classification and controls and get it approved from the purchaser.

- (c) PVC insulated, single core, multi stranded Aluminium conductor, 660/1100 Volt grade cables conforming to IS:694 (or latest) shall be used for the wiring. The standard sizes shall be as follows.
- (i) 2.5 sq.mm for light/fan point wiring.
  - (ii) 4 sq.mm for Power point wiring.
  - (iii) 6 sq.mm for connection between main switch and distribution board.
- (d) Electrical fittings, plug points and appliances as indicated in following table shall be provided in a switching station. The contractor shall get the locations of the electrical fittings/ appliances approved from purchaser.

**TABLE**

SN	DESCRIPTION OF ITEM	QUANTITY
1.	5 Amp. 3 pin flush type socket outlet with switch	1 No.
2.	15 Amp. 3 pin flush type socket outlet with switch	2 No.
3.	Fluorescent fitting complete with choke, starter, PF improving capacitor inside the reflector cover and a fluorescent tube	1 No inside the building
4.	Outdoor luminaire fitting suitable for 150 Watt HPSV lamp with all accessories including a 150 Watt HPSV lamp	1 No outside the building
5.	230 AC, 300 mm, 940 RPM exhaust fan.	1 No. in battery room

#### **2.8.11 MAIN SWITCHGEAR AND SWITCH BOARD :**

- (a) **Main board** consisting of main switch and distribution board shall be situated as near as practicable to the termination of service line and shall be easily accessible without use of external aid. Switch boards of adequate sizes as approved by the purchaser shall be made of mild steel and recessed in the wall. Front of the boards shall be fitted with 3 mm thick phenolic-laminated sheet similar to Hylem one. All the metal switchgears and switch boards shall be painted, prior to erection with two coats of approved enamel paint, as required on all sides accessible.

(b) **Main Switch**

Main switch shall be 230 Volt, 32 Amp, metal clad, composite switch fuse unit, single pole with rewirable type fuses and neutral link. It shall conform to IS: 13947 (Part.3) (or latest). It shall have cable entry holes, cover handle interlocking, sealing arrangements and weather proof enclosures.

(c) **Distribution Board**

Distribution board shall be 230 V, 16 Amp. metal clad boards conforming to IS:2675 (or latest) with latest amendments with hinged type metallic cover, cable entry holes and weather proof enclosures. It shall have reusable type fuse units.

- (d) Switches shall be 230 V, 5/15 Amp, one way flush type, piano type switches, conforming to **IS:3854** (or Latest) with latest amendments and shall be ISI marked.

Three pin socket outlets shall be 230 Volt, 5/15 Amp, flush type, conforming to **IS:1293** (or latest) with latest amendments and shall be ISI marked.

Ceiling roses shall be 230 V, 5 Amp, 2 pole bakelite ceiling roses, conforming to **IS:371** (or latest) and shall be ISI marked.

#### **2.8.12 EARTHING:**

Earthing systems including earth electrode in accordance with **IS:3043** (or latest) shall be provided. Loop earthing with G.I. wire of not less than 8 SWG shall be provided for all mountings of the main board and other metal clad switches and distribution boards.

#### **2.8.13 ELECTRICAL FITTINGS AND APPLIANCES:**

- (a) Fluorescent lamp fittings conforming to IS:1777 (or latest) with latest amendments and suitable for 1x40 Watt fluorescent tube shall be provided. The fittings shall be complete with copper wound choke, lamp holders, starter with base, power factor improving capacitor, 40 Watt fluorescent tube etc. The fittings shall be mounted on the walls with suitable mounting arrangements.



(b) **EXHAUST FAN**

The contractor shall provide single phase, 230V, 50 Hz, 6 pole, 940 RPM propeller type exhaust/ventilating fans having a size of 300 mm and with a mounting ring but without regulator and louver shutters. The fan shall conform to **IS:2312** (or latest) and shall be ISI marked.

(c) **OUTDOOR LUMINAIRES**

- (i) The contractor shall provide weather proof street light/outdoor luminaire fittings of two piece construction, comprising of cast Aluminium control gear housing and deep drawn stove enameled lamp housing with anodised Aluminium side reflectors, clear acrylic bowl, held by antirust, robust toggle.

The luminaire fitting shall be suitable for a 150 watt HPSV lamp and shall be complete with control gear box with ballast, PF improving capacitor, connector block, fuse cutout, earthing terminal and a 150 watt HPSV lamp.

(ii) **INSTALLATION**

The control gear box, mounted on a teakwood board of appropriate size and shall be installed on wall inside the building at an accessible height and connected to the switch board through a ceiling rose.

The luminaire fitting shall be installed on a pre-erected 3 meter long medium class G.I. pipe of 50 mm diameter.

The pipe shall be grouted on the outside wall of the building with the help of M.S. clamps such that height of G.I. pipe above the roof of the buildings is not less than 2.5 meters. The fitting shall be mounted with the help of a 25 mm dia G.I. pipe, given a bend of 120 deg. from horizontal plane and MS clamps. Flexible copper wire of suitable size shall be provided to connect the control gear & the fitting. The control gear box and the fitting shall be properly earthed.

**2.8.14 TESTING AND COMMISSIONING:**

On completion, all works including wiring, electrical fittings and appliances shall be tested jointly with the representative of the purchaser in accordance with **IS:732** (or latest) and commissioned.

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**PART - III**  
**PARTICULAR SPECIFICATION**

**3.1 Introduction**

This part of the specification is complementary to Part-II. This work includes –

**Augmentation/Replacement of Catenary wire over Delhi Division (7th Phase).**

**3.2 Location**

Work is to be executed at different locations of different depot zones (as per Annexure-Y) under jurisdiction of Delhi division of Northern Railway. However, Railway reserves right to change site of work anywhere in adjacent / adjoining area of work mentioned in Para 1.1.1 (iii) above in jurisdiction of Delhi Division under **Sr.Divil. Elect. Engineer (TRD), Northern Railway, DRM's Office, New Delhi** and contractor shall be bound to execute the work without any extra cost.

**3.3 Tracks to be Equipped**

- (a) Electrified section to be equipped.

(b) **Schematic Diagram**

The tentative schematic electrical sectioning of the tracks will be supplied to the successful Tenderer, if required.

**3.4 General Particulars**

- (a) The section passes through populated localities. The bearing capacity of the soil is likely to vary from 5500 to 22000 Kg/Sq. m. or latest. The actual bearing capacity shall however be determined in accordance tests as provided in PART-II Chapter-II of tender papers.

- (b) **Access Road** – Majority of the section is approachable by Road/Rail.

**3.5 Climatic Data Temperature**

- a) Temperature

The maximum and the minimum temperature in the open area are 47° C and 4° C respectively. The mean temperature may be taken as 35° C.

- b) Rainfall.

Rains occur generally from June to September.

- c) Humidity.

The maximum relative humidity is nearly 50 to 80%.

- d) Wind pressure.

The basic wind pressure of this section shall be adopted as per IS: 875 with A&C or latest. This wind pressure also conforming with the wind pressure adopted by State Electricity Board or latest Guidelines issued by RDSO/Railway or latest IS amendments.

- e) Thunder storm.

The region is subject to thunder storm during monsoon from June to September.

**3.6 Labour & Materials**

Un-skilled labour is available almost all over the section while skilled labour would be available generally at the main towns in the section .

### 3.7 **Contractor's Office**

It is obligatory on the part of the Contractor to establish an office with land line phone for, planning, designs and for expedition finalization of particular designs & working drawings. The office should be headed by a qualified Engineer whose credentials shall be approved by the purchaser's Engineer. In addition, the Contractor would have to establish field construction office at convenient and approved locations for co-ordination and progressing of Field works.

### 3.8 **Contractor's Depots**

Suitable space shall be made available for the Contractor to set up one main depot.

### 3.9 **Duration of Traffic Blocks**

Normally track occupation may be granted at any time during day or night hours to suit convenience of traffic operation and will ordinarily be granted on one track at a time over a distance covered by one or two consecutive block shadows. Normally the duration of block on any section will be about 2 hours in a day for all the tracks in the section taken together. In special case, track occupation may be granted during night hours. Blocks provided may be utilized for one or more working gang or track lorries or ladder trolleys to suit convenience of work.

If Blocks are granted during night hours, the contractor will make his own arrangements of lighting at his own cost for execution of work.

### 3.10 **-DELETED-**

### 3.11 **Addresses**

The list of addresses to which correspondence and documents relating to the Contract, should be sent is as under:

#### i. **For All Policy, Contractual & Commercial Matters:**

Sr. Divisional Electrical Engineer(TRD)  
Northern Railway, State Entry Road,  
DRM's Office, New Delhi.

#### ii. **For Security Deposits:**

Sr. Divisional Finance Manager,  
Northern Railway, DRM's Office,  
State Entry Road, New Delhi.

#### iii. **For matters relating to particular design and working drawings:**

Sr. Divisional Electrical Engineer(TRD)  
Northern Railway, State Entry Road,  
DRM's Office, New Delhi.

#### iv. **For matters relating to standard designs and drawings for fittings, components, equipments and prototype tests:**

Sr. Divisional Electrical Engineer(TRD)  
Northern Railway, State Entry Road,  
DRM's Office, New Delhi.

#### v. **Matters relating to progressing of field work scheduling of quantities and submission of bills.**

Sr. Divisional Electrical Engineer(TRD)  
Northern Railway, State Entry Road,  
DRM's Office, New Delhi.

3.12 **Quantities Approximate :**

Part-V, Form-5 gives the approximate quantities for various items of work.

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**LIST OF STANDARD DRAWINGS AND SPECIFICATIONS**

This Annexure contains reference to drawing numbers, charts, Schedules, Specifications and other data referred to in various paragraphs of this Tender Paper.

All references to drawings, charts, schedules, specifications, IS etc. given in this Annexure or elsewhere in the tender document shall be taken to be the latest versions including all amendments. All other items not covered under the Drawing/Specification shall be referred to as per relevant IS and Railway practice in force. The latest specifications/drawings/manual of OEM/RDSO/CORE as applicable shall be followed.

The Drawing and RDSO specification can be purchased from the office of CEE/CORE, Prayagraj (U.P.) or TI Directorate of RDSO, Lucknow on payment basis.

For drawings of fittings/equipments See Form-6: Part V.

**(A) LIST OF STANDARD DRAWINGS FOR “OHE” (Latest version shall be followed)**

Sl. No	Brief Description	Drawing		Mod. No.
		Series	Number	
1	2	3	4	5
1.	Extra allowance for setting of structures on curves (1676 mm Broad gauge)	ETI/OHE/G	00111 Sh-1	C
2.	Standard setting of structures in the vicinity of signals (broad gauge)	-do-	00112	D
3.	Typical design of side bearing foundation.	-do-	00131	-
4.	Typical design of cantilever mast.	RE/33/G	00141 Sh.3	-
5.	Standard drilling schedule of OHE masts 9.5 m long RSJ and BFB	ETI/OHE/G	00144 Sh.3	C
6.	Span and stagger chart for (conventional OHE, Cad. Cu catenary & Cu cont. wire) wind pressure 75,112.5 & 150kgf/m <sup>2</sup> .	ETI/OHE/G	00202	-
7.	Employment schedule for Cantilever mast Regulated OHE without return conductor and without Earth wire (WP- 112.5 kgf/m <sup>2</sup> (Cd- 65/Cu, Cont. 107/Cu)	ETI/OHE/G	00153 Sh.1	F
8.	Employment schedule for Cantilever mast Regulated OHE without return conductor and with Earth wire (WP- 112.5 kgf/m <sup>2</sup> (Cd- 65/Cu, Cont. 107/Cu)	ETI/OHE/G	00153 Sh.2	F
9.	Employment schedule for Cantilever masts Regulated OHE with return conductor and without Earth wire (WP- 112.5 kgf/m <sup>2</sup> (Cd- 65/Cu Cont. 107/Cu)	-do-	00153 Sh.3	F
10.	Employment schedule for Cantilever masts Regulated OHE with return conductor and with Earth wire (WP- 112.5 kgf/m <sup>2</sup> (Cd- 65/Cu, Cont. 107/Cu)	-do-	00153 Sh.4	E
11.	Employment schedule for Cantilever masts unregulated OHE without return conductor and without Earth wire (WP- 112.5 kgf/m <sup>2</sup> at 35°C and 28kgf/m <sup>2</sup> at 4°C (Cat- 65/Cu, Cont. 107/Cu)	-do-	00154	D
12.	Employment schedule of bracket tubes Conventional OHE (Cad Cu Caty & Cu contact wire 1000 kgf tension each) WP-75 Kg/ m <sup>2</sup>	ETI/OHE/G	00158 sh.1 of 3	-
13.	Employment schedule of bracket tubes Regulated Conventional OHE (Cad. Cu Cat & Cu contact wire 1000 kgf tension in each) WP-112.5 Kg/ m <sup>2</sup>	ETI/OHE/G	00158 sh.2 of 3	-

14.	Employment schedule of bracket tubes Regulated Conventional OHE (Cad Cu Caty & Cu contact wire 1000 kgf tension in each) WP-150 Kg/ m <sup>2</sup>	ETI/OHE/G	00158 sh.3 of 3	-
15.	Dropper schedule for uninsulated Overlap spans	-do	00169	A
16.	Dropper schedule for insulated Overlap spans	-do	00170	A
17.	Dropper schedule for conventional regulated OHE. With Zero presag (1400/1400)	-do	00177	A
18.	Adjustment chart of Regulating equipment 3 Pulley Type (3:1 ratio)	-do	00195	A
19.	Schematic arrangement of regulated OHE	-do	02101	A
20.	Schematic arrangement of uninsulated overlap (3 & 4 span overlaps)	-do	02121 Sh.4	A
21.	Schematic arrangement of insulated overlap	ETI/OHE/G	02131 Sh.3	A
22.	Standard termination of tramway type OHE (Regulated) with Pulley type regulating equipment (3:1 ratio).	ETI/OHE/G	04212	B
23.	General distribution of droppers	ETI/OHE/G	00161	-
24.	Outline of Pantograph (Broad gauge and metre gauge).	RE/33/G	00181	A
25.	General formation of single track in Embankments and cutting (Broad gauge.)	RE/33/G	01101 Sh.1	A
26.	General formation of double track in embankments and cutting (Broad gauge).	-do-	01102 Sh.1	A
27.	General formation of multiple tracks (1676 mm gauge).	-do-	01103 Sh.1	A
28.	Standard anchor arrangement	-do-	01401	E
29.	Anchor arrangement with dwarf mast.	ETI/OHE/G	01402	B
30.	Schedule of anchor block for B.G. track.	-do-	01403 Sh.1	E
31.	Schedule of anchor block for B.G. track.	-do-	01403 Sh.2	D
32.	Schedule of anchor block for B.G. track (Black cotton soil)	-do-	01403 Sh.3	D
33.	Standard guide tube arrangement on a mast and structures.	ETI/OHE/G	01505	-
34.	Trapezoidal counter weight arrangement on OHE structures.	ETI/OHE/G	01502	-
35.	Arrangement of 3KV & 25 KV Pedestal Insulator supports on OHE masts and portals.	-do-	01601	-
36.	Standard arrangements for mounting of number plate on OHE Structures.	ETI/OHE/G	01701	A
37.	Schematic arrangement of regulated overhead equipment.	-do-	02101	A
38.	Typical arrangements of OHE on cantilever masts for double track section.	-do-	02102	-
39.	Typical arrangement for fixing of bracket assembly on 9.5 m mast and Structure to suit raising of tracks (in future)	-do	02102 Sh.3	-
40.	Mast on platforms (Metre Gauge)	RE/33/G	02104 Sh.2	A
41.	Details of bracket arrangement on tangent and curved tracks	ETI/OHE/G	02106 Sh.1	A
42.	Details of bracket arrangement for OHE	-do-	02106 Sh.3	C
43.	Single bracket assembly on Structures and dropped arms.	RE/33/G	02107	D
44.	Box type cantilever Arrangement.	ETI/OHE/G	02108	A
45.	Arrangement at anticreep.	TI/DRG/OHE/G ENL/RDSO/	00001/12/0	0
46.	Standard cantilever arrangement for boom anchor anticreep location.	ETI/OHE/G	02113	-
47.	Schematic arrangement of uninsulated over Lap	RE/33/G	02121 Sh.1	F

	(type-I) (3 & 4 Span overlaps)			
48.	Schematic arrangement of insulated overlap.	ETI/OHE/G	02131 Sh.1	
49.	General arrangement of regulated OHE at turn-outs (overlap & crossed type).	ETI/OHE/G	02141	C
50.	General arrangement of regulated OHE at cross over(overlap & crossed type).	-do	02151	-
51.	Arrangement of neutral section	-do-	02161 Sh.1	C
52.	Arrangement of neutral section assembly (PTFE Type) at SWS.	-do	02162	-
53.	Arrangement of short neutral section.	-do	02161 Sh.2	-
54.	Schematic arrangement of unregulated overhead equipment.	-do	03101	-
55.	Standard termination of OHE (Regulated & un-regulated).	ETI/OHE/G	03121 Pt 1 of 3	E
56.	-do-	-do	03121 Pt 2 of 3	E
57.	-do-	-do	03121 Pt 3 of 3	E
58.	General arrangement of Unregulated OHE at turnouts (crossed & overlap type).	-do	03151	-
59.	General arrangement of unregulated OHE at crossovers and diamond crossings (overlap and crossed type).	-do	03152 Sh.1	-
60.	General arrangement of unregulated OHE at diamond crossing.	-do	03152 Sh.2	-
61.	General arrangement of pull off	-do-	03301	A
62.	General arrangement of Head span	-do	03201	-
63.	In span jumper connection between catenary & contact wire.	-do-	05101	-
64.	Continuity jumper connection at un-insulated overlap turnouts and cross overs	-do	05102	C
65.	Anti- theft jumper	-do	05107	A
66.	Connections at turnouts	-do	05103	B
67.	Potential equalizer connection at insulated overlap and neutral section	-do-	05104	-
68.	Connections at diamond crossing.	-do-	05106	A
69.	General arrangement of connections to OHE by copper cross feeder (150).	-do	05121 Sh.1	C
70.	General arrangement of connections at switching station on double track section by copper cross feeder	ETI/OHE/G	05122 Sh.1	C
71.	General arrangement of connections at switching station on multiple track section by copper cross feeder	-do-	05123 Sh.1	C
72.	Suspension of 25kV feeder(Spider)on 25KV OHE masts	ETI/OHE/G	05143	B
73.	Termination of feeder, return conductor & return feeder(copper & aluminum).	ETI/OHE/G	05145-1	A
74.	Arrangement of suspension of double spider 25 KV feeder and return feeder between sub-station and feeding station	RE/33/G	05152	C
75.	Assembly of section insulators	RE/33/G	05181	C
76.	General arrangement of earth wire on OHE mast	ETI/OHE/G	05201	A
77.	General arrangement of earth wire on OHE mast	ETI/OHE/G	05201-1	-
78.	Arrangement of transverse bonds	ETI/OHE/G	05251	A
79.	Connection of return conductor to track	-do-	05306	F
80.	Suspension arrangement of aluminum return conductor (spider) on traction Structures	-do-	05307	B
81.	Suspension of return conductor (spider) from boom of Structures (with clevis type disc insulators)	-do-	05312	A

82.	Connections between OHE and aluminum return conductor at booster stations	ETI/OHE/G	05413	B
83.	Mounting of 25kv Isolators on OHE Structures (General arrangement)	ETI/OHE/G	05513 Sh.1	A
84.	Details of small part steel work for supporting 25kv Isolator on new T.T.C. boom	-do-	05513 Sh.2	A
85	Connection from Isolator to OHE	-do-	05516	A
86	Characteristics of conductors/ bus-bar for 25kv AC traction	-do-	05600	A
87	Mounting arrangement of Auxiliary Transformer on OHE masts	ETI/OHE/G	05522	-
88	Employment Schedule for Cantilever Mast regulated OHE without return conductor & without earthwire (WP- 75 kgf/ m <sup>2</sup> .) (Cat. 65/Cu & Cont. 107/Cu)	ETI/C	0702 (Sh.1)	B
89	Employment Schedule for Cantilever Mast regulated OHE with earth wire but without return conductor (WP- 75 kgf/ m <sup>2</sup> ) (Caty. 65/Cu & Cont. 107/Cu)	-do-	0702 (Sh.2)	B
90	Employment Schedule for Cantilever Mast regulated OHE with return conductor but without earth wire (WP- 75 kgf/ m <sup>2</sup> ) (Caty. 65/Cu & Cont. 107/Cu)	-do-	0702 (Sh.3)	B
91	Employment Schedule for Cantilever Mast regulated OHE with return conductor with earth wire (WP- 75 kgf/ m <sup>2</sup> ) (Caty. 65/Cu & Cont. 107/Cu)	-do-	0702 (Sh.4)	B
92	Employment Schedule for Tramway type regulated OHE RC & EW (WP- 75 kgf/m <sup>2</sup> )	-do-	0704	B
93	Employment Schedule for 8"x 8"x35 lbs BFB (9.5 M. long)(WP-112.5 kgf/m <sup>2</sup> Caty. 65/Cu & Cont. 107/Cu.	-do-	0708	B
94	Employment Schedule for OHE mast (9.5m) overlap central location with 3.0 m implantation WP-75 kgf/m <sup>2</sup> Caty. 65/Cu & Cont. 107/Cu.	-do-	0709	A
95	Employment schedule for OHE mast (9.5M) overlap central with 3.0 M implantation WP-112.5 kgf/m <sup>2</sup> (Caty 65/cu and Cont.107/Cu)	ETI/C	0710	A
96	Employment Schedule for OHE mast (9.5m) overlap inter with 3.0 m implantation. WP-75 kgf/ m <sup>2</sup> Caty. 65/Cu & Cont. 107/Cu.	-do-	0711	A
97	Employment schedule for OHE mast (9.5M) overlap inter with 3.0 M implantations. WP-112.5kgf/m <sup>2</sup> Caty.65/Cu and cont.107/Cu	-do-	0712	A
98	Employment Schedule for 9.5 m 200x200x49.9 kg mast WP-75 kgf/m <sup>2</sup> (Caty. 65/Cu & Cont. 107/Cu.)	-do-	0713	B
99.	Employment schedule for 9.5 m long 200x200x49.9 kg mast WP-112.5 Kg/ m <sup>2</sup> (Caty. 65/Cu and Cont.107/Cu)	-do-	0714	B
100	Employment Schedule for OHE mast (9.5m) WP- 75 kgf/ m <sup>2</sup> overlap Anchor location with 3.0 m implantation (Copper OHE)	-do-	0715	A
101	Employment schedule for OHE mast (9.5M) WP 112.5 kgf/ m <sup>2</sup> overlap anchor location with 3.0 M implantations. (Copper OHE)	-do-	0716	A
102	Employment Schedule for pre-stressed span concrete mast (PC 42) - 9.5 M long conventional OHE, normal location (WP-150),112.5 & 75kgf/ m <sup>2</sup> )	ETI/C	0725	A
103	STD portals (N,O,P,R,G & Double BFB types)	-do-	0064	-
104	Volume chart and equivalent chart of foundations (Side bearing, Side gravity and W.B.C.)	TI/DRG/CIV/ FND/RDSO	00001/04/0 SH-1	B



105	Volume chart and equivalent chart of foundations (Side bearing, Side gravity and W.B.C.)	TI/CIV/FND/RDSO	00001/12/0 SH-1	A
106	Volume chart and equivalent chart of foundations (NG type)	TI/DRG/CIV/FND/RDSO/	00001/04/0 SH-2	B
107	Volume chart and equivalent chart of foundations (NG type)	TI/CIV/FND/RDSO	00001/12/0 SH-2	A
108	Volume and equivalent chart of foundations for Dry black cotton soil (NBC type) (For 16500 & 11000kgf/ m <sup>2</sup> )	TI/DRG/CIV/FND/RDSO/	00001/04/0 SH-3	B
109	Volume and equivalent chart of foundations for Dry black cotton soil (NBC type) (For 16500 & 11000kgf/ m <sup>2</sup> )	TI/CIV/FND/RDSO	00001/12/0 SH-3	A
110	Volume chart and equivalent chart of New pure gravity foundations (500 mm exposed)	TI/DRG/CIV/FND/RDSO/	00001/04/0 SH-4	B
111	Volume chart and equivalent chart of New pure gravity foundations (500 mm exposed)	TI/CIV/FND/RDSO	00001/12/0 SH-4	A
112	Volume and equivalent chart of New foundations for Dry black cotton soil only (8000 kg/m <sup>2</sup> )(NBC type) 2.5 M depth	TI/DRG/CIV/FND/RDSO/	00001/04/0 SH-5	B
113	Volume and equivalent chart of foundations for Dry black cotton soil only (8000 kg/m <sup>2</sup> ) NBC type 2.5 m depth	TI/CIV/FND/RDSO	00001/12/0 SH-5	A
114	Volume and equivalent chart of foundations (For 8000 kg/m <sup>2</sup> Direct load )	ETI/C	0058 Sh.6	B
115	Special BFB portal for 5 tracks (General arrangement)	-do-	0026 Sh.1	C
116	Protective screen of foot-over bridge and road over-bridge.	-do-	0068	H
117	Chart for portal foundation	-do-	0005/68	
118	Muff for OHE structures	-do-	0007/68	E
119	Structures muff for sand cored foundations	-do-	0012/69	E
120	9.5 m Standard traction mast (fabricated 'K' series)	-do-	0018-2	D
121	Remote Control Cubicle at Stn, Foundation, RCC slab, Building plant & Steel door	-do-	0067	B
122	9.5 m long standard traction mast (fabricated with bottom plates 'B' series)	ETI/C	0071	E
123	Details of OHE foundation in soft rock (Bearing capacity 45,000 Kg/m <sup>2</sup> ).	ETI/C	0059	C
123	Details of OHE foundation in Hard rock (Bearing capacity 90,000 Kg/m <sup>2</sup> ).	ETI/C	0060	D
124	Details of foundation for fencing upright	-do-	0032	B
125	Employment schedule for switching and booster station main masts	ETI/C	0185	B
126	Drilling schedule for S-1 mast	ETI/C	0030	F
127	Drilling schedule for S-2 mast	-do-	0031	D
128	Drilling schedule for S-3 mast (length 11. 4 m)	-do-	0180	C
129	Drilling schedule for 8" x 6" x 35 lbs. RSJ mast 8.0 m long for booster transformer station Type S-4	-do-	0036	E
130	Drilling schedule for S-5 mast (11.4m long)	-do-	0042	E
131	Drilling schedule for S-6 mast (length 12.4m)	-do-	0181	C
132	Drilling schedule for S-7 mast (length 12.4m)	-do-	0182	C
133	Drilling schedule for S-8 mast (length 12.4m)	-do-	0183	C
134	Drilling schedule for S-9 mast (length 12.4m)	-do-	0184	C
135	General arrangement & details of fencing panels & gate for switching station	-do-	0186 Sh.1	E

136	Details of fencing uprights and anti-climbing device for switching station	-do-	0186 Sh.2	E
137	S-100 fabricated mast for mounting LT supply transformer and drop out fuse switch at switching station	-do-	0043	B
138	S-101 details of mast for supporting Isolator inside switching station	ETI/C	0044	A
139	Details of anchor beam or SP, SSP, & FP	-do-	0033	D
140	Details of small part steel for switching station	ETI/C	0034 Sh.1	K
141	Details of bracing for switching & B.T. masts	ETI/C	0034 Sh.2	B
142	Details of small parts steel of out rigger for switching stations and booster transformer stations	ETI/C	0037	C
143	Details of small parts steel for booster transformer stations	ETI/C	0040	E
144	Details of pre-cast cable trench for switching station	-do-	0038	E
145	Standard 'R' type portal rod laced general arrangement	-do-	0011/69 Sh.1	C
146	'G' type portal special upright and end piece	-do-	0056	C
147	Short bored pile foundation for traction mast (permissible BM & volume)	-do-	0062	B
148	Chart for portal foundations in dry black cotton soil safe bearing capacity 16500 Kg/ M <sup>2</sup>	-do-	0063	B
149	Dwarf mast foundation on wet & dry black cotton soil	CORE/ALD/OH E/SK/C	02	-
150	Typical design of new pure gravity foundation.	ETI/SK/C	131	A
151	Typical design of side gravity foundation (Soil pressure=8,000 Kg/ M <sup>2</sup> )	-do-	142	A
152	Rock Anchor for B.G. Track. –	ETI/SK/C	208	-
153	Bracket fitting for PSC Mast (cap 4200 Kgm) general arrangement and SPS details	ETI/SK/C	214 Sh.1 of 2	E
154	SPS details for Earth wire clamp on PSC mast	ETI/SK/C	214 Sh. 2 of 2	A
155	Special arrangement of OHE under over line structure	ETI/OHE/SK	529	--
156	Earthing and bonding of PSC mast.	ETI/OHE/SK	537 Sh.1 of 2	D
157	Typical Earthing arrangement in SPUN PSC Mast with 18mm dia rod.	-do-	537 Sh.2 of 2	B
158	Arrangement of overlap	ETI/OHE/SK	566	-
159	Catenary dropper assembly	ETI/OHE/P	1190	B
160	Parallel clamp (20/20)	ETI/OHE/P	1550	E
161	Standard guide tube assembly.	ETI/OHE/P	5060-2	C
161 A	Counter weight assembly for Regulating Equipment (3:1 Ratio)	ETI/OHE/P	5090-5	E
161 B	Trapezoidal weight assembly for Regulating Equipment (3:1 Ratio)	TI/DRG/OHE/AT D/RDSO/	00004/00/2	-
161 C	Trapezoidal weight assembly	ETI/OHE/P/	5090-1	G
161 D	Counter weight assembly	ETI/OHE/P/	5090	F
162	Standard anti-wind clamp	-do-	2550-1/2	L
163	Multiple cantilever cross arm assembly.	RE/33/P	3120	H
164	Anchor fitting assembly on rolled sections	ETI/OHE/P	3230	C
165	Anchor fitting assembly on 'K' series, TCC masts and 'P' type portal upright.	-do-	3240	D
166	Anchor assembly on 'N' and 'O' type portal upright	-do-	3250	D
167	Structure bonds	-do-	7000	F
168	Earthing station	-do-	7020	B
169	Longitudinal rail bond	-do-	7030	F

170	Short super mast assembly	ETI/C/P	8010	G
171	Long super mast assembly	-do-	8020	C
172	Bracket attachment assembly on portal upright (N,O,R,P,G &BFB Type)	-do-	8030	B
173	Super mast assembly on portals	-do-	8050	C
174	Medium super mast assembly	ETI/OHE/P	8060	C
175	Compensating plate	-do-	5191-1/2	D
176	Suspension clamp	RE/33/P	1160	J
177	Double suspension clamp	-do-	1170	K
178	Double suspension lock plate.	-do-	1172	C
179	Catenary splice (65)	ETI/OHE/P	1090	-
180	Typical location & schematic connection diagram for a three interrupter switching station	ETI/PSI	003	C
181	Typical general arrangement of a three interrupter switching station	-do-	004	F
182	Typical location plan & general arrangement for sectioning & paralleling station	-do-	005	F
183	Typical location plan and general arrangement for a feeding station	-do-	006	E
184	Typical general arrangement at a Booster transformer station (with 4 cross feeder) Type III	-do-	013	B
185	General arrangement of 280 KVA Booster Transformer station Type III (with 4 cross feeder)	-do-	018	A
186	Typical general arrangement at a booster transformer station (without cross feeder) Type-I	ETI/PSI	011	C
187	Typical number plate for Auxiliary Transformer	ETI/PSI/P	7525	-
188	Typical fencing and anti-climbing arrangement at switching stations	ETI/PSI	104	E
189	Typical earthing layout of sub-sectioning and paralleling station	-do-	201	B
190	Typical earthing layout of a sectioning and paralleling station	-do-	202	B
191	Typical earthing layout of a feeding station	-do-	203	B
192	Earthing details for interrupter L.T. supply transformer 25 KV Lightning Arrestors P.T. Type-I (S-100 masts, S-101 mast, fencing upright and main mast)	-do-	204	C
193	Typical earthing layout at a booster transformer stations	-do-	211-1	A
194	Typical cable run layout of a sub-sectioning & paralleling station	-do-	301	C
195	Typical cable run layout of a sectioning and paralleling station	-do-	302	C
196	Typical cable run layout of a feeding station	-do-	303	B
197	Typical earthing layout at a booster transformer station (with 4 cross feeder for Type III,IV and V	ETI/PSI	212	B
198	Typical drawing for a terminal board	-do-	501	C
199	36 mm Aluminum Bus terminal for 25kv Isolator (Rigid type)	ETI/PSI/P	6480	C
200	36 mm Aluminum Bus splices	-do-	6490	B
201	36 mm Aluminum Bus Tee connector	-do-	6500	C
202	36 mm Aluminum Bus Tee terminal	-do-	6510	D
203	36/15 mm Top connector	-do-	6520	B
204	36mm Aluminum flexible bus splice	-do-	6550	B
205	36 mm Aluminum bus splice cum tee connector	-do-	6560	B
206	Typical number plate for interrupter and double pole isolator	-do-	7520	B
207	Typical number plate for potential transformer Type	-do-	7521	B
208	Typical number plate for booster transformer	-do-	7522	B

209	Caution plate 25 KV AC	ETI/OHE/P	7531	C
210	General Caution notice at entrance to railway Station (Hindi & English)	RE/33/P	7551	C
211	Typical details of pressed steel door, window and ventilator	RE/Civil/S	129/ 2001	R2
212	Bolted base connection for portals located in drains	ETI/C	0010	C
213	Details of base plate for mast on drains in station yards	-do-	0002/68	A
214	Height gauge for level crossings (for clear span upto 7.3 mtr) details of structure and foundation	TI/DRG/CIV/ HGAUGE/RDSO	00001/05/0	--
215	Height gauge for level crossings (for clear span above 7.3 mtr up to 12.2 mtr) details of structure and foundation	TI/DRG/CIV/ HGAUGE/RDSO	00002/05/0	--
216	Standard plan details of Height gauge for span 7.3 M to 10.0 M with rail Type	RE/CIVIL/S	146/2008	R3
217	Arrangement for false catenary under over line structure	ETI/OHE/SK	446	--
218	Typical arrangement of OHE with insulated copper catenary under over line structure	ETI/OHE/SK	570	--
218 A	Anti Climbing Arrangement	TI/SK/OHE/ANTI MON/RDSO	00001/08/0	--
218 B	Anti Climbing Arrangement	TI/SK/OHE/ANTI MON/RDSO	00001/09/0	--
218 C	GSSW Assembly	TI/DRG/OHE/G SSW	0002/09/0	--
218 D	18 mm Lug (Forged) (Compression type)	TI/DRG/OHE/GT BLUG/RDSO	00001/04/0	--

**(B) LIST OF STANDARD DRAWINGS FOR TRAMWAY TYPE OHE (REGULATED) (Latest version shall be followed)**

219	Span and stagger chart for Tramway type OHE (Regulated)	ETI/OHE/G	04201	-
220	Drilling schedule of OHE mast 8.5m & 9m ling RSJ and BFB for Tramway OHE (Regulated) respectively.	ETI/OHE/G	04202 Sh.1 Sh.2	C C
221	Schematic arrangement of tramway type OHE (regulated).	-do-	04203	C
222	Arrangement of bracket assembly for Tramway Type OHE (regulated)	-do-	04204	B
223	Arrangement of anti-creep for Tramway Type OHE (Regulated)	ETI/OHE/G	04205	B
224	Arrangement of anticreep (alternative arrangement) for Tramway OHE (Regulated)	-do-	04206	B
225	Arrangement of section Insulator for Tramway Type OHE (Regulated)	-do-	04207 Sh.1	B
226	Small parts steel for supporting section insulator assembly for (regulated Tramway Type OHE)	-do-	04207 Sh.2	B
227	General arrangement of turnouts for Tramway type OHE (Regulated)	ETI/OHE/G	04208	-
228	Adjustment chart for Tramway type OHE (Regulated)	ETI/OHE/G	04209	-
229	Bridle wire clamp (6 mm) with two bolts	ETI/OHE/P	1070-1	B
230	Large suspension clamp 20mm (with Armour rod)	ETI/OHE/P	1580 Sh-2	-
231	Hook Bracket	ETI/OHE/P	2380	C
232	BFB Steady arm assembly for Tramway OHE (Regulated)	ETI/OHE/P	2540-1	-
233	Anti wind clamp for tramway OHE (Regulated)	-do-	2550-3	E
234	Counter weight assembly (light)	ETI/OHE/P	5090-3	I
235	Counter weight assembly	-do-	5090-6	D
236	Employment schedule for tramway type regulated OHE without R.C. and E.W. (W.P.112.5 kgf/sq.m)	ETI/C	0705	B

237	Protective screen at FOB/ROBs	ETI/C	0068	H
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**(C) STANDARD TYPICAL AND PARTICULAR DRAWINGS FOR TSS AND SHUNT CAPACITOR BANKS.**  
**(Latest version shall be followed)**

238	Typical layout of Remote Control cubicle at a switching station	ETI/PSI	0010	E
239	Typical layout of 132 /27kv Traction sub-station (Type-I)	TI/DRG/PSI/TSSLO/RDS O/	00001/01	0
240	Typical layout of 132 /27kv Traction sub-station (Type-II)	TI/DRG/PSI/TSSLO/RDS O/	00002/01/0	-
241	Typical layout of 132 /27kv Traction sub-station (Type-III)	TI/DRG/PSI/TSSLO/RDS O/	00003/02	0
242	Typical layout of 132/27kv Traction Sub-station (Type IV) (with outgoing feeders and metering Facilities)	TI/DRG/PSI/TSSLO/RDS O/	00004/02	0
243	Typical layout of 132/27kv Traction Sub-station (Type V)	TI/DRG/PSI/TSSLO/RDS O/	00005/02	0
244	Typical layout of 132/27kV traction sub-station (Type VI)	TI/DRG/PSI/TSSLO/RDS O/	00006/02	0
245	Typical layout of 132/27kV traction sub-station (Type VII)	TI/DRG/PSI/TSSLO/RDS O/	00007/02	0
246	Typical layout of 132/27kV traction sub-station (Type-VIII)	TI/DRG/PSI/TSSLO/RDS O/	000008/02	-
247	Typical layout of 132/27kV traction sub station with single transformer (Type -IX)	TI/DRG/PSI/TSSLO/RDS O/	00009/02	0
248	Typical layout of 132/27kv Traction Sub-station with 132kv Switching Station (Type x)	TI/DRG/PSI/TSSLO/RDS O/	00010/02	0
249	Typical layout of Control Room at traction sub-station.	TI/DRG/PSI/CPROOM/R DSO/	00001/01	0
250	Standard plan of control room at traction sub-station (General arrangement and RCC details)	RE/Civil/	S-144/06	0
251	Typical return current connection to buried rail at 132/25kv Traction sub-station	ETI/PSI	0212-1	Nil
252	Typical general arrangement of earth screen wire termination at Traction substation	ETI/PSI	0225	C
253	Typical termination arrangement for strung bus "Spider" (AAC) conductor at TSS.	ETI/PSI	0226	B
254	General arrangement & terminal connection for 25kV PT Type-II at TSS	ETI/PSI	0227	A
255	General arrangement and terminal connection for 25kV Potential Transformer at TSS (220kV)	ETI/PSI	0227-1	Nil
256	Typical layout of 220/27kV traction sub station (Type -I)	ETI/PSI	0240-1	Nil
257	Typical return current connection to buried rail at 220/25kV TSS.	ETI/PSI	0242	A
258	Typical termination arrangement for strung bus (ZEBRA ACSR) conductor at TSS (220kV)	ETI/PSI	0243	A
259	Typical general arrangement of earth screen wire termination at 220/25kV traction sub-station.	ETI/PSI	0244	Nil
260	Mounting arrangement of 100KVA 25kv/240V LT supply transformer at TSS	ETI/PSI	0312	B
261	25kv D.O. Fuse switch assembly	ETI/PSI	032	D
262	Typical fencing layout at traction Sub-station (Details of fencing panel, door, anticlimbing device etc.)	ETI/PSI	121	F
263	Typical arrangement of an earth electrode	ETI/PSI	222-1	Nil
264	Typical earthing, cable trench & foundation layout of 132/25kv TSS	ETI/PSI	224	E
265	Typical earthing arrangement for equipment/ structure at TSS	ETI/PSI	228	A
266	Typical earthing cable trench and foundation layout of 132/25kV traction sub-station with Shunt Capacitor bay	ETI/PSI	229	Nil
267	Typical details of cable run at a two transformer TSS	ETI/PSI	323	E

268	Part Plan for Details of position of feeder Bus coupling interrupter at TSS	ETI/PSI/SK	272	Nil
269	Terminal connector for 220kV equipments (Typical drawing)	ETI/PSI/SK	324	Nil
270	Typical schematic diagram of protection for double Transformer traction sub station	ETI/PSI	024-1	Nil
271	Typical layout for 25kv Shunt capacitor with series reactor to be installed at 132/25kv TSS	ETI/PSI	0223	E
272	High speed auto reclosing scheme for feeder circuit breaker at 25kV A.C TSS	ETI/PSI	0231-1	A
273	Typical details of cable run at a two transformer TSS with Shunt Capacitor	ETI/PSI	325	Nil
274	Typical details of cable run at two transformers Traction Sub-station with Shunt capacitor (220kV)	ETI/PSI	326	Nil
275	General Scheme of supply for 25kV, 50 Hz single phase traction system	ETI/PSI	702-1	D
276	Standard Post Insulator for clean area (Creepage path 850mm min)	ETI/OHE/P	6090-1	C
277	Typical number plate for circuit breaker	ETI/PSI/P	7523	Nil
278	Typical number plate for Auxiliary Transformer	ETI/PSI/P	7525	Nil
279	Typical number plate for Power transformer at TSS	ETI/PSI/P	7526	Nil
280	Typical number plate for PT at TSS	ETI/PSI/P	7527	A
281	Typical number plate for CT at TSS	ETI/PSI/P	7528	A
282	Typical number plate for Isolators at TSS	ETI/PSI/P	7529	A
283	Bimetallic terminal connector to suit 'ZEBRA' ACSR conductor and 30 dia Cu stud of CT/CB/traction power transformer.	ETI/PSI/P	11010	C
284	220kV system bimetallic terminal connector to suit 'ZEBRA' (28.58 Dia ) ACSR conductor & Al./Cu. pad of Isolator /CT/CB.	ETI/PSI/P	11030	C
285	220kV system tee connector to suit 'ZEBRA' (28.58 dia) ACSR conductor on both ways.	ETI/PSI/P	11040	C
286	220kV system rigid connector on SI to suit ZEBRA (28.58 dia) ACSR conductor	ETI/PSI/P	11050	C
287	Details of expansion type terminal connector to suit 50 dia Al. tubular busbar to terminal pad of 25kv CT/ Isolator/ CB and Interrupter	ETI/PSI/P	11060 Sh.2 of 2	E
288	Detail of rigid type bimetallic terminal connector suitable for 50 dia Al. tubular busbar to 30 dia Cu. Stud of 25kV CT.	ETI/PSI/P	11070	B
289	Rigid bimetallic terminal connector suitable for 50 dia Al. tubular busbar to terminal pad of 25kv Isolator/ CT	ETI/PSI/P	11090	C
290	Rigid through connector to suit 50 dia Al. Tubular bus bar and 'SPIDER' AAC conductor for 25kv PT Type-II	ETI/PSI/P	11110	C
291	Details of Rigid terminal connector suitable for 20 dia Al. Conductor to terminal pad of 25kv PT Type I & II	ETI/PSI/P	11120	C
292	25kv system tee connector to suit 50 O/D Al. Tube and 'SPIDER' AAC conductor	ETI/PSI/P	11140	B
293	25 K.V system Tee connector to suit 50. O/D AL. tubular busbar to 50. O/D AL. tubular busbar	ETI/PSI/P	11150	B
294	25Kv System Rigid bus splice connector to suit 50 O/D Al. tube on both ways	ETI/PSI/P	11180	B
295	25 kV System Sliding clamp for 50mm O/D Aluminium Bus bar	ETI/PSI/P	11190	C
296	25Kv System Rigid connector on S.I to suit 50 mm O/D Al. Bus bar	ETI/PSI/P	11200	C
297	25kv system expansion bus coupler on SI to suit 50 O/D Al. tube.	ETI/PSI/P	11210	D
298	Typical fencing , door and anticlimbing device details of traction sub-station	CORE/ALD/PSI	01	D
299	Structural layout of 132/25 KV traction sub-stations	ETI/C	0200, SH.No.-1	H
300	Structural layouts of 132/25kv traction sub-stations	ETI/C	0200,	D

			SH.No.-2	
301	Details of Beam B/1 for 132/25 KV TSS	ETI/C	0201	D
302	Details of Tower T 1 for 132/25 KV TSS	ETI/C	0202	H
303	Details of Tower T 2 for 132/25 KV TSS	ETI/C	0203	G
304	Details of beam B/2 and column C/1 for 132/25kV traction sub-station.	ETI/C	0208	E
305	Typical cable trench and foundation lay out of 132/25kv TSS	ETI/C	0210	F
306	Details of baffle wall at TSS(WP-112.5kg/sq.m) and WP (75kg/sq.m)	ETI/C	0213	D
307	Details of RCC baffle Wall at TSS(WP-150kg/sq.m)	ETI/C	0214	B
308	Transformer oil drainage arrangement at sub-stations	ETI/C	0216	B
309	Line Diagram of Structural layouts of 220/25kV Traction sub-station	ETI/C	0222	Nil
310	Structural layout of 220/27kV traction sub-station (Type-I)	ETI/C	0222-1	Nil
311	Control Room for Traction substation	ETI/C	0225 Sheet-1	Nil
312	Control Room for Traction Sub-station(RCC details)	ETI/C	0225 Sheet-2	Nil
313	Details of structure for 132kv double pole Isolator	ETI/C	0310	G
314	Details of structure for 132kv support insulators	ETI/C	0320	E
315	Details of structure for 132kv Current transformer	ETI/C	0330	F
316	Details of structure for 120kv Lightning Arrestor	ETI/C	0340	F
317	Details of structure for 25kv Current transformer	ETI/C	0360	F
318	Details of structure for 42kv ,10KA LA & 25kv support insulator	ETI/C	0370 Sheet-1	J
319	Black Weight of Structure for 42kv,10KA LA & 25kv support insulator.	ETI/C	0370 Sheet-2	Nil
320	Details of structure for 25kv Single Pole isolator	ETI/C	0380	F
321	Details of structure for 25kv Potential transformer	ETI/C	0390	E
322	S-100 Fabricated Mast for mounting LT supply transformer and DO fuse switch at switching station	ETI/C	0043	B
323	Details of structure and foundation for 25kV DP Isolator at TSS	ETI/SK/C	0180	C
324	Gillsans Letters and Figures	RE/33	527	A
325	Typical schematic diagram of protection for single transformer traction sub-station	ETI/PSI	0228-1	Nil
326	25 kV drop out fuse switch details	ETI/PSI	038	C
327	Operating pole for 25kV drop out fuse switch	ETI/PSI	039	B
328	Typical schematic diagram for TSS, FP, SSP and SP with 21.6 MVA or 30 MVA transformer for three lines.	TI/DRG/PSI/3L- TSS/RDSO	00001/07	1
329	Scheme of locking /Interlocking arrangement of 132 kV Isolator at Traction Sub-Station.	ETI/PSI	5212	B
330	Typical return current connection to buried rail at 132 kV/25 kV Traction Sub-Station.	ETI/PSI	0212-1	Nil
331	Typical arrangement of an earth electrode.	ETI/PSI	222-1	Nil
332	Flexible connector for 25 kV circuit breaker 25kV Interrupter & 25 kV side of 13.5/20 MVA traction transformer.	ETI/PSI/P	6570	F
333	Scheme of Interlocking arrangement for 25kV circuit breakers at Traction Sub-Station	ETI/PSI	5214	B
334	Expansion type terminal connector for 25 kV, 60mm dia terminal for traction power transformer.	ETI/PSI/P	11220	D

**(D) STANDARD TYPICAL AND PARTICULAR DRAWINGS FOR SCADA WORKS (Latest version shall be followed)**

The annexure contains reference to standard, typical and particular drawings & specification referred to in various paragraph of tender specification (Pt.II) and particular specification.

335	General scheme of supply for 25 kV 50 Hz Single Phase AC	ETI/PSI	702-1	D
336	Typical layout of control room at TSS	TI/DRG/PSI/CPROOM/R DSO	00001/01	0
337	Typical layout of remote control cubicle at switching stations.	ETI/PSI	0010	E
338	Schematic inter connection diagram for remote control of power gear & supervision equipments at TSS.	ETI/PSI	644	C
339	Schematic inter connection diagram for remote control of power gear and supervision equipments at controlled station (SP & SSP)	ETI/PSI	645	C
340	High speed Auto reclosing Scheme for feeder Circuit Breaker at 25 kV A.C. Traction Sub-station.	ETI/PSI	0231-I	A
341	Control desk arrangement for 2 work stations of SCADA system.	ETI/PSI/SK	337	Nil
342	Setting up earthing station at switching posts (SSP & SP) with conventional earthing as per Special Maintenance No. TI/SMI/0032 Rev-1	-	-	-

**(E) (a) LIST OF STANDARD DRAWING FOR HIGH RISE OHE**

S.N.	Brief Description	Drawing		Mod No.
		Series	Number	
343	Design handout for Overhead equipment for running double stack containers under electrified routes (High Rise OHE) with speed potential of 140 Kmph based on revised wind zone.	TI/DESIGNS/OHE/2013/00001 (July'13)	-	-
344	Terms of reference for consultancy contract for high speed OHE and high rise OHE.	RDSO Letter No. TI/Traction policy/2013 dated 25.04.2013	-	-
345	OHE span in view of changes in wind zones in country.	RDSO Letter No. TI/OHE/GA/2013 dated 25/30.04.2013	-	-
346	SPECIAL BFB PORTAL FOR 5 TRACKS (GENERAL ARRANGEMENT)	TI/DRG/CIV/BFB-POTAL	00001/13/0	Sh No. 1
347	SPECIAL BFB PORTAL DETAILS OF UPRIGHT	TI/DRG/CIV/BFB-PORTAL	00001/13/0	Sh No. 2
348	G-TYPE PORTAL DETAILS SPECIAL UPRIGHT AND END PIECE	TI/DRG/CIV/G-PORTAL	00001/13/0	-
349	HIGH RISE OHE Employment Schedule Mast (11.4 m) (Wind Pressure 178 kgf/m <sup>2</sup> ) (Basic Wind Speed 50 m/s) (Without Return Conductor and Without Earth Wire)	TI/DRG/CIV/ES/	00001/13/0	SHEET- 1
350	HIGH RISE OHE Employment Schedule Mast (11.4 m) (Wind Pressure 155 kgf/m <sup>2</sup> ) (Basic Wind Speed 47 m/s) (Without Return Conductor and Without Earth Wire)	TI/DRG/CIV/ES/	00001/13/0	SHEET- 2



351	HIGH RISE OHE Employment Schedule Mast (11.4 m) (Wind Pressure 136 kgf/m <sup>2</sup> ) (Basic Wind Speed 44 m/s) (Without Return Conductor and Without Earth Wire)	TI/DRG/CIV/ES/	00001/13/0	SHEET- 3
352	HIGH RISE OHE Employment Schedule Mast (11.4 m) (Wind Pressure 105 kgf/m <sup>2</sup> ) (Basic Wind Speed 39 m/s) (Without Return Conductor and Without Earth Wire)	TI/DRG/CIV/ES/	00001/13/0	SHEET- 4
353	HIGH RISE OHE Employment Schedule Mast (11.4 m) (Wind Pressure 73 kgf/m <sup>2</sup> ) (Basic Wind Speed 33 m/s) (Without Return Conductor and Without Earth Wire)	TI/DRG/CIV/ES/	00001/13/0	SHEET- 5
354	TWO TRACK CANTILEVER STRUCTURE (TTC) GENERAL ARRANGEMENT	TI/DRG/CIV/TTC/	00001/13/0	SHEET- 1
355	TWO TRACK CANTILEVER STRUCTURE (TTC) DETAILS OF UPRIGHT	TI/DRG/CIV/TTC/	00001/13/0	SHEET- 2
356	11.4 M Long Standard Traction Mast "B" Series (B-150, B-175, B-200, B-225 & B-250 type Fabricated with Batten Plates)	TI/DRG/CIV/B- Mast/	00001/13/0	-
357	Volume Charts & Equivalent Charts of Foundations (Side Bearing, Side Gravity & WBC)	TI/DRG/CIV/FND/	00001/13/0	Sheet- 1
358	Volume Charts & Equivalent Charts of Foundations (NG Type)	TI/DRG/CIV/FND/	00001/13/0	Sheet- 2
359	Volume Charts & Equivalent Charts of Foundations for Dry Black Cotton Soil (NBC Type, 3.0 metre Depth)	TI/DRG/CIV/FND/	00001/13/0	Sheet- 3
360	Volume Charts & Equivalent Charts of New Pure Gravity Foundations (500 mm exposed)	TI/DRG/CIV/FND/	00001/13/0	Sheet- 4
361	Volume Charts & Equivalent Charts of Foundations for Dry Black Cotton Soil (NBC Type, 2.5 metre Depth)	TI/DRG/CIV/FND/	00001/13/0	Sheet- 5
362	Employment Schedule OHE Mast (11.4 metre) Wind Pressure 155 kgf/m <sup>2</sup>	TI/DRG/CIV/ES/	00001/13/0	Sheet- 1
363	Employment Schedule OHE Mast (11.4 metre) Wind Pressure 136 kgf/m <sup>2</sup>	TI/DRG/CIV/ES/	00001/13/0	Sheet- 2
364	Employment Schedule OHE Mast (11.4 metre) Wind Pressure 105 kgf/m <sup>2</sup>	TI/DRG/CIV/ES/	00001/13/0	Sheet- 3
365	Schedule Anchor Blocks for BG Tracks	TI/DRG/OHE/GUYHR/	00001/13/0	Sheet- 1
366	Double Guy Rod Arrangement with Anchor Block for BG Tracks	TI/DRG/OHE/GUYHR/	00001/13/0	Sheet- 2
367	Schedule Anchor Blocks for BG Track Black Cotton Soil	TI/DRG/OHE/GUYHR/	00001/13/0	Sheet- 3
368	Guy Rod Ø 25 mm	TI/DRG/OHE/GUYHR/	00001/13/0	Sheet- 4
368A	Dropper Schedule Encumbrance 1.4m/1.4m (For 25 kV AC Regulated OHE) (65 and 107 SQ. MM)	TI/DRG/OHE/DROP/	00001/10/1	Rev-1
368B	Dropper Schedule Encumbrance 1.4m/0.9m (For 25 kV AC Regulated OHE) (65 and 107 SQ. MM)	TI/DRG/OHE/DROP/	00002/10/1	Rev-1
368C	Dropper Schedule Encumbrance 1.4m/0.75m (For 25 kV AC Regulated OHE) (65 and 107 SQ. MM)	TI/DRG/OHE/DROP/	00003/10/1	Rev-1
368D	Arrangement of mounting of 25kV/240V, 50kVA LT Supply Transformer for High Rise OHE (On separate mast)	ETI/OHE/HR/AT/G/	05522 Sheet-2	-
368E	Mounting Arrangement of Auxiliary Transformer on High Rise OHE mast	ETI/OHE/HR/AT/G/	05522 Sheet-1	-
368 F	Anchor Arrangement with Dwarf Mast for conventional and High Rise OHE	ETI/OHE/HR/ G/	01402	-

368G	Standard Arrangement of Drop Arm for supporting Cantilevers on the Booms of Portals and TTC (For Normal as well as High Rise OHE)	ETI/C/HR/	0076	-
368H	Drilling schedule for S-6H mast (length 13.0 m) (for High Rise OHE)	ETI/C/HR/	0181	-
368 J	Drilling schedule for S-7H mast (length 13.0 m) (for High Rise OHE)	ETI/C/HR/	0182	-
368 K	Drilling schedule for S-8H mast (length 13.0 m) (for High Rise OHE)	ETI/C/HR/	0183	-
368 L	'P' Type Portal General Arrangement and details of upright & End Pieces (High Rise OHE)	TI/DRG/CIV/P-Portal/	00001/13/0	-

**(E) (b) LIST OF STANDARD DRAWING AS PER NEW WIND ZONES (Latest version shall be followed)**

369	Normal OHE Employment Schedule Mast (9.5 m) (Wind Pressure 178 kgf/m <sup>2</sup> ) (Basic Wind Speed 50 m/s) (Without Return Conductor and Without Earth Wire)	ETI/C/	0758 Sheet-1	A
370	Normal OHE Employment Schedule Mast (9.5 m) (Wind Pressure 155 kgf/m <sup>2</sup> ) (Basic Wind Speed 47 m/s) (Without Return Conductor and Without Earth Wire)	ETI/C/	0758 Sheet-2	A
371	Normal OHE Employment Schedule Mast (9.5 m) (Wind Pressure 136 kgf/m <sup>2</sup> ) (Basic Wind Speed 44 m/s) (Without Return Conductor and Without Earth Wire)	ETI/C/	0758 Sheet-3	A
372	Normal OHE Employment Schedule Mast (9.5 m) (Wind Pressure 105 kgf/m <sup>2</sup> ) (Basic Wind Speed 39 m/s) (Without Return Conductor and Without Earth Wire)	ETI/C/	0758 Sheet-4	B
373	Normal OHE Employment Schedule Mast (9.5 m) (Wind Pressure 73 kgf/m <sup>2</sup> ) (Basic Wind Speed 33 m/s) (Without Return Conductor and Without Earth Wire)	ETI/C/	0758 Sheet-5	A
374	Normal OHE Employment Schedule Mast (9.5 m) (Wind Pressure 178 kgf/m <sup>2</sup> ) (Basic Wind Speed 50 m/s) (Without Return Conductor and Without Earth Wire)(1100+1100) kgf tension CAT-65 mm <sup>2</sup> , CONT-107 mm <sup>2</sup> .	ETI/C/	0759 Sheet-1	-
375	Normal OHE Employment Schedule Mast (9.5 m) (Wind Pressure 155 kgf/m <sup>2</sup> ) (Basic Wind Speed 47 m/s) (Without Return Conductor and Without Earth Wire) (1100+1100) kgf tension CAT-65 mm <sup>2</sup> , CONT-107 mm <sup>2</sup> .	ETI/C/	0759 Sheet-2	-
376	Normal OHE Employment Schedule Mast (9.5 m) (Wind Pressure 136 kgf/m <sup>2</sup> ) (Basic Wind Speed 44 m/s) (Without Return Conductor and Without Earth Wire) (1100+1100) kgf tension CAT-65 mm <sup>2</sup> , CONT-107 mm <sup>2</sup> .	ETI/C/	0759 Sheet-3	-
377	Normal OHE Employment Schedule Mast (9.5 m) (Wind Pressure 105 kgf/m <sup>2</sup> ) (Basic Wind Speed 39 m/s) (Without Return Conductor and Without Earth Wire) (1100+1100) kgf tension CAT-65 mm <sup>2</sup> , CONT-107 mm <sup>2</sup> .	ETI/C/	0759 Sheet-4	-
378	Normal OHE Employment Schedule Mast (9.5 m) (Basic Wind Speed 33 m/s) (Wind Pressure 73 kgf/m <sup>2</sup> ) (Without Return Conductor and Without Earth Wire) (1100+1100) kgf tension CAT-65 mm <sup>2</sup> , CONT-107 mm <sup>2</sup> .	ETI/C/	0759 Sheet-5	-

379	Normal OHE Employment Schedule Mast (9.5 m) Basic Wind Speed 50 m/s Wind Pressure 178 kgf/m <sup>2</sup> (Without Return Conductor and Without Earth Wire) 1000 kgf tension in CAT. 65mm <sup>2</sup> 1000 kgf tension in CONT. 107mm <sup>2</sup>	TI/DRG/CIV/ES/RDSO/00001/18/0 Sheet-1/5	-
380	Normal OHE Employment Schedule Mast (9.5 m) (Basic Wind Speed 47 m/s) (Wind Pressure 155 kgf/m <sup>2</sup> ) (Without Return Conductor and Without Earth Wire) 1000 kgf tension in CAT. 65mm <sup>2</sup> 1000 kgf tension in CONT. 107mm <sup>2</sup>	TI/DRG/CIV/ES/RDSO/00001/18/0 Sheet-2/5	-
381	Normal OHE Employment Schedule Mast (9.5 m) (Basic Wind Speed 44 m/s) (Wind Pressure 136 kgf/m <sup>2</sup> ) (Without Return Conductor and Without Earth Wire) 1000 kgf tension in CAT. 65mm <sup>2</sup> 1000 kgf tension in CONT. 107mm <sup>2</sup>	TI/DRG/CIV/ES/RDSO/00001/18/0 Sheet-3/5	-
382	Normal OHE Employment Schedule Mast (9.5 m) (Basic Wind Speed 39 m/s) (Wind Pressure 105 kgf/m <sup>2</sup> ) (Without Return Conductor and Without Earth Wire) 1000 kgf tension CAT-65 mm <sup>2</sup> , 1000 kgf tension in CONT-107 mm <sup>2</sup> .	TI/DRG/CIV/ES/RDSO/00001/18/0 Sheet-4/5	-
383	Normal OHE Employment Schedule Mast (9.5 m) (Basic Wind Speed 33 m/s) (Wind Pressure 73 kgf/m <sup>2</sup> ) (Without Return Conductor and Without Earth Wire) 1000 kgf tension in CAT. 65mm <sup>2</sup> 1000 kgf tension in CONT. 107mm <sup>2</sup>	TI/DRG/CIV/ES/RDSO/00001/18/0 Sheet-5/5	-
384	Normal OHE Employment Schedule Mast (9.5 m) Basic Wind Speed 50 m/s Wind Pressure 178 kgf/m <sup>2</sup> (Without Return Conductor and Without Earth Wire) 1000 kgf tension in CAT. 65mm <sup>2</sup> 1000 kgf tension in CONT. 107mm <sup>2</sup> (with implantation more than 2.8 m & upto 3.8 m)	TI/DRG/CIV/ES/RDSO/00002/18/0 Sheet-5/5	-
385	Normal OHE Employment Schedule Mast (9.5 m) (Basic Wind Speed 47 m/s) (Wind Pressure 155 kgf/m <sup>2</sup> ) (Without Return Conductor and Without Earth Wire) 1000 kgf tension in CAT. 65mm <sup>2</sup> 1000 kgf tension in CONT. 107mm <sup>2</sup> (with implantation more than 2.8 m & upto 3.8 m)	TI/DRG/CIV/ES/RDSO/00002/18/0 Sheet-4/5	-
386	Normal OHE Employment Schedule Mast (9.5 m) (Basic Wind Speed 44 m/s) (Wind Pressure 136 kgf/m <sup>2</sup> ) (Without Return Conductor and Without Earth Wire) 1000 kgf tension in CAT. 65mm <sup>2</sup> 1000 kgf tension in CONT. 107mm <sup>2</sup> (with implantation more than 2.8 m & upto 3.8 m)	TI/DRG/CIV/ES/RDSO/00002/18/0 Sheet-3/5	-
387	Normal OHE Employment Schedule Mast (9.5 m) (Basic Wind Speed 39 m/s) (Wind Pressure 105 kgf/m <sup>2</sup> ) (Without Return Conductor and Without Earth Wire) 1000 kgf tension CAT-65 mm <sup>2</sup> , 1000 kgf tension in CONT-107 mm <sup>2</sup> . (with implantation more than 2.8 m & upto 3.8 m)	TI/DRG/CIV/ES/RDSO/00002/18/0 Sheet-2/5	-
388	Normal OHE Employment Schedule Mast (9.5 m) (Basic Wind Speed 33 m/s) (Wind Pressure 73 kgf/m <sup>2</sup> ) (Without Return Conductor and Without Earth Wire) 1000 kgf tension in CAT. 65mm <sup>2</sup> 1000 kgf tension in CONT. 107mm <sup>2</sup> (with implantation more than 2.8 m & upto 3.8 m)	TI/DRG/CIV/ES/RDSO/00002/18/0 Sheet-1/5	-
389	Normal OHE Employment Schedule Mast (9.5 m) Basic Wind Speed 50 m/s Wind Pressure 178 kgf/m <sup>2</sup> (Without Return Conductor and Without Earth Wire) 1000 kgf tension in CAT. 65mm <sup>2</sup> 1000 kgf tension in CONT. 107mm <sup>2</sup> (with implantation more than 3.8 m & upto 4.85 m)	TI/DRG/CIV/ES/RDSO/00003/18/0 Sheet-5/5	

390	Normal OHE Employment Schedule Mast (9.5 m) (Basic Wind Speed 47 m/s) (Wind Pressure 155 kgf/m <sup>2</sup> ) (Without Return Conductor and Without Earth Wire) 1000 kgf tension in CAT. 65mm <sup>2</sup> 1000 kgf tension in CONT. 107mm <sup>2</sup> (with implantation more than 3.8 m & upto 4.85 m)	TI/DRG/CIV/ES/RDSO/00003/18/0 Sheet-4/5	
391	Normal OHE Employment Schedule Mast (9.5 m) (Basic Wind Speed 44 m/s) (Wind Pressure 136 kgf/m <sup>2</sup> ) (Without Return Conductor and Without Earth Wire) 1000 kgf tension in CAT. 65mm <sup>2</sup> 1000 kgf tension in CONT. 107mm <sup>2</sup> (with implantation more than 3.8 m & upto 4.85 m)	TI/DRG/CIV/ES/RDSO/00003/18/0 Sheet-3/5	
392	Normal OHE Employment Schedule Mast (9.5 m) (Basic Wind Speed 39 m/s) (Wind Pressure 105 kgf/m <sup>2</sup> ) (Without Return Conductor and Without Earth Wire) 1000 kgf tension CAT-65 mm <sup>2</sup> , 1000 kgf tension in CONT-107 mm <sup>2</sup> . (with implantation more than 3.8 m & upto 4.85 m)	TI/DRG/CIV/ES/RDSO/00003/18/0 Sheet-2/5	
393	Normal OHE Employment Schedule Mast (9.5 m) (Basic Wind Speed 33 m/s) (Wind Pressure 73 kgf/m <sup>2</sup> ) (Without Return Conductor and Without Earth Wire) 1000 kgf tension in CAT. 65mm <sup>2</sup> 1000 kgf tension in CONT. 107mm <sup>2</sup> (with implantation more than 3.8 m & upto 4.85 m)	TI/DRG/CIV/ES/RDSO/00003/18/0 Sheet-1/5	

Note: New wind pressures/speeds as per RDSO letter No TI/CIV/MS/14 dated 14.07.2014 & IS: 875 Part-III, 1987, Reaffirmed during 1997 are:

Sl No.	Design Wind Pressure (Kg/m <sup>2</sup> )	Basic Wind Speed	
		metre / second	Km / hour
i	178	50	180.0
ii	155	47	169.2
iii	136	44	158.4
iv	105	39	140.4
v	73	33	118.8

**(F) LIST OF STANDARD RDSO's SPECIFICATIONS FOR OHE, TSS AND SCADA (Latest version shall be followed)**

SI.NO. 1	TITLE OF SPECIFICATION 2	SPECIFICATION NO 3
1.	Annealed stranded copper conductor for jumper wire.	ETI/OHE/3(2/94) with A&C slip No.1 of (4/95)
2.	Copper busbar	RE/30/OHE/5 (11/60)
3.	Structural Steel tubes.	ETI/OHE/11 (5/89)
4.	Hot dip zinc galvanisation of steel masts (Rolled and Fabricated) tube and fittings used on 25 KV AC OHE.	ETI/OHE/13(4/84) with A&C slip No. 1 of (5/86), 2 of (4/90) & 3 of (4/90)
5.	Stainless steel wire ropes	TI/SPC/OHE/WR/1060 with A&C slip No 1 of (11/06) & 2 of (05/07)
6.	Solid core porcelain insulators for 25 KV 50 Hz single phase over head lines	TI/SPC/OHE/INS/0070 (04/2007)
7.	25 KV single and double pole isolators.	ETI/OHE/16(1/94) with A&C slip No.1 of (06/2000) & 2 of (3/2004)
8.	Steel fasteners & Stainless Steel fasteners	TI/SPC/OHE/Fasteners/0120
9.	Aluminum alloy section and tubes	ETI/OHE/21(9/74)
10.	Standard for drawings for Traction Overhead equipment	ETI/OHE/25(3/66)
11.	Light Weight Section Insulators assembly. OR Section Insulator assembly without sectioning insulator.	TI/SPC/OHE/LWTSL/0060 (8/2006) OR ETI/OHE/27(8/84) with A&C slip No.1 of (10/92)
12.	Enameled steel plates	ETI/OHE/33(8/85)
	Retro-reflective Structure Number Plates & Caution/Warning Boards	ETI/OHE/33A(12/97) Rev-8 (11/12)
13.	Galvanised steel wire	ETI/OHE/36(12/73) with A&C Slip No.1 of (5/98)
14.	3 pulley Type Regulating Equipment	TI/SPC/OHE/ATD/0060 (8/2006) with A&C Slip No1 of (10/2006), 2 of (5/2007) & 3 of (01/13)
15.	Fitting for 25 kv 50 Hz AC Overhead equipment.	TI/SPC/OHE/Fitting/0130(10/13) {Old ETI/OHE/49 (9/95) with A&C}
16.	Cadmium copper conductor for overhead Railway Traction	ETI/OHE/50 (6/97) with A&C slip No.1 to 3 (04/09).
17.	Principles of OHE layout plans and sectioning diagrams for 25 KV AC traction.	ETI/OHE/53(6/88) with A&C slip no.1 of (12/88), 2 of (8/89), 3 of (6/90), 4 of (8/92) & 5 of (11/2006)
18.	19/2.79mm All Aluminum alloy stranded catenary wire.	ETI/OHE/54(2/85) with A&C slip No. 1 of (11/89) & 2 of (10/92)
19.	Bimetallic (Al-cu) strip	ETI/OHE/55(4/90)
20.	Short Neutral Section Assembly (Phase Break)	TI/SPC/OHE/SNS/0000 of (2/2000) with A&C slip No. 1
21.	Code for bonding and earthing for 25 KV, AC single phase, 50 Hz traction system.	ETI/OHE/71(11/90) with A&C slip no. 1 of (8/91) & 2 of (3/93)
22.	Insulated Cadmium copper catenary 19/2.10 mm dia for provision under overline structures in the 25 KV AC Electric Traction.	TI/SPC/OHE/INSCAT/0000 of (4/2000)
23.	Battery charger for 110 V battery, 40 AH.	ETI/PSI/1(6/81)
24.	Lightning arrestor- 7.5 KV	ETI/PSI/3(8/75) with A&C slip No.1 of (2/91)
25.	220 KV or 132 KV or 110 KV or 66 KV or 25 kV Potential transformers	TI/SPC/PSI/PTs/0990 with A&C slip No.1 to 5 (01/09)
26.	25 KV Dropout fuse switch & operating pole for use with 10 KVA and 100 kVA 25 kV/ 230 V L.T. Supply transformer.	ETI/PSI/14(1/86) with A&C slip no 1 of (4/87)
27.	25 kV/240 V, 5 kVA, 10 kVA, 25 kVA & 50 kVA, 50 Hz single phase oil filled Auxiliary Transformers.	ETI/PSI/15(8/03)
28.	Low maintenance Lead Acid 40AH & 200 AH cells.	RDSO/PE/SPEC/TL/0040-2003(Rev-0) with A&C slip no 1 of (9/2005)

29.	150 KVA, 25 KV, single phase, 50 Hz. Dry type Cast resin Booster Transformers	ETI/PSI/97(6/87) with A&C slip No.1 of (9/88)
30.	100 KVA & 150 KVA, 25 KV, single phase, 50 Hz, oil filled Booster Transformers	ETI/PSI/98(8/92) with A&C slip No.1 of (9/92), 2 of (1/94) & 3 of (6/94)
31(a)	25 KV AC Single Pole, Double Pole mounted, Out Door Vacuum Circuit Breaker (VCB) and Vacuum Interrupter (BM).	TI/SPC/PSI/LVCBIN/0120 (December'2013) Revision-0)
31(b)	220 kV/132 kV/110 kV/100 kV/66 kV Double Pole, Triple Pole, Out Door SF6 Circuit Breakers.	TI/SPC/PSI/HVCB/0120 (June'2014) with A&C slip No.1(March-16)
32	Hard drawn grooved copper Contact wire	ETI/OHE/76(6/97) with A&C slip No.1 of (4/01), 3 of (03/05) , 4 of (12/06), 5 of (7/09), 6 of (5/12) & 7 of (12/13)
33	Metal Oxide Gapless type Lightning Arrestor for use on 25kV side of Rly. traction sub stations & switching stations	TI/SPC/PSI/MOGLA/0100(07/10)
34	Technical Specification for Silicon Composite Insulators for 25 kV A.C. 50 Hz single phase over head traction lines.	TI/SPC/OHE/INSCOM/1070 (01/07) OR TI/SPC/OHE/INSCOM/1071 (04/13)
35	Specification for solid core porcelain cylindrical post insulator for systems with nominal voltage of 66kV, 110kV, 132kV & 220kV.	TI/SPC/OHE/POST/0100(01/2010)
36	25kv/240V L.T. supply Transformer, 100 KVA	ETI/PSI/15 A (7/82) with A&C Slip No.1(9/89)
37	Battery charger for 110V Battery, 200 AH	ETI/PSI/24(6/81)
38	Low tension Distribution panels for Rly. A.C traction sub-stations	ETI/PSI/29 (12/79)With A&C Slip No.1 ( 2/93)
39	Standard for drawings for power supply Installations.	ETI/PSI/31 (5/76)
40	Low tension distribution panels.	ETI/PSI/63(7/82)
41	Technical specification for control and relay panel for 25kV ac TSS including specification for numerical type protection relays for traction transformer, 25kV shunt capacitor bank and transmission line for 25kV ac TSS on Indian Railways.	TI/SPC/PSI/PROTCT/6071
42	Technical specification for shunt capacitor & series reactor equipment for traction sub-station	TI/SPC/PSI/FC&SR/0100(01/10)
43	Technical specification for 25kV ac, 50 Hz, single phase, oil filled, current transformer with CT ratio of I-1000-500/5A (for general purpose), II-1500-750/5A (for heavy haul duties) for Railway ac traction sub station.	ETI/PSI/90 (6/95) with A&C Slip No.1, 2,3,4,5,6,7 (08/2007) & 8 (April 2009).
44	Technical specification for two zone static relay for distance protection for 25kV ac single phase 50 Hz traction overhead equipment.	ETI/PSI/101 (8/87) with A&C Slip No.1 (09/87)
45	Technical specification for current transformers. I. 220kV. 200-100/5A, II. 132kV. 400-200/5A, III. 110kV. 400-200/5A, IV. 66kV. 800-400/5A for Railway A.C traction substations.	ETI/PSI/117 (7/88) with A&C Slip No.1 (11/88), 2 (3/89), 3 (12/89), 4 (4/90), 5 (6/90), 6 (9/92), 7 (8/05), 8 (08/2007) & 9 (July 2008).
46	Specification for 21.6 MVA single phase, 50 Hz. i) 220/27kV ii) 132/27kV iii) 110/27kV, iv), 66/27kV traction power transformer for Railway A.C traction sub- station.	ETI/PSI/118 (10/93) with A&C Slip No.1 to 9 & A&C slip No.10 (08/12) or latest
47	Code of practice for earthing of power supply installations for 25kV A.C., 50 Hz, single phase traction system.	ETI/PSI/120 (2/91) with A&C Slip No1 (10/93)
48	Technical specification for i) 245 kV, (ii) 145 kV, (iii) 123 kV, (iv) 72.5 kV double pole & triple pole Isolator for Railway traction sub stations.	ETI/PSI/122 (3/89) with A&C Slip No.1(4/90)
49	Specification for Metal Oxide gapless type lightning arrestors (combined) for use on 220/132/110/66 kV side of Railway A.C. traction sub station.	ETI/PSI/137 (8/89) with A&C Slip No.1,2,3 (Embodying) A&C slip No. 4(8/94) 5(04/01), 6 (9/05) & 7(07/2007)
50	Technical specification for 220 kV or 132 kV or 110 kV or 66kV or 25 kV potential transformer.	TI/SPC/PSI/PTs/0990 with A&C Slip No.1,2,3,4,& 5 (April 09)

51	Delta I type High resistive fault selective Relay for 25 kV AC Single phase 50 Hz traction system.	TI/SPC/PSI/PROTCT/1982(12/2003) with A&C slip No.1(10/13)
52	Panto flashover protection relay for 25 kV A.C. single phase 50 Hz traction system.	TI/SPC/PSI/PROTCT/2983 (09/2001)
53	Technical Specification of SCADA system for 25kV, AC Single phase Traction supply on Indian Railway.	TI/SPC/RCC/SCADA/0130(04/2014)
54	Technical Specification for Galvanised Steel Stranded Wire for Traction Masts	TI/SPC/OHE/GSSW/0090 (10/2009)
55	Technical specification for galvanized steel stranded wire for traction bonds	TI/SPC/OHE/GALSTB/0040(09/04) Rev. 1 (08/05)
56	Setting up Earthing Station at switching posts (SSP & SP) with conventional Earthing.	Special Maintenance Instruction No. TI/SMI/0032 Rev-1
57	Design handout for Overhead equipment for running double stack containers under electrified routes (High Rise OHE) with speed potential of 140 Kmph based on revised wind zone.	TI/DESIGN/OHE/2013/00001 (July'13)
58	OHE span in view of changes in wind zones in country	TI/OHE/GA/2013 DATED 25/30.04.2013
59	Technical guidelines and Standard Instruction for Railway Electrification Works including OHE, TSS, Transmission Line, SCADA, Electrical General Works, signaling Works, Telecom works & Civil Engineering Works.	CORE/RE TENDER/EPC/2014/STANDARD INSTRUCTIONS AND GUIDELINES

**(G) LIST OF IS SPECIFICATION (Latest version shall be followed)**

<b>S No.</b>	<b>IS Code No.</b>	<b>Descriptions</b>
1	IS:210-1993	Grey iron castings
2	IS:269-1989	Specification for 33 grade ordinary Portland cement (4 <sup>th</sup> Rev)
3	IS:282-1982	Dropper Wire
4	IS:306-1983	Tin bronze castings
5	IS:335-1993	New Insulating oil (4 <sup>th</sup> Rev) Reaffirmed 2000
6	IS:371-1999	Ceiling rose spec.( (3 <sup>rd</sup> Rev)
7	IS: 383-1970	Specification for coarse & fine aggregates from natural sources for concrete
8	IS:398(Pt.I)-1996	All Aluminum conductor
9	IS:398 Pt.II-1996	Al. conductor for overhead transmission purposes
10	IS:398(Part-III) 1976.	Aluminum conductors galvanized steel reinforced
11	IS: 432 Pt.1-1982	Specification for mild steel & medium tensile steel bars and hard drawn steel wires for concrete reinforcement
12	IS: 456-2000	Plain & Reinforced concrete Code of practice (3 <sup>rd</sup> Rev)
13	IS: 516-1959	Method of tests for strength of concrete
14	IS:617-1994	Aluminum castings
15	IS:694:1990	Al. Jumper wire
16	IS:702-1988	Specification for industrial bitumen (2 <sup>nd</sup> Rev) reaffirmed 1999
17	IS:731-1971	Porcelain Insulator for overhead power lines with a nominal voltage greater than 1000V
18	IS:732-1989	Code of practice for electrical wiring installation (3 <sup>rd</sup> Rev)
19	IS:800-1984	Code of practice for general construction in steel (2 <sup>nd</sup> Rev)
20	IS:808-1989	Dimensions for hot rolled steel beam, column, channel & angle sections
21	IS:816-1969	Welding
22	IS:875 (Part-3) 1987 (Reaffirmed)	Code of practice for design loads (other than earthquakes) for building and structures – Part 3: Wind loads second revision.
23	IS:1293-2005	Plugs & socket outlets of rated voltage upto and including 250V and rated current up to 16 Amp(3 <sup>rd</sup> Rev)
24	IS:1387-1993	General requirements for the supply of metals and metal products
25	IS: 1489 Pt. I 1991	Specification for Portland-Pozzalana cement Pt .I Fly ash based (3 <sup>rd</sup> Rev)
26	IS:1554(Part-I) 1988	PVC insulated cables
27	IS:1608-1995	Mechanical testing of metal- tensile testing
28	IS:1731-1971	Dimensions for steel flats for structural & general engineering purpose
29	IS:1777-1978	Industrial Luminaries with metal reflectors (1 <sup>st</sup> Rev)
30	IS:1786-1985	Specification for high strength deformed steel bars and wires for concrete reinforcement
31	IS:1897-1983	Copper strip for formed fittings
32	IS:2004-1991	Carbon steel forgings for general engineering purpose
33	IS:2062-2011	Steel for general structural purpose
34	IS: 2074-1992	Ready mix Paint, air drying, Red oxide, Zinc chrome
35	IS:2121-1981	Aluminum and steel cored Aluminum conductors for (Part I & II) overhead power lines.
36	IS:2141-2000	Galvanised stay strand
37	IS:2312-1967	Propeller type AC ventilating fans (1 <sup>st</sup> Rev)
38	IS: 2386 Pt.III-1963	Method of tests for aggregates for concrete Pt. III Specific gravity, density voids, absorption & buckling
39	IS:2673-2002	Dimensions for Aluminum Tubular Busbar.
40	IS:2675-1983	Enclosed distribution fuse boards ad cut-outs for voltage not exceeding 1000V AC & 1200V DC (2 <sup>nd</sup> Rev)
41	IS:3043-1987	Code of practice for earthing (1 <sup>st</sup> Rev)
42	IS:3091-1999	Aluminum bronze castings
43	IS:3188-1980	Characteristics of string insulator units
44	IS:3837-1976	Accessories for Rigid steel conduit for electrical wiring
45	IS:3854-1997	Switches for domestic & similar purposes(2 <sup>nd</sup> Rev)
46	IS:4826-1979	Specification for hot dipped for galvaised coatings on round steel wires (1 <sup>st</sup> Rev)
47	IS:5082-1998	Material for Aluminum tubular busbar.



<b>S No.</b>	<b>IS Code No.</b>	<b>Descriptions</b>
48	IS: 6403-1981	Code of practice for determination bearing capacity of shallow foundations (1 <sup>st</sup> Rev)
49	IS:7098 (Part I) 1988	LT XLPE cables
50	IS:7098 (Part II) 1985	HT XLPE cables
51	IS: 8130-1984	Conductor for Insulated electric cables & flexible cords (1 <sup>st</sup> Rev)
52	IS:9537 Pt-I-1980	Conduits for electrical installations
53	IS:9968(Pt.2)-2002	Annealed Copper Jumper Wire
54	IS:13947 Pt. III 1993	Specification for low voltage switchgear & control gear Pt.-3, disconnectors & fuse combination unit
55	IS:14329-1995	Malleable iron castings

(H) LIST OF STANDARD SPECIFICATIONS (Latest version shall be followed)

(i) Power Supply Installation (PSI) Specifications

SN	Specification No.	Rev.	Description	Date of Issue
1	TI/SPC/PSI/40-150CHGR/1210	0	Battery Charger for 110V battery, 150Ah (for 2X5kV) and 40Ah (for 25kV) at SP/SSP for Electric Traction Installation	July,21
2	TI/SPC/PSI/200-250CHGR/0210	0	Battery Charger for 110V battery, 200/250Ah at Traction Sub Station for 25kV/2X25kV Electric Traction Installation	July,21
3	ETI/PSI/14(01/86)	1	25kV.Drop out fuse switch.	Apr. 87
4	ETI/PSI/15 with A&C Slip No.1	-	25kV/240V Auxiliary transformer, 5KVA,10kVA.,25kVA.&50kVA.	Dec.24
5	ETI/PSI/15A with A&C Slip No.2	1	25kV/240VAuxiliary transformers, 100kVA.	Dec.24
6	TI/SPC/PSI/LTDPNL/0210	1	Low Tension Distribution Panels of Railway a. c. Traction Substations, Sub sectioning and Paralleling Post, Sectioning and Paralleling post.	Oct.21
7	TI/SPC/PSI/DRAWING/0210	-	Standards Drawings for power supply installation.	Nov.21
8	TI/SPC/PSI/CLS/0025	5	Control & distribution panel for colour light signaling supply in 25kV AC traction systems.	Jan.25
9	<u>ETI/PSI/44(12/73)</u>	-	Standards for electrical distribution system in stations & yards where 25kVa.c.traction is to be introduced.	Dec.73
10	TI/SPC/PSI/PROTCT/6072 with Addendum & Corrigendum Slip No. 1	0	Technical Specification for Control and Relay Panel including Numerical Type Relays for Traction Transformer, OHE, 25 kV Shunt Capacitor Bank and Transmission Line protection for 25 kV AC TSS on Indian Railways	Aug. 22
11	TI/PSI/FC & SR/0100(01/10) with A&C no. 1	1	Technical specification for Shunt Capacitor & Series Reactor equipment for Traction Sub-station.	Oct. 16
12	TI/SPC/PSI/FC&SR/1210	0	Technical specification for Shunt capacitor and series reactor equipment for 2x25 kV feeding system	June,21
13	ETI/PSI/70 (11/84)	-	Hollow porcelain insulators & Bushing.	Nov.84
14	TI/SPC/PSI/MOGLA/0101 (02/15)	-	Metal oxide gap less type lightening arrester for use on Railway traction substations and switching stations.	Feb.15
15	<u>ETI/PSI/72(9/85)</u>	-	Electric power connectors for AC. Traction power system.	Sep.85
16	ETI/PSI/75(10/97)	-	25 kV, 50 Hz single phase series Compensation Equipment.	Oct.97
17	ETI/PSI/98(8/92)	3	100KVA. and 150KVA.25kVsingle phase 50Hz,oil filled booster transformer.	Jun.94
18	ETI/PSI/99(4/89)	-	Tri-Vector Meter and Maximum Demand Indicator for Railway a.c.Traction.	Apr 89
19	TI/SPC/PSI/DRPC/0050 (08/05) with A&C no. 1	1	Technical specification for Dynamic reactive power compensation equipment for Railway traction substations (for development of prototype only).	Oct.16
20	<u>TI/SPC/PSI/GASCHR/0250</u>	0	Technical Specification of Gas Chromatograph for analysis of	Oct.25

			Dissolved Gases in Transformer Oil	
21	ETI/PSI/106(10/87)	-	Capacitance bridge and dissipation factor bridge for the measurement of solid insulation of insulating oil.	Oct.87
22	<u>TI/SPC/PSI/ERTHNG/0210</u>	0	Technical specification for Power Supply Installation for 25kV & 2X25kV, AC, 50Hz, Traction System	Aug, 21
23	TI/SPC/PSI/TRNPWR/3201 with A&C Slip No.1	-	Technical Specification For 13.5/18.9MVA, 21.6/30.24MVA, 30/42MVA & 40/56MVA Single Phase Traction Power Transformer	Dec.24
24	<u>TI/SPC/PSI/TRNPWR/4200 with A&amp;C Slip No.1</u>	0	Technical Specification for 21.6MVA & 38/53/63MVA Single Phase Dual LV Winding Traction Power Transformer	Dec.24
25	<u>TI/SPC/PSI/TRNPWR/5200 with A&amp;C Slip No.2</u>	0	Technical Specification for 54MVA & 60/84/100MVA SCOTT Connected Traction Power Transformer	Dec.24
26	<u>TI/SPC/PSI/AUTOTR/1200 with A&amp;C Slip No. 01 &amp; 02</u>	0	Technical Specifcaton for 8MVA,12.3MVA & 16.5MVA, ONAN,55kV/27.5kV Autotransformer	Aug.25
27	TI/SPC/PSI/AUTOTR/0091 with A&C Slip No.1	-	Technical specification for 50/75/150 MVA , ONAN/ONAF/OFAF, 220/ 132 kV, 3-Phase Oil Immersed Type Auto Transformer.	Dec.24
28	TI/SPC/PSI/PT/0210 with A&C Slip No.1	0	Technical Specification For 220kV or 132kV or 110kV or 66kV or 25kV Potential Transformer for Railway Electric Traction	Dec.24
29	TI/SPC/PSI/CT/0210 with A&C Slip No.1	0	Technical Specification for Current Transformers with CT ratio of (i) 220kV, 400-200/5A & 200-100/5A (ii) 132kV, 800-400/5A & 400-200/5A (iii) 110kV, 800-400/5A & 400-200/5A (iv) 66kV, 1200-600/5A & 800-400/5A (v) 50kV, 1500-750/5A & 200/5A (vi) 25kV, 3000-1500/5A, 1600-800-400/5A, 1500-750/5A, 1000-500/5A, 400-200/5A & 100-50/5A (vii) 11kV, 500/5A for Railway AC Traction Substation	Dec.24
30	<u>TI/SPC/PSI/ISOLTR/0210 with A&amp;C slip No.1 &amp; 2</u>	2	Technical Specification For 25kV Motorised/Manual Operated and 50kV/66kV/100kV/110kV/132kV/220 kV Manual Operated Single Pole, Double Pole and Triple Pole Isolators for Railway Electric Traction.	Dec.25
31	<u>TI/SPC/PSI/LVCBIN/0121 (05/23) withA&amp;C Slip No. 1</u>	-	Technical Specification for 25 kV Single Pole, Double Pole, Pole Mounted, Outdoor Vacuum Circuit Breake(VCB) and Vacuum Interrupter (BM) for Indian Railway.	Jan.25
32	<u>TI/SPC/PSI/HVCB/0121 with A&amp;C Slip No.1</u>	1	Technical Specification for 220kV/132kV/110kV/100kV/66kV/50kV. Double/Triple pole & 50kV Double Pole Outdoor SF6 Circuit Breaker for Indian Railways.	Aug.21
33	TI/SPC/PSI/HVGIS/0210	0	Technical Specification for 220kV, 132kV Gas Insulated Switchgear (GIS) for AC Traction System of Indian Railway	July,21
34	<u>TI/SPC/PSI/LVGIS/0210</u>	0	Technical Specification for 25kV Gas Insulated Switchgear (GIS) for AC Traction System of Indian Railway	July,21
35	ETI/PSI/127(8/89)	3	Series capacitor equipment for 2x25kV 'AT' feeding system.	Oct. 16

36	ETI/PSI/128(8/89)	3	Resonance suppressing C-R device for 2x25KV 'at' feeding system.	Sep.90
37	TI/SPC/PSI/PROTCT/7101	-	Technical Specification for Control & Relay Panel Including Numerical type protection relays for Scott- connected /V Connected Single Phase Traction Transformers, OHE Protection, 55kV AT Protection & Shunt Capacitor Bank protection for 2 X 25 kV Traction Sub Station, Sectioning and Paralleling Post, Sub-Sectioning & paralleling Post and Autotransformer Post.	Jul. 21
38	TI/SPC/PSI/AFL/0240	0	Auto Transformer Neutral Current Ratio Based Automatic Fault Locator for 2x25 kVAC Traction System	Jan.25
39	ETI/PSI/137(8/89)	7	Metal oxide gap less type lightning arresters for use of 220/132/110/66kV side of railway ac traction substation.	Jul.07
40	TI/SPC/PSI/LCMLA/0032(03/2025)	-	Technical specification for leakage current monitor for lightning arrester	Mar.25
41	ETI/PSI/148(4/92)	-	Specification for SF-6 Gas leakage detector.	Apr.92
42	TI/SPC/PSI/PROTCT/4050(11/05) with A&C Slip No.1	1	Control & Relay Panel for protection system of Mumbai Sub-urban area for 50Hz AC Traction power supply system including parallel operation on 25kV Side.	Oct. 16
43	TI/SPC/PSI/OFC/0050 (10/05)	-	25 Core Armoured Optic Fibre Cable for use in Indian Railway traction installation systems	Oct.05
44	TI/SPC/PSI/PQAR/0080 (09/08)	-	Technical specification for power quality analyzer and Recorder with Remote display.	Sep.08
45	TI/SPC/RCC/SCADA/0134 (11/23)	-	Technical Specification for Supervisory Control and Data Acquisition System for 25kV and 2x25kV Single Phase 50 Hz AC Traction Power Supply.	Nov. 23
46	TI/SPC/PSI/CABLE/0090 (02/09)	-	Manufacture and supply of 132Kv XLPE underground cable and accessories.	Feb.09

**(ii) OHE (Insulator, Tower Wagon and T&P) Specifications**

SN	Specification No.	Rev.	Description	Date of Issue
1	TI/SPC/OHE/INS/0071	-	Specification for Solid Core Porcelain Insulators for 25kV AC 50Hz Single phase over head Traction lines.	April 22
2	TI/SPC/OHE/ INSCOM /1072	2	Technical specification for Silicone Composite Insulators for 25 kVA.C.50 Hz Single Phase Overhead Traction Equipment.	10.11 2022 (w.e.f. 08.08.2023)
3	TI/SPC/OHE/INSTEST/0091	0	Specification for Testing load testing Machine for 25kV Porcelain & Composite Insulators before installation.	Aug 2024
4	TI/SPC/OHE/POST/0101	-	Specification for Solid core Porcelain cylindrical Post Insulators for system with nominal Voltage of 66kV, 110 kV, 132kV & 220 kV.	June 22
5	TI/SPC/OHE/MEMV/0090(03/09)	-	Technical Specification for Self-Propelled Mast Erection Machine	Mar.09

			Vehicle for running on(1676mm) Routes of Indian Railways.	
6	TI/SPC/OHE/SPOLT/0140	1	Technical Specification for Self Propelled Overhead Equipment Laying Train.	Oct. 2019
7	TI/SPC/OHE/NETRA/0143	3	specification for B. G. OHE parameters recording cum Test Car (NETRA) for 160 KMPH for electric traction.	March 22
8	TI/SPC/OHE/WIRING/0091	1	Technical Specification for self-propelled wiring train for paying of Contact & Catenary wire of over head lines on BG (1676mm) Routes of IRS.	May' 2015
9	TI/SPC/OHE/8WDETC/0092 with A& C Slip No. 1	1	Technical Specification for 8-Wheeler Diesel Electric Inspection & maintenance OHE Car under slung type for operation on Broad gauge (1676mm)	Oct, 16
10	TI/SPC/OHE/OLIVIR/0051(01/2015)	1	Technical specification for over headline inspection with video recording system for current collection test.	Jan.15
11	TI/SPC/OHE/TOOLPL/0992		Technical specification for Gear less hand operated pulling and lifting machines.	Feb. 22
12	TI/SPC/OHE/TOOLPL/1991		Ratchet lever Hoist (Pull-lifts).	Dec. 21
13	TI/SPC/OHE/AUGER/0090(02/2009)		Self-propelled Auger Vehicle for digging of foundations of Overhead lines.	Feb 2009
14	TI/SPC/OHE/SPMUV/0092	2	Technical specification for Self Propelled Multipurpose Utility Vehicle for hauling stringing vehicle and other electrification vehicle.	Jan. 2017
15	TI/SPC/OHE/4WDHTW/0070	0	Technical specification for 4wheeler over head equipment inspection car 1676mm.Gauge.	Jun. 2007
16	TI/SPC/OHE/8WDHTW/0070 (Rev.1)	1	Specification for design, construction, supply and commissioning of 8-Wheeler Inspection and Maintenance cars for operation on broad gauge (1676mm) electrified (25 kV a.c.) routes of Indian Railways.	Jun. 07
17	ETI/OHE/58(1/95)	-	Specification for hand operated lifting and swiveling platform.	Jan. 95
18	TI/SPC/OHE/TIPS/1031	-	Technical specification for infra-red imaging system for stationary Installation.	Dec.13
19	<u>TI/SPC/OHE/CW/WEAR/0080</u>	-	Technical specification for On-Board Equipment for On-line scanning for thickness of contact wire used in 25kVac traction.	Feb. 08
20	ETI/OHE/72(11/91)	-	Specification for 4 axle car for winding and/or unwinding of contact wire and catenary wire.	Nov.91
21	TI/SPC/OHE/ATD/0060 Rev.1	1	Specification for Three PulleyType Regulating Equipment ( 3:1Ratio)	Sep. 16
22	TI/SPC/OHE/TIPS/2030 (2003)	-	Specification for Locomotive mounted current collection checking and analysis.	2003

23	TI/SPC/OHE/RRV/0090 (05/09)	0	Specification for Self-propelled Road Rail Vehicle for maintenance of Over Headlines	May 09
24	TI/SPC/OHE/MRI/0143(10/2025)	-	Technical Specification for Measuring and Recording Instrumentation to be Retrofitted on 8-Wheeler.	Oct 25

(iii) **OHE- Specifications**

SN	Specification No.	Existing Specifications/ Rev.	Description	Date of Issue
1	TI/SPC/OHE/HDCSCF/0031	TI/SPC/OHE/HDCSCF/0030	Technical Specification for Hard Drawn Stranded Copper Conductor	14/12/2020
2	TI/SPC/OHE/CW/0971	ETI/OHE/76(6/97)	Technical Specification for Hard Drawn Grooved Copper Contact Wire (Drawn out of Continuous Cast Copper wire rods)	01/01/2021
3	<u>TI/SPC/OHE/CAT(Cu-Cd)/0971</u>	ETI/OHE/50(6/97)	Technical Specification for Cadmium Copper Conductors for Over Head Electric Traction	04/01/2021
4	TI/SPC/OHE/CCC/0871	ETI/OHE/65(8/87)	Technical Specification for Continuous Cast Copper Wire Rods	08/01/2021
5	TI/SPC/OHE/JMP/0941	ETI/OHE/3(1/83)	Technical Specification for Annealed Stranded Copper Conductors for Jumper Wire for Electric Traction	18/01/2021
6	TI/SPC/OHE/STRIP(Al-Cu)/0901	ETI/OHE/55(4/90)	Technical Specification for BIMETALLIC (ALUMINIUM-COPPER) STRIP	20/01/2021
7	TI/SPC/OHE/FASTENERS/0120	1	Technical Specification for Steel fasteners and Stainless Steel Fasteners for 25 kV A.C. Traction Overhead Equipment	March 17
8	ETI/OHE/33A(12/97)	8	Specification for non-Retro-reflective background of Structure Number Plates & caution/warning boards with Retro-Reflective letter, figures and symbols.	Nov.12
9	<u>ETI/SPC/OHE/FITTINGS/0130 (10/13) Rev. 1</u>	1	Technical specification for Fittings for 25kV ac OHE.	Nov. 21
10	TI/SPC/OHE/GALSTB/0040 Rev. 1	1	Technical specification for Silicone Composite Insulators for 25 kVA.C.50 Hz Single Phase Overhead Traction Equipment.	April 22
11	ETI/OHE/11(5/89)	1	Specification for 25 kV AC traction overhead equipment for Steel tubes.	May 18
12	ETI/OHE/13(4/84)	4	Specification for Hot dip zinc galvanization of steel	May 18

			masts (Rolled& Fabricated), tubes and fittings used on 25kV ac OHE.	
13	ETI/OHE/71 (11/90)	1	Code of bonding and earthing for 25kv a.c.50Hz single phase traction system.	02.03.21
14	TI/SPC/OHE/WR/1060(06/06) with A&C slip no. 1 to 4	4	Specification for Stainless Steel Wire Ropes.	May 06
15	<u>TI/SPC/OHE/5PATD/0130 with A&amp;C slip no. 1&amp;2</u>	-	Technical specification for 5 pulley Auto Tensioning Device for 25kV a.c. traction.	Oct. 15
16	<u>TI/SPC/OHE/3PHTATD/0150 with A&amp;C slip no. 1</u>	-	Technical specification for 3pulley Auto Tensioning Device with 2400 kgf Tension for 25kV a.c. traction	Sep. 16
17	<u>TI/SPC/OHE/LWTSI/0060(Rev.) with A &amp; C Slip no.1</u>	1	Specification for Light weight Section insulator assembly.	Jul. 16
18	<u>TI/SPC/OHE/SNS/0000 (Rev.1) with A &amp; C slips 1</u>	1	Specification for Short Neutral Section Assembly (Phase Break)	Jan. 16
19	TI/SPC/OHE/SPRINGATD/0110 Rev.1(03/12)	1	Technical specification for Spring Auto Tensioning Device.	July. 18
20	ETI/OHE/27 (8/84) with A & C slips 1 & 2.	-	Specification for Section Insulator Assembly without Sectioning Insulator	Aug. 84
21	ETI/OHE/51(9/87) Rev. 1 with A&C 1	1	Specification for Discharge/ earthing pole assembly for 25kV ac traction.	11.03.2022
22	TI/SPC/OHE/FRPNP/0060	-	Specification for Retro-Reflective structure number plate on FRP base.	Jun.06
23	ETI/OHE/33(8/85)	-	Specification for Enameled steel plates	Aug. 85
24	ETI/OHE/53(6/88)	-	Principles for OHE Layout Plans and Sectioning Diagrams for 25 kV a.c. traction.	Nov. 06
25	TI/SPC/OHE/GSSW/0090	1	Galvanized steel stranded wire (GSSW) for anchoring of the traction mast.	31.10.22
26	TI/SPC/OHE/CW(CuAg)/0130(05/2025)		Technical Specification for Continuous Cast Silver Bearing Copper Rods and 107 mm <sup>2</sup> Silver Bearing Grooved Copper Contact Wire	14.05.2015
27	<u>TI/SPC/OHE/CAT(Cu-Mg)/0150 (06/2025)</u>	0	Technical Specification for Hard Drawn Stranded Magnesium Copper Conductors for Over Head Electric Traction	16.06.2025

(iv) **Civil Specifications**

SN	Specification No.	Rev.	Description	Date of Issue
1	ETI/C/2/(8/94)	-	Technical specification for spunpre-stressed cement concrete (PSC) OHE traction mast.	Aug.94
2	ETI/C/3(5/83)	1	Technical specification for spraying zinc coating on the OHE mast for Railway Electrification.	Feb. 21
3	ETI/C/4(8/90)	-	Technical specification for cold roll formed mast for Railway electrification.	Aug.90
4	ETI/C/5(5/88)	1	Specification for Flo-Coat stel tubes for 25 kv A. C. traction overhead equipment.	May.01
5	TI/SPC/CIV/POR/0080(08/2008)	1	Technical Specification for Corrosion Resistant Paint System for outdoor structures of Traction Distribution and Traction Rolling Stock.	Feb.21

Note: RDSO latest Master list of specification shall also be followed.

(v) **Instruction/Special Maintenance Instruction (IN/SMI)**

(a) **INSTRUCTION (PSI)**

SN	Instruction No.	Rev.	Description
1	TI/IN/0001(05/94)	0	Instruction for Booster Transformer & Return conductors in 25kV AC Traction systems.
2	TI/IN/0002(01/97)	0	Guidelines for design of fixed compensation for improving power factor at 25V,50Hz traction sub-station.
3	TI/IN/0011(12/05)	0	Guidelines operating procedures of TSS in Mumbai Area
4	TI/IN/0014(04/07)	0	Dynamic reactive power compensation on Indian Railways.
5	TI/IN/0016(05/08)	0	Parallel operation of traction transformers on Indian Railways.
6	TI/IN/0017(07/08)	0	Guidelines on protection scheme with parallel operation of 2x21.6MYA Traction transformers.
7	TI/IN/0018(02/09)	0	Application of existing Panto Flashover Relay attraction substation (TSS) for single line section on Indian Railways.
8	TI/IN/0019(09/09)	0	Instruction for load profile, currents and voltage harmonics measurement and recoding in a 25kVtractionsubstation.
9	TI/IN/0020(12/09)	0	Instruction for timely replacement and up-gradation of computers at remote control centers of Traction SCADA System on IR.
10	TI/IN/0021(01/10)	0	Instruction for increasing data transfer speed of the Traction SCADA system on IR from 600/1200 bps to minimum 9600bps
11	TI/IN/0022(02/10)	1	Setting guidelines for Traction Transformer and 25kV shunt capacitors protection relays developed as per RDSO specification No. TI/SPC/PSI/PROTCT/6070(9/08) for 25kV AC Traction Sub station
12	TI/IN/0023(02/10)	0	Instruction for operating RTU switch power supply of 110V de (in place of 240Vac) for existing Traction SCADA system on IR.
13	TI/IN/0024(06/10)	0	Instruction for monitoring and analysis of feeder circuit Breaker tripping for 25kV ac traction system.



14	TI/IN/0025(08/10)	0	Technical instruction for improving reliability of Traction SCADA System on IR.
15	TI/IN/0026 (09/10)	0	Protection scheme and relay setting guideline for 25 kV AC TSS provided with 30 MVA Traction Transformer.
16	TI/IN/0027 (10/10)	0	Technical Instructions on maintenance practices to be adopted for numerical type microprocessor based protection relay module for 25 kV AC Traction system on IR.
17	TI/IN/P & S/0028 (12/10)	0	Implementation of feeder circuit breaker backup features in different make/type of feeder protection module provided in C & R panels as per old RDSO's specification NO. ETI/PSI/65 (01/97)
18	TI/IN/0029 (04/11)	0	Technical Instruction on important aspects of relay setting of vectorial Delta I relays as per RDSO's Specification No. TI/SPC/PSI/PROTCT/1982.
19	TI/IN/0030	0	Technical Instruction related to the Installation and commissioning of the 42 kV Metal Oxide Gapless Lightning Arrestor Provided on Traction System on IR.
20	TI/SMI/0032	2	Technical Instruction on setting up of earth station with conventional Earthing System.
21	TI/IN/0036	0	Technical Instruction for Relay Setting Guideline for protection scheme for low density routes
22	TI/IN/0043 Rev.01	1	PSI Guideline for Increasing Speed Potential to 160kmph on NDLS-HWH & NDLS-BCT Routes
23	TI/IN/0044 (02/22)	0	Procedure for cross acceptance criteria for new item/design/specification for 25kv & 2x25 kv AC traction system.
24	TI/IN/0048 (04/24)	0	Technical Instruction for implementing Cyber Security in existing Specification for Supervisory Control and Data Acquisition Shystem for 25 kV and 2x25 kV Single Phase 50Hz AC Traction Power Supply.
25	TI/IN0049	0	Setting guidelines for Delta-I and backup distance protection relay provided as per RDSO Specification No. TI/SPC/PSI/ PROTCT/1982 with A&C Slip-1 or Specification No. TI/SPC/PSI/PROTCT/6072 for 25 kV AC Traction Sub-station
26	<u>TI/IN/0052(10/25)</u>	1	Technical Instruction regarding Standard Operating Procedure for implementing Cyber Security Guidelines for protection of Critical Information Infrastructure (CII) of Indian Railways with respect to SCADA System
27	TI/IN/0054	0	Back Charging Scheme for 2X25kV TSS, SP & SSP of Scott Connected as well as V Connected Schemes.
28	TI/IN/0050 (10/25)	1	Relay Setting Guidelines for Traction Transformer, Feeder Protection & Shunt Capacitor Bank Protection Relay developed as per RDSO Specification No.TI/SPC/ PSI/ PROTCT/7101 for 2x25 kV AC Traction System.

**(b) MAINTENANCE INSTRUCTION (PSI)**

SN	Instruction No.	Rev.	Description
1	<u>TI/MI/0026(07/03)</u>	2	Periodical maintenance instruction & trouble shooting guidelines for capacitor bank.
2	TI/MI/0038(05/06)	2	Inspection test schedule for traction power transformer.
3	TI/MI/0039 Rev.03	3	Maintenance Instruction for Overhauling of Traction Transformer

4	TI/MI/0041(04/10)	1	Conditioning Monitoring of Lightening Arresters provided on traction system on Indian Railway
5	TI/MI/0048 Rev. 2	2	Maintenance Instruction for provision of disconnection assembly to lightning arrestor provided over 25 kV side of Traction system of Indian Railways.
6	I/MI/0054 Rev.1	1	Maintenance instructions for 25kV Vacuum Circuit Breaker and Interrupter of Indian Railways Traction System

**(c) MAINTENANCE INSTRUCTION / INSTRUCTION (OHE)**

SN	Instruction No.	Rev.	Description
1	TI/MI/0018(04/06)	3	Winch type regulating equipment.
2	TI/MI/0027(03/98)	0	Development of 107mm <sup>2</sup> silver bearing copper contact wire (silver contents 0.1%)
3	TI/MI/0028(09/01)	2	Overhead equipments (OHE) on turnout/ cross over to avoid panto entanglements.
4	TI/MI/0029(04/06)	3	3:1Ratio, 3Pulley type regulating equipment
5	TI/MI/0034(06/99)	0	Contact wire in out of run OHE
6	TI/MI/0035(09/01)	1	Provision of pipe on Hex Tie Rod of auto Tensioning Device(ATD)
7	TI/MI/0037	3	Special Maintenance instruction for OHE Contact wire and Associated fittings.
8	TI/MI/0044 (09/17)	1	Guidelines for overhead Hooper/chute/crane loading unloading of rakes in electrified siding
9	TI/MI/0045 (11/09)	0	Maintenance instruction for gas auto tensioning device
10	TI/MI/0049 (05/21)	1	Tolerance and Limits in 25 kV AC OHE installation with 67/107 sq. mm Catenary/ Contact wire Tension 1000kg/1000kg.
11	TI/IN/0008(09/01)	0	Instruction for use of copper cross feeders at switching station.
12	TI/IN/0009(10/01)	0	Instruction for splicing of 19/3.99mm Aluminum conductor (spider).
13	TI/IN/0015(01/10)	0	Instruction for application of lubricant on wire rope Used with auto tensioning devices.
14	TI/IN/0037 (01/19)	0	Electrical clearances speed instructions and speed precautions for ODC movement in electrified area.
15	TI/IN/0041 (09/20)	0	Guidelines for Rigid Catenary Overhead Conductor System for use in Tunnels and Retractable Rigid Overhead Conductor System in Sidings/Depots.
16	TI/IN/0042 (10/20)	0	OHE guidelines for increasing speed potential to 160 KMPH on NDLS- HWH and NDLS-BCT routes.
17	TI/MI/0051 (12/17)	0	Ending Clamp
18	TI/MI/0053 (10/17)	0	Pre and post Monsoon precaution for traction Installation
19	TI/MI/0055	2	Revision of Maintenance Instruction on Identification of Defects on Traction Installation using Thermo-Vision Camera and Preventive Action.
20	TI/MI/0056	3	Prevention from climbing of monkey over Traction Installation Structure.
21	TI/MI/0059	3	Provision of Anti-bird disc for prevention of bird fault in composite and porcelain insulator (Stay tube Insulator, Bracket tube insulator and 9 ton insulator)
22	TI/MI/0058 (08/21)	1	To Prevent Contact Wire Parting at RRA location

23	TI/MI/0060 (12/22)	0	Maintenance manual for traction distribution equipment (OHE, PSI & SCADA) for 160 kmph train operation.
24	TI/MI/0061	1	Provision of Composite High Voltage Insulating Coating under overline structures, wherever the reduced electrical clearances are adopted.
25	TI/MI/0062	1	Provision of standard arrangement of the false Catenary under over line structures
26	TI/IN/0053	0	Guidelines for Maintenance of Transmission Lines owned/ maintained by IRs
27	TI/IN/0056	0	Guidelines for AI enabled drone based condition monitoring system for IRs
28	TI/IN/0057	0	Guidelines for Artificial intelligence enabled Loco based condition monitoring system for Indian Railways
29	TI/IN/0041	1	Guidelines for ROCS for use in Tunnels and location with limited electrical clearances and retractable Rigid Overhead Conductor System in Sidings/Depots.
30	TI/IN/0055	0	Use of Binocular in Railway for OHE and PSI
31	TI/IN/0059	0	Connection with 3 PG Clamps in isolator jumper of 160 sqmm and G jumper of 160 sqmm in first sub sector including yards
32	TI/MI/0064 Rev1	1	Provision of the Standard arrangement of droppers on the cantilever at girder bridges
33	TI/MI/0065	0	SMI for Rigid Overhead Conductor System (ROCS) and Retractable Rigid Catenary system (RRCS)
34	TI/IN/0046	0	Live line OHE Measuring Gauge (LLOMG) with data logging and reporting.

**(d) MAINTENANCE INSTRUCTION /INSTRUCTION OHE-E (Insulator, Tower Wagon)**

SN	Instruction No.	Rev.	Description
1	TI/MI/0001(10/82)	0	Failure of 25kV pedestal insulator and to use only solid core support insulator.
2	TI/MI/0007(06/84)	0	Use of disc insulator in place of 9-T solid core insulators of 25kV ac OHE.
3	TI/IN/0007(09/01)	0	Instruction for action to be taken in-case of failure of 25 kV porcelain Insulator.
4	TI/MI/0008(08/94)	0	Failure of 9-T insulator due to non provision of double eye distance rod at BWA location.
5	TI/MI/0040(04/05)	0	To measure the severity of pollution by brush wash method
6	TI/MI/0042(04/2023) Rev. 1	0	Special maintenance instructions for testing of 25kV Porcelain & composite Insulators before installation.
7	TI/IN/0012(12/05)	0	Failure prone insulators, Insulators suspected to be failure prone and those to be retained in service.
8	TI/IN/0013(06/2023) Rev. 2	2	Action to be taken by Divn./OHE Depots for handling of composite insulators.
9	TI/MI/0043 Rev. 4	4	Maintenance Instruction for 8-Wheeler Tower Wagons covering instructions for DETC & DHTC.
10	TI/MI/0052	1	Special Maintenance Instruction for 4- wheeler Tower wagon.
11	TI/IN/0040	0	Instruction of cleaning of 25KV composite insulators used in Indian railways traction system.
12	TI/IN/0051 (06/2024)	0	Instruction for handling of 25 kV Porcelain insulators
13	TI/IN/0058	0	Guidelines for identification of defective composite insulators using thermal camera in 25 kV Traction System on Indian Railways.

(e) **INSTRUCTION (CIVIL)**

<b>SN</b>	<b>Instruction No.</b>	<b>Rev.</b>	<b>Description</b>
1	TI/IN/0035 (09/17)	0	Technical Instruction for Testing of OHE structure's foundation.
2	TI/IN/0038 (02/19)	0	Technical instruction of earthing bonding on bridges.
3	TI/IN/0039 (01/19)	0	Technical instruction for making non schedule hole in steel structure of traction installation.

**PART – IV**

**ANNEXURE – 2**

Quantities of all items mentioned in Part-V, Form-5 under Qty. Column (SCHEDULE OF PRICES & TOTAL PRICES).

**PART – IV**

**ANNEXURE -3**

**REQUIREMENT OF SPARES**

Quantities FOR OHE & TSS

**“NIL”**

**PART – IV**

**ANNEXURE-4**

**LIST OF ITEMS TO BE SUPPLIED BY PURCHASER TO THE CONTRACTOR  
EQUIPMENTS, FITTINGS AND FINISHED MATERIAL.**

**FOR OHE & TSS WORKS**

<b>S. No.</b>	<b>Description</b>	<b>Quantity</b>
<b>1</b>	65 sq.mm. cadmium copper catenary wire.	Entire Requirement
<b>2</b>	107 sq.mm. continuous cast copper contact wire.	-do-
<b>3</b>	66/27 or/and 110/27 or/and 132/27 or/and 220/27 KV, 21.6/ 30.24 MVA Traction Power Transformer (As Applicable)	-do-
<b>4</b>	Anticreep wire (if required as per site condition)	-do-

**NOTE:**

1. The prices against various Items of schedule - 1 shall be exclusive of the cost of supply of the above Items.
2. All galvanised bolts, nuts, lock nuts and washers required for assembly and fastening of steel work and mounting of above equipments shall be supplied by the contractor and appropriate item of schedule -1 should include the cost thereof.
3. All the fasteners whether stainless steel or otherwise required for fittings and components shall be supplied by the contractor.

**PART-IV**

**ANNEXURE - 5**

**LIST OF TOOLS AND PLANTS FOR MAINTENANCE**

**- D E L E T E D -**

**PART – IV**

**ANNEXURE-6**

**UNIT QUANTITIES OF FINISHED WIRES AND CONDUCTORS FOR VARIOUS ITEMS OF WORK**

**IF THE SAID ITEMS UNDER RAILWAY SCOPE OF SUPPLY**

Wire/Conductor	Applicable Linear density kg/m	Item No Sch.1	Bare unit requirement per unit of work (m)	Allowance for erection per unit of work returnable as scrap (m)	Total requirement per unit of work (col.4& 5)	REMARKS
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Contact wire (107)	0.9512	6(a)	1005.0	5	1010.0	
		6(b)	1005.0	5	1010.0	
		6(c)	1005.0	5	1010.0	
		6(d)	1005.0	5	1010.0	
		10	0.5		0.5	
		12(a)	4.0		4.0	
		31(g)	3.0		3.0	
		12(c)	4.0		4.0	
Cadmium copper wire(65)	0.5973	5(a)(ii)	1.0		1.0	
		6(a)	1005.0	5	1010.0	
		10	0.5		0.5	
		12(c)	0.65		0.65	
		15(a)	0.5		0.5	
		31(g)	3.0		3.0	
Cadmium copper wire(130)	1.1692	4(b)(iv)	4.5		4.5	
		5(a)(ii)	1.0		As required	
		6(a) <sup>a</sup>	As required		As required	
All Aluminium conductor(Spider)	0.6520	7(a)	1010.0	10	1020.0	
		7(b)	2020.0	20	2040.0	
Large Jumper(105)	0.982	10	4.0		4.0	
		15(a)(i)	6.0		6.0	
Cadmium copper Bridle wire	0.2187	6(c)	8.5		8.5	per bracket
Small Jumper (50)	0.4352	4(b)(i)	4.5		4.5	
		4(b)(ii) (iii) & (iv)	4.5		4.5	
		6(a)	6.0		6.0	
		10	1.6		1.6	
		15(a)(ii)	1.6		1.6	
		5(b)	1.5		1.5	
Dropper wire (5mm)	0.1746	5(c)	1.5		1.5	
		6(a) & (d)	180.0	20	200.0	
		12(a) & (d)	5.0		5.0	
		12(b)	5.0		6.0	
		31(a)	10.0	2	12.0	
		31(g)	10.0	2	12.0	
		6(c)				As required
Dropper wire (7mm)	0.341	4(a)(i)	1.8	0.2	2.0	
		4(a)(v)	1.8	0.2	2.0	
		12(c)	0.80		0.80	
9/2.29 mm Al. Alloy catenary		6(d)	1005	10	1015	



37/2.25(150 sq mm) Copper conductor (Feeder Wire)	1.3335	7 (e)	1010	10	1020.0	
19/7/1.25 (160 sq mm) Copper conductor (Large Jumper)	1.504	15.(d)	As required	-	As required	
19/2.10 (65 sq mm) PVC Catenary wire		15 (c ) & 15 (e)	As required	-	As required	

---

**NOTE :**

**1) Col.4** of the above table indicates the bare unit requirement of the various types of wire and conductors for various items of schedule-1. This includes allowance for sag wherever required.

**2) Col.5** of the above table indicates the permissible allowances for the erection which should be left over with the contractor and should be returned to the purchaser in the form of scrap on completion of work. Such working allowance has been indicated on the assumption that all wire and conductors shall be made available in tailor made lengths as shall be indicated by the contractor to suit individual employment and, further, that the actual supplies shall be made in the serial order as will be indicated by the Contractor. Should the purchaser be unable to supply the conductor as per above on account of which drums of a length longer than the ones desired by the contractor shall have to be erected, then such, extra length as shall result from the difference of the length of the drums actually employed and length of the drums ordered by the contractor shall be considered over and above the quantities admitted as allowances for erection under col. 5. Such extra length shall, in addition, be considered and shall be returned to the Purchaser in the form of scrap.

**3) Col.6** of the above table indicates the total quantities of wires and conductors to be supplied to the contractor by the Purchaser, free of cost. Such quantities do not take into account extra quantities which may be used on account of note 2 above and quantities damaged which shall be allowed for over and above the quantities indicated in Col. 6.

**4)** Whenever cadmium copper wire (130) is required against item 5(a) (ii), the same will supplied by the Purchaser and the quantity of cadmium copper wire (65) against this item will be correspondingly reduced.

When copper wire (130) is required against item 6(a) the same will be supplied by the purchaser and the quantities of cadmium copper wire (65) and contact wire (107) against this item will be correspondingly reduced.

**5)** Whenever anti-theft jumper is provided against item 15(a), the length of jumper used shall be calculated depending on the setting distance of the anchor structure and the quantity required shall be supplied by the purchaser.

Whenever large jumper (105) is employed against item 15(a), the requirement of cadmium copper wire (65) shown against this item will not be permissible and vice-versa.

Whenever anti-creep is of the boom anchor type, catenary (cadmium copper) wire against 15(a) shall be 2 meters instead of 0.5 meters.

**6)** If required by the contractor, the Purchaser will supply to the contractor wires and conductors required for replacement due to thefts, accidents etc. The cost of such wires and conductors shall be reimbursable to the Purchaser by the contractor.

---

XXXXX

**PART – IV**

**ANNEXURE-7**

**Details of contractual payments received during the last three financial years and current financial year**

SN	Name of the work	Name of the Employer	Date of payment	For the financial year	Total Contractual amount received
1	2	3	4	5	6

**XXXXX**

## PART – IV

Annexure-8

### TENDERER'S CREDENTIALS (BID CAPACITY)

\_\_\_\_\_ RAILWAY

For tenders having advertised value more than Rs 10 crore wherein eligibility criteria include bid capacity also, the tenderer will be qualified only if its available bid capacity is equal to or more than the total bid value of the present tender. The available bid capacity shall be calculated as under:

Available Bid Capacity =  $[A \times N \times 2] - 0.33 \times N \times B$

Where,

A = Maximum value of construction works executed and payment received in any one of the previous three financial years or the current financial year (up to date of inviting tender), taking into account the completed as well as works in progress.

N= Number of years prescribed for completion of work for which bids has been invited.

B = Existing commitment and balance amount of ongoing work with tender as per prescribed proforma of Railway for statement of all work in progress and also the work which are awarded to tenderer but yet not started upto date of inviting tender.

Note:

- (a) The Tenderer(s) shall furnish the details of -
  - (i) Maximum value of construction works executed and payment received in any one of the previous three financial years or the current financial year (up to date of inviting tender) for calculating A, and
  - (ii) Existing commitments and balance amount of ongoing works with tenderer as per the prescribed proforma of Railway for statement of all works in progress and also the works which are awarded to tenderer but yet not started upto the date of inviting of tender for calculating B. In case of no works in hand, a 'NIL' statement should be furnished.  
The submitted details for (i) and (ii) above should be duly verified by Chartered Accountant.
- (b) In case if a bidder is JV, the tenderer(s) must furnish the details of
  - (i) Maximum value of construction works executed and payment received in any one of the previous three financial years or the current financial year (up to date of inviting tender) by each member of JV for calculating A, and
  - (ii) Existing commitments and balance amount of ongoing works with each member of JV either in individual capacity or as a member of other JV as per the prescribed proforma of Railway for statement of all works in progress and also the works which are awarded to each member of JV either in individual capacity or as a member of other JV but yet not started upto the date of inviting of tender for calculating B. In case of no works in hand, a 'NIL' statement should be furnished.  
The submitted details for (i) and (ii) above should be duly verified by Chartered Accountant.
- (c) Value of a completed work/work in progress/work awarded but yet not started for a Member in an earlier JV shall be reckoned only to the extent of the concerned member's share in that JV for the purpose of satisfying his/her compliance to the above mentioned bid capacity in the tender under consideration.
- (d) The arithmetic sum of individual "bid capacity" of all the members shall be taken as JV's "bid capacity".
- (e) In case, the tenderer/s failed to submit the above statement along with offer, their/his offer shall be considered as incomplete and will be rejected **summarily**.
- (f) The available bid capacity of tenderer shall be assessed based on the details submitted by the tenderer. In case, the available bid capacity is lesser than estimated cost of work put to tender, his offer shall not be considered even if he has been found eligible in other eligibility criteria/tender requirement.

## (Bid Security)

Bank Guarantee Bond from any scheduled commercial bank of India  
*(On non-judicial stamp paper, which should be in the name of the Executing Bank).*

**Name of the Bank: -----**

President of India,  
 Acting through Sr. DEE/TRD,  
 Northern Railway,  
 DRM's office  
 New Delhi

Beneficiary: Sr.DFM/N.Rly. DRM's Office, New Delhi

Date:-----

**Bank Guarantee Bond No.:**

**Date:-----**

In consideration of the President of India acting through----- *(Designation & address of Contract Signing Authority)*, ..... Railway, ..... (hereinafter called "The Railway") having invited the bid for..... through Notice inviting tender (NIT) No. .... We have been informed that . . . . *[Insert name of the Bidder]*..... *(hereinafter called "the Bidder")* intends to submit its bid (hereinafter called "the Bid") .

WHEREAS, the Bidder is required to furnish Bid Security for the sum of *[Insert required Value of Bid Security]*, in the form of Bank Guarantee, according to conditions of Bid.

**AND**

WHEREAS, ..... *[Insert Name of the Bank]*, with its Branch ..... *[Insert Address]* having its Headquarters office at..... *[Insert Address]*, hereinafter called the **Bank**, acting through ..... *[Insert Name and Designation of the authorised persons of the Bank]*, have, at the request of the Bidder, agreed to give guarantee for Bid Security as hereinafter contained, in favour of the Railway:

1. KNOW ALL MEN that by these present that I/We the undersigned *[Insert name(s) of authorized representatives of the Bank]*, being fully authorized to sign and incur obligations for and on behalf of the Bank, confirm that the Bank, hereby, unconditionally and irrevocably guarantee to pay to the Railway full amount in the sum of *[Insert required Value of Bid Security]* as above stated.

2. The Bank undertakes to immediately pay on presentation of demand by the Railway any amount up to and including aforementioned full amount without any demur, reservation or recourse. Any such demand made by the Railway on the Bank shall be final, conclusive and binding, absolute and unequivocal on the Bank notwithstanding any disputes raised/ pending before any Court, Tribunal, Arbitration or any Authority or any threatened litigation by the Bidder or Bank.

3. The Bank shall pay the amount as demanded immediately on presentation of the demand by Railway without any reference to the Bidder and without the Railway being required to show grounds or give reasons for its demand of the amount so demanded.

4. The guarantee hereinbefore shall not be affected by any change in the constitution of the Bank or in the constitution of the Bidder.

5. The Bank agrees that no change, addition, modifications to the terms of the Bid document or to any documents, which have been or may be made between the Railway and the Bidder, will in any way absolve the Bank from the liability under this guarantee; and the Bank, hereby, waives any requirement for notice of any such change, addition or modification made by Railway at any time.

6. This guarantee will remain valid and effective from.....*[insert date of issue]*till .....*[insert date, which should be minimum 90 days beyond the expiry of validity of Bid]*. Any demand in respect of this Guarantee should reach the Bank within the validity period of Bid Security.

7. The Bank Guarantee is unconditional and irrevocable.

8. The expressions Bank and Railway herein before used shall include their respective successors and assigns.

9. The Bank hereby undertakes not to revoke the guarantee during its currency, except with the previous consent in writing of the Railway. This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No.758.

10. The Bank hereby confirms that it is on the SFMS (Structured Financial Messaging System) and shall invariably send the advice of this Bank Guarantee to the following bank details –

IFSC CODE	SBIN000RAIL
IFSC TYPE	BRANCH
BANK NAME	STATE BANK OF INDIA
BRANCH NAME	RAIL
CITY NAME	NAVI MUMBAI
ADDRESS	SECTOR-11, CBD BELAPUR, NAVI MUMBAI
DISTRICT	NAVI MUMBAI
STATE	MAHARASHTRA
BG ENABLED	YES

11. The Guarantee shall be valid in addition to and without prejudice to any other security Guarantee(s) of Bidder in favour of the Railway. The Bank, under this Guarantee, shall be deemed as Principal Debtor of the Railway.

Date .....

Place.....

Bank's Seal and authorized signature(s)

*[Name in Block letters]* .....

*[Designation with Code No.]*.....

*[P/Attorney]* No.

Witness:

1 Signature, Name & Address & Seal

2 Signature, Name& address & Seal

Bank's Seal

*[P/Attorney]*No.

**Note:** All italicized text is for guidance on how to prepare this bank guarantee and shall be deleted from the final document.

**PART – IV**

**Annexure –8B**

Reference -Para 1.1.26.2 & 1.1.32.15.2 of Tender Form (Second Sheet) of  
Annexure I of ITT of GCC

**Each Bidder or each member of a JV must fill in this form separately:**

**NAME OF BIDDER/JV PARTNER:**

Annual Contractual Turnover Data for the Previous 3/4 Years (Contractual Payment only)			
Year	Amount Currency	Exchange Rate	Indian National Rupees Equivalent
Average Annual Contractual Turnover for last 3 years			

1. The average annual contractual turnover shall be calculated as an average of "total contractual payments" in the previous three financial years. However, in case balance sheet of the previous year is yet to be prepared/ audited, the audited balance sheet of the fourth previous year shall be considered for calculating average annual contractual turnover.
2. The information supplied shall be substantiated by data in the audited balance sheets and profit and loss accounts for the relevant years in respect of the bidder or all members constituting the bidder.
3. Contents of this form should be certified by a Chartered Accountant duly supported by Audited Balance Sheet duly certified by the Chartered Accountant.

**SEAL AND SIGNATURE OF THE BIDDER**

Certified that all figures and facts submitted in this form have been furnished after full consideration of all observations/notes in Auditor's reports. \_\_\_\_\_

**(Signature of Chartered Accountant)**

**Name of CA:** \_\_\_\_\_

**Registration No:** \_\_\_\_\_

**(Seal)**

**PART – IV**

Annexure-9

**Constitution of firm:**

1	Constitution of the firm/ concern. (Tick as applicable)	Sole Proprietorship /Partnership firm/ Company/ LLP/JV/Society/HUF etc.
2	Full name of Sole proprietorship/ Partnership firm/ Company/ LLP/JV/society/huf etc (as case may be)	
3	Year of formation / incorporation	
4	PAN No.	
5	Registered Office Address with contact no. & registered E-mail ID.	
6	Address on which correspondence regarding this tender should be done.	
7	Names of the proprietor / partners / JV Members etc.	
8	Details of TDC/EMD submitted online (as applicable)	

We have enclosed alongwith the tender, all the requisite documents pertaining to the constitution of the firm/ concern / company. etc., as specified in clause 1.1.29 of "Preamble & General Instructions to Tenderers".

Signature of tenderer

**FORMAT FOR CERTIFICATE TO BE SUBMITTED / UPLOADED BY TENDERER ALONGWITH THE TENDER DOCUMENTS**

I.....(*Name and designation*)\*\*appointed as the attorney/authorized signatory of the tenderer, M/s..... (hereinafter called the tenderer) for the purpose of the Tender documents for the work of ..... as per the tender No. .... of .....(*Railway*)\*\*, do hereby solemnly affirm and state on the behalf of the tenderer including its constituents as under:

1. I/we the tenderer (s) am/are signing this document after carefully reading the contents.
2. I/We the tenderer(s) also accept all the conditions of the tender and have signed all the pages in confirmation thereof.
3. I/we hereby declare that I/we have downloaded the tender documents from Indian Railway website [www.ireps.gov.in](http://www.ireps.gov.in) . I/we have verified the content of the document from the website and there is no addition, no deletion or no alteration to the content of the tender document. In case of any discrepancy noticed at any stage i.e. evaluation of tenders, execution of work or final payment of the contract, the master copy available with the railway Administration shall be final and binding upon me/us.
4. I/we declare and certify that I/we have not made any misleading or false representation in the forms, statements and attachments in proof of the qualification requirements.
5. **I/We also understand that my/our offer will be evaluated based on the documents/credentials submitted along with the offer and same shall be binding upon me/us.**
6. **I/We declare that the information and documents submitted along with the tender by me/us are correct and I/we are fully responsible for the correctness of the information and documents, submitted by us.**
7. I/we certify that I/we the tenderer(s) is/are not blacklisted or debarred by Railways or any other Ministry / Department of Govt. of India from participation in tender on the date of submission of bids, either in individual capacity or as a HUF/ member of the partnership firm/LLP/JV/Society/Trust.
8. I/we understand that if the contents of the certificate submitted by us are found to be forged/false at any time during process for evaluation of tenders, it shall lead to forfeiture of the Bid Security and may also lead to any other action provided in the contract including banning of business for a period of upto two year. Further, I/we (*insert name of the tenderer*) \*\*.....and all my/our constituents understand that my/our offer shall be summarily rejected.
9. I/we also understand that if the contents of the certificate submitted by us are found to be false/forged at any time after the award of the contract, it will lead to termination of the contract, along with forfeiture of Bid Security/Security Deposit and Performance guarantee and may also lead to any other action provided in the contract including banning of business for a period of upto two year.
10. I/We have read the clause regarding restriction on procurement from a bidder of a country which shares a land border with India and certify that I am/We are not from such a country or, if from such a country, have been registered with the competent Authority. I/We hereby certify that I/we fulfil all the requirements in this regard and am/are eligible to be considered (evidence of valid registration by the competent authority is enclosed)

SEAL AND SIGNATURE  
OF THE TENDERER

Place:

Dated:

\*\*The contents in Italics are only for guidance purpose. Details as appropriate are to be filled in suitably by tenderer.

**NOTE: Instructions issued by Railway Board regarding Annexure-10 vide letter no. 2022/CE-I/CT/GCC Correspondence dated 14.05.2024 or latest shall be followed.**



**PART – IV**

**ANNEXURE-10(A)**

Reference Para 6.1 of ITT of GCC

(This certificate is to be given by attorney/authorized signatory/each member of Partnership firm/Joint Venture (JV)/Hindu Undivided Family (HUF)/Limited Liability Partnership (LLP) etc.)

I/We.....(Name), attorney/authorized signatory of the.....(constituent firm/constituent partner) and member/partner of the .....(tendering firm) hereby solemnly affirm and state as under.

1. I/we certify that..... constituent firm/constituent partner) is/are not blacklisted or debarred by Railways or any other Ministry / Department of Govt. of India from participation in tender on the date of submission of bids, either in individual capacity or as a HUF/ member of the partnership firm/LLP/JV/Society/Trust.

2. I/We have read the clause regarding restriction on procurement from a bidder of a country which shares a land border with India and certify that I am/We are not from such a country or, if from such a country, have been registered with the competent Authority. I/We hereby certify that I/we fulfil all the requirements in this regard and am/are eligible to be considered (evidence of valid registration by the competent authority is enclosed)

SEAL AND SIGNATURE OF THE CONSTITUENT  
FIRM/CONSTITUENT PARTNER

Place:

Dated:

## PART – IV

Annexure-11

**Checklist of Mandatory documents (Notarised/Self-Attested as applicable scanned copy) to be uploaded by the tenderer(s) while submitting their offer (Except optional documents), if not uploaded, tender shall be summarily rejected.**

SN	Description of Documents	Remarks
<b>Mandatory Documents:</b>		
1	Tender Document Cost	-deleted-
2	BID Security Deposit (in terms of Clause 1.1.15 of tender document).	(Contractors are allowed to make payments against this tender towards Bid security Deposit through only payment modes available ON IREPS portal or in terms of clause 1.1.15 of tender document) Exemption if any for Bid security deposit relevant documents shall be uploaded.
3	Constitution of Firm documents for Sole Proprietorship/Partnership firm/ Company/ LLP/JV/Society etc. (in terms of clause 1.1.29 of the tender document). (as per Annexure-9/10A).	The tenderer(s) shall upload the attested copies of the constitution of their concern Firm in terms of clause 1.1.29 of tender document, while submitting their offer, if not uploaded, tender shall be summarily rejected. "After opening of the tender, any document pertaining to the constitution of the firm/JV/sole Proprietorship /partnership firm/company/Society (as applicable), shall not be entertained/considered under any circumstances and no claim or representation whatsoever from the tenderer in this regard shall be entertained"
4	Valid Electrical Contractor License (in terms of clause no. 1.1.26)	Self-Attested copy
5	Certificate for declaration/ undertaking regarding authenticity of documents in support of credentials to fulfill Eligibility Criteria as per Annexure-10/10A of Tender Document attached as per clause no.1.1.16(e). <b>NOTE: Instructions issued by Railway Board regarding Annexure-10 vide letter no. 2022/CE-I/CT/GCC Correspondence dated 14.05.2024 or latest shall be followed.</b>	Self-Attested copy
6	Employment/Partnership Etc. of Retired Railway Employees (in terms of Clause 1.1.31) as per Annexure-20) shall be uploaded while bidding.	Self-Attested copy
<b>Optional Documents:</b>		
7	Copy of PAN Card of FIRM	Self-Attested copy
8	E-Payment/NEFT/RTGS Mandate form (as per clause 1.1.8) and as per format mentioned at FORM-14 of tender document.	Self-Attested copy
9	Statement of Similar Works Executed/Completed By Contractors during last Seven years, as per FORM-2 of tender document.	Self-Attested copy
10	Statement of works being executed/in-hand by contractor/s, as per FORM-2 of tender document.	Self-Attested copy
11	List of Engineers/Personnel already available/ Proposed to be employed for Deployment on this work, as per FORM-2 of tender document.	Self-Attested copy
12	Details of Plant and Machinery already available with firm, as per FORM-2 of tender document.	Self-Attested copy
13	All works tenders or service tenders invited by Railways through e-tendering on IREPS, having advertised value of Rs. 10 lakh and above, includes an option for the contractor to take payment from Railways through a letter of credit (LC) arrangement as per tender clause 1.2.39.	An option for the contractors.
14	Any other information/certificates/ documents required as per tender conditions shall be submitted (Optional).	Self-Attested copy

**PART – IV**

Annexure-12  
LCDA No. (18 DIGIT IPAS GENERATED NO.)

**DOCUMENT OF AUTHORIZATION**

Reference: (i) Works Contract/Supply Contract No. .... dated .....  
(ii) Inland Letter of Credit no. .... dated .....

This document is issued against contract no. .... (FROM IREPS)..... dated ..... for supply/work of ..... (DESCRIPTION OF GOODS/WORK FROM IREPS).....

The beneficiary of the aforementioned Letter of Credit M/s.....(NAME AND VENDOR CODE)..... (Vendor Code..... as per IREPS.....) is entitled to receive payment, aggregating INR .....(FROM ABSTRACT OF BILL PASSED)..... out of a total LC amount of INR.....(FROM MASTER TABLE OF LC OPENED)..... against the first/second\* commercial invoice no. (FROM IPAS)..... dated .....FROM IPAS..... For INR (FROM IPAS)..... raised against the above contract from State Bank of India.....(branch- FROM LC MASTER TABLE)..... on the strength of this Certificate.

The details of payments already made to the beneficiary under this Letter of Credit are as follows:

S. No.	Invoice No.	Invoice date	Invoice Amount (INR)	LCDA No.	LCDA date	Amount paid (INR)
<b>Total Paid</b>						

THIS PAYMENT : .....  
LC BALANCE AFTER THIS PAYMENT : .....

(Signature of authorized Railway authority)  
Name:  
Designation:  
Official Seal:

**PART – IV**

Annexure-13

Reference GCC Para 60.(2)

**CERTIFICATE OF FITNESS**

1. (a) Serial Number \_\_\_\_\_  
(b) Date \_\_\_\_\_
2. Name of person examined \_\_\_\_\_
3. Father's Name: son/daughter of \_\_\_\_\_  
Residing at \_\_\_\_\_
4. Sex \_\_\_\_\_
5. Residence: \_\_\_\_\_
6. Physical fitness \_\_\_\_\_
7. Identification marks \_\_\_\_\_
8. Date of birth, if available, and/or certified age \_\_\_\_\_  
I certify that I have personally examined (name) \_\_\_\_\_ who is desirous of being employed in a factory or on a work requiring manual labour and that his/her age as nearly as can be ascertained from my examination, is \_\_\_\_\_ years.  
  
I certify that he/she is fit for employment in a factory or on a work requiring manual labour as an adult/child.
9. Reasons for :  
(a) Refusal to grant certificate, or \_\_\_\_\_  
(b) Revoking the certificate \_\_\_\_\_

Signature or left hand  
Thumb impression of the person examined.

Signature of Certifying Surgeon

**Note:** In case of physical disability, the exact details and cause of the physical disability should be clearly stated.

**PART – IV**

Annexure-14  
(Reference Clause 62. (1) of GCC  
Registered Acknowledgement Due

**PROFORMA OF 7 DAYS NOTICE FOR WORKS AS A WHOLE/ IN PARTS  
(DETAILS OF PART OF WORK TO BE MENTIONED)**

**RAILWAY**

(Without Prejudice)

To

M/s \_\_\_\_\_

Dear Sir,

Contract Agreement No. \_\_\_\_\_

In connection with \_\_\_\_\_

In spite of repeated instructions to you by the subordinate offices as well as by this office through various letters of even no. \_\_\_\_\_, dated \_\_\_\_\_; you have failed to start work/show adequate progress and/or submit detailed programme for completing the work/ part of work (details of part of work to be mentioned).

2. Your attention is invited to this office/Chief Engineer's office letter no. \_\_\_\_\_, dated \_\_\_\_\_ in reference to your representation, dated \_\_\_\_\_.

3. As you have failed to abide by the instructions issued to commence the work /to show adequate progress of work you are hereby given 7 days' notice in accordance with Clause 62 of the Standard General Conditions of Contract to commence works / to make good the progress, failing which further action as provided in Clause 62 of the Standard General Conditions of Contract viz. to terminate your Contract and complete the balance work without your participation will be taken.

Kindly acknowledge receipt.

Yours faithfully

For and on behalf of the President of India

**PART – IV**

Annexure-15  
Reference Para 62(1) of GCC  
Registered Acknowledgement Due

**PROFORMA OF 48 HRS. NOTICE FOR WHOLE WORK**  
**RAILWAY**  
(Without Prejudice)

To  
M/s \_\_\_\_\_

Dear Sir, \_\_\_\_\_

Contract Agreement No. \_\_\_\_\_

In connection with \_\_\_\_\_

Seven days' notice under Clause 62 of the Standard General Conditions of Contract was given to you under this office letter of even no., dated \_\_\_\_\_; but you have taken no action to commence the work/show adequate progress of the work.

2. You are hereby given 48 hours' notice in terms of Clause 62 of the Standard General Conditions of Contract to commence works / to make good the progress of works, failing which and on expiry of this period your above contract will be rescinded and the work under this contract will be carried out independently without your participation and your Security Deposit shall be forfeited and Performance Guarantee shall also be encashed and any other consequences which may please be noted.

Kindly acknowledge receipt.

Yours faithfully

For and on behalf of the President of India

**PART – IV**

Annexure-16  
Reference Para 62.(1) of GCC  
Registered Acknowledgement Due/Standard Correspondence  
through IR-WCMS/Email on registered IREPS Email

**PROFORMA OF TERMINATION NOTICE  
NORTHERN RAILWAY  
(Without Prejudice)**

No. \_\_\_\_\_

Dated \_\_\_\_\_

To

M/s \_\_\_\_\_  
\_\_\_\_\_

Dear Sir,

Contract Agreement No. \_\_\_\_\_

In connection with \_\_\_\_\_  
Forty eight hours (48 hrs.) notice was given to you under this office letter of even no., dated \_\_\_\_\_; but you have taken no action to commence the work/show adequate progress of the work. Since the period of 48 hours' notice has already expired, the above contract stands rescinded in terms of Clause 62 of the Standard General Conditions of Contract and the balance work under this contract will be carried out independently without your participation. Your participation as well as participation of every member/partner in any manner as an individual or a partnership firm/JV is hereby debarred from participation in the tender for executing the balance work and your Security Deposit shall be forfeited and Performance Guarantee shall also be encashed.

The Final Measurements of work executed by you against the said contract will be taken/started on \_\_\_\_\_ at \_\_\_\_\_ hrs. at site. The measurement will be continued till all the measurement are taken. You are advised to be present at site on the above mentioned date and time to witness the measurements, other wise measurements will be taken ex-parte and thereafter, variation (addendum & corrigendum) & final bill of work executed till date of termination based on ex-parte final measurement shall also be processed ex-parte.

Kindly acknowledge receipt.

Yours faithfully

For and on behalf of the President of India

**PART – IV**

Annexure-17  
Reference Para 62.(1) of GCC  
Registered Acknowledgement Due

**PROFORMA OF 48 HRS. NOTICE FOR PART OF THE WORK.....  
(DETAILS OF PART OF WORK TO BE MENTIONED)  
\_\_\_\_\_ RAILWAY**

(Without Prejudice)

To  
M/s \_\_\_\_\_

Dear Sir,  
Contract Agreement No. \_\_\_\_\_  
In connection with \_\_\_\_\_

1. Seven days' notice under Clause 62 of the Standard General Conditions of Contract was given to you under this office letter of even no., dated \_\_\_\_\_; but you have taken no action to commence the work/show adequate progress of the part of work.....(details of part to be mentioned).
2. You are hereby given 48 hours' notice in terms of Clause 62 of the Standard General Conditions of Contract to commence works / to make good the progress of works, failing which and on expiry of this period your above part of work.....(Details of part to be mentioned) in contract will be rescinded and the work will be carried out independently without your participation.
3. Your full Performance Guarantee for the contract shall be forfeited and you shall not be issued any completion certificate for the contract. However, no additional Performance Guarantee shall be required for balance of work being executed through the part terminated contract.
4. The contract value of part terminated contract shall stands reduced to .....  
Kindly acknowledge receipt.

Yours faithfully

For and on behalf of the President of India



**PART – IV**

Annexure-18  
Reference Para 62.(1) of GCC  
Registered Acknowledgement Due

**PROFORMA OF TERMINATION NOTICE FOR PART OF THE WORK..... (DETAILS OF PART OF  
WORK TO BE MENTIONED)  
RAILWAY**

(Without Prejudice)

No. \_\_\_\_\_

Dated \_\_\_\_\_

To \_\_\_\_\_  
M/s \_\_\_\_\_

Dear Sir,

Contract Agreement No. \_\_\_\_\_

In connection with \_\_\_\_\_

1. Forty eight hours (48 hrs.) notice was given to you under this office letter of even no., dated \_\_\_\_\_; but you have taken no action to commence the work/show adequate progress of the part of work.....(details of part to be mentioned).
2. Your above part of work in contract .....(details of part to be mentioned) stands rescinded in terms of Clause 62 of the Standard General Conditions of Contract and the same will be carried out independently without your participation. Your participation as well as participation of every member/partner in any manner as an individual or a partnership firm/JV is hereby debarred from participation in the tender for executing the balance work
3. Your full Performance Guarantee for the contract shall be forfeited and you shall not be issued any completion certificate for the contract. However, no additional Performance Guarantee shall be required for balance of work being executed through the part terminated contract.
4. The contract value of part terminated contract stands reduced to .....

Kindly acknowledge receipt.

Yours faithfully

For and on behalf of the President of India

**PART – IV**

Annexure-19  
Reference Para 16.(4) of GCC

**Insurance Surety Bond for Performance Security**

Name of the issuer of surety bond:

President of India,  
Acting  
through.....,  
Railway.

Date: .....

Surety Bond No: .....  
Amount of Bond: .....

Issue Date:.....  
Expiry Date.....

WHEREAS, In consideration of the President of India acting through .....(*Designation & address of contract signing authority*), .....Railway, ....., (*hereinafter called "The Railway"*) having accepted the bid of M/s ..... hereinafter called the contractor, for the work of ..... under invitation for bids No ....., Dated ....., Vide Letter of Acceptance No.....

AND

WHEREAS, the contractor is required to furnish Performance Security for the sum of Rs. ....(Rupees .....Only), in the form of Surety Bond, being a condition precedent to the signing of the contract agreement.

SB No:

Date:

WHEREAS, we,....., (*Name of insurance company*) hereinafter called the Surety, acting through [*Designation(s) of the authorised person of the Surety*], have, at the request of the M/s ..... contractor, agreed to give Bond for performance security/ additional performance security as hereinafter contained:

1. KNOW ALL MEN by these present that I/We, the undersigned [*Insert name(s) of authoized representatives of the Surety*], being fully authorized to sign and incur obligations for and on behalf of the Surety, confirm that the Surety, hereby, unconditionally and irrevocably Bond to pay the Railway the full amount in the sum of.....( Rupees .....Only) as above stated.
2. The Surety undertakes to immediately pay on presentation of demand by the Railway any amount up to and including aforementioned full amount without any demur, reservation or recourse. Any such demand made by the Railway on the Surety shall be final, conclusive and binding, absolute and unequivocal notwithstanding any disputes raised/pending before any Court tribunal, arbitration or any authority or any threatened litigation by the Bidder or Bank.
3. On payment of any amount less than aforementioned full amount, as per demand of the Railway, the Bond shall remain valid for the balance amount i.e. the aforementioned full amount less the payment made to the Railway.
4. The Surety shall pay the amount as demanded immediately on presentation of the demand by Railway without any reference to the contractor and without the Railway being required to show grounds or give reasons for its demand or the amount demanded.
5. The Surety Bond shall be unconditional and irrevocable.
6. The Bond hereinbefore shall not be affected by any change in the constitution of the Surety or in the constitution of the Contractor.
7. The Surety agrees that no change, addition, modifications to the terms of the Contract Agreement or to any documents, which have been or may be made between the Railway and the Contractor, will in any way release us from the liability under this Bond; and the Surety, hereby, waives any requirement for notice of any such change, addition or modification to the Surety.
8. This Bond is valid and effective from the date of its issue, which is [insert date of issue]. The Bond and our obligations under it will expire on .....(Expiry Date). All demands for payment under the Bond must be received by us on or before that date.
9. The Surety agrees that the Railways right to demand payment of aforementioned full amount in one instance or demand payments in parts totalling up to the aforementioned full amount in several instances will be valid until either the aforementioned full amount is paid to the Railway or the Bond is released by Railway before the Expiry date.

10. The Surety agrees that its obligation to pay any amount demanded by the Railway before the expiry of this Bond will continue until the amount demanded has been paid in full.
11. The expressions Surety and Railway hereinbefore used shall include their respective successors, administrators and assigns.
12. The Surety hereby undertakes not to revoke the Bond during its currency, except with the previous consent in writing of the Railway. This Bond is subject to the Uniform Rules for Demand Bonds, ICC Publication No. 758.
13. We, the Surety Insurer, further agree that the Authority shall be the sole judge to decide as to whether the Bidder is in default of due and faithful fulfilment and compliance with the terms and conditions contained in the Bidding Documents including, inter alia, the failure of the Bidder to keep its Bid open during the Bid validity period set forth in the said Documents, and the decision of the Authority that the Bidder is in default as aforesaid shall be final and binding on us, notwithstanding any differences between the Authority and the Bidder or any dispute pending before any Court, tribunal, arbitrator or any other authority.
14. The Bond shall be in addition to and without prejudice to any other security Bond (s) of the contractor in favour of the Railway available with the Railway. The Surety, under this Bond, shall be deemed as Principal Debtor of the Railway.

**Notwithstanding anything to the contrary contained in these presents,**

- a. Our liability under this Surety Bond shall not exceed .....(Rupees .....Only).
- b. This Surety Bond shall be valid up to .....(being the date of expiry);
- c. Unless the bank is served a written claim or demand on or before .....[date of expiry] all rights under this Bond shall be forfeited and the Surety shall be relieved and discharged from all liabilities under this Bond irrespective of whether or not the original Surety bond is returned to the Surety.

Dated    the day of 20...

15. The Insurance Surety Bond shall be verified by sending mail to [*customer.care@sbigenral.in*].

Place.....

Bank's Seal and authorized signature(s)  
[Name in Block letters].....  
[Designation with Code No.].....  
[P/Attorney] No.....

Witness

1

2

[Note: All italicized texts are for guidance on how to prepare this Insurance Surety Bond and shall be deleted from the final document] (As per Railway Board letter no. 2022/CE-I/CT/GCC-2022/Policy/Pt.-I dated 09.01.2025 or latest).

**PART – IV**

Annexure-20  
Reference Para 16 (a), (b) & (c) of GCC

**Employment/Partnership Etc. of Retired Railway Employees**

(Information and particulars in terms of Tender Clause 1.1.31 (*Para 16 (a), (b) & (c) of GCC-2022*, with up-to-date correction slip)) & Tender Clause 1.1.92(i).

- (i) Information and particulars regarding employed retired Railway Engineer (s)/ Officer(s) of the Gazetted rank.

SN	Name of retired gazette Officer/Engineer with Designation	Date of Retirement	Details of obtained permission (wherever applicable)

- (ii) Information and particulars regarding retired Railway Engineer (s)/ Officer(s) of the Gazetted rank being one of the partners in the partnership Firm/Joint venture/registered Society/registered firm/LLP etc.

SN	Name of retired gazette Officer/Engineer with Designation	Date of Retirement	Details of obtained permission (wherever applicable)

- (iii) Information and particulars regarding retired Railway Engineer (s)/ Officer(s) of the Gazetted rank being director in the company.

SN	Name of retired gazette Officer/Engineer with Designation	Date of Retirement	Details of obtained permission (wherever applicable)

**Note:**

1. Details as per the above format shall be furnished by the tenderer. The format should not be left blank. In case of there being no such retired Gazetted Railway Officer/ Engineer, Nil to be furnished in the format.
2. Also submit the document of permission from the President of India or any officer, duly authorized by him in this behalf, in case (i) where such Engineer or officer had not retired from government service at least 1 year prior to the date of submission of the tender (ii) where such Engineer or officer is a partner or director as the case, in partnership firm or an incorporated company.

- (iv) Information and particulars in terms of Tender Clause 1.1.31(c) (*Para 16 (c) of GCC-2022* & tender clause 1.1.92(i) regarding Family member employed in gazette capacity on Indian Railway.

SN	Name of the Family Member who is employed in Gazette capacity on Indian Railway with Designation	Relation

**Note:** Details as per the above format shall be furnished by the tenderer. The format should not be left blank. In case of there being no such family member, Nil to be furnished in the format.

Signature of the tenderer.....  
Name.....

**PART-V**

**FORM – 1**

**NORTHERN RAILWAY  
TENDER FORMS**

Tender No. \_\_\_\_\_  
Name of Work \_\_\_\_\_

To  
The President of India  
Acting through the  
Sr. Divil. Elect. Engineer (TRD)  
Northern Railway  
DRM's Office  
New Delhi

1. I/We \_\_\_\_\_ have read the various conditions to tender attached hereto and agree to abide by the said conditions. I/We also agree to keep this offer open for acceptance for a period of \_\_\_\_\_ days from the date fixed for closing of the tender and in default thereof, I/We will be liable for forfeiture of my/our "Bid Security". I/We offer to do the work for \_\_\_\_\_ Railway, at the rates quoted in the attached bill(s) of quantities and hereby bind myself/ourselves to complete the work in all respects within \_\_\_\_\_ months from the date of issue of letter of acceptance of the tender.

2. I/We also hereby agree to abide by the Indian Railways Standard General Conditions of Contract, with all correction slips up-to-date and to carry out the work according to the Special Conditions of Contract and Specifications of materials and works as laid down by Railway in the annexed Special Conditions/Specifications, Standard Schedule of Rates (SSOR) with all correction slips up-to-date for the present contract.

3. A Bid Security of ₹ \_\_\_\_\_ has already been deposited online/ submitted as Bank Guarantee bond. Full value of the Bid Security shall stand forfeited without prejudice to any other right or remedies in case my/our Tender is accepted and if:

- (a) I/We do not submit the Performance Guarantee within the time specified in the Tender document;
- (b) I/We do not execute the contract documents within seven days after receipt of notice issued by the Railway that such documents are ready; and
- (c) I/We do not commence the work within fifteen days after receipt of orders to that effect.

4. (a) I/We am/are a Startup firm registered by \_\_\_\_\_ Department of Industrial Policy and Promotion (DIPP) and my registration number is \_\_\_\_\_ valid upto \_\_\_\_\_ (Copy enclosed) and hence exempted from submission of Bid Security.

5. We are a Labour Cooperative Society and our Registration No. is \_\_\_\_\_ with \_\_\_\_\_ and hence required to deposit only 50% of Bid Security.

6. Until a formal agreement is prepared and executed, acceptance of this tender shall constitute a binding contract between us subject to modifications, as may be mutually agreed to between us and indicated in the letter of acceptance of my/our offer for this work.

\_\_\_\_\_  
Signature of Tenderer(s)

Date \_\_\_\_\_

Address of the Tenderer(s)  
\_\_\_\_\_

**PART-V****FORM – 2**  
**Sheet-1****STATEMENT OF SIMILAR WORKS EXECUTED/COMPLETED BY CONTRACTORS DURING LAST SEVEN YEARS**

SN	Name and place of work	Authority /agency for which work was carried out	Date of award & agreement no. & date	Date of completion (original /actual )	Agreemental cost /completion cost.	Principal /Technical features work in brief	SN at which relevant certificate /documents are attached.
1	2	3	4	5	6	7	8

**STATEMENT OF WORKS BEING EXECUTED/IN HAND BY CONTRACTOR/S**

SN	Name and place of work	Authority/ agency for whom work is being carried out	Date of award & agreement no. & date	Date of completion (Original/ actual)	Agreemental cost of work cost/ likely cost	Principal/ Technical features work in brief	SN at which relevant certificate/ Documents are attached	Payment taken till.	Difference
	2	3	4	5	6	7	8	9	10 (6-9)

**PART-V**

**FORM – 2**  
**Sheet-2**

**LIST OF ENGINEERS/PERSONNEL ALREADY AVAILABLE/ PROPOSED TO BE EMPLOYED FOR DEPLOYMENT ON THIS WORK.**

SN	Name & Designation	Qualification	Professional experience	Organization with whom working	Date by which personnel will be available for this work
1	2	3	4	5	6

**DETAILS OF PLANT AND MACHINERY ALREADY AVAILABLE WITH FIRM.**

SN	Particulars of equipment	No. of Unit.	Kind & make	Capacity	Date by which plant would be available for use on this work	Age & condition	Work on which it is being used.
1	2	3	4	5	6	7	8

**DEVIATION FROM TENDER PAPERS**



**PART-V**

**FORM -4**

**-- D E L E T E D --**

**XXXXX**

**PART-V****FORM-5  
SHEET-1****SCHEDULE - 1A  
SCHEDULE OF PRICES & TOTAL PRICES  
SECTION-1: (GENERAL)**

This schedule shall be read in conjunction with its explanatory notes in Part-I Chapter-IV "A" for detailed description for various items included therein. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with escalation of estimate (% above SOR) and loading of percentage quoted by the tenderer over advertised value of the section.

(All prices in Rupees)

SOR Item No.	Brief Description of items	Unit	Qty.	Unit Rate Based upon CORE's SOR		Total Cost		
				Material	Erection	Material	Erection	Total
1	2	3	4	5	6	7 (4x5)	8 (4x6)	9 (7+8)
-DELETED-								

**PART-V****FORM-5  
SHEET-2****SCHEDULE - 1B  
SCHEDULE OF PRICES & TOTAL PRICES  
SECTION-2: (CONCRETE)**

This schedule shall be read in conjunction with its explanatory notes in Part-I Chapter-IV "A" for detailed description for various items included therein. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with escalation of estimate (% above SOR) and loading of percentage quoted by the tenderer over advertised value of the section.

(All prices in Rupees)

SOR Item No.	Brief Description of items	Unit	Qty.	Unit Rate Based upon CORE's SOR		Total Cost		
				Material	Erection	Material	Erection	Total
1	2	3	4	5	6	7 (4x5)	8 (4x6)	9 (7+8)
-DELETED-								

**PART-V****FORM-5  
SHEET-3****SCHEDULE - 1C  
SCHEDULE OF PRICES & TOTAL PRICES  
SECTION-3: (FERROUS)**

This schedule shall be read in conjunction with its explanatory notes in Part-I Chapter-IV "A" for detailed description for various items included therein. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with escalation of estimate (% above SOR) and loading of percentage quoted by the tenderer over advertised value of the section.

(All prices in Rupees)

SOR Item No.	Brief Description of items	Unit	Qty.	Unit Rate Based upon CORE's SOR		Total Cost		
				Material	Erection	Material	Erection	Total
1	2	3	4	5	6	7 (4x5)	8 (4x6)	9 (7+8)
-DELETED-								

**PART-V****FORM-5  
SHEET-4****SCHEDULE - 1D  
SCHEDULE OF PRICES & TOTAL PRICES  
SECTION-4: (NON-FERROUS)**

This schedule shall be read in conjunction with its explanatory notes in Part-I Chapter-IV "A" for detailed description for various items included therein. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with escalation of estimate (% above SOR) and loading of percentage quoted by the tenderer over advertised value of the section.

(All prices in Rupees)

SOR Item No.	Brief Description of items	Unit	Qty.	Unit Rate Based upon CORE's SOR		Total Cost		
				Material	Erection	Material	Erection	Total
1	2	3	4	5	6	7 (4x5)	8 (4x6)	9 (7+8)
-DELETED-								

**PART-V****FORM-5  
SHEET-5****SCHEDULE - 1E  
SCHEDULE OF PRICES & TOTAL PRICES  
SECTION-5: (INSULATORS)**

This schedule shall be read in conjunction with its explanatory notes in Part-I Chapter-IV "A" for detailed description for various items included therein. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with escalation of estimate (% above SOR) and loading of percentage quoted by the tenderer over advertised value of the section.

(All prices in Rupees)

SOR Item No.	Brief Description of items	Unit	Qty.	Unit Rate Based upon CORE's SOR		Total Cost		
				Material	Erection	Material	Erection	Total
1	2	3	4	5	6	7 (4x5)	8 (4x6)	9 (7+8)
-DELETED-								

**PART-V****FORM-5  
SHEET-6****SCHEDULE - 1F  
SCHEDULE OF PRICES & TOTAL PRICES  
SECTION-6:**

This schedule shall be read in conjunction with its explanatory notes in Part-I Chapter-IV "A" for detailed description for various items included therein. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with escalation of estimate (% above SOR) and loading of percentage quoted by the tenderer over advertised value of the section.

(All prices in Rupees)

SOR Item No.	Brief Description of items	Unit	Qty.	Unit Rate Based upon CORE's SOR		Total Cost		
				Material	Erection	Material	Erection	Total
1	2	3	4	5	6	7 (4x5)	8 (4x6)	9 (7+8)
-Deleted-								

**PART-V****FORM-5  
SHEET-7****SCHEDULE - 1G  
SCHEDULE OF PRICES & TOTAL PRICES  
SECTION-7:**

This schedule shall be read in conjunction with its explanatory notes in Part-I Chapter-IV "A" for detailed description for various items included therein. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with escalation of estimate (% above SOR) and loading of percentage quoted by the tenderer over advertised value of the section.

(All prices in Rupees)

SOR Item No.	Brief Description of items	Unit	Qty.	Unit Rate Based upon CORE's SOR		Total Cost		
				Material	Erection	Material	Erection	Total
1	2	3	4	5	6	7 (4x5)	8 (4x6)	9 (7+8)
-Deleted-								



**PART-V****FORM-5  
SHEET-8****SCHEDULE - 1H  
SCHEDULE OF PRICES & TOTAL PRICES  
SECTION-8A: (GENERAL)**

This schedule shall be read in conjunction with its explanatory notes in Part-I Chapter-IV "B" for detailed description for various items included therein. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with escalation of estimate (% above SOR) and loading of percentage quoted by the tenderer over advertised value of the section.

(All prices in Rupees)

SOR Item No.	Brief Description of items	Unit	Qty.	Unit Rate Based upon CORE's SOR		Total Cost		
				Material	Erection	Material	Erection	Total
1	2	3	4	5	6	7 (4x5)	8 (4x6)	9 (7+8)
-DELETED-								

**PART-V****FORM-5  
SHEET-9****SCHEDULE - 11  
SCHEDULE OF PRICES & TOTAL PRICES  
SECTION-8B: (Cement & Reinforced Concrete Item)**

This schedule shall be read in conjunction with its explanatory notes in Part-I Chapter-IV "B" for detailed description for various items included therein. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with escalation of estimate (% above SOR) and loading of percentage quoted by the tenderer over advertised value of the section.

(All prices in Rupees)

SOR Item No.	Brief Description of items	Unit	Qty.	Unit Rate Based upon CORE's SOR		Total Cost		
				Material	Erection	Material	Erection	Total
1	2	3	4	5	6	7 (4x5)	8 (4x6)	9 (7+8)
-DELETED-								

**PART-V****FORM-5  
SHEET-10****SCHEDULE - 1J  
SCHEDULE OF PRICES & TOTAL PRICES  
SECTION-8C: (Other Items (All Commodities))**

This schedule shall be read in conjunction with its explanatory notes in Part-I Chapter-IV "B" for detailed description for various items included therein. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with escalation of estimate (% above SOR) and loading of percentage quoted by the tenderer over advertised value of the section.

(All prices in Rupees)

SOR Item No.	Brief Description of items	Unit	Qty.	Unit Rate Based upon CORE's SOR		Total Cost		
				Material	Erection	Material	Erection	Total
1	2	3	4	5	6	7 (4x5)	8 (4x6)	9 (7+8)
-DELETED-								

**PART-V****FORM-5  
SHEET-11****SCHEDULE - 1K  
SCHEDULE OF PRICES & TOTAL PRICES  
SECTION-8D: (INSULATOR)**

This schedule shall be read in conjunction with its explanatory notes in Part-I Chapter-IV "B" for detailed description for various items included therein. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with escalation of estimate (% above SOR) and loading of percentage quoted by the tenderer over advertised value of the section.

(All prices in Rupees)

SOR Item No.	Brief Description of items	Unit	Qty.	Unit Rate Based upon CORE's SOR		Total Cost		
				Material	Erection	Material	Erection	Total
1	2	3	4	5	6	7 (4x5)	8 (4x6)	9 (7+8)
-DELETED-								

**PART-V****FORM-5  
SHEET-12****SCHEDULE - 1L  
SCHEDULE OF PRICES & TOTAL PRICES  
SECTION-9A: (STEEL ITEMS)**

This schedule shall be read in conjunction with its explanatory notes in Part-I Chapter-IV "B" for detailed description for various items included therein. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with escalation of estimate (% above SOR) and loading of percentage quoted by the tenderer over advertised value of the section.

(All prices in Rupees)

SOR Item No.	Brief Description of items	Unit	Qty.	Unit Rate Based upon CORE's SOR		Total Cost		
				Material	Erection	Material	Erection	Total
1	2	3	4	5	6	7 (4x5)	8 (4x6)	9 (7+8)
-DELETED-								

**PART-V****FORM-5  
SHEET-13****SCHEDULE - 1M  
SCHEDULE OF PRICES & TOTAL PRICES  
SECTION-9B: (ALUMINIUM ITEMS)**

This schedule shall be read in conjunction with its explanatory notes in Part-I Chapter-IV "B" for detailed description for various items included therein. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with escalation of estimate (% above SOR) and loading of percentage quoted by the tenderer over advertised value of the section.

(All prices in Rupees)

SOR Item No.	Brief Description of items	Unit	Qty.	Unit Rate Based upon CORE's SOR		Total Cost		
				Material	Erection	Material	Erection	Total
1	2	3	4	5	6	7 (4x5)	8 (4x6)	9 (7+8)
-DELETED-								

**PART-V****FORM-5  
SHEET-14****SCHEDULE - 1N  
SCHEDULE OF PRICES & TOTAL PRICES  
SECTION-9C: (NON-FERROUS ITEMS)**

This schedule shall be read in conjunction with its explanatory notes in Part-I Chapter-IV "B" for detailed description for various items included therein. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with escalation of estimate (% above SOR) and loading of percentage quoted by the tenderer over advertised value of the section.

(All prices in Rupees)

SOR Item No.	Brief Description of items	Unit	Qty.	Unit Rate Based upon CORE's SOR		Total Cost		
				Material	Erection	Material	Erection	Total
1	2	3	4	5	6	7 (4x5)	8 (4x6)	9 (7+8)
-DELETED-								

**PART-V****FORM-5  
SHEET-15****SCHEDULE - 10  
SCHEDULE OF PRICES & TOTAL PRICES  
SECTION-10A: (EQUIPMENTS)**

This schedule shall be read in conjunction with its explanatory notes in Part-I Chapter-IV "B" for detailed description for various items included therein. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with escalation of estimate (% above SOR) and loading of percentage quoted by the tenderer over advertised value of the section.

(All prices in Rupees)

SOR Item No.	Brief Description of items	Unit	Qty.	Unit Rate Based upon CORE's SOR		Total Cost		
				Material	Erection	Material	Erection	Total
1	2	3	4	5	6	7 (4x5)	8 (4x6)	9 (7+8)
-DELETED-								



**PART-V****FORM-5  
SHEET-16****SCHEDULE - 1P  
SCHEDULE OF PRICES & TOTAL PRICES  
SECTION-10B: (WIRES & CABLE ITEMS)**

This schedule shall be read in conjunction with its explanatory notes in Part-I Chapter-IV "B" for detailed description for various items included therein. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with escalation of estimate (% above SOR) and loading of percentage quoted by the tenderer over advertised value of the section.

(All prices in Rupees)

SOR Item No.	Brief Description of items	Unit	Qty.	Unit Rate Based upon CORE's SOR		Total Cost		
				Material	Erection	Material	Erection	Total
1	2	3	4	5	6	7 (4x5)	8 (4x6)	9 (7+8)
-DELETED-								

**PART-V****FORM-5  
SHEET-17****SCHEDULE - 1Q  
SCHEDULE OF PRICES & TOTAL PRICES  
SECTION-10C: (BATTERY ITEMS)**

This schedule shall be read in conjunction with its explanatory notes in Part-I Chapter-IV "B" for detailed description for various items included therein. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with escalation of estimate (% above SOR) and loading of percentage quoted by the tenderer over advertised value of the section.

(All prices in Rupees)

SOR Item No.	Brief Description of items	Unit	Qty.	Unit Rate Based upon CORE's SOR		Total Cost		
				Material	Erection	Material	Erection	Total
1	2	3	4	5	6	7 (4x5)	8 (4x6)	9 (7+8)
-DELETED-								

**PART-V****FORM-5  
SHEET-18****SCHEDULE - 1R  
SCHEDULE OF PRICES & TOTAL PRICES  
SECTION-11: (NON-SCHEDULE ITEMS)**

This schedule shall be read in conjunction with its explanatory notes in Part-I Chapter-IV "C" for detailed description for various items included therein. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with escalation of estimate (% above SOR) and loading of percentage quoted by the tenderer over advertised value of the section.

(All prices in Rupees)

<b>NS Item No.</b>	<b>Brief Description of items</b>	<b>Unit</b>	<b>Qty.</b>	<b>Unit Rate</b>	<b>Total Cost</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6 (4X5)</b>
NS-1	Supply of material for replacement of Catenary wire for Conventional OHE.	TKM	81.67	97132.05	7932774.52
NS-2	Stringing/Erection of OHE Catenary wire.	TKM	81.67	68623.06	5604445.31
NS-3	Dismantling of OHE equipment including Catenary wire for replacement of Catenary wire.	TKM	81.67	54999.37	4491798.55
	<b>Total (Section-11)</b>				<b>18029018.38</b>

**PART-V**

**FORM-5  
SHEET-19**

**SUMMARY**

SN	Section	Cost			Average % above SOR	M.F.	Total Cost after loading % as per average LAR.		
		Material	Erection	Total			Material	Erection	Total
1	Section-1 (General)	0.00	0.00	0.00	-	1	0.00	0.00	0.00
2	Section-2 (Concrete)	0.00	0.00	0.00	-	1	0.00	0.00	0.00
3	Section-3 (Ferrous)	0.00	0.00	0.00	-	1	0.00	0.00	0.00
4	Section-4 (Non-ferrous)	0.00	0.00	0.00	-	1	0.00	0.00	0.00
5	Section-5 Insulators	0.00	0.00	0.00	-	1	0.00	0.00	0.00
6	Section-6 - (deleted)-	0.00	0.00	0.00	-	1	0.00	0.00	0.00
7	Section-7 - (deleted)-	0.00	0.00	0.00	-	1	0.00	0.00	0.00
<b>A</b>	<b>OHE SOR Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>-</b>	<b>-</b>	<b>0</b>	<b>0</b>	<b>0</b>
8	Section-8A (General)	0.00	0.00	0.00	-	1	0.00	0.00	0.00
9	Section-8B (Cement & Reinforced Concrete Item)	0.00	0.00	0.00	-	1	0.00	0.00	0.00
10	Section-8C (Other Items (All Commodities))	0.00	0.00	0.00	-	1	0.00	0.00	0.00
11	Section-8D (Insulator)	0.00	0.00	0.00	-	1	0.00	0.00	0.00
12	Section-9A (Steel Items)	0.00	0.00	0.00	-	1	0.00	0.00	0.00
13	Section-9B (Aluminium Items)	0.00	0.00	0.00	-	1	0.00	0.00	0.00
14	Section-9C (Non-Ferrous Items)	0.00	0.00	0.00	-	1	0.00	0.00	0.00
15	Section-10A (Equipments)	0.00	0.00	0.00	-	1	0.00	0.00	0.00
16	Section-10B (Wires & Cable Items)	0.00	0.00	0.00	-	1	0.00	0.00	0.00
17	Section-10C (Battery Items)	0.00	0.00	0.00	-	1	0.00	0.00	0.00
<b>B</b>	<b>TSS SOR Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>-</b>	<b>-</b>	<b>0</b>	<b>0</b>	<b>0</b>

**NON-SCHEDULE ITEMS**

SN	Section	Cost	Average % above SOR	M.F.	Total Cost after loading % as per average LAR.
<b>C</b>	<b>Section-11 (Non-Schedule Items)</b>	<b>18029018.38</b>	<b>-</b>	<b>1</b>	<b>18029018.38</b>

**NOTE:**

1. The unit Price indicated in Column 5 of Schedule1 (A to Q), Section 1 to 10, are inclusive of the cost of material, GST on materials along with taxes, contractor's overheads and profit.
2. The unit Price indicated in Column 6 of Schedule1 (A to Q), Section 1 to 10, are inclusive of the cost of the erection/installation charges, all incidental charges such as transport, loading/leading/unloading, handling, post erection checking along with Taxes etc., contractor's overheads and profit.

The unit Price indicated in Column 5 of Schedule1 (R), Section 11, are inclusive of the cost of the Stringing/erection/installation charges, all incidental charges such as transport, loading/leading/unloading, handling, post erection checking along with Taxes etc., contractor's overheads and profit.

3. For SOR ITEMS, The tenderer are required to quote SINGLE uniform percentage individually for each section as below/atpar/above against the SOR cost while quoting the financial bid page of E-tender on IREPS website.
4. For NON-SCHEDULE ITEMS, the tenderer are required to quote either Single uniform percentage for NS Items below/atpar/above against the NS cost or unit rate for particular items while quoting the financial bid page of E-Tender on IREPS website. The percentage quoted for SOR items will not be applicable for NON-SCHEDULE ITEMS.
5. Rates should be quoted as per format available on IREPS website only.
6. The quoted Rates are inclusive of componets such as GST, freight, overheads, and profit in unit rates as and when applicable. Tenderer is advised to visit the site of work to understand scope of work before quoting the tender. All the supply/erection items should be confirm to relevant RDSO/CORE/OEM specifications or as per prior approval of Railway.

XXXXX

**PART-V**  
**SCHEDULE -2 & 3**

**FORM -6**

**---DELETED---**

**PART-V**

**FORM – 7**

**ALTERNATIVE PROPOSALS OF THE TENDERERS**

Para No. the tender papers	Alternative Proposals	Technical advantage and/or financial implication of the Proposal.

**TENDERER'S SCHEME OF WORK AND TIME SCHEDULE****I. FOR OVERHEAD EQUIPMENT**

Issue of preliminary layouts and site allocations:  
 Submission of layout plans for walk-outs and approvals:  
 Approval of layout plans:  
 Preparation and submission of Drawings for approval:  
 Approval of Drawings:  
 Ordering of steel work on the Purchaser:  
 Bulk order for materials.  
 Detailed ordering of materials.  
 Foundation installation:  
 Delivery of steel work.  
 Steel work erection.  
 Delivery of materials  
 Wiring and testing  
 Guarantee period.

---

MONTHS

**Note:** The above time schedule should be uploaded separately for each section and the different time schedules should be numbered as First Section, Second Section.....etc.

**II. SWITCHING STATIONS AND BOOSTER TRANSFORMERS STATIONS**

Submission of locations plans for approval:  
 Approval of location plans:  
 Preparation and submission of general arrangement and other drawings and cross sections for foundations and steel work.  
 Approval of drawings :  
 Ordering of steel work on the Purchaser :  
 Bulk order for materials :  
 Detailed ordering of materials :  
 Foundation installation :  
 Delivery of steel work :  
 Steel work erection :  
 Delivery of materials :  
 Erection of equipment :  
 Testing and commissioning :  
 Guarantee period :  
 MONTHS.

**Note:** The above time schedule should be uploaded separately for each section and the different time schedules should be numbered as First Section, Second Section.....etc.



### **III. FOR TRACTION SUB-STATION WORKS**

1.	Submission of location plan for approval.	
2.	Approval of location plans.	
3.	Earth filling and leveling.	
4.	Preparation and submission of general arrangement and other drawings and cross-sections for foundations and drawings etc.	
5.	Building foundation.	
6.	Building roof slab.	
7.	Fixing of doors/windows etc.,	
8.	Flooring and finishing.	
9.	Approval of cross section (Foundation and steel work)	
10.	Allocation of small steel work and fittings.	
11.	Bulk order for materials.	
12.	Detailed ordering of materials.	
13.	Foundation installation.	
14.	Delivery of steel work.	
15.	Steel work erection.	
16.	Delivery of materials.	
17.	Fixing, testing and commissioning of Electrical equipments (General).	
18.	Installation, testing and commissioning of Yard light fittings.	
19.	Erection of equipment.	
20.	Guarantee period.	

Months from the date of issue of Letter of Acceptance of Tender.

0     3     6     9     12     15     18     21     24     27     30

### **IV     FOR SCADA WORKS:    -DELETED-**

**PART-V****FORM-9/A****NAME OF MANUFACTURER/S PLACE/S OF  
MANUFACTURE AND INSPECTION OF SUPPLIES  
(CORE/RDSO APPROVED SOURCES)**

Item	Description of Items	Name & address of Place of Manufacturer	Place of Manufacturer	Place of Inspection
1	2	3	4	5

**Declaration by the Tenderer.**

We hereby confirmed that all the equipments, components and materials which will be supplied by us would confirm to technical and other particulars as detailed in part-II, chapter-IV and would comply with the RDSO's specifications listed in Annexure-I with their latest version as specified in Part-IV of the tender paper. We further confirm that the equipments, components and materials except those listed below would be procured from the approved sources/suppliers approved by CORE/RDSO.

i).

ii).

iii).

Technical details conforming the scope of the concerned specifications and the details of manufacturer for the above Items are enclosed in Form-9/B.

**NOTE:-** To be furnished on separate sheet for individual portion of OHE & TSS WORKS.

**PART-V**

**FORM-9/B**

**NAME OF MANUFACTURER/S PLACE/S OF  
MANUFACTURE AND INSPECTION OF SUPPLIES  
(CORE/RDSO APPROVED SOURCES)**

Following particulars should be furnished as under :-

1. Item No.
2. Description of item
3. Name and address of manufacturer
4. Place of manufacturer
5. Place of inspection
6. Whether permitted to use ISI Standard mark (Wherever applicable)
7. Approx. turnover of this item in last 3 years (Enclose list of orders executed)

**Declaration by the Tenderer :**

We hereby confirm that -

- (i) The design approval/prototype approval of the above items will be obtained from CORE/RDSO/one the approval of purchaser. All cost on this account will be borne by us.
- (ii) In case of delay in prototype approval, we shall arrange the procurement of above listed items from the CORE/RDSO approved sources.
- (iii) We also clearly understand that delay on account of prototype approval shall not be claimed by us as reasonable ground for extension of completion period.

**NOTE:-** To be furnished on separate sheet for individual portion of OHE & TSS WORKS.

Signature of Tenderer

**CONTRACT AGREEMENT OF WORKS**

CONTRACT AGREEMENT NO. \_\_\_\_\_ DATED \_\_\_\_\_

ARTICLES OF AGREEMENT made this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_ between President of India acting through the Railway Administration hereafter called the "Railway" of the one part and \_\_\_\_\_ herein after called the "Contractor" of other part.

WHEREAS the Contractor has agreed with the Railway for performance of the works \_\_\_\_\_ set forth in the Bill(s) of Quantities hereto annexed upon the Standard General Conditions of Contract, updated with correction slips issued up to date of inviting tender or as otherwise specified in the tender documents and the Specifications of \_\_\_\_\_ updated with correction slips issued up to date of inviting tender or as otherwise specified in the tender documents and the applicable Standard Schedule of Rates (SSOR) of \_\_\_\_\_ updated with correction slips issued up to date of inviting tender or as otherwise specified in the tender documents and the Special Conditions and Special Specifications, if any and in conformity with the drawings here-into annexed AND WHEREAS the performance of the said works is an act in which the public are interested.

NOW THIS INDENTURE WITNESSETH that in consideration to the payments to be made by the Railways, the Contractors will duly perform the said works in the said Bill(s) of Quantities set forth and shall execute the same with great promptness, care and accuracy in a workman like manner to the satisfaction of the Railway and will complete the same in accordance with the said specifications and said drawings and said conditions of contract on or before the \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_ and will maintain the said works for a period of \_\_\_\_\_ Calendar months from the certified date of their completion and will observe, fulfill and keep all the conditions therein mentioned (which shall be deemed and taken to be part of this contract, as if the same have been fully set forth herein), AND the Railway, both hereby agree that if the Contractor shall duly perform the said works in the manner aforesaid and observe and keep the said terms and conditions, the Railway will pay or cause to be paid to the Contractor for the said works on the final completion thereof the amount due in respect thereof at the rates specified in the Bill(s) of Quantities hereto annexed.

Contractor \_\_\_\_\_ (Signature) Railway: Designation \_\_\_\_\_

Address \_\_\_\_\_ (For President of India)

Date \_\_\_\_\_ Date \_\_\_\_\_

Signature of **Witnesses** (to Signature of Contractor) with address:**Witnesses:**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**STANDING INDEMNITY BOND FOR "ON ACCOUNT" PAYMENTS****(On paper of requisite stamp value)**

We, M/s \_\_\_\_\_ hereby undertake that we hold at our stores Depot/S at \_\_\_\_\_ for and on behalf of the President of India acting in the premises through the General Manager or his successor \_\_\_\_\_ Railway \_\_\_\_\_ (hereinafter referred to as "The Purchaser") all materials for which "On Account" payments have been made to us against the Contract for supply and erection of (\_\_\_\_\_) on the section/s \_\_\_\_\_ Railway also referred to as Group/s \_\_\_\_\_ vide letter of Acceptance of Tender \_\_\_\_\_ dated \_\_\_\_\_ and material handed over to us by the purchaser for the purpose of execution of the said contract, until such time the materials are duly erected or otherwise handed over to him.

We shall be entirely responsible for the safe custody and protection of the said materials against all risk till they are duly delivered as erected equipment to the purchaser or as he may direct otherwise and shall indemnify the purchaser against any loss /damage or deterioration whatsoever in respect of the said material while in our possession and against disposal of surplus materials. The said materials shall at all times be open to inspection by any officer authorized by the Purchaser / Engineer incharge of work or his successor.

Should any loss, clam age or electroporation of materials occur or surplus material disposed off and refund becomes due, the Purchaser shall be entitled to recover from us the full cost as per prices included in Schedule 3 to the Contract (as applicable) and in respect of other material as indicated in Part I, Chapter – IV, section I and also compensation for such loss or damage if any long with the amount to be refunded without prejudice to any other remedies available to him by deduction from any sum due or any sum which at any time hereafter becomes due to us under the said or any other Contract.

Dated this day \_\_\_\_\_ day of \_\_\_\_\_ 200

for and on behalf of

M/s \_\_\_\_\_ (Contractor)

Signature of witness

Name of witness in Block letter.

Address.

---

**PART-V**

**Form-12**

**PROFORMA FOR TIME EXTENSION**

**No.** \_\_\_\_\_

**Dated:** \_\_\_\_\_

**Sub:** (i) \_\_\_\_\_ *(name of work)*.

(ii) Acceptance letter no. \_\_\_\_\_

(iii) Understanding/Agreement no. \_\_\_\_\_

**Ref:** \_\_\_\_\_ *(Quote specific application of Contractor for extension to the date received)* \_\_\_\_\_

Dear Sir,

**1.** The stipulated date for completion of the work mentioned above is \_\_\_\_\_. From the progress made so far and the present rate of progress, it is unlikely that the work will be completed by the above date (or 'However, the work was not completed on this date').

**2.** Expecting that you may be able to complete the work if some more time is given, the competent authority, although not bound to do so, hereby extends the time for completion from \_\_\_\_\_ to \_\_\_\_\_.

**3.** Please note that an amount equal to the liquidated damages for delay in the completion of the work after the expiry of \_\_\_\_\_ *(give here the stipulated date for completion with/without any liquidated damage fixed earlier)* will be recovered from you as mentioned in Clause 17B of the Standard General Conditions of Contract for the extended period, notwithstanding the grant of this extension. You may proceed with the work accordingly.

**4.** The above extension of the completion date will also be subject to the further condition that no increase in rates on any account will be payable to you.

**5.** Please intimate within a week of the receipt of this letter your acceptance of the extension of the conditions stated above.

**6.** Please note that in the event of your declining to accept the extension on the above said conditions or in the event of your failure after accepting or acting upto this extension to complete the work by \_\_\_\_\_ *(here mention the extended date)*, further action will be taken in terms of Clause 62 of the Standard General Conditions of Contract.

Yours faithfully  
For and on behalf of the President of India

**PART-V**

**Form 12A**

(Reference Clause 1.1.72 (A)) of GCC

**PROFORMA OF 14 DAYS NOTICE FOR OFFLOADING OF PART OF CONTRACT WORK**  
**RAILWAY**

(Without Prejudice)

To

M/s \_\_\_\_\_

Dear Sir,

Contract Agreement No. \_\_\_\_\_

In connection with \_\_\_\_\_

In spite of repeated instructions to you by the subordinate offices as well as by this office through various letters of even no. \_\_\_\_\_, dated \_\_\_\_\_; you have failed to show adequate progress of work so as to complete the contract within the original / extended date of completion of contract and part(s) of contract work are yet to be started/ still lagging behind the agreed program of work, listed as under:

*(Details of part(s) of work which is delayed and can be executed independently, to be mentioned).*

2. Your attention is invited to this office/Chief Engineer's office letter no. \_\_\_\_\_, dated \_\_\_\_\_ in reference to your representation, dated \_\_\_\_\_.

3. As you have failed to abide by the instructions issued to commence the work /to show adequate progress of work, you are hereby given 14 days' notice in accordance with Clause 40A of the Standard General Conditions of Contract to deploy adequate resources i.e. *(the details of resource requirement, to be mentioned)* and commence / to make good the progress for part(s) of works detailed above, failing which action as provided in Clause 40A of the Standard General Conditions of Contract shall be commenced after expiry of 14 days' notice period viz. to offload few/ all part(s) of work mentioned above to any of the existing or new contractor without your participation and at your Risk & Cost, not exceeding the value of Performance Guarantee of this contract, which may please be noted.

Kindly acknowledge receipt.

Yours faithfully

For and on behalf of the President of India

**PART-V**

**Form 12B**  
(Reference Clause (A)) of GCC  
Registered Acknowledgement Due

**NOTICE FOR PART OF CONTRACT WORK OFFLOADED**  
**RAILWAY**

(Without Prejudice)

To  
M/s \_\_\_\_\_

Dear Sir,  
Contract Agreement No. \_\_\_\_\_  
In connection with \_\_\_\_\_

1. Fourteen days' notice under Clause 40A of the Standard General Conditions of Contract was given to you under this office letter of even no., dated \_\_\_\_\_; but you have taken no/inadequate action to deploy adequate resources to commence the part(s) of work/show adequate progress of the part(s) of work, mentioned therein.

As you have failed to abide by the instructions issued to commence the part(s) of work/show adequate progress of the part(s) of work even at the lapse of 14 days' notice period under Clause 40A of the Standard General Conditions of Contract, few part(s) of the work under the contract have been offloaded and being executed by other mode(s) at the cost detailed below:

Or,

1. Please refer your request letter no..... dated ....., wherein it was requested under clause 40 A of the Standard General Conditions of Contract to offload part(s) of works at your risk & cost. The details of part(s) of the work under the contract which have been offloaded and being executed by other mode(s) at the cost detailed below:

*(List of Part(s) of work offloaded, Details of mode of execution of such offloaded work alongwith approximate cost thereof to be mentioned)*

2. The final measurement of work(s) already executed for above part(s) of work recorded as per clause 45 (A) or/and 45 (B) of the Standard General Conditions of Contract is enclosed herewith.

3. The Bill(s) of Quantities for Part(s) of work offloaded is enclosed herewith.

4. The additional cost in execution of offloaded work through mode(s) mentioned in para (1) above is determined as Rs. \_\_\_\_\_, over& above the cost of execution under this contract (including the PVC amount payable as per contract, as on the date of issue of this notice). This additional cost shall be recovered from your next on account bill(s) or any other dues payable to you under contract.

5. The Contract value gets reduced to Rs.....:

6. You are requested to continue with the balance work in the contract subsequent to offloading of above part(s) of work.

Kindly acknowledge receipt.

Yours faithfully  
For and on behalf of the President of India



**PART-V**

**Form-13**

**EXTENSION OF PERIOD OF COMPLETION OF WORK  
( ON PURCHASER ACCOUNT)**

Registered A.D

No:

Dated

To

-----  
-----  
-----

Sub: (i) \_\_\_\_\_ (name of work) \_\_\_\_\_  
(ii) Acceptance letter No. \_\_\_\_\_  
(iii) Undertaking/Agreement No. \_\_\_\_\_

Ref: \_\_\_\_\_ (Quota specific application of the Contractor for extension to the date, if received).

Dear Sir,

The stipulated date for completion of the work in \_\_\_\_\_ Section under the above Contract was \_\_\_\_\_. In consideration of the Contractor's letter No. \_\_\_\_\_ of \_\_\_\_\_ the General Manager/Sr.DEE/TRD/NDLS on behalf of the President of India, is pleased to grant extension of the time for completion of works in accordance with clause 1.2.28 of the contract, as mentioned below:

-----  
It may be noted that unless repugnant to the context, all the terms and conditions of the Contract will remain unaltered during the extended period from \_\_\_\_\_ to \_\_\_\_\_ also, and further no increased/additional rates and claims of recoveries which have not been already envisaged in terms of the conditions of the Contract will be leviable either by you or by the Purchaser in respect of this extended period.

Yours faithfully,

( \_\_\_\_\_ )  
For & on behalf of  
The President of India

**PART-V**

**Form-14**

**MANDATE FORM FOR ECS/RTGS/NEFT (ELECTRONIC CLEARING SERVICE).  
(Investor/Customer's option to receive payments through Credit Clearing Mechanism)**

Name of the scheme and the periodicity of payment.

- 1) Investor/Customer's Name: .....
- 2) Particulars of Bank account:
- A. Name of Bank: .....
- B. Name of the branch: .....
- Address: .....
- Telephone No.: .....
- C. 9- Digit MICR code number of the bank : .....  
and branch appearing on the  
cheque issued by the bank.
- D. Type of the account (S.B., Current : .....  
or Cash Credit) with code(.....).
- E. Ledger and ledger folio number(if any): .....
- F. Account number (as appearing on the cheque book): .....  
(In lieu of the bank certificate to be obtained as under, please attach a blank cancelled cheque or  
photocopy of a cheque or front page of your saving bank passbook issued by your bank for  
verification of the above particulars).
- G. Date of effect: .....

I hereby declare that the particulars given above are correct and complete. If the transaction is delayed or not effected at all for reasons of incomplete or incorrect information, I would not hold the user institution responsible. I have read the option invitation letter and agree to discharge the responsibility expected of me as a participant under the scheme.

**Signature of the Investor/Customer**

Date:

Certified that the particulars furnished above are correct as per our records Bank 's Stamp.

**PART-V**

**FORM - 15**

Reference GCC Para 48.(3)

**FINAL SUPPLEMENTARY AGREEMENT**

1. Articles of agreement made this day \_\_\_\_\_ in the year \_\_\_\_\_ between the President of India, acting through the \_\_\_\_\_ Railway Administration having his office at \_\_\_\_\_ herein after called the Railway of the one part and \_\_\_\_\_ of the second part.
2. Whereas the party hereto of the second part executed an agreement with the party hereto of the first part being agreement Number \_\_\_\_\_ dated \_\_\_\_\_ for the performance \_\_\_\_\_ herein after called the 'Principal Agreement'.
3. And whereas it was agreed by and between the parties hereto that the works would be completed by the party hereto of the second part on \_\_\_\_\_ date last extended and whereas the party hereto of the second part has executed the work to the entire satisfaction of the party hereto of the first part.
4. And whereas the party hereto of the first part already made payment to the party hereto of the second part diverse sums from time to time aggregating to ₹ \_\_\_\_\_ including the Final Bill bearing voucher No. \_\_\_\_\_ dated \_\_\_\_\_ of value \_\_\_\_\_ duly adjusted as per price variation clause, if applicable (the receipt of which is hereby acknowledged by the party hereto of the second part in full and final settlement of all his /its claims under the principal agreement.  
And whereas the party hereto of the second part have received sum of ₹ \_\_\_\_\_ through the Final Bill bearing voucher No. \_\_\_\_\_ dated \_\_\_\_\_ duly adjusted as per price variation clause (PVC), if applicable (the receipt of which is hereby acknowledged by the party thereto of the second part) from the party hereto of the first part in full and final settlement of all his/its disputed claims under principal agreement.  
Now, it is hereby agreed by and between the parties in the consideration of sums already paid by the party hereto of the first part to the party hereto of the second part against all outstanding dues and claims for all works done under the aforesaid principal agreement excluding the Security Deposit, the party hereto of the second part have no further dues of claims against the party hereto of the first part under the said Principal Agreement. It is further agreed by and between the parties that the party hereto of the second part has accepted the said sums mentioned above in full and final satisfaction of all its dues and claims under the said Principal Agreement.  
(Applicable in case Final Supplementary Agreement is signed after release of Final Payment)  
**Or**  
*And whereas the party hereto of the first part already made payment to the party hereto of the second part diverse sums from time to time aggregating to ₹ \_\_\_\_\_ through various On Account Bills (the receipt of which is hereby acknowledged by the party hereto of the second part).*  
*And whereas the party hereto of the second part have received sum of ₹ \_\_\_\_\_ through various On Account Bills (the receipt of which is hereby acknowledged by the party thereto of the second part) from the party hereto of the first part and party hereto of the second part have accepted final measurements recorded on Page No..... to Page No.... of Measurement Book No.....and corresponding Final Bill duly adjusted as per price variation clause (PVC), if applicable, for full and final settlement of all his/its disputed claims under principal agreement.*  
*Now, it is hereby agreed by and between the parties in the consideration of sums already paid through various On Account Bills and sums to be paid through Final Bill duly adjusted as per price variation clause (PVC), if applicable, based on accepted final measurements including the Security Deposit by the party hereto of the first part to the party hereto of the second part against all outstanding dues and claims for all works done under the aforesaid principal agreement, the party hereto of the second part have no further dues of claims against the party hereto of the first part under the said Principal Agreement.*  
(Applicable in case Final Supplementary Agreement is signed before release of Final Payment)
5. It is further agreed and understood by and between the parties that the arbitration clause contained in the said principal agreement shall cease to have any effect and/or shall be deemed to be non-existent for all purposes.

Signature of the Contractor/s  
for and on behalf of the President of India

Witnesses

ADDRESS: \_\_\_\_\_

**END OF TENDER DOCUMENT  
(LAST PAGE)**